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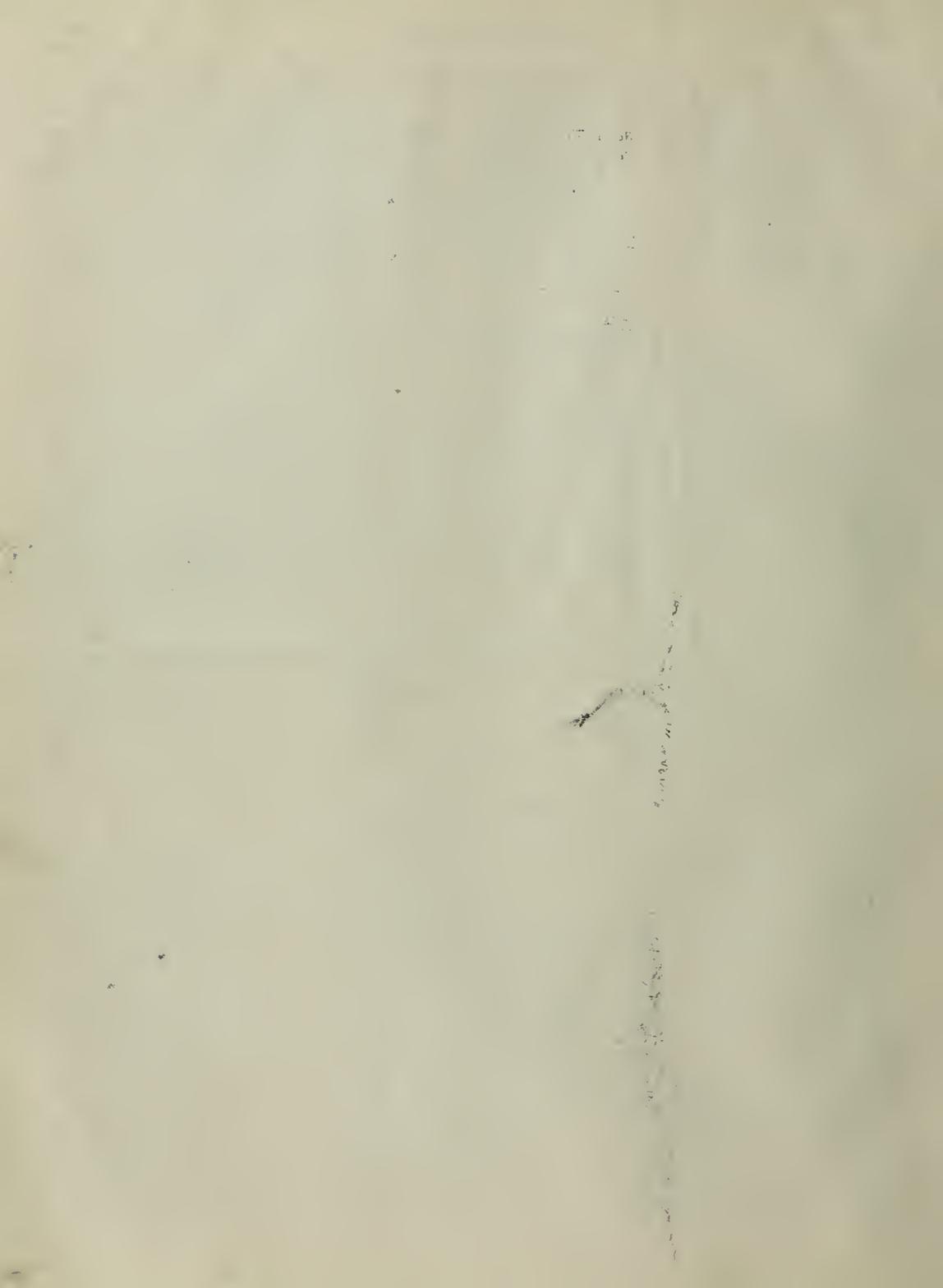
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EDITORIAL

Railway Age

EDITORIAL

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On "Buying Now" and "Shipping Now"

LARGE PARTS OF THE CONTENTS of this issue of the *Railway Age* will run counter to the views and inclinations of many of those for whose reading they are especially intended. The parts referred to are those containing articles designed to present the reasons why shippers who can do so should "ship now," and railways that can do so should "buy now." Many shippers believe that they should at present ship no more freight than they have to, and many railways believe that they should not at present buy any more equipment and materials than they have to.

It is always easier to go with the tide than against it. It is always easier to win the approval of people by telling them what they already believe than by telling them what they don't believe. It is always easier to influence people to do what they are already inclined to do than to influence them to do what they are inclined not to do. Of no class of affairs are the foregoing statements more true than of economic and business affairs. "Mob psychology" plays a very large part in such affairs, and when the tide has set in the general direction of shipping or not shipping, of buying or not buying, most people not only go with the tide, but are inclined to suspect the sincerity or intelligence of those who advise going against the tide. And yet this "mob psychology" which prompts most people to do what it is the general tendency to do is one of the principal causes of the violent changes that occur and the heavy losses that are incurred in industry and business.

The longer rises and falls which occur in general business activity are due to economic laws the operation of which no legislation, no public sentiment and no action by private combinations or persons can prevent. But even the effects produced by the operation of laws of nature can be aggravated or mitigated by human action. No human action can prevent the weather from getting hot in summer or cold in winter, but human beings can protect themselves from sun stroke in hot weather and can wear clothing and provide heating systems for their homes that will keep them from freezing in winter. Similarly, human action can prevent the operation of economic laws from causing a large part of the harm that they now do cause.

1. Fatalism Regarding Business Affairs

In ancient times men were very fatalistic in their attitude toward economic, as well as toward natural, laws. They considered it inevitable that there should be bountiful crops in some parts of the world and millions starving in other parts of the world. They could conceive of no means by

which food could be transported in sufficient quantities from places where it was abundant to the places where there was famine. A Chinaman even at present considers it as inevitable that many persons should starve annually in his country as that there should be seasonable changes of temperature.

Nobody in the United States believes that numerous people must starve in this country every year, but there are still many who are so fatalistic in their views of economics and business as to believe that violent fluctuations, resulting in periods of great prosperity, followed by periods of profound depression and great loss and suffering, are inevitable; and that to attempt to arrest a general tendency in either direction is as futile as was the attempt of Mrs. Partington to sweep back the sea with her broom.

The *Railway Age* is publishing this "Buy Now—Ship Now" number partly because it does not accept this economic philosophy, and partly because it believes that there exist at present certain special business and transportation conditions which make it peculiarly urgent that the policies of "Buying Now" and "Shipping Now" should be adopted.

Since the economic activities of the United States are the activities of human beings working together in an organized society, we believe it is possible for these human beings to be so informed and influenced that large numbers of them will do things which will tend to shorten industrial depressions and make them less disastrous. The principal reason why the country has periods of such feverish and unhealthy business activity and inflation, followed by periods of great depression, unemployment, loss and suffering is, that it has times when most people go forward with production and buying on the largest possible scale almost regardless of how high production costs and prices mount, and other times when production and buying occur on only a very small scale regardless of how low costs of production and prices descend. It would promote the welfare of all classes if business activity could be restrained in periods of the former kind, and stimulated in periods of the latter kind.

2. Prices Increasing—Everybody Buys; Prices Declining—Nobody Buys

We have just passed through a period of the former kind. It has been superseded, with unexpected suddenness and violence, by a period of the latter kind. Almost everybody contributed to the excesses of the former period, and now almost everybody is contributing to the excesses of the latter. Almost everybody bought madly while prices were going up.

In consequence, acute shortages of materials, of labor and of transportation developed. Now, when prices are going down, almost everybody is refusing to buy or ship anything that he does not need to buy or ship at once, and, in consequence, there are great surpluses of productive and transportation capacity, and of labor.

It is axiomatic that action and reaction follow each other, and that the violence of each is in proportion to the violence of the other. Of nothing is this more true than of business activity and prices. The longer production is curtailed, prices decline and a surplus of transportation capacity exists, the more certain it will become that when business activity does revive the demands for products and for transportation will be unprecedented and that prices will advance again. The present business situation is largely due to a "buyers' strike" of unprecedented extent and violence. Because prices, after having gone so high, have declined so much in many lines in such a short time, many persons seem to believe that they will continue to descend without a pause until they reach their pre-war level. Not only is any such continuous fall of prices entirely improbable, but if it should occur it would be ruinous to every class of the people of the United States. It would be impossible to readjust costs of production fast enough to cope with such a decline of prices. Most industrial and commercial concerns would be bankrupted and most of their employees would be thrown out of work. What is needed is a reduction of prices by stages, each stage of the decline being followed by a period during which they are temporarily stabilized.

The time must come, if the country is ever to cease to fluctuate between periods of feverish and unhealthy prosperity and periods of even more unhealthy depression, when leaders in public affairs and in business will resist the tendency to an excessive expansion of industry and overtrading when that tendency prevails, and toward excessive reductions of production and under-trading when that tendency prevails. There never was or will be a better time to begin offering resistance to excessive reductions of production and buying than the present.

3. Bearing of Transportation Situation Conditions

The existing transportation situation greatly emphasizes the need for such resistance being made. Five years of costly experience have demonstrated that the railways, with their existing facilities, cannot transport all the commodities that the country can produce unless they are given opportunity to transport them in more uniform volume than in former years. A severe and protracted decline of the amount of freight shipped now would inevitably result in seasonal traffic being offered to the railroads all at one time which would be followed by acute traffic congestions and car shortages, and great delays in the handling of a large part of the freight. These things would restrict production after it began to revive and thereby tend to hold up or increase prices and the cost of living, whereas it is desirable that for some years the general tendency of prices and the cost of living should be steadily, but not violently, downward.

The same general effects that will be produced by the

failure of shippers to ship now all the freight that they can ship will be produced by failure of the railways to buy now all the equipment and supplies that they are reasonably able to buy. The railways themselves, as purchasers of equipment and supplies, are among the largest shippers in the country. Therefore, every unnecessary delay by them in buying will tend to reduce the amount of freight that can be shipped now and to increase the amount of it that must be shipped later. A point of even greater importance is that every unnecessary delay of the railways in buying will restrict the amount they increase their capacity and thereby reduce their ability to handle freight later on. When the next period of heavy traffic comes the railways will be in a very precarious position if they cannot show the public that they have done all they can to prepare for it.

It need hardly be said that the determination of whether those who have freight to ship can and will ship it now, and of whether the railways can and will buy now, is not entirely in the hands of those who have things to ship and of the railways that need to buy. No shipper can ship a thing unless somebody is willing to accept and pay for it, and he must be convinced that the price he can get is reasonable under all the conditions before he will ship it. Likewise, no railway management can be justified in making purchases unless those who have equipment and supplies to sell are willing to sell them at prices which, under all the conditions, the management of the railway is convinced are fairly reasonable. There are great opportunities under present conditions for differences of opinion between buyers and sellers as to whether the prices the former are able to take, and the latter are able to pay, are reasonable; and when these differences of opinion cannot be composed no shipping or buying will be done. But when differences of opinion regarding reasonable prices are very great there is a strong chance that both parties are unreasonable, and that the prices which under the conditions can and ought to be offered and accepted lie between the two extremes.

4. Not Urging What Is Impossible

In agitating the subjects of "Buying Now" and "Shipping Now" the *Railway Age* is not engaged in a quixotic effort to get people to do what it is impossible for them to do. A manufacturer who cannot get merchants to buy his goods cannot ship them. A railway which is trembling on the brink of bankruptcy, or whose ability to buy has been restricted or destroyed because the government is withholding from it money which it would require in order to purchase equipment and supplies in normal amounts, cannot be expected to buy in normal amounts. The slogans of "Ship Now" and "Buy Now" are addressed only to those who really can ship now or buy now, and whose failure to do what they can do now will sooner or later make conditions for everybody concerned worse than they otherwise would be.

There are many business interests that can ship now, and many railways that can buy now; and they should consider very carefully whether, by following a policy of delaying shipping and delaying buying, they will not in the long run lose more than they will gain.

1920 and 1921

THE YEAR 1920 was in many respects the most extraordinary in the history of the railroads of the United States. The total traffic handled, the total earnings made, the operating expenses incurred and the taxes paid were the largest ever known. The total net operating income earned was the smallest ever recorded since records for all the railways were kept. In 1888, the first year for which we have statistics of the Interstate Commerce Commission, the total net operating income was reported as \$316,000,000. In 1920 it was only about \$150,000,000.

The year in which such an astounding record of earnings and expenses was made could hardly have failed to be remarkable in other respects, and it was. It witnessed the largest single advance in wages ever given to railway employees or to any class of workmen in the history of the world. It witnessed the largest advances in freight and passenger rates ever made. It saw railway construction decline to 314 miles and the amount of railroad abandoned increase to 713 miles. This was the fifth consecutive year in which the investigations of the *Railway Age* have shown more mileage abandoned than built. Railway affairs have reached such a pass that we now make compilations to find, not how much the mileage has increased, but how much it has diminished. The diminution in 1920 was the greatest that ever occurred.

When conditions get so bad that they can hardly get any worse, hope, "springing eternal in the human breast," leads us to anticipate that they will soon begin to get better. The statistics published elsewhere in this issue indicate that conditions in the railroad industry really have begun to improve. The number of locomotives built for domestic service in 1920 was smaller than in 1919, but the number ordered was nine times larger. The number of freight cars built was not as large as in 1919, but the number ordered was three and one-half times larger. The number of passenger train cars built was almost twice as large as in 1919, and the number ordered four times as large.

There was a marked increase in efficiency of operation, to which was due the fact that a record-breaking traffic was handled. As small as the net operating income was, Dr. Parmelee, Director of the Bureau of Railway Economics, estimates in an article published elsewhere, that if throughout the year 1920 the same wages and rates had been in effect as are now a net operating income of \$990,000,000 would have been earned. This would not have been six per cent upon the valuation fixed by the Interstate Commerce Commission, but it would have been five and one-half per cent. Having reached the bottom of the hill the railways before the year closed began to climb upward.

The railways fought and won in 1920 the hardest and most important battle of their lives. They succeeded in getting themselves returned to private operation under unprecedentedly favorable legislation. They secured almost all the advances in rates for which they asked. They began breaking all records for volume of business moved just when

their critics commenced to proclaim they were "breaking down."

Hard as was the battle they had to fight and win in 1920, it seems not improbable they will have to fight an even harder one in 1921. They must earn more net operating income under the new rates than they have been earning and they may have to do so in spite of a reduced business for some months. Apparently there is only one way for them adequately to increase net operating income and that is substantially to reduce operating expenses.

It is not difficult temporarily to reduce expenses by slashing right and left regardless of later consequences. But the railways are confronting the probability that within a few months they will have to handle a larger business than ever. If they recklessly reduce expenditures of all kinds now they will later be criticised upon the ground that by doing so they failed to fulfill their obligation to do their best to prepare for handling the country's commerce. On the other hand, if they do not reduce operating expenses as much as is practicable they will not earn sufficient net income to enable them to raise new capital, and if they cannot raise new capital they cannot adequately increase their facilities.

The Greeks talked about people having to avoid Scylla and Charybdis in order to make a successful voyage. A more modern phrase refers to people who are in the predicament of being "between the devil and the deep sea." A still more modern and perhaps more expressive term describes people as being "between hell and high water." Either of these phrases might be aptly used to describe the situation in which the railways find themselves.

The way out seems clear enough, but to follow it will be by no means easy. The railways should effect every economy that is consistent with proceeding as rapidly and as energetically as practicable to putting and keeping their organizations and property in condition to handle a large business. They will be criticised by those who like to criticise them no matter what they do. They always have been, which is a pretty good reason for believing they always will be. For this reason, the railways should use every means available for presenting to regulating bodies, business men and the public the facts regarding what they are doing, how they are doing it, and why they are doing it. Regulating bodies, business men and most of the public wish success for the efforts being made to show that the railways can be operated more economically and can give more and better service under private than government operation, and they will all help if the railways will show they are doing their best. But their help will be needed and they must be "shown."

As 1920 was in many respects the darkest year in railroad history so it is not difficult to conceive that 1921 may be made the most glorious. The railways achieved a great thing when in spite of all difficulties they in 1920 surpassed all previous records in handling freight. The problem of reducing operating expenses needs the same intelligent, concerted, strenuous treatment in 1921 that was given the problem of

breaking the congestion and eliminating the car shortage in 1920. If as much progress is made in reducing expenses, rehabilitating the properties and increasing their capacity

in 1921 as was made in other respects in 1920 the fears which still so widely prevail regarding the future of the railways will soon be dispelled.

The Railways and Labor in 1921

FOR THE GOOD OF BOTH the railways and the employees the thing most needed in the railroad field is an increase in the economy and efficiency of operation. The thing most needed to bring this about is an increase in the efficiency of labor. Probably nothing will contribute so much toward increasing the efficiency of labor as a better understanding by the managements and the men of one another's problems and points of view. The best way to bring about a better understanding will be for the officers and representatives of the employees of the various individual railways to get together and frankly talk over their mutual problems. Whether or not national agreements or national boards of adjustment exist under private operation, the efficiency and loyalty of the employees of the individual lines will depend largely upon the fairness and frankness with which the managements deal with them, and frequent conferences between the officers and representatives of the men can hardly fail to beget fairness and frankness on both sides.

"Get together" programs of various kinds are being adopted on different railways, and they seem to promise more satisfactory and beneficent relations in 1921 than have prevailed for some years. The officers and employees of the Missouri, Kansas & Texas recently held their first "staff meeting" under private operation at Dallas, Texas. The meeting was attended by the principal operating officers and officers in some other departments, and by the general chairmen of the committees of the principal labor organizations. Committees composed of both officers and representatives of the employees have been organized to study important problems such as "Shop Efficiency and Welfare Work," "Station Efficiency and Welfare Work," "Roadway Department Efficiency and Welfare Work," etc. The representatives of the employees have expressed their gratification at being invited to attend these meetings and serve on the efficiency committees, and it is believed that the results of the conferences and the work of the committees will be highly beneficial.

In New England the Boston & Maine and its employees have adopted a somewhat similar policy. Officers of the railroad and representatives of the men have been holding meetings, the fundamental purpose of which has been, (a) to discuss grievances not disposed of through conferences between local officers and local committees; and (b) to inform one another of developments arising on either side of mutual interest, and to discuss general questions of operation and policy. By arranging a system of schedules which required that the local officers and representatives of the local organizations should meet regularly, at which all of the matters in dispute would be heard and decision rendered within a specified time, practically all disputes of consequence were soon settled, and the general officers of the railroad and the representatives of the labor organizations were left almost free to discuss general questions of operation and policy.

The men have been encouraged to speak frankly on all matters of interest to them, and the officers have shown no

hesitation in expressing their points of view, and out of it all is gradually developing a better understanding of the difficulties encountered by both the management and the men. The men have been fully informed as to the financial condition of the road, and especially of the causes for the present unsatisfactory situation of the New England railroads generally. Both the management and the men recognize the fact that they cannot introduce a millennium in their relations, but they also believe that each side has been and will be benefited by frank conferences, and the results thus far gained support this view.

On the last day of the old year the management of the Pennsylvania Railroad System issued a statement that it had just concluded with the representatives of its engine and train service employees, "a mutual agreement regarding the settlement of future labor differences, which, if lived up to in spirit by both sides, should, in the belief of the management, eliminate any question of strikes on this railroad so far as train operation is concerned." The arrangement is the outcome of a series of meetings. There has been established the "Joint Reviewing Committee of the Pennsylvania Railroad System" for the settlement of all controversial questions affecting the train and engine service men. The committee will be composed on behalf of the management of two representatives of each of the four regions of the system, and on behalf of the employees of the general chairmen of the men in engine and train service. The votes of the representatives of the employees on the committee will be of the same power as those of the officers, and a two-thirds vote will be necessary to decide any question presented. On all matters except individual discipline cases the full committee will vote. The Pennsylvania system, for operating purposes, is divided into four regions. When a discipline case comes before the joint reviewing committee the representatives of the management and of the employees in the region in which the case arises will not sit as members of the committee, but will act as counsel in the presentation of their respective claims, while the remaining members of the committee will hear the case and determine the issue. The work of the joint reviewing committee will be supplemented by monthly conferences between superintendents of the various divisions and representatives of the men, and between the general superintendents of the grand divisions and representatives of the men.

These are but a few examples which might be cited of policies which are being initiated on the railroads for bringing about better understandings and settling controversies while they are in their incipency and before they reach the stage where they might cause serious trouble. Undoubtedly the year 1921 will see increasing efforts made by the managements and employees of the various railways to come to a better understanding, and more harmonious and efficient working relations established. Nothing could be done which would tend more strongly in the long run to pro . . . the

real interests of both; and the public should regard developments of this kind with great interest and satisfaction because, in the long run, the public will be the chief bene-

ficiary of all policies which tend to make interruptions of transportation less likely, and to promote increases in the efficiency of operation.

The Government Should Pay the Railways

ONE OF THE MAIN REASONS why many railways are not buying the normal amounts of equipment and materials is that the United States government is withholding from them money that they need. Congress did not intend that this should be done, with the resultant injury it causes to business of all kinds.

Congress is in session and can very quickly, by a simple piece of legislation, remedy the situation. Congress ought to do so.

Congress provided, in the Esch-Cummins Act, for loans up to \$300,000,000 to be made to the railways on the certification of the Interstate Commerce Commission. The plain purpose was to help the railways get through the period of transition immediately following their return to private operation. The commission acted promptly and in good faith to give effect to the intent of Congress, but the bureaucrats in the United States Treasury Department put so many obstacles in the way that the railways have not succeeded yet in getting all the loans Congress provided for.

To further help the railways get through the period of transition following their return to private operation, Congress provided for the guarantee of their net return from March 1 to September 1. Congress knew a deficit was bound to be incurred. Expenses and taxes were exceeding total earnings when the railways were returned. A large advance in wages was impending. The very fact that Congress guaranteed the net returns of the railways for six months is conclusive evidence that it expected a deficit to be incurred until the Interstate Commerce Commission should grant

advances in rates to fulfill the provisions of the act.

Congress provided that payments to the railways on account of the guarantees should be made on the certification of the Interstate Commerce Commission. On September 1 about \$400,000,000 of the amount guaranteed remained unpaid. The commission and the railways assumed that this could and would be paid in installments as the guarantees had been previously, but the Treasury Department has held it up on the ground that after September 1 no further installments could lawfully be paid except in complete settlement of claims.

The withholding from the railways of more than \$400,000,000 due them has left many of them almost without immediate available financial resources. It is disabling them from going ahead with purchases and improvement and maintenance work that are much needed. It is defeating the plain intent of Congress that the railways should be provided with means of getting through the transition period in a way that would help them and the business of the country. Developments within recent months have made it more necessary than it appeared it would be when the Esch-Cummins Act was passed for the railways to make purchases that would serve as a stabilizing and supporting influence to general business. The withholding of the funds due them is crippling them and helping to slow down business of all kinds when it needs to be stimulated.

Congress can and should speedily pass legislation which will cause the railways promptly to be paid the money which is due them and which they greatly need.

Constructive Work by the Interstate Commerce Commission

ONE OF THE MOST significant and outstanding features of the railway history of 1920 is the constructive work done by the Interstate Commerce Commission. The federal regulatory laws preceding the Transportation Act gave the Commission large powers but did not give it corresponding responsibility for the results of their exercise. The Transportation Act not only gives the Commission greatly increased powers but also new responsibilities. The Commission in 1920 exercised its powers and assumed its responsibilities in a way that deserves high praise and promises well for the future federal regulation of railways.

The Transportation Act gives the Commission new authority for the regulation of operation in times of emergency. A real emergency was created by the conditions resulting from the switchmen's strikes. The Commission, if it had been anxious to do so, could have issued orders regarding the distribution of cars and locomotives and the operation of terminals which would have made it practically the manager of the railroads. It very wisely refrained from doing

so and practically told the chief executives of the railroads that it was their job, not that of the Commission, to manage the roads, and that while so far as was necessary it would help them by the exercise of its authority, it would not assume, unless forced to, the responsibility for actually operating the roads. The result was that the Commission issued such orders as were necessary to help the managements, but left to them both the opportunity and duty of actually conducting operation and the outcome fully vindicated the intelligence and self-restraint that it showed.

The Commission might have timidly refused to grant advances in rates anywhere near as large as those that the railways asked for. If it had done this many railway companies speedily would have been bankrupted, private operation would have failed and the Commission would have been mainly to blame. It might, on the other hand, have boldly granted all the advances in rates for which the railways asked. If it had done that the railways would have been able from the start to earn the full return of six per cent

and the Commission might and probably would have been criticised for being too generous with them. The advances in rates actually granted apparently in the long run will be sufficient to enable the railways to earn a return of six per cent and afford a powerful incentive to efficiency and economy, since it has become plain that only under the most efficient and economical operation possible can the required return be earned. It has saved itself from any just criticism for being too generous. It has given the railway managements an incentive to the utmost efforts to operate efficiently, and it is reasonable to assume that if it finds that the rates granted by it are either too low or too high to yield the specified return of six per cent it will in due time adopt corrective measures.

While the committee of state commissioners delegated to sit with the Interstate Commerce Commission in the rate case recommended that the same advances in state rates should be granted as in interstate rates this has not been done in many states. The state commissions are supposed to have great political power. The Interstate Commerce Commission might have timidly refused to exercise the authority granted in the Transportation Act to cause the state rates to be advanced. On the contrary it has courageously rendered

decisions which if they are upheld by the courts will force the states to put their rates on the same general basis as the interstate rates.

One of the things most needed to enable private operation to succeed has been closer co-operation between the railways and the shippers. One of the principal reasons why there has not been enough of such co-operation in the past has been that the railways often tried to make important changes in rates, in the privileges granted to shippers, and in service without adequate previous conference with them. The commission repeatedly and in numerous ways has used its great influence to get the railways and shippers to confer and agree about important matters instead of carrying them before it for highly controversial hearings.

The commission has acted in accordance with the spirit of the Transportation Act. The public and Congress having made plain that they prefer private ownership and operation and want them given reasonable opportunity to succeed, the commission has been contributing all it can toward their success. Having in the Transportation Act been given its first opportunity to be really helpful and constructive the commission has been doing all it could to be helpful and constructive.

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A Train of 60 Refrigerator Cars on the New York Central

“Ship Now” Section

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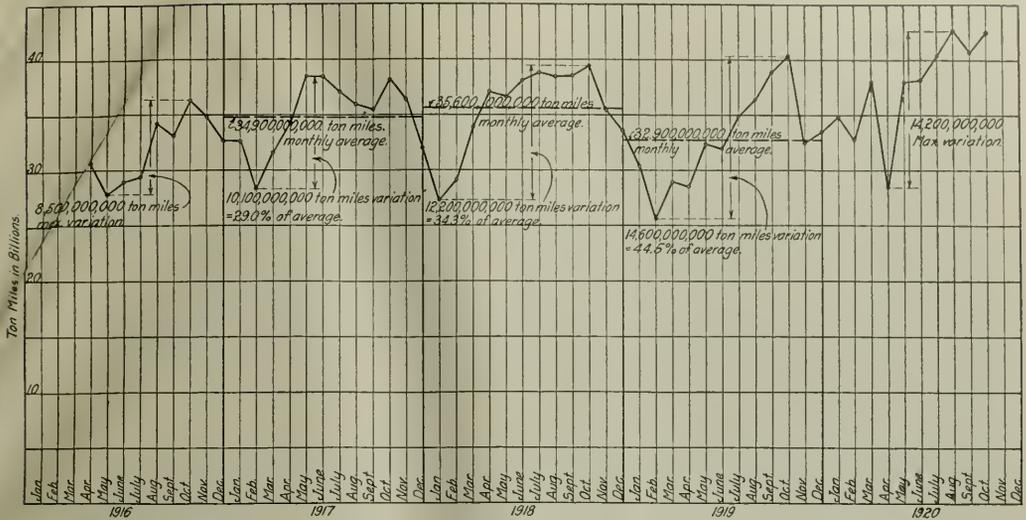
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THOMAS DE WITT CUYLER
Chairman of the Association of Railway Executives



Fluctuations in Freight by Months

Why Buyers and Producers Should “Ship Now”

Both General and Special Conditions Indicate a Volume of Business which Must Be Given to the Railways in Uniform Amounts to Prevent Serious Trouble

FROM A PURELY transportation standpoint there are several important reasons why it behooves the shippers of the United States who can do so to “ship now.” The word “shippers” is used here to designate those who, whether the originators or receivers of freight, can determine whether it will be shipped now or later.

The railways at the present time have surplus transportation capacity. The net surplus of freight cars on the date of the last report, December 15, was 101,472. The actual surplus capacity which the railways had was larger than this figure indicates.

It is practically certain, however, that this surplus capacity will not exist long. It was created by two things, first, an increase in the efficiency of operation, and secondly, a decrease in the amount of traffic offered. It seems certain not to last long because it seems certain that within a few months there will be a large increase in the traffic offered, and that, meantime, the railways will not be

able substantially to increase their maximum capacity.

The reasons why it appears certain that within a few months the railways will again have all, and more than all, the traffic they can handle are partly reasons of a general character and partly reasons due to unusual special conditions now existing.

There are certain general causes which always have operated in the past, are operating at present, and will continue to operate in future, constantly to increase freight business. These causes are the normal growth of the country's population, and the normal increase of its production and consumption per capita. Study of the history of the freight traffic of American railways shows that even the most violent panics and the severest industrial depressions result in only very brief and comparatively small

declines in the amount of freight offered for movement. The accompanying chart, entitled “Revenue Ton Miles in Billions,” shows the fluctuations of traffic from 1901 to 1920.

ALL SHIPPERS who can do so should “Ship Now!” The railways will probably have to handle at least 550,000,000 tons of bituminous coal in 1921.

The total available appropriations for highway construction amount to \$1,394,000,000, vastly exceeding all past records.

The amounts of grain still on the farms surpass anything ever known before.

An abnormal amount of lumber is already cut and ready for shipment.

From 1901 to 1907 the traffic handled increased every year. In fact, the increase was continuous from 1894 to 1907. The latter was a "peak" year, and there was a decline in 1908 following the panic of 1907. It is significant, however, that the amount of freight handled in 1908 was larger than in any previous year except 1907. Freight business then began to grow again, and 1910 was another "peak" year. There was a decline in 1911, but the business handled in that year was greater than in any previous year except 1910, and in 1912 it was larger than in 1910. The year 1913 was another "peak" year, but in spite of the depression in 1914 and 1915 in each of these years the freight traffic was greater than in any previous year except 1913.

In 1916, 1917 and 1918 there were further great increases of freight. The slump in 1919 made the total freight handled in that year less than in either 1918 or 1917, but even in 1919 it was greater than in 1916, which, in net earnings, was the banner year of railroad history. In 1920 traffic again exceeded that of any previous year. There was a slump late in 1920, but in spite of it the railways almost down to the end of the year handled more freight than in the same weeks of any previous year.

The indications are that the traffic in the early part of 1921 will be lighter than it was in the early part of 1920, but the almost unbroken experience of the last 30 years indicates that the total amount of freight offered to the railways during the entire year will be greater than in any previous year, with the possible exception of 1920.

It would be a safe prediction that this would be the case even though there was nothing to base the prediction on except past experience, but there exist at the present time several special conditions which seem to foreshadow a large freight business.

The sharp decline in general business activity in the latter part of 1920 was largely responsible for the decline in railroad traffic. The general decline in business activity, in turn, was largely due to a "buyers' strike," which was as sudden in its coming as it was violent in its effects. The suddenness with which it came and the extent of its effects are indicated by replies received in response to a questionnaire sent out by The Blackman Company, an advertising agency of New York. This questionnaire was addressed to trade and technical papers devoted to 36 different lines of industrial and mercantile business, including most of the important lines of business in the country. The replies to it showed that there had been a diminution of buying in 30 out of the 36 lines of business surveyed. In 22 of these 30 lines of business the reduction in buying had come suddenly. In some businesses it came several months ago, but in a large majority it began within the last six months, and in most of them in September or later. In none of the industries surveyed in which there had been a reduction of buying had the reduction been less than 10 per cent, in most of them it had been over 50 per cent, and in many of them it had exceeded 75 per cent.

So sudden and drastic a reduction of buying in so many lines of business could hardly fail to be followed in a short time by an increase of buying, and, as a matter of fact, in a large part of all the lines of business surveyed the reductions

of prices which had been made had begun to secure responses in increased buying. It seems entirely reasonable to assume that increased purchases in almost all lines of business will be a feature of the spring months of 1921.

Other special conditions of great importance are that there is an abnormal amount of grain upon the farms, that the coal supplies on hand at present are certainly no more than normal, that there is in prospect an unprecedented activity in highway construction, that there is an unusual amount of lumber piled up at the mills ready for shipment, and that there is need for general construction activities to provide buildings for business purposes and homes for people to live in. The country's grain, coal, coke and building materials (including lumber, sand, stone, cement, brick, etc.) normally furnish the railways with over 60 per cent of their total ton-



Annual Fluctuations and Growth of Freight Traffic

nage. It is easy, therefore, to see how a heavy movement of these commodities, which it seems reasonable to expect, will contribute toward making the total traffic large.

Assuming that the railways within the year 1921 will be offered a larger traffic to handle than ever before, except possibly in 1920, what are the prospects that they will be able to handle it? The railways were returned to private operation on March 1, 1920, but what interstate rates they were going to be allowed to charge was not settled until five months later. It was not possible during this time for the companies to make any substantial increase in their facilities. When the earnings produced by the new rates began to be ascertained they were disappointing. There had been increases in operating expenses which had not been contemplated, and many states had failed to make advances in state rates proportionate to those made by the Interstate Commerce Commission in interstate rates. Furthermore, about the end of October there began a decline in traffic and earnings which alarmed railway officials. Besides, the government owed the railways several hundred million dollars and the inability of the companies to get this money reduced their ability to carry on the rehabilitation and expansion of their properties.

Consequently, the railways entered the year 1921 with

practically no more facilities than they had at the beginning of 1920. They have increased their capacity by more efficient operation, and there is no doubt that the amount of traffic that they can handle in any given week or month is larger than it was before. But the experience of the last five years, when the capacity of the railways has been almost constantly unequal to the demands, has shown that if they are to handle in an entire year as large an amount of business as they did in 1920, or even in 1918, the business must be given to them in more uniform amounts from week to week, and month to month, than it was before the war.

The fluctuations in the amount of traffic handled by the railways in different parts of the same year have been much less recently in years when they have handled a large traffic than they have been in years when they have handled a comparatively small traffic. In the year 1915, when the total traffic handled was small, the freight handled in October was 35 per cent greater than in March. Again, in 1919, when the total freight handled was the smallest in any year of the last four, the freight handled in October was 38 per cent greater than in March. These differences represent very wide fluctuations. In 1916, 1917, 1918 and 1920 the railways handled almost every ton of freight they could. In

1916, however, the amount of freight handled in October was only 15 per cent greater than in March, in 1917 only 22 per cent greater, in 1918 only 16½ per cent greater, and in 1920 only 12 per cent greater. The reason why the railways were able to handle, and did handle, so much more business in these years than in 1915 and 1919 was not that they were able to, and did, handle much more in the "peak" months, but that they handled more in the months preceding and following the peaks.

The lesson taught by these facts should not be lost. Experience has indicated that with their existing facilities the railways can move a little more than 1,000,000 carloads of freight a week, or approximately 43,000,000,000 tons one mile a month, and that when they have done this they have about reached the limit. Therefore, if concerns engaged in industry and commerce want them to move in 1921 a traffic as great as that they moved in 1920, or even in 1918, commercial and industrial concerns must endeavor to give the traffic to them in approximately uniform amounts from week to week and month to month. If large amounts of traffic which might be moved in the early part of the year are held back and then thrown upon the railways in unprecedented volume, the railways will simply be unable to handle a large part of it for months afterward.

Prospective Coal Traffic in 1921

THE RAILWAYS during 1920 transported the largest amount of bituminous coal ever handled by them in any calendar year except in 1918. The statistics of the United States Geological Survey regarding the amount of bituminous coal produced and transported up to December 18 of each of the last four years are as follows:

1917.....	536,288,000 tons	1919.....	441,592,000 tons
1918.....	566,349,000 tons	1920.....	537,555,000 tons

In view of the fact that the amount of coal produced and transported in 1920 was so large, and in view of the further fact that in the latter part of the year there was a decline in general business activity and the weather was mild, the question naturally arises as to how large the railways can reasonably expect the coal traffic in 1921 to be. The correct answer to this question depends, first, upon the supplies of coal now on hand, and, secondly, upon the probable consumption of coal.

Railway officers will have no difficulty in recalling that it required the utmost exertion by the railways to handle the coal actually moved in 1917, which amounted to 551,000,000 tons. In fact, the alleged failure of the railways to handle the coal traffic efficiently and in large enough volume was one of the main reasons for the adoption of government control in 1918. Under government control various extraordinary measures were used to increase the amount of coal transported. The zone system was adopted, cars were pooled and the coal producers were given priority in the use of open top cars.

The result was that the amount of bituminous coal moved was increased about 30,000,000 tons in 1918 as compared with 1917. Toward the end of 1918 there began a decline in general industrial activity owing to the signing of the armistice, and it was estimated that the amount of coal produced in that year exceeded the requirements by 30,000,000 tons—in other words, that the actual requirements of the country were about the same as the amount actually transported in 1917.

Largely owing to the extraordinary reserves accumulated in 1918 and also to the decline in industrial activity, there

was a sharp decline in the demand for and production of coal in the early part of 1919. In the first five months of 1919 the production fell 100,000,000 tons below that of the first six months of 1918. Late in the year came the miners' strike, which further reduced production, and the total production of the year was 121,000,000 tons less than in 1918 and 93,000,000 tons less than in 1917.

In the latter part of 1919 there began a great revival of business activity and a corresponding increase in the demand for coal. The country, therefore, entered the year 1920 with a coal shortage. This was increased by the "outlaw" switchmen's strikes. The railways, in spite of the switchmen's strikes and other difficulties, succeeded, as we have seen, in moving as much coal as they did in 1917, but about 30,000,000 tons less than in 1918. It is the opinion of experts that the production and transportation of coal in 1920 made up the deficiency which existed at the beginning of the year, and also provided the average storage stocks of coal. In other words, the country apparently has entered the year 1921 with normal supplies on hand.

There are, however, no abnormally large stocks on hand, as there were at the beginning of 1919. Furthermore, the consuming capacity of the country increases year by year. The country's consuming capacity increases with its productive capacity, and the unprecedentedly large general freight traffic given to the railways in 1920 shows that the country's general industrial capacity is much larger now than it ever was before.

It was only by herculean exertion that the railways were able to handle the coal traffic moved in 1920. Furthermore, there had to be diverted to the coal traffic the use of many thousands of open top cars which, except for the necessary priority orders issued by the Interstate Commerce Commission, would have been used for the handling of highway construction materials and other traffic.

On the whole it seems to be a safe assumption that unless the depression in business throughout 1921 is unprecedentedly acute the amount of coal the country will need and the railways will have to haul will be practically as great as it

was in 1917 and 1920, or approximately 550,000,000 tons. The actual annual production during the past four years exceeded 535,000,000 tons. The year opens with the railways having no larger supply of open top cars than in 1920. There is more construction work in prospect, especially highway construction, than ever before, and this year those engaged in construction activities should not be obliged, as so many of them were last year, to curtail, or actually stop, their work because the cars they need for shipping sand, gravel, cement, etc., must be used to haul coal.

If the railways are to handle even normal quantities of building materials and at the same time transport approximately 550,000,000 tons of coal, it will be necessary for them to move coal in much more nearly uniform volume throughout the year than they have been given opportunity to do within recent years. They cannot, however, transport coal in approximately uniform volume throughout the year unless consumers and dealers will buy it and producers will ship it in practically uniform volume.

The wide fluctuations which have occurred in the past in the production and shipment of coal are strikingly illustrated by the fact that in the first 98 working days of 1919 the average production was only 1,263,000 tons a day, while toward the end of 1920 the railways were moving 2,200,000 tons a day. The latter figure is more than 60 per cent larger than the former. When the railways are moving an average of only 1,260,000 tons of coal daily they have idle many thousands of coal cars and a very large part of their entire physical plant, while when they are moving 2,200,000 tons of coal a day they are being obliged to put forth the utmost efforts to handle coal.

The railways cannot afford to use so large a part of their facilities to handle coal as they were obliged to use during most of 1920, and the country cannot afford to have them do so. The facilities of the railways are at present inadequate to handling all the country's commerce when general business is active, and if they are obliged during part of the year to devote so large a share of their energies and facilities to moving coal as in 1920 they must neglect other traffic.

The only way to prevent the vast fluctuations in coal traffic which within recent years have been such a disturbing and demoralizing influence both to transportation and to

general business is, as has been indicated, to get consumers and dealers to buy and producers to ship more uniform amounts throughout the year. The average weekly requirements are between 10,000,000 and 11,000,000 tons, and when shipments fall as low as 8,000,000 or even 7,000,000 tons, the result sooner or later will be transportation troubles and scares about "coal famines."

The work of educating the consumers, dealers and producers of coal to ship in more uniform volume throughout the year probably will be long and difficult, but there should be no delay in beginning it. In the spring of 1919 there seemed to be no occasion for warning coal producers and dealers that they ought to "ship now." Their failure to ship the normal amounts of coal in the early part of that year resulted later, however, in a flood of denunciation of the railways by the coal operators because of the alleged failure of the carriers to perform their duty, and was one of the main contributing causes of the national industrial and financial disaster which was only narrowly averted when the switchmen's strike in 1920 interfered for a few weeks with the normal operation of the railways.

The coal consumers, dealers and producers of the country must be made to understand that with the railways as short of facilities as they are now they cannot handle the country's normal requirements of coal without having the coal given to them for transportation in reasonable volume throughout the year, and that if they do not use cars when they can get them they will not be allowed to monopolize the supply of them at other times when they are as much needed for other kinds of industry as for the coal industry.

The Interstate Commerce Commission said in its annual report:

"To the extent that the emergency in the fuel situation can be traced to the failure of dealers or consumers in regions remote from their sources of supply to purchase or make firm contracts for that supply in season, it is to be hoped that timely and effective action will be taken to prevent recurrence. They can hardly expect that our regulatory powers, which have to do with transportation rather than with distribution of commodities, should be relied upon to relieve them from the consequences of their own inertia, to the inconvenience or detriment of other regions and derangement of the orderly movement of general traffic."

Large Amounts of Lumber at the Mills

IF THE RAILWAYS do not in 1921 have a heavy lumber traffic it will be because dealers do not buy the normal amounts of lumber and not because the lumber mills cannot ship it. The amounts of lumber which have been cut by the mills and piled up by them because they have not received normal orders within recent months are very large. The Bureau of Lumber Economics of the National Lumber Manufacturers' Association gives the information that on October 31, 1918 mills in the South had 1,355,236,000 feet of lumber on hand. This was substantially greater than the amount normally on hand and was 200,000,000 to 300,000,000 feet more than the amount on hand at the same time in 1919. Thirty-four mills in the Northwest reported that on October 31 they had on hand 296,586,000 feet of Douglas fir, which was 10 per cent greater than the amount normally on hand.

This accumulation of lumber at the mills was largely due to relatively small orders and shipments in 1920. Statistics are available regarding the amount of lumber cut and shipped in the 50 weeks ending December 11 from the Southern Pine Association, the West Coast Lumbermen's Association, Western Pine Manufacturers' Association, the California Redwood Association, the North Carolina Pine Association and

the Northern Hemlock and Hardwood Manufacturers' Association. The total cut by the members of these associations was 10,397,670,836 feet, and the total shipments 9,007,892,616 feet. The orders received amounted to 8,236,107,078 feet. The shipments for all the associations amounted to only 87 per cent of the cut and the orders to only 79 per cent of the cut. It was, of course, owing to this disparity between the cut, the shipments and the orders that so much lumber was accumulated at the mills.

The statistics for the different associations are as follows:

	Cut	Per cent	Shipments	Per cent	Orders	Per cent
Southern Pine Association	4,289,769,417	100	3,903,804,519	91	3,585,547,271	84
West Coast Lumbermen's Association	3,746,602,479	100	3,283,991,469	88	2,876,368,235	77
Western Pine Manufacturers' Assn.	1,152,687,000	100	911,142,000	79	760,350,000	66
California White and Sugar Pine Manufacturers' Assn.	514,802,000	100	304,328,000	59	533,665,000	104
California Redwood Association	296,605,000	100	263,637,000	89	222,345,000	75
North Carolina Pine Association	308,851,940	100	276,249,628	89	203,237,572	66

It will be seen that in only one territory, that of the California White and Sugar Pine Manufacturers' Association,

did the amount of lumber ordered exceed the amount cut, and that in no territory did the amount of lumber actually shipped exceed 91 per cent of the amount cut, and that it ranged as low as 60 per cent of the amount cut.

The total amount cut in the country as a whole was not as large as the average for the last six years, but the orders and shipments were relatively much smaller still. In fact, both orders and shipments were the smallest in 1920 that they were in any of the last five years.

The need for a great increase of housing construction for both business and residential purposes throughout the country is generally recognized. The comparatively small amount of lumber used recently has been due not merely to the high prices of lumber, but to the very high cost of other materials used in housing construction and also to the very high wages of labor in the building trades. Another reason has been the very small amount of building of freight cars and of other work in which lumber is used on railroads.

The prices of lumber have declined considerably from the

high levels reached within recent months, and there seems reason to believe that we are approaching the time when there will be a substantial increase in the amount of lumber used both in general construction work and by the railways themselves. In other words, the prospects apparently are for an increase in the amount of lumber shipped. Any increase in the demand will speedily be followed by a proportionate increase in the amount shipped simply because the manufacturers have so much on hand at the present time which is ready for shipment.

There were, however, no significant indications of increasing orders towards the end of the year. On the contrary, in the four weeks ending December 11 shipments were only 88 per cent and orders only 71 per cent of the amount cut. It seems probable from the figures, however, that the stocks in the retail lumber yards of the country must have become relatively quite small and that they will soon have to begin replenishing their supplies, which, of course, would cause an increase in lumber movement.

Great Amounts of Grain Still Upon the Farms

THE STATISTICS regarding the size of the grain crops grown in the United States in the year 1920, and the amount of grain which has been shipped since these crops were produced, have an important bearing upon the question of the amount of traffic which the railways will have to handle in 1921. Many farmers are holding their grain because of the recent sharp declines in prices, but both the limits of the farmers' financial resources and the limits of the facilities for storing grain make it seem certain that they cannot continue long to hold back so large a part of their grain as they have been holding back.

The grain crops grown in 1920 were, in the aggregate, the largest ever produced in this country. They were larger even than those produced in the war years when the farmers were being urged, as a matter of patriotic duty, to produce all the grain they could. The crops of 1918, 1919 and 1920 in bushels were, according to the government's crop reports, as follows:

Kind of grain	1920	1919	1918
Wheat	789,078,000	934,365,000	917,100,000
Corn	3,232,367,000	2,358,509,000	2,582,814,000
Oats	1,524,055,000	1,231,754,000	1,538,359,000
Rye	69,318,000	88,909,000	89,103,000
Barley	202,024,000	161,345,000	256,375,000
Total	5,817,642,000	4,774,782,000	5,383,751,000

Under ordinary conditions the raising of such vast crops would have been followed in the immediately succeeding months by the shipment over the railroads of unprecedented amounts of grain. This, however, was not the case in 1920. It is a remarkable fact that, on the contrary, the amount of grain and grain products shipped by rail in every single week from that ended July 17 to that ended December 11 was smaller than in the corresponding week of 1919, in spite of the fact that the total grain crops raised amounted to over 1,000,000,000 bushels more than in 1919. The total amount of grain shipped in the last two weeks of July, 1919, was 108,660 carloads. The amount shipped in the same two weeks of 1920 was only 72,694 carloads, a decline of almost 36,000 carloads. The number of carloads shipped in the months of August, September, October and November, and the first two weeks in December, in the years 1919 and 1920 were as follows:

	1920	1919
August	158,652	195,937
September	174,828	190,131
October	198,321	213,409
November	139,909	160,461
December (two weeks)	73,929	76,863

The total number of carloads of grain shipped in 1919 in the 21 weeks ending with December 11 was 945,461, while

in the same weeks of 1920 it was only 818,333, a decline of 127,128 carloads.

The fact that 1,000,000,000 more bushels of grain were produced in 1920 than in 1919, and that in the 21 weeks when the grain traffic is usually heaviest the amount of grain shipped in 1920 was 127,128 carloads less than in 1919, shows conclusively that there is still on the farms of the country a vastly greater amount of grain than there was a year ago.

It is believed by those who are well informed that the amount of wheat upon the farms is substantially less than a year ago. This is indicated by the fact that in the year ended July 1, 1920, the total exports of wheat were only 122,000,000 bushels, while from July 1 to December 18, 1920, the exports of wheat were about 147,000,000 bushels. On the other hand, the exports of oats have been far smaller than they were last year, while the exports of rye and barley, the other two principal grains exported, have been relatively about the same.

Practically no corn is exported, and most of that which is produced is never shipped at all but consumed upon the farms. But while most of the corn produced is consumed upon the farms, the total amount of it produced is so much larger than the amount of any other kind of grain that the actual amounts of it shipped are very large.

Factors of the situation which have some bearing upon the question of the amount of grain that will be shipped in 1921, are the amounts believed to have been left over from 1919 and the crop prospects for 1921. There is believed to have been an unusual amount of the 1919 crops still on the farms being held for higher prices when the 1920 crops were harvested. As to the prospective crop of 1921, it is stated that the "new winter wheat get-a-way" is the best ever known at this time of year except in December, 1918. With such a vast amount of grain still on the farms, and the winter wheat prospects good, it is difficult to conceive how the total amount of grain that the railways will be asked to transport in 1921 can fail to be very large.

However, whether the roads will be able to furnish sufficient box cars to transport all the grain offered to them undoubtedly will depend upon the way in which the grain traffic comes to them. One of the main reasons why the amount of grain moved in the summer of 1920, when the prices were still high, was so small was that the railways were unable, because of labor and other conditions, to furnish the farmers all the cars for which they asked. It is easy to believe that if the movement of the grain still in

the hands of the farmers is unnecessarily delayed, and there should be an active revival of general business in the spring, the railroads would find it extremely difficult, if not impossible, to furnish the farmers with all the cars for which they would ask.

The farmers are holding back such large amounts of grain because they hope by doing so to get better prices. The recent declines in the prices of grain have been very heavy, and if the farmers could get better average prices by holding the grain than by shipping it in normal, or even more than

normal, volume in the early part of 1921, it would be impossible justly to criticize them for holding it. But the farmers, like other business men, should recognize the fact that transportation conditions as well as prices are an important factor in American business at the present time. They might find that in the long run it was more advantageous to ship a large part of their grain when they could get plenty of cars in which to ship it, than to hold it for higher prices and then find, if and when the higher prices came, they could not get enough cars.

Vast Program of Highway Construction

IF THE APPROPRIATIONS which have been made for highway construction are a criterion, the amount of road building in the United States in 1921 will far exceed that ever done in any previous year.

It was estimated that the total appropriations for the construction of highways available in 1920 were about \$650,000,000. This was regarded as a very large amount; and it was much larger than was ever available before. It was found impossible to do anywhere near all the road building planned, largely because the threatened coal shortage made it necessary to give priority in the use of open top cars to the transportation of coal. Probably the amount actually spent in 1919 was about \$390,000,000. Expenditures for the same purpose in 1918 were \$286,000,000, and in 1917, \$280,000,000.

The total funds available for highway construction work in 1921 amount to \$1,394,000,000, or twice as much as in 1920. This is the estimate given in a recent bulletin of the Associated General Contractors of America, which published the following table entitled "Funds Available for Highway Construction, 1921":

Total federal aid appropriation.....	\$275,000,000
Forest road appropriations.....	14,000,000
State bond issues.....	543,000,000
County bond issues.....	362,000,000
Direct levies and revenue (estimated).....	200,000,000
Total.....	\$1,394,000,000
Less total of projects completed or under construction.....	264,000,000
Available for new construction, 1921.....	\$1,130,000,000
STATE BOND ISSUES	
1918 (Partly expended)	Colorado..... \$5,000,000
Illinois..... \$60,000,000	Maryland..... 3,000,000
Pennsylvania..... 50,000,000	Minnesota..... 75,000,000
1919 (Partly expended)	W. Virginia..... 50,000,000
California..... 40,000,000	Missouri..... 60,000,000
Oregon..... 12,500,000	Virginia (Legislature to fix)..... 50,000,000
Nevada..... 1,000,000	New Jersey vehicular tunnel..... 29,000,000
S. Dakota..... 4,500,000	
Wyoming..... 2,800,000	
Maine..... 10,000,000	
Michigan..... 50,000,000	
Utah..... 4,000,000	
1920 (New appropriations)	
Alabama..... 25,000,000	
Idaho..... 2,000,000	
Oregon..... 10,000,000	
	Total State Bond issues available for 1921..... \$543,800,000
COUNTY BOND ISSUES, 1920	
Alabama..... \$5,000,000	Nevada..... 1,200,000
Arizona..... 4,400,000	New Jersey..... 200,000
Arkansas..... 2,400,000	New Mexico..... 13,609,000
California..... 24,635,000	N. Carolina..... 1,158,000
Colorado..... 1,515,000	Oregon..... 9,696,704
Florida..... 15,245,000	Pennsylvania..... 21,337,553
Georgia..... 7,373,009	Rhode Island..... 8,500,000
Illinois..... 8,862,845	S. Dakota..... 7,039,200
Iowa..... 18,475,000	Tennessee..... 7,185,000
Kansas..... 50,000	Texas..... 86,023,000
Kentucky..... 1,700,000	Vermont..... 2,766,000
Louisiana..... 5,850,000	Washington..... 8,225,000
Maine..... 2,300,000	W. Virginia..... 7,039,200
Michigan..... 2,300,000	Wisconsin..... 36,525,000
Minnesota..... 12,800,000	Wyoming..... 2,800,000
Mississippi..... 15,773,000	
Missouri..... 13,504,000	
Montana..... 6,783,000	
Nebraska..... 3,000,000	
	Total county bond issues..... \$361,971,537

large portion of the bond issues were approved only recently, and the time necessary to prepare plans and secure approval of the projects will doubtless limit the expenditures.

More significant considerations from the standpoint of the contractors, according to the bulletin of the Associated General Contractors, are certain factors which it mentions, including ability to get labor, materials and transportation service.

It has been estimated that for every mile of highway constructed there must be transported 100 carloads of equipment and materials. Inability to get sufficient transportation has been one of the chief limiting factors affecting road building within recent years. One of the main reasons why the contractors have not been able to get sufficient transportation has been that they have made no special effort to move equipment and materials when adequate means of transportation were available.

100 CARLOADS PER MILE OF HIGHWAY

Recognizing this fact, a movement was started some weeks ago by the Lakewood Engineering Company, of Cleveland, one of the largest construction companies in the country, to get those concerned in construction activities to "ship now." It sent letters to contractors, highway engineers, banks, chambers of commerce, railway officials and others concerned, pointing out that "if road materials are transported and stored during the winter and early spring months, when open top cars are more available than they are during the construction season, the contractors could proceed with considerably less interruption and their working season would be increased accordingly." The Lakewood Engineering Company states that many replies have been received to its letter, and that most of those replying are in accord with the plan suggested and offer help in making it a success.

Several letters tell what already has been done along this line. At Ogden, Utah, materials for 20 miles of road were shipped in the winter of 1919-1920, and the road was completed during the season of 1920 in record time. The State of Delaware has followed this practice for three years. The Board of Freeholders of Passaic County, New Jersey, has acquired a central storage yard for stockpiling road materials this winter. Belleville, Ill., reports that it has already stored cement for next season's work.

Nevertheless, the idea of "shipping early" is apparently new to many, although it was strongly urged last year by several state highway departments, as well as by the United States Bureau of Public Roads.

One question frequently asked about the early transportation and storage of road building materials is how the contractor is to pay for the materials and their transportation. The Lakewood Engineering Company points out that in 27 states, and in the District of Columbia, legislation has made it possible to pay the contractor in full or in part for material when it is delivered. It adds, "In those states where it is not possible for the highway departments to make such

It has been estimated by the Bureau of Public Roads that of the total amount available probably not more than one-half actually will be expended during the coming year. A

payments it will, of course, be necessary for the contractor to finance the transportation and storage of materials ahead of time. In such instances he will have to arrange with his banker for the needed funds. But even if he does have to borrow the money, there is every reason why he should do so. The interest on the amount required is absolutely insignificant when compared to the sum the contractor will lose if he should have to shut down his job even only a few days because he cannot get regular delivery of materials during the construction season."

RAILWAY TRANSPORTATION AND HIGHWAY CONSTRUCTION

In the circular letter from which the foregoing quotations are made the Lakewood Engineering Company commented at length upon the relation of railway transportation to highway construction, and as its comments are those of a concern which is highly experienced in this field, they are given at some length below:

"Road building materials are usually shipped in open top or gondola cars. In the northern states the greatest demand for these cars comes in the summer months, when they are required for handling coal, ore, sand and stone for construction work and road building, etc.

"In a few instances it has been pointed out by railway executives that on their own particular lines this condition does not exist and these cars are more in demand in the fall, winter, and early spring months than during the summer. However, taking the country as a whole, it is a fact that there is generally a shortage of open top equipment in the summer, and a surplus in the winter. One reason for this is because the navigation season on the Great Lakes closes in November for the transportation of coal and ore. Many cars are needed for this service during the summer and early fall.

"At the close of the navigation season these cars are released, and for a short time are busy carrying coal to the local territory, which can be served after the lake trade is taken care of. But this local service is practically at an end by the last of December, when there begins to accumulate a surplus of open top equipment. The transportation of coal slumps off rapidly after this time, as coal contracts are made on April 1, and from January until that time there is only a very small amount of this business for the railroads.

"It has been the general practice to request shipments of road materials during the actual construction season. The result has been that the railroads are always contending with a peak load just at the time the contractor could do his most effective work if he were able to get his materials. The inability of the railroad to furnish the necessary cars very often makes it impossible for the contractor to get well started on his work, with the result that the close of the season finds him with a job which must be carried over until next year.

"On the other hand, if the surplus cars which are available during the winter and spring months could be put at work hauling materials to be stored by the contractor until his season opens, he would be assured of steady work when he did get under way.

"There now seems no possible reason to look forward to lower prices for materials next year. Freight rates have increased, and a larger demand for materials is expected. The demand is increasing in many localities faster than the supply. Freight rates and the law of supply and demand are the two principal factors governing price. Therefore, it does not seem that material prices will go down. Yet even if there were hope for a decline by next season, the extra cost to the contractor buying his materials for winter and spring storage will really be only a small insurance premium guaranteeing that he will not have to close down his work every few days to wait for materials. Such slight extra cost is mighty cheap insurance.

"The banks of the country are more than willing to help. A contractor needing financial assistance to aid him in shipping and storing materials early should not hesitate to go to his banker. Money loaned for this purpose is really backed by the security of the state for which the road is to be built. And what better security could be wanted?

"The difficulty of unloading sand or stone which has frozen in transit is an objection which is frequently raised to the shipment of road materials during the winter months. It is true

that these materials may freeze in the cars, but material for road construction is shipped generally only a comparatively short distance, and such freezing will be confined to a thin crust unless the cars are delayed in transit or unloading. The proper unloading equipment will make it possible to get the materials out of the cars in a minimum amount of time, which will prevent it from freezing solid.

"Where material is delayed, and becomes frozen in severe weather, it, of course, will be necessary to employ steam pipes, or to apply heat in some other way to thaw it before it can be handled from the cars. But such procedure is far from impossible.

"In the fall it is not possible to continue actual paving where the subgrade freezes slightly at night. Although the temperature during the day may not be below freezing, the contractor will not be permitted to place concrete. But such weather is ideal for continuing unloading and storing materials for next season's work.

"In some of the northern states, where very severe weather prevails, it would, of course, be necessary to withhold shipments during extremely cold weather, because even though they are transported for only a short distance, they may become frozen solid in a very short time under such conditions.

"However, in such states where these conditions do prevail, it is possible to ship materials at all times except during the dead of winter.

"Many quarries close down during the winter months—therefore, an argument has been made that materials will not be available for winter shipment. So far as we are able to learn, the quarries close down largely because of habit. There has been no active market for them during the winter months. They have preferred to stop their work instead of assuming the burden of stocking their materials until next season. If a market could be assured for the quarries which would absorb their output, there is no reason why they should not operate twelve months out of the year, with the exception of time required to make repairs."

Highway construction on a large scale is new in the United States. It is so new that, owing to the war and general financial conditions within recent years, the railroads have not been able to provide sufficient cars to transport all the equipment and materials required to enable contractors to work continuously throughout the construction season if they attempt to ship practically all their equipment and materials in the construction season. The Lakewood Engineering Company, after a long and broad experience in this field, has made clear that it is feasible for contractors to distribute their shipments of equipment and materials more uniformly throughout the year, and that they should "ship now" not merely in the interest of the railroads, but in their own interest and that of the public.



Photo by Edwin Gallo way, N. Y.

Piers and Freight Yards at Cleveland, Ohio, with Union Station Train Sheds in Foreground



Redwood Lumber on the Waterfront at Eureka, Cal. Photo by Erving Galloway

Railway Executives Comment on "Ship Now"

Why It Is Important to "Ship Now"

By Daniel Willard

President, Baltimore & Ohio Railroad;

Chairman of the Advisory Committee of the Association of Railway Executives

WHILE IT IS TRUE that there is a surplus of transportation facilities, particularly box cars and freight locomotives, in the United States today, it does not by any means follow that such will be the case two or three months from now. As a matter of fact, having in mind that a large portion of the wheat crop is still in the interior of the country; that we have raised this year one of the largest corn crops ever raised; and further, that funds have actually been provided for a very substantial program of road-building next year, I repeat, for these reasons and others I cannot help feeling that the transportation facilities of the railroads will be fully used by next spring, say March or April.

In order to avoid possible delays which might be experienced at that time because of the active demand for cars, I think it is highly desirable not only from the standpoint of

the railroads but in the public interest, that wherever possible and as much as possible, advantage be taken of the surplus facilities now, to ship in anticipation of the wants later on.

I am inclined to believe that the railroads with their existing facilities could perhaps handle all the business offered during a twelve months' period, providing it were offered uniformly through the entire period, but that of course is exactly what does not happen, and it is certain that the railroads with their present facilities are not able to take care of the possible peak loads, and this is why I think it is wise to urge upon all who can do so to *ship now*.

I think the *Railway Age* is absolutely right in carrying on such a campaign, and I hope it will be successful. As a matter of fact, it has come to me directly that certain large shippers are already acting in accordance with that policy.

"Ship Early" and Ease the Peak Load

By R. H. Aishton

President of the American Railway Association

FOR THE FIRST TIME in five years, on this January 1, 1921, there is a surplus of transportation in the United States, and the transportation machine is not being worked to its capacity. Two things have brought about this condition:

First: The combined co-operative efforts of the railway staffs, shippers and public bodies whereby the average car loading has increased from 28.3 tons in February, 1920, to 30.0 tons in November, 1920, and average miles per car per day have increased from 22.0 in February, 1920, to 28.0 in November, 1920, the net practical results attained automatically approximately adding 500,000 cars to the equipment without any additional capital investment.

Second: Shipments have decreased through the shut-down or curtailment of industry; uncertainty of commodity

prices has restricted buying; credit conditions have restricted building operations; the situation regarding foreign exchange and the inability of foreign nations to finance purchases have reduced exports, all bringing about a lessened demand for transportation.

As a result, on the one hand of the improved efficiency of the railroads in handling the freight offered, and on the other of the decrease in the volume of business demanding transportation, there is for the first time in years, except for a short time in 1919, a surplus of cars and locomotives above requirements and not actively working to their capacity. This condition is not without precedent, although seldom, if ever, has the transition from insufficient transportation to a surplus of that commodity come as suddenly and violently as in the past few months and as the decline was sudden,

violent and deep, so may we, if past history is any indication, predict a rebound of the same character.

Never before has the interest of the shipper, the public as represented by the Interstate Commerce Commission and the railroads and their owners and officers been so mutual as now. What can be done to meet this future revival of business in addition to what is now being done in a large degree by the railroads in providing additional locomotives, cars and facilities under a most burdensome financial situation, which program will no doubt be augmented with an easier money situation?

With the knowledge born of past experience that the volume of transportation business is a series of peak loads and valleys of depression, and that every peak is higher than the preceding one and every valley of a higher elevation than the one before it, and that the constant trend is upward, it would seem that all interests, those serving the public and those serving the railroads, might with mutual advantage study practical methods of meeting the increased volume of business so sure to come, possibly in a few weeks, certainly before many months.

Regardless of the present car surplus, a decision to:

(1) "Keeping up the habit" of capacity carloading and capacity car mileage during this period of transportation surplus, would be of inestimable advantage when the days of car shortage come again. A habit once formed is not easily gotten away from.

(2) A decision to "Ship Early" would tremendously help the situation and ease off the peak load. There is a great housing shortage, both for business and homes. Is it not

fair to assume that one of the first upward moves will be in building construction? Clearly, if every activity in this direction were to start May 1, there would be a tremendous load on the railroads and inability to meet this sudden load would be unfortunate and affect the public interest in many directions. Can we not anticipate that this may occur and would it not be wise to commence transporting, and if necessary storing even at the cost of re-handling, some of the many materials entering into projects already determined on, in order that there may be no delay due to transportation?

We may definitely assume a large program of highway building and improvement will be started. "Ship Early" would insure an absence of transportation difficulties, such as occurred last winter. In a large part of the United States material can be handled during winter months when there is a surplus of cars as easily as in midsummer, and even where there is severe winter weather a portion of the materials can be transported and handled without great additional expense.

Why not "Ship Early" the thousands of carloads of fertilizer in the winter instead of in the spring when they are required on the farms, and avoid the uncertainties of delays due to an overburdened transportation machine?

Why not "Ship Early" such materials as are required for the maintenance programs of railroads, instead of adding this burden to the heavy load later on?

Might we not profitably have confidence in the future, and having that confidence in this time of depression put the transportation facilities to the utmost possible use in providing against the day of Opportunity?

Future of Railways Depends on Constructive Regulation

By J. Kruttschnitt

Chairman of the Southern Pacific Company

WHAT ENLARGEMENT of facilities *should* the railroads make?

The average annual capital expenditure for the construction of new and the betterment of existing lines for the ten years preceding 1917 was about \$660,000,000, but as the purchasing power of the dollar has declined, at least twice this amount, or \$1,320,000,000 per annum, will be needed to provide what the smaller sum did formerly. In the years 1918-1919 under government control \$806,000,000 only was spent (Annual Report of the Director General of Railroads for 1919). As the normal expenditures for the two years should have been \$2,640,000,000, capital expenditures were short \$1,834,000,000 on January 1, 1920, and this amount, in addition to the normal annual sum of \$1,320,000,000, should be spent in 1920 to catch up, and \$1,320,000,000 should be spent annually thereafter, subject, of course, to reduction ratably with any rise in the purchasing power of the dollar and in the efficient use of existing facilities.

2. What enlargement of facilities the railroads will be able to make in coming years will depend on the extent to which the Transportation Act—passed by Congress after five and one-half years of close study, the greatest (and the only) piece of constructive legislation of the kind ever enacted in this country—will be allowed to work without radical change. It has been in more or less complete operation just ten months—much too short a time to test its merits, when we consider that during this period the railroads have been handicapped by abnormal economic conditions, by shortage of equipment and other facilities and by the disorganization and depletion of their forces following 26 months of government operation. Demands of substantially all classes of employees for increased wages, which long before should have been answered, remained unsettled by the outgoing Railroad

Administration, which by procrastination evaded and shifted responsibility to the incoming owners of railroads. This long strain on the patience of the employees caused the so-called "outlaw strikes" of April, 1920, and the worst congestion of railroad traffic ever known.

With motive power and equipment returned by the government in deplorable condition and large numbers of employees disloyal and deserting, traffic conditions were hardly restored to normal before the end of August, when the wage award, quickly followed by the grant of increased rates, was made. The higher rates have been in force but 17 weeks, during six of which the volume of freight traffic has rapidly fallen; and the refusal of a number of state commissions to harmonize state rates with those prescribed by the Interstate Commerce Commission has deprived the carriers of much necessary revenue. We advert to these facts in order to appreciate that conditions prevailing since the Transportation Act took effect have been such as to make it impossible to form a clear opinion of the changes it will produce in the destinies of the railroads.

The Act unmistakably recognizes the duty of the government in its regulation of interstate commerce to *foster and protect* its instrumentalities and to substitute a *constructive* for a *repressive* policy, under which rates had been kept down to low levels and severe punitive measures had been enforced against the carriers.

The two cardinal and controlling features of the Act are: The continuance of private ownership and operation as a national policy, and, the recognition of public interest and public duty in respect to the adequacy and efficiency of transportation facilities.

To make this policy a success requires the sympathy and co-operation of the Interstate Commerce Commission in in-

terpreting and administering the law, and of the carriers and the public in loyally obeying it. The reduction of the outlaw strike congestion, which was accomplished by the efforts of these three agencies, affords convincing proof of the compelling force of united effort. At least several years of uninterrupted operation of the Transportation Act without interference and under normal conditions of traffic, interest rates, and commodity and labor costs will be necessary to develop its effect on the future of our transportation systems, and it is of vital importance that such free opportunity be afforded.

It is not reassuring, however, to know that amendments that go far towards nullifying it have already been suggested. The most important is the proposal to make consolidations compulsory, presumably following the plan that Senator Cummins proposed in January, 1920, whose main features are grouping of the railroads into systems, each one to be operated by a corporation with a federal charter; the grouping into systems to be brought about by forced sale in condemnation proceedings after a period of seven years, within which voluntary consolidation in harmony with a pre-approved plan is permitted. Hence practically all existing railroads for seven or more years will have to live in apprehension, uncertainty and confusion that will be fatal alike to railroad development and to successful operation and maintenance of the properties.

The effect of such legislation—tantamount to government ownership—upon existing systems would be revolutionary, and the mere threat of it makes the future of the railroads so dark and uncertain as to perpetuate the injury to their credit and destroy the stabilizing effect of the Act of 1920.

Another measure before Congress is to change the federal valuation act unfavorably to the railroads. A fair valuation of the railroads is necessary to accomplish the purposes of the Transportation Act, for its principal provisions are based on such a valuation. If the federal valuation act is to be tinkered with and amended to the prejudice of the rail-

roads, confidence in their future will be to the same extent destroyed.

Another proposed amendment is to change the present provisions of the long-and-short haul clause so as to absolutely forbid any greater charge for a longer than for a shorter haul. The passage of such legislation will very seriously affect the earnings of many large systems of railroads, and the threat of such legislation will also create a lack of confidence in the earning power of the railroads likely to be affected thereby.

Again, there is the anti-strike amendment. One of the objects of the Transportation Act was to provide a method of settling labor controversies and avoiding the serious consequences of an enduring test between the railroads and their employees. Before legislation having this end in view has had time to function, an amendment is proposed the practical effect of which will be, in all likelihood, the bringing about immediately a life and death fight between the carriers and organized labor.

It cannot be too earnestly asserted that a feeling of confidence in the permanence of a constructive fostering policy is absolutely necessary for railroad development and prosperity. Such improvements as the Pennsylvania and New York Central stations in New York were planned years before they were made public, otherwise the provident acquisition of real estate would have been impossible. Without such confidence initiative will be destroyed; no corporation will dare to assume the risk of making plans the completion of which may at any time be halted with irremediable loss.

From the above will be seen how impossible is an answer to the second question as to the ability of the railroads to enlarge their facilities. They will no doubt muddle along until Congress by its treatment of proposed destructive amendments inspires investors with confidence that the Transportation Act that it has created is not to be rendered impotent before it has had the opportunity to prove its value.

Conditions a Challenge to Resourcefulness of Private Management

By C. E. Schaff

Receiver, Missouri, Kansas & Texas

THE DECLINE in traffic which marked the closing weeks of 1920 complicates the task confronting the railroads in 1921. While it may slow up railroad recovery, it should not be suspended.

Unfortunately, the decline in traffic followed so closely on the heels of the rate advances, that the railroads cannot immediately get the benefit of the increased net revenue which was anticipated. Revenue calculations of the Interstate Commerce Commission, as reflected in the rates established under the Transportation Act, were predicated upon expectation of traffic in undiminished volume. We are again in a situation not unfamiliar to railroads. Our rates have been adjusted to meet one set of conditions, and an entirely different set of conditions has developed before we were well settled under the new rates.

In the face of these circumstances, it should not be discouraging if the railroads fail to maintain the rate of progress toward complete readjustment that was established, following the passage of the Transportation Act and the return to private operation under a sound federal policy.

Despite the difficult conditions which interfered with efficient operation in the months immediately following the return to private operation, the railroads handled a record-breaking tonnage in 1920. Service was everywhere improved. Accumulations of traffic were cleared up. Equipment conditions were made better and the close of the year

found the railroads prepared to carry an increased traffic load. Developments generally had indicated the soundness of prophecies that resumption of private operation was the first step toward restoration of railroad efficiency. Indeed, progress had been so rapid as to discount the predictions made freely a year ago that it would require from three to five years to restore the railroads to pre-war efficiency.

The immediate task of the railroads is to counter-balance, so far as possible, through increased efficiency and decreased operating costs, the adverse effect of the decline in traffic on net revenues. The success we shall have in showing encouraging net revenues in the face of decreased business will, of course, regulate our rate of progress in carrying forward the improvement programs which experience has demonstrated are essential to equip the railroads to handle traffic satisfactorily, when business is again moving in what we should consider normal volume.

These conditions are a challenge to the initiative and resourcefulness of private management. They are difficult, but encouragement is found in the fact that the traffic decline itself is influencing our movement toward a readjustment under which operating costs should be relatively lower.

The response of the railroads to the federal policy adopted early last year, has been distinctly encouraging. With the 1921 task satisfactorily discharged, private ownership and operation will have met an acid test.

More Freight Should Be Moved in Months of Light Business

By L. F. Loree,
President, Delaware & Hudson Company

I THINK THE RAILROADS have shown very conclusively that they have the equipment and facilities necessary to handle a business about 15 per cent larger than the movement of October and November, 1920. The results realized from the effort to increase car loading and car movement are very gratifying, but there is still considerable margin for further accomplishment, especially in the car movement. To accomplish this some very bad practices of the railroads and some equally bad practices of the shippers should receive serious attention; and a systematic and determined effort should be made to improve the terminal facilities and the road facilities affecting the movement, especially the former.

A review of the car surpluses and unfilled car requisitions running back to 1907 shows the seasonal character of the railroad business and the very heavy burden thrown on the

roads by the movement in October, November and December, and, equally, the very light movement offering in April, May and June. To the extent that the shipper can move his freight in these months of light business, he can reckon on prompt handling and avoid the delays which may embarrass him in the months of heavy business.

However, the indications all are that the business offering in the Fall months of 1921 can be easily handled. Is it then wise to encourage an abnormal movement in months when weather conditions and short days make the work expensive rather than let it take its normal course and move it when conditions are more favorable and the work is relatively economical?

I am afraid the *Railway Age's* campaign is too like the "sunshine campaign" of 1908 and can serve no useful purpose.

Shippers Should Anticipate Their Requirements

By C. H. Markham
President of the Illinois Central Railroad

THERE IS EVERY REASON to believe that the spring will bring a heavy revival of business, following the winter's slump. Railway men are concerning themselves over what effect this commercial revival, if it materializes, will have upon the transportation machinery of the country.

The railways performed a miraculous feat in their endeavors to meet the 1920 demands for transportation, handling an increasing volume of business very largely through the adoption of more efficient and co-operative methods. This performance was made in the face of heavy obstacles which are not likely to face the railways next spring—labor difficulties, disorganized forces, highly deteriorated equipment, inadequate rates and a coal shortage. Therefore, it may be safely predicted that the railways will be able to handle even more business in 1921 than they did during 1920.

It is yet too early to predict with any degree of certainty how great the burden of traffic of 1921 will be, and it is therefore well that those having traffic to offer should realize that the railways are now in a position to handle more traffic than is being offered, and that this position may be changed. By realizing that, and anticipating their transportation requirements as far ahead as possible, shippers may be able, not only to assist in relieving general conditions, but to move shipments which might be tied up, should a paralysis of traffic occur.

In this connection, it should be noted that large road-building programs are being considered in a number of states. In the majority of cases the state money for the purchasing of road-building materials is now available. There are certain classes of material which can be transported at this time, in preparation for the spring business revival, for instance, sand, gravel, cement, etc.

Retail lumber yards are being rapidly emptied of supplies, without adequate replenishment. The spring business revival should bring a demand for the resumption of building programs, which, in turn, will demand a heavy lumber traffic. Such traffic in that line as can be moved now, should be moved.

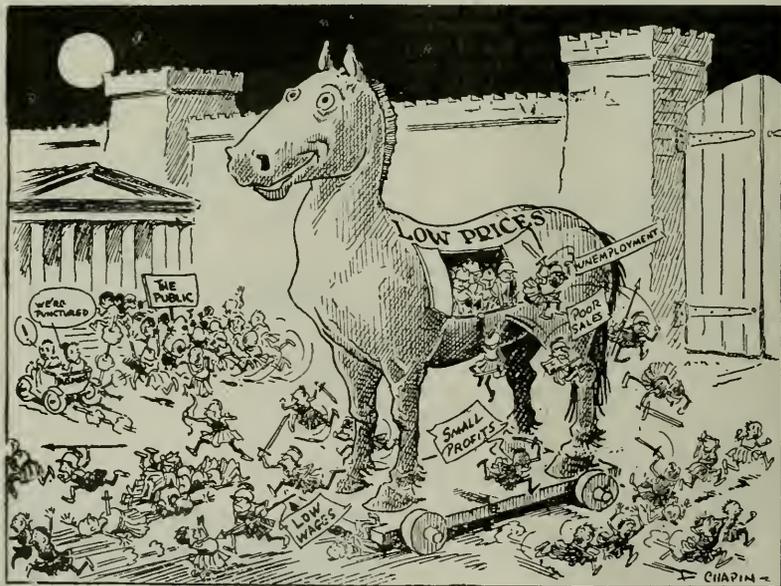
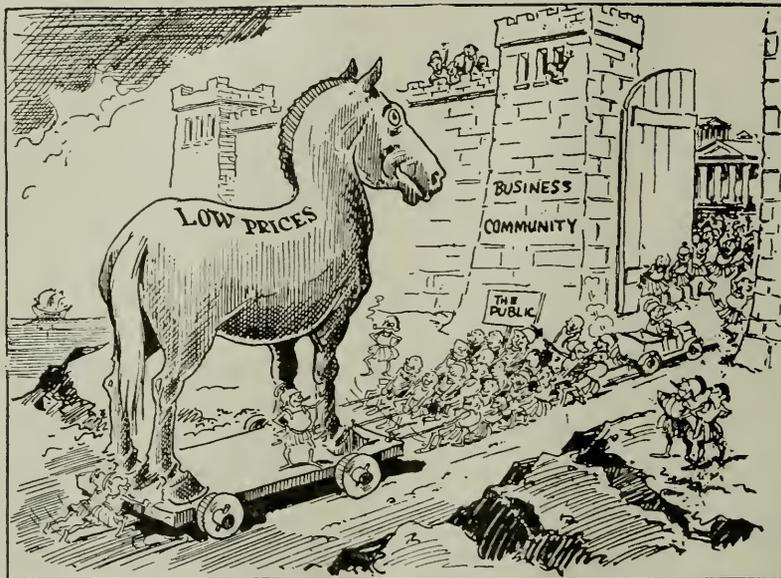
There are other instances of this kind. Every shipper would do well to make a study of his needs for the coming year, and arrange his transportation demands in such a way

that the movement will be facilitated. He will profit by knowing that his demands have been handled, and are out of the way. Business in general will profit by the relief which it will mean in the spring movement. The railways will profit by having transportation demands more evenly distributed.



Photo by International

Unloading Boilers of American Locomotives at Danzig,
Poland



Chapin in America at Work

The Trojan Horse

CHAPIN

“Buy Now” Section

Why “Buy Now” Program by the Railways Is Needed.

“Buy Now” as Viewed by the Railway Supply Interests.

The Public Demands Better Service, W. W. Salmon.

Why the Railroads Should Buy Now, A. L. Humphrey.

Railways Should Buy Only to Meet Pressing Needs,
Samuel M. Vauclain.

More Uniform Buying Would Cause Lower Prices,
Charles J. Symington.

Uncertainties of Situation Militate Against Buying,
R. P. Lamont.

An Opportunity to Prepare for Greater Economy and
Efficiency, Stanley H. Bullard.

Railway Buying and General Business, E. B. Leigh.

Railroad Power of Rehabilitation Returning.

The Next Step Toward Preventing Depressions.

What Additions to Physical Property Are Necessary?

How the Need for More Motive Power Will Be Met.

Little Progress in Reducing Equipment Shortage.

Repair Shop and Enginehouse Equipment Needs.

Attitude of Investors Toward Railroad Securities.



ALBA B. JOHNSON
President of the Railway Business Association



The De Witt Yards of the New York Central, Near Syracuse, N. Y.

Why "Buy Now" Program by Railways Is Needed

Many Factors in Problem Which Those Controlling Purchases Must Consider—"Buying Now" Would in Long Run Help Railways and General Business

THE RAILWAY EXECUTIVE who is considering the problem of the extent of the purchases his railway can make now, and of the extent to which it ought to make purchases now, has to take into consideration many factors.

Many railway companies are so short of funds and have such poor prospects of satisfactory earnings that they really cannot do otherwise under present conditions than carry on a hand to mouth existence. Many others cannot under present conditions raise money for capital expenditures but have sufficient funds available from earnings with which to buy the equipment and materials they require to make immediately needed improvements and to do adequate maintenance work. Some railways, even under present conditions, not only have sufficient earnings to make immediately needed improvements and adequately maintain their properties, but have good enough credit to raise capital in relatively as large amounts and on as easy terms as it can be raised by any industrial, commercial or financial concerns.

Even railways with the best credit hesitate at present, however, to issue securities in large amounts to raise new capital because hardly any railroad can sell stock, and the high rates

of interest which must be paid on bonds will impose a heavy burden of fixed charges for years to come.

Practically all railroads are handicapped in making purchases by the fact that the government owes the companies in the aggregate about \$400,000,000 of the deficit incurred during the guarantee period from March 1 to September 1. The inability of many companies to get their share of this money from the government is one of the principal reasons why they are restricting their purchases as much as possible. Many of them are so short of funds that if they made large purchases now the equipment and supply companies filling their orders would have to give them credit for practically the entire amounts purchased. There is a case on the way to the Supreme Court and also legislation pending in Congress, the outcome of either of which may soon release to the railways a large part of the funds the government is now withholding.

Another reason why many railways which are in an entirely sound condition financially are restricting their purchases is that their earnings under the new freight and passenger rates are disappointing, and that their business recently has been declining. Before deciding on their future

"RAILWAYS MUST consider the effect which a drastic curtailment of their purchases at present will have upon their immediate ability to maintain and increase the capacity of their plants, and ultimately to handle the traffic offered to them. If later on there are acute congestions and serious car shortages and it can be shown that they have not done all they reasonably could to prepare for handling a large business, they will be subjected to severe criticisms."

programs they want to see the earnings for a few more months and to get a better idea of how great and how long the decline in traffic is going to be.

Undoubtedly, however, one of the principal reasons why many railways are not buying on a much larger scale than they are buying is that they believe the prices of equipment and supplies should be and will be reduced more than they have been, and are waiting for them to decline further.

There is published elsewhere in this issue in different articles a large amount of data regarding the tendencies of prices of railway equipment and materials from pre-war days down to the present time. The figures regarding the prices of locomotives, freight cars and passenger cars show that they reached their maximum in the first six months of 1920. Comparing with the average for the years 1910-1914, the cost of locomotives in the first six months of 1920 had advanced 151 per cent, of freight cars over 200 per cent and of passenger train cars over 100 per cent. There have been some reductions since these maximum figures were reached, but there is an unmistakable sentiment among many railway officers who control purchases that further reductions must be made before they will be justified in placing orders on even as large a scale as their present financial resources will permit.

The reductions in the prices of some other things the railways buy in large volume have been greater. The prices of open hearth steel rails, which in 1918 was from \$57 to \$65, is now fixed by the United States Steel Corporation at \$47. Track spikes, which sold as high as 5.25 cents and even 7 cents in 1917, are now 3.65 cents. Steel plates for bridges and cars which were 8 cents in September, 1917, and 4 cents in April, 1920, are now 2.65 cents. Pig iron, which was \$50 in July, 1917, and \$51 in September, 1920, is \$33. These are not the prices quoted by all manufacturers, but are the ruling prices. None of them is anywhere near as low as prices in pre-war days, but the declines have been relatively greater than those in the prices of equipment and specialties.

The railways have to consider purchases from the standpoint, not only of their financial resources, but also from that of economy, because the Transportation Act provides not merely that they shall be allowed to earn a net return sufficient to enable them to develop their facilities, but that they shall be allowed to earn this return if they are efficiently and economically operated. Therefore, altogether aside from the matter of their immediate financial resources, they cannot from the standpoint of public regulation and public opinion disregard the necessity of reasonable economy.

On the other hand, the railways cannot afford, in considering the question of purchases, to disregard the effect which the policy adopted by them may have upon their own traffic or their ability to render service. Directly and indirectly they are among the largest shippers in the country. Their purchases not only cause the movement of the finished products they buy, but of the fuel and raw materials that enter into their manufacture. Therefore, other things being equal, the more the railways curtail their purchases now the more they will reduce their own traffic and earnings at a time when they have surplus transportation capacity. Furthermore, the less they buy now the more they will have to buy later on, and the more they buy later on the more they will

increase the traffic that they will have to handle when the movement of freight traffic in general has revived. Therefore, for the railways the arguments for "shipping now" are as pertinent as for any other class of shippers.

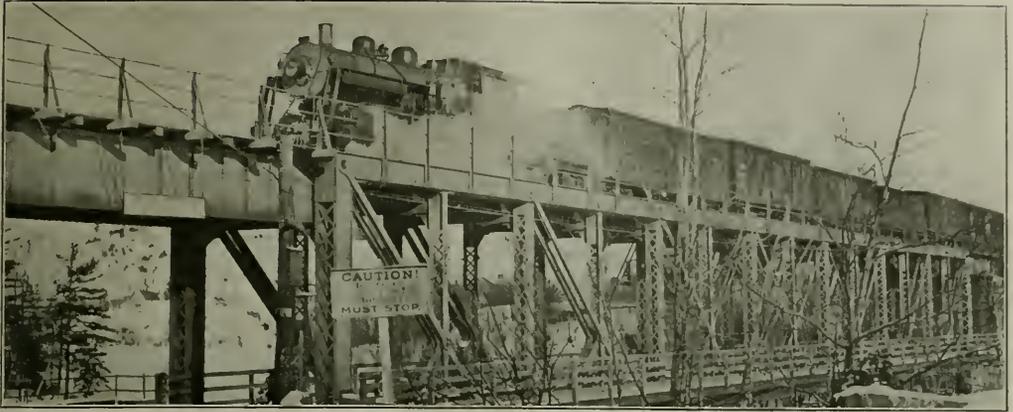
The railways must also consider the effect which a drastic curtailment of their purchases at present will have upon their immediate ability to maintain and increase the capacity of their plants, and ultimately to handle the traffic offered to them. If later on there are acute congestions and serious car shortages and it can be shown that they have not done all they reasonably could to prepare for handling a large business, they will be subjected to severe criticisms which will be difficult to answer.

Reverting to the question of prices, this is one for adjustment between the railways and the equipment and supply companies. All arguments in support of the view that the railways should "buy now" in order to stabilize conditions and prepare for the handling of a large business in future are equally potent in support of the view that the equipment and material companies should do all they reasonably can to make it feasible and desirable for railways to "buy now."

When the buyer and seller cannot agree on prices there is no buying or selling. More uniform purchasing by the railways from month to month and year to year is as desirable from the standpoint of the equipment and material manufacturers as from the standpoint of the railways, but it is evident they must get closer together in their views regarding prices before the process of stabilization of railway purchases can actually be begun.

There can be no doubt that the past policy of the railways has been too largely that of buying in large amounts when general business has been active and prices have been high and of buying in too small amounts when general business has been inactive and prices have been relatively low. It is estimated that at the present time the mills of the independent steel companies on the average are not working to much more than one-fourth of their capacity. The plants of most of the railway equipment and material manufacturers are in somewhat the same general plight. The lumber mills, of whose product the railways are large purchasers, have unusually large quantities of lumber on hand and are operating much below their capacity. Certainly, it does seem that these general conditions afford a good opportunity for the railways and the manufacturers soon to get together on a basis of prices that will justify the railways in beginning to make purchases in as large amounts as the financial resources and prospects of the various railway companies will permit.

There is a good deal of reason for believing that many of the prices now being quoted by equipment and material companies are not the lowest at which they are really willing to make contracts, but are offered as a basis for negotiation, and that lower prices would in many cases be made if it were established with reasonable certainty that large sales actually could be made at these lower prices. Any business concern has a natural reluctance to making reductions in prices when it fears that the effect will be that it will fill only the small orders it is receiving currently at these reduced prices and not get large orders at the reduced prices. There is a great difference, as every fisherman knows, between a mere "nibble" and a real "bite."



“Buy Now” as Viewed by Railway Supply Interests

The Public Demands Better Service

By W. W. Salmon

President, General Railway Signal Company

SHIPPERS, travelers, merchants, and, in general, the people of the United States who are paying an unprecedentedly high price for transport by rail, expect a good deal better service from the railways than many of them think they are getting.

Any prolonged continuance of failure to get an improved service and equipment of the kind and in the quantity required for the economical conduct of their business will lead to general, grave dissatisfaction and may create an item of bad will on the part of the public that will prove costly to the railway owners.

While it may be possible that by waiting, the railways may make certain purchases at a somewhat lower cost than if they purchase now, and that money may be cheaper then

than now, delay on these accounts in the making of purchases essential to meeting the reasonable requirements of the public will prove, in the long run, to be a “penny wise, pound foolish” policy.

Having for some years devoted a large part of my time to trying to aid in bringing about more liberal and fairer treatment of the railways and having had opportunity to observe how difficult it has been to get the various trade associations of the United States to advocate and approve legislation designed to enable the railways to put themselves in position profitably and adequately to serve the public, I would greatly regret any action or inaction on the part of the railways that would result in the creation of new hostile sentiment toward them.

Why the Railroads Should Buy Now

By A. L. Humphrey

President, Westinghouse Air Brake Company

ONE EVIL from which the railway supply business suffers more than any other is the unfortunate fluctuations in output of most of the principal railway supply plants, which is generally referred to as the feast and famine condition of their order books. This is largely brought about by the fact that the railroads generally regulate their purchases in some direct relation to traffic conditions existing and set aside only such percentage of their gross income as can be spared over and above a certain amount of their daily average income.

When earnings fall off, orders are usually issued to curtail expenditures of all kinds, and especially the purchase of outside material. When earnings begin to increase, the lid is lifted slightly and requisitions are again placed for

needed material, some of which should have been on hand for actual requirements during the dull period.

Anyone familiar with manufacturing conditions must appreciate the fact that this same feast and famine condition is, above all others, the one that militates most against the securing of the thing the railroads are so strenuously contending for at the present time, namely, lower prices. A full order book one month and an empty shop the next month are incompatible with low prices.

If the output of a plant falls below a certain minimum, then the overhead expense is immediately such that, to recoup the loss, prices must be increased rather than lowered, as would be expected on a declining market, and if it is not possible at the moment to secure increased prices

in the long run, the purchaser must pay the actual average cost through a period of years and must in turn take into consideration this very feast and famine condition with which we are all only too familiar in the railway supply business.

If the railroads, like industries, could continue their normal purchases through such times as these, they would immediately have the benefit of the traffic in the movement of raw material for such manufacture, and in turn the handling of the traffic incident to the finished product on the way to remote customers, and an immediate benefit would be secured in the matter of the railroads being able to make needed repairs and maintenance at times when both labor and material were available, as compared with the difficulty in recent years in getting material when it was wanted, which prevented many needed matters of repairs and maintenance being attended to at the proper time.

We have heard from all sides in recent times the complaint that this or that could not be done because material

and labor were not available and, yet, when both become plentiful, the purchases are curtailed.

Another very important item for consideration in this matter is the one of confidence which should be injected into the general situation immediately upon a general purchasing policy being established by important railway systems for the reason that the railroads themselves are the largest purchasers of all kinds of material and the moment one railroad begins purchasing it encourages others to do so with the immediate effect of brighter times for all concerned.

The fear that is now being felt that prices have not reached bottom is based on an unimportant consideration, as it must be realized that, in the main, prices do not vary to a sufficient extent to involve any considerable amount of loss, and, suppose loss does ensue, how long would it be before the industries of the country would be in the same position the railways were in at the time of the last rate increase? Is this desired? If not, buy now!

Railways Should Buy Only to Meet Pressing Needs

By Samuel M. Vauclair

President, Baldwin Locomotive Works

IN MY JUDGMENT this is the time for everybody to be careful and to act with the utmost prudence. I can only recommend railroads, manufacturers, merchants and housekeepers to buy sparingly and only in sufficient quantities to meet their most pressing needs. I feel that there must be a revision downward in the cost of everything, and it can only be accomplished safely by practicing the utmost

economy, not only in business, but in all walks of life from the housekeeper upward.

Therefore, I cannot consistently and sincerely advise the railways that this is the time for them to buy regardless of their necessities. They must be left free to exercise their own judgment, and we as manufacturers must govern ourselves accordingly.

More Uniform Buying Would Cause Lower Prices

By Charles J. Symington

President, The T. H. Symington Company

IT IS NOT WITHIN the province of the manufacturer of railway materials to instruct the responsible officials of the railways as to when they should purchase equipment, but he can perhaps be excused for contributing to the discussion if he believes he can demonstrate that the immediate release of requisitions for new equipment and supplies will operate to the direct financial benefit of the railways themselves.

The fortunes of the railways and of industries are indissolubly linked together and no possible advantage can accrue to the former by the stagnation of the latter. The railways have it in their power by the purchase now of necessary equipment to shorten materially the period of industrial and economic readjustment through which we all are passing, to stimulate at once freight traffic through the resulting movement of raw materials, and, what should be of prime importance to themselves, to get new equipment into service and begin earning money months earlier than if such purchases should be delayed until spring.

The mistake should not be made of assuming that cars, if ordered three months from now, could be placed in service only three months later than if ordered at once. Many plants depending on railway work have recently made drastic reductions in their rates of operation and in their working

forces, amounting in some cases to virtual shutdown. This condition will become practically universal among such plants if a moderate program of railway buying is not inaugurated before February 1. This condition will result in weeks and perhaps months of delay after the railways do decide to buy, before these plants can get their organizations rebuilt on an efficient basis.

Shutdowns and reorganizations cost money, and the ultimate consumer, in this case the railways, pays the bill. This must of necessity be so, as no manufacturer could keep out of bankruptcy if his costs were figured only on his good months. In our own plant we have not had, within my recollection, more than five good months in any one year, with the average around three. I believe our case to be typical and it should be obvious that a more uniform rate of operation would result in decreased costs and correspondingly lower average prices.

Under the particular circumstances which surround us at this time, most manufacturers are stocked up to a certain extent with high priced materials, solely because what looked like a buying movement last year came to a standstill before it had acquired any considerable momentum. This, however, is not such a factor in the present discussion as some of our purchasing agent friends might think. The price of

equipment is of necessity based on the cost of raw materials, but it is affected also by spasmodic buying and at this time particularly by the state of uncertainty which now exists as to when and to what extent railway buying will be resumed.

The present situation demands confidence, and I for one am ready to play with the cards face up. If the manufacturers can start running on railway work before their organi-

zations shall have become scattered, the delay and expense involved in getting production up to its normal speed will have been avoided and satisfactory deliveries can be promised and made. I am convinced that immediate action by the railways would provide the needed impetus for a sane readjustment of business with, as a result, material prosperity for themselves and the prevention of much individual suffering and financial distress.

Uncertainties of Situation Militate Against Buying

By R. P. Lamont

President, American Steel Foundries

WE SHOULD ALL LIKE to see the railroads buy equipment and supplies at this time, and if they did come into the market in a large way it would be very effective in bringing an upturn in the business of the country in certain lines at least, but if I were at the head of a railroad property I am not sure whether I should buy at this time.

At the moment the prices of the various materials such as pig iron, coal, coke, oil, refractories, etc., are relatively high; labor is also at the highest point for many years; and it is difficult to sell securities even at a very expensive rate from a railroad standpoint. On top of this the railroads are confronted with a shrinking business and reduced earnings.

In short, there is nothing in the general industrial or business situation today to justify the buying of additional equipment; however, there is one important offsetting consideration in that there are still people in influential places who would like to see the railroads back under the control of the government, and the railroads are in the position of having to justify the present situation of private ownership by showing that they can give better service than under government operation.

If the roads do buy heavily at the present time and prices and business continue to decline, it will be unfortunate; on the other hand, if they do not buy and business should suddenly improve to an extent that would make it impossible for them to handle the business next fall, it would be a very serious matter. Because of this consideration, it would seem to be desirable for the roads generally to take advantage of the present slack business to get roadbeds and equipment in

the best possible shape, and in addition to buy what other materials and equipment they can without any new financing.

It is difficult to say whether the present process of liquidation and readjustment has just begun or whether it is about completed. There are those who believe that many commodities, including wages, rents, real estate, together with the raw materials above mentioned, are still badly out of line with other commodities such as rubber, sugar, coffee, copper, cotton, wool, breadstuffs, etc., which have had a very severe shrinkage, and that there cannot be a general and sound resumption of business until this liquidation has become more complete. If this is true, the depression may drag through practically all of next year.

On the other hand, if the farmer should begin within the next few weeks to "cash in" his crops and resume buying of ordinary necessities, including agricultural implements, etc., thereby enabling the retailers to get rid of their stocks, so that they can in turn send in orders to the jobbers, who will then be able to replenish their stocks from the manufacturers, there may be a sharp revival of business in the spring. I believe we can have a pretty definite notion by the end of February as to whether or not this will come about, and I should be inclined to defer action on any large program until then.

Our business depends entirely upon railroad purchases, but the situation, as I view it, is so uncertain that I hardly feel like unqualifiedly urging any extensive buying program at this time.

An Opportunity to Prepare for Greater Economy and Efficiency

By Stanley H. Bullard

Vice-President, Bullard Machine Tool Company

THE SPIRIT of optimism which is the predominant note of every informed statement on business conditions of today, and the future, is founded on the basic soundness of our position, and the fact that true values are resulting from the period of readjustment through which we are now passing and from which we will soon emerge.

It is evident that the "new era" will be one of strict economy—one in which economy will be practically and wisely exercised—one in which judgment and not expediency alone will prevail in every transaction.

There are certain indications that a realization of the necessity for this new brand of economy is sinking deep into the consciousness of practically every unit of our industrial and business structure. And this is good; for it will eventually result in a constantly increasing efficiency

in the use of equipment, a higher sense of responsibility for the good condition of such equipment, and, even though wages are maintained at high levels, an actual lowering of costs in practically every line of production.

We are mentally prepared for this outcome. Are we taking the proper and timely steps to place our shops in a state of proper physical preparedness?

Equipment which has been stressed to its limit in the last few years, and during that time has been at the tender mercy of "the best we could get," is today in doubtful condition to permit truly economical operation. This applies to almost every item and now is the time, in fact the big opportunity, to make a careful survey, put it in shape or replace it with something which will meet the coming demands, and do it with economy.

Equipment manufacturers are in an exceptional position to serve, either in the matter of maintenance repairs (both material and experienced labor) or in the matter of replacement by prompt shipment of equipment of the latest and most efficient design. They are also now able to aid the officials in charge of shop operation in the planning

of better and cheaper methods of performing shop work, bringing to these problems a new viewpoint.

Certainly we are all of us wiser than the Irishman who wouldn't mend his roof when the sun shone, because it didn't leak, and when it *did* leak, couldn't mend it because of the rain.

Railway Buying and General Business

By E. B. Leigh

President, Chicago Railway Equipment Company

WITH REFERENCE to the advantages of a "Buy Now—Ship Now" policy, not only to the railways themselves but to the country at large: Let me first call attention to a fact, familiar to you, namely, that it has been amply demonstrated that for a period of over fifteen years prior to the Great War, railway purchases not only initiated general activity, but also that once thus started, sustained a general buying movement, and with its logical reflection in general business—in a word, general business prosperity. While this relation was largely suspended during the abnormal conditions of war, the principle is as sound today as ever.

As we are now passing through a period of drastic liquidation, it may be urged that commodity prices have not yet reached their lowest level; while the labor question is far from being adjusted as eventually it must be—hence that it is not yet an opportune time to initiate extensive buying.

Under normal conditions this situation might properly influence and delay all purchases, where postponement is possible, until these important factors have become stabilized.

But are we, or are the railways, operating under "normal" conditions?

It is well known that railway facilities are entirely inadequate, both in requirement and condition; that purchases on an enormous scale must be made before our railways, as a whole, will be able to take care of the country's requirements, once the temporary depression is passed and the several years of unprecedented business, confidently predicted by nearly all authorities, are upon us.

At this particular time, and in view of the unusual con-

ditions surrounding them, it would seem the part of wisdom for the railways to consider the possibilities of ultimate, rather than immediate cost of facilities, when measured in terms of the consequences of delay; for it is worth while to remember that ultimate cost may involve factors other than present price. A margin of price obtained by delay might prove an expensive economy if the delay itself entailed disaster.

Most serious is the prospect that in the next large freight movement (not far off from the most pessimistic standpoint, if measured by the time absolutely necessary for construction), inadequate facilities, poorly maintained, will mean *unsatisfactory service*.

If that occurs it will take every resource of skill and organization to keep the railways in private control. What could prevent this issue from dominating the next presidential campaign? If ever anybody needed the caution against the temptation to be penny wise and pound foolish it is the railways of the United States in the year 1921.

The present period of depression affords an ideal opportunity for the manufacturer to produce and the railways to transport the needed facilities. By so doing both are active; each would gain; the railways by utilizing their present equipment in acquiring their materials and devices; the manufacturer in making prompt deliveries; while each would gain valuable time and headway in that inevitably vast rehabilitation of the railway's carrying facilities.

In view of the situation outlined, and the probable helpful effect upon business generally, surely it would seem wise to "buy now" and "ship now."

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Photo from Ewing Galloway

A Cotton Warehouse Yard

Railroad Power of Rehabilitation Returning

Budgets Indicate Gradual
Re-establishment of Rail-
road Credit, With Which
Expenditure Will Keep Pace



THE RAILROADS of the United States have been considering 1921 programs for additions and betterments which, in terms of new bridges, new rail, ballast, shop extensions, and new equipment approximate a normal pre-war year's work. This statement is based on information furnished us at our request by the presidents of nearly all of the large railroads of the country, approximately one-fourth of whom gave us detailed information concerning the projects now under consideration, these roads being so widely scattered and operating under such diverse conditions as to be representative of the railroads of the entire country. While this program may seem conservative, when compared with the cumulative effect of several years during which not much expansion work has been done, it marks a distinct advance toward better conditions, and the fact must not be overlooked that to raise nearly \$1,500,000,000 now required to carry out such a program would place a strain on the credit of the roads more than twice as great as was required to raise between \$600,000,000 and \$700,000,000 a year before the war.

Executives are keenly appreciative of the need for extensive improvements, and increases in railroad facilities, and there is probably no group in the country more anxious that this need be supplied within the shortest possible time. This statement of the receiver of a large line is typical of similar expressions by others.

"In common with most southwestern lines * * * terminal facilities are inadequate, and if funds were available we would like to spend about \$6,000,000 per year in providing freight train yards and facilities for caring for equipment, passing tracks and ballasting. If we were able to spend \$5,000,000 or \$6,000,000 for the next six years we would include in improvements stretches of double track and about 400 miles of automatic block signals."

The president of an eastern railroad says:

"Should business develop, as I believe it must, this company would need, say, 50 locomotives and 3,000 freight and coal cars, as well as 75 passenger cars. We ought to spend on additional running tracks, yards, stations, and other facilities from seven to ten million dollars."

A western railroad is planning to spend about \$12,000,000 in improvements, including the acquisition of new shops and equipment, probably over a period of three years or more.

While it is impossible to discuss in detail what may be considered the railroads' maximum expectation for the year's capital expenditures, it is evident that the largest item would be for new locomotives and freight cars and that, amounting to about one-half of the total, it would be proportionately a little larger than the average. Of the remainder, the greater proportion would be spent in renewing bridges, relaying rail, providing additional passing tracks and second tracks, and in public improvements, such as grade separation projects and new stations. Yards and terminals, shop extensions and shop facilities together, apparently come in for considerably less than one quarter of the total.

In general, comparatively little new passenger equipment is under consideration. That this is not because of any failure to appreciate the need for additional passenger cars is evident from the following statement by an eastern railroad president:

"It was our expectation to expend approximately \$1,225,000 in the purchase of additional passenger train cars during 1921, but in view of the decision of the Interstate Commerce Commission that no moneys would be loaned from the \$300,000,000 revolving fund for the purchase of such equipment until practically all other needs have been met, it has been found necessary to postpone such purchase until a later date."

Year's Work Now Uncertain

What the railroads have had under consideration and what actually is likely to be done may be quite different matters. The extent to which all the projects being contemplated will be definitely developed and the extent to which they will be carried out is very uncertain at the present time.

There are five principal reasons for this uncertainty, not all of which affect every case, but some one or more of which is at present exerting a powerful influence to defer the definite formulation of betterment programs on a scale satisfactory to railway executives. These are: First, the sharp business recession since October; second, inability to forecast the full effect on net earnings of the new freight and passenger rates; third, failure to effect settlements with the United States government for the period of government control and the subsequent guaranty period; fourth, the slowness with which loans have been released from the \$300,000,000 fund created by the Transportation Act, and fifth, the convic-

RAILROADS possessing cash or credit are pushing ahead with their betterment programs. Other large programs are awaiting the gradual restoration of railroad credit.

The general attitude of railroad executives reflects confidence in the ultimate working out of the present uncertainties to a satisfactorily stable basis, but this faith is tempered by a disinclination to take chances with the solvency of the properties on a guess as to just when the desired stability will be attained.

tion that the prices prevailing during the closing months of 1920 are excessive.

The marked reduction in traffic which has been evident since the latter part of October has had a most marked effect in holding up or causing a complete revamping of programs for the coming year. Thus, the chairman of the board of directors of a southern road says:

"We had outlined a comprehensive plan of development which we now feel, owing to the very considerable recession in business, will be materially modified. Under these conditions I feel that we should go slow in making forecasts and determining just what should be the program for 1921, until we see the signs of revival of business, which I personally feel will take place after the first of the year."

The president of another road says: "At the present time I feel like postponing all expenditures except such as are absolutely necessary until we can see a little farther on."

The president of a western railroad system says that, until business improves, "we have felt that it would not be practicable to make any budget of improvements for next year, because expenditures in that direction necessarily will depend upon the revival of business."

There is an inkling of the problems of management created by the decrease in the volume of freight movement in the statement of the president of another road, who says "I spent some little time in getting the * * * organization into the frame of mind necessary to enable it to deal with a slump in traffic and until there is a radical change in the business outlook I don't want to begin talking to our people about spending money for improvements unless it is something necessary for safety of operation or service to the public."

There are a number of railroads whose credit standing is such that the only means of financing additions and betterments is from surplus earnings. The showing made by such railroads, particularly in the west and southwest, under the new rates during the month of September and October were sufficiently encouraging to lead to the development of tentative improvement programs. The effect of the decrease in traffic on these roads is clearly brought out in the following quotation from the president of one of them:

"The great slump in business which has occurred in the last six weeks and the outlook for its continuance for some months has made it necessary for me to revise the plan which I had in mind and will probably make it necessary for us to hold our expenditures down to those matters which are more or less inseparably connected with the maintenance work, or which are required by state or federal authorities."

Several conditions have arisen in the short time since the increase in freight and passenger rates went into effect which make it very difficult to foresee just how closely they will produce an average net operating income equal to six per cent on the valuation. In the first place the rates have only been in effect for a period of four months, and during that period the heaviest average daily traffic movement ever recorded has been followed by a slump that has reduced traffic to a point considerably below the average for the first six months of 1920, the basis on which the rate increase was established. Furthermore, during September and October, two months of unusually heavy traffic, the net operating income of the railroads as a whole was respectively \$34,000,000 and \$26,000,000 less than the six per cent average designed to be produced by the rates, although the first returns for November are more favorable.

Other factors adding to the uncertainty as to the adequacy of the present rates are stated thus by the president of an eastern railroad: "First of all the rates authorized are not yet all in effect and few, if any, of the roads have been able to adjust their operations, and particularly their forces, upon anything like a stable basis."

Considerable time will probably elapse before operating

practices become stabilized on an efficient basis, and until it is generally believed that such a basis has been reached, no one can say with certainty how far it may be possible to offset conditions unfavorable to the present rates, by decreases in operating expenses.

At the present time, therefore, the ultimate effect of the rates in restoring railroad credit is largely a matter of conjecture.

The first and second causes for uncertainty as to what capital expenditures may be made during the coming year are of very general application; there are probably few instances in which they have not exerted a material influence towards limiting expenditures in the immediate future. The failure to secure settlements with the government, particularly for the six months' guaranty period, and the slowness with which negotiations have been completed for loans from the revolving fund are not of general application, but in the aggregate the amounts involved are great enough to produce a marked effect in delaying the effective rehabilitation of the nation's transportation system. Approximately \$400,000,000 due the carriers under the guaranty provisions of the Transportation Act is locked up in the United States treasury awaiting a decision in mandamus proceedings before the Supreme Court of the District of Columbia to determine whether the treasury department's strict interpretation of the act shall prevent the roads from having access to any portion of this sum until all claims have finally been adjusted.

Following considerable delay at the outset in interpreting the provisions of the Transportation Act pertaining to the distribution of the \$300,000,000 revolving fund, loans are now being approved with much greater celerity and at the present time probably about two-thirds of the total amount has been authorized. This leaves approximately \$100,000,000 still available. When this is added to the \$400,000,000 guaranty fund, the total amount thus withheld very closely approximates the average annual expenditure for additions and betterments made by all the railroads during the years immediately preceding the war period.

Just how this situation has affected some individual railroads is indicated by the following statement of the president of an eastern system:

"What we shall be able to do in that year (1921) is problematical and largely depends on what settlement we may make with the government under the contract and during the guaranty period; when we secure the money, and how much; and also upon financial conditions generally in the immediate future."

The president of a small railroad in the central district which has plans developed for the expenditure of approximately \$1,800,000 in 1921 says, "Whether we will be able to do much of it or not will depend on whether we can work out some settlement with the government which now owes us nearly \$3,000,000. Up to this time we have been unable to get anything and are naturally pretty short of cash."

The belief that present price levels are excessive and cannot long be maintained, in some cases is also a powerful factor in reducing capital expenditures to bare necessities.

"Who has the nerve to buy a thousand freight cars at \$3,200 to \$3,500 a car, or locomotives at \$55,000 to \$70,000, or undertake large construction jobs with an eight-hour day program and existing rates of wages? Who will build extensions to railroads with steel at \$55 to \$57 a ton? * * *

"Manifestly there is some work which must go on willy nilly; but * * * a suit of clothes with patches on the seat are still clothes and a man may still present himself in public and bide his time till the price of another suit comes within reach."

This is the statement of the president of an eastern railroad having \$20,000,000 in bridge and grade separation projects, shop extensions amounting to \$1,000,000 and a new

equipment program amounting to about \$3,000,000 "which ought to be put in hand."

The president of a southern railroad who has authorized expenditures for double track, reduction of grades and other roadway expenditures since the return of the railroads to private control aggregating more than \$12,000,000, and who hopes to appropriate considerably larger amounts during 1921, says: "The present prices for equipment of all classes are in my opinion quite excessive and unless material reductions are brought about we may not be able to increase our ownership on the scale now in contemplation. * * * We have some very pretentious ideas as to additional equipment but I am afraid that we shall be obliged to go rather slowly."

Programs Definitely Undertaken

But in spite of all these unsatisfactory conditions tending to withhold expenditures on a large scale, a number of extensive projects have been definitely laid out for execution this year. Others undoubtedly will be decided upon in ample time for completion before the end of the year, as many railroads do not take up final consideration of their budgets until after January 1. Many improvements started during 1920 also will be carried on or completed during the current year. These projects will add materially to the volume of work under way during the year as well as to the facilities which will become available before the end of the year.

The few definite programs, knowledge of which is available, call for total expenditures, including equipment, ranging from approximately \$2,500 to \$26,000 per mile of line.

The Delaware & Hudson Company is planning line reconstruction and new yard projects involving a total expenditure of \$2,250,000.

The Southern Pacific, Texas and Louisiana Lines, has recently authorized expenditures of over \$16,000,000, of which \$8,750,000 is for the purchase of equipment or the construction of equipment in its own shops, \$3,800,000 is for ballasting, \$2,800,000 for rail relaying and \$700,000 each, for the purchase of new shop tools and for bridge work, respectively.

The Chicago & Alton will spend \$2,404,000 for equipment which will become available during 1921, and will complete a new freight house and general office building in Chicago, costing \$1,960,000. In addition to this the freight yard and engine terminal at Springfield, Ill., will be enlarged at a cost of \$425,000, and \$195,000 will be expended on second main track. Other additions and betterments amounting to \$200,000 make a total of \$5,184,000 in additions and betterments which are all expected to be in service before the end of 1921.

The Richmond, Fredericksburg & Potomac, with only 119 miles of line, is spending a little more than \$1,000,000 on improvements, \$500,000 of which is for the purchase of new equipment or rebuilding of existing equipment, while a slightly larger amount will be expended in additional engine house facilities, shop tools, freight station and classification yard enlargements and the construction of a new electro-pneumatic interlocking plant.

The Delaware, Lackawanna & Western will undertake a grade separation project through the city of East Orange, N. J., that will involve a total expenditure of about \$4,000,000.

The Chicago, St. Paul, Minneapolis & Omaha now has under contract 10,500 tons of rail, 10 locomotives, 125 stock cars, five new station projects and extensive yard and station improvements at five terminal points. This work will aggregate \$2,100,000 and will all be completed in 1921. The full program for the year, of which this forms a part, has not yet been completed.

The Missouri, Kansas & Texas has tentatively outlined a program for improvements for this year aggregating approximately \$22,500,000. Of this amount over \$12,000,000

is for 60 passenger cars, 2,800 freight cars and 40 locomotives; \$6,000,000 is about equally divided between shops and engine houses and terminals and yards; \$900,000 is for new rail, \$886,000 for stations, \$701,000 for signals and interlocking plants, and the remainder for ballast, bridges and shop machinery.

The budget of one eastern road, averaging \$7,000 a mile of line, will be spent as follows: \$3,000,000 for new freight locomotives, \$900,000 for seaboard terminal improvements and about \$1,000,000 for new passing tracks, terminal facilities, double track and miscellaneous improvements, to be completed during 1921.

The Norfolk Southern has made definite plans to spend about \$400,000 on grade revisions and strengthening bridges, which will practically double the train haul between Raleigh and Charlotte, N. C., a distance of 156 miles. This road is also planning to spend about \$250,000 on the rehabilitation of 400 freight cars.

The Boston & Maine is planning to purchase 27 new switch engines and 10 freight locomotives.

The Chicago, Indianapolis & Louisville will build a \$200,000 steel freight car repair shop and expects to spend \$350,000 for new locomotives.

The president of a large eastern railroad says: "We are going along and authorizing upwards of \$1,000,000 of new work every month, and have been doing so right along during the past because the * * * company is obliged to do about that each month whether it wants to or not in order to measurably keep up with the procession." This money is spent on such additions as new industrial tracks, enlargement of certain facilities, grade separation and new equipment.

These budgets are reasonably certain of execution during the coming year and they are typical of the plans of other railroads that will be carried out in spite of present uncertain business conditions.

Among the projects under way but incompleting which will be continued during 1921, the Nashville, Chattanooga & St. Louis has appropriations for new capital amounting to \$273,000 for additional terminal facilities, \$314,000 for other roadway improvements, \$264,000 for additional freight cars and \$93,000 for other equipment.

The Wheeling & Lake Erie is spending about \$1,500,000 on additions and betterments, approximately \$1,000,000 of which will be used during 1921. The improvements contemplated are additional yard and terminal facilities at Jewett and Canton, Ohio, and car repair facilities at Brewster, Ohio.

The Long Island now has under way yard addition and improvement projects amounting to \$500,000 and is spending \$540,000 on additional high tension transmission lines to reinforce its electrical installation.

Some of the other projects already under way are the construction of equipment and the building of a double track on portions of the Virginian which, including additional side tracks and improvements in terminal facilities, involve a total expenditure of approximately \$10,000,000; the building of a cut-off on the Kanawha & Michigan and the enlargement of yard and engine terminal facilities on the Texas & Pacific.

Contracts have been let by the Atchison, Topeka & Santa Fe for the construction of new shops at Albuquerque, New Mexico, involving an expenditure of nearly \$2,000,000.

The Outlook

The general attitude of railroad executives is not one of pessimism; rather, it reflects confidence in the ultimate working out of the present uncertainties to a satisfactorily stable basis. This underlying faith, however, is tempered by a disinclination to take chances with the solvency of the properties on a guess as to just when the desired stability

will be attained, and it is also restricted in its effect by a lack of credit not within the power of the executives to overcome immediately. One railroad president aptly summarizes the situation as follows:

"While the outlook under the new rate basis * * * is very encouraging, the actual status of the company is that of being convalescent at the moment, and this, I take it, is true of the great majority of American railroads.

"Because of the very poor showing which all of the companies made as a result of operation during the period of federal control, more or less—generally more—doubt has been cast upon the earning possibilities of the companies and consequently upon their credit, and those who determine the standing of railroad credit will want to see the results from a number of months of operation on the new rate basis before reaching a definite conclusion."

The impossibility of any overnight rehabilitation of the railroads' properties and the need for patience on the part of the public is also touched on by the president of a western system. He says:

"I do not think the public should expect too much of the railroads at too early a date. The Transportation Act of 1920 and the increased rates are calculated to restore railroad credit but this will take time and until it is so restored that financing can be done on a reasonable basis railroads cannot go ahead with any comprehensive program of expansion and improvements. When the way is clear for financing, the next step will be to make arrangements therefor. After such arrangements are made, it will then be in order to look for such an improvement in the railroad plant as the needs of the country require and the public expect."

The whole matter sums up to just this: Those roads fortunate enough to possess cash or credit are pushing ahead with their betterment programs, but in general, extensive programs must await the restoration of railroad credit. Credit restoration, at best must be a gradual progress, and the sharp recession in business has temporarily stopped the process. In the meantime the provisions of the Transportation Act to tide the roads over this transition period are functioning only partially and may or may not function completely before the period is past.

With one exception the factors affecting credit restoration must take their course through the "mills of the gods." The volume of traffic alone is subject to some control and this is in the hands of the shipping public.

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Photo by International

American Cars Unloaded at Danzig, Poland, Ready to Be Assembled

New York Central Proposes Lease of Chicago Junction

THE NEW YORK CENTRAL has filed formal application with the Interstate Commerce Commission for authority to lease, operate and ultimately purchase the Chicago Junction Railway Company terminal properties at Chicago. The project proposes the unification of related lines for greater economy and efficiency, and concerns properties valued at about \$33,000,000.

The New York Central has long needed larger freight terminal facilities at Chicago, and the lines embraced in the proposed merger are the only such properties remaining unconnected with a large trunk line system, spreading over the important industrial districts of southwestern Chicago, including the Union Stockyards district. Included in the plan are the lesser terminal properties of the Chicago River & Indiana.

The Chicago Junction terminal facilities connect directly with the New York Central's "outer belt line"—the Indiana Harbor Belt Railroad—forming a natural extension of this company's rails into the heart of the city's southwestern industrial section, and thereby assuring to both railroads an increase in efficiency and capacity which has been impracticable under independent operation. The terminal properties have superior connections also with three other railroads of the New York Central system—the New York Central, the Michigan Central and the Big Four—each of which will be provided with better terminal service for all of its heavy Chicago traffic.

The application states that extensive immediate improvement and development of the existing terminal facilities, which could not possibly be duplicated, is planned. It enumerates in detail the various operating conditions which make acquisition of the additional terminals by the trunk line distinctly a matter in the public interest and cites the ways in which the efficiency and capacity of both the terminal properties and the existing facilities of the trunk line would be enhanced by the consolidation. It is stated that at present the natural flow of a large amount of freight traffic over the main lines actually is impeded and delayed by circuitous routing because of the inadequacy of terminal facilities at Chicago.

The territory served by the Chicago Junction terminal lines, in its extremities extends from Western Boulevard on the west to Lake Michigan and from Forty-ninth street on the south to Ogden avenue.

The Chicago Junction, in general, includes a double-track inner belt line 23.94 miles long, with side tracks and industrial tracks aggregating 168.66 miles. It owns 68 locomotives and 291 cars. The Chicago River & Indiana owns 15.71 miles of terminal road, all within the city of Chicago, and has trackage rights of 28.87 miles over other roads. It owns 9 locomotives and 264 cars. The foregoing are the figures given by Moody's Manual.

The proposed method by which the terminal properties are to be acquired by the New York Central provides for the purchase of all of the capital stock of the Chicago River & Indiana, and the lease thereto, with right of ultimate purchase, of all the properties of the Chicago Junction Railway Company. The properties have been exhaustively examined by experts as the basis for appraisal of valuations.

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PRAISE FOR PRIVATE CONTROL.—Nowhere has the spirit of American efficiency been manifested more strongly than in the management of the railroads since their return to private control last March.—*N. Y. Commercial.*

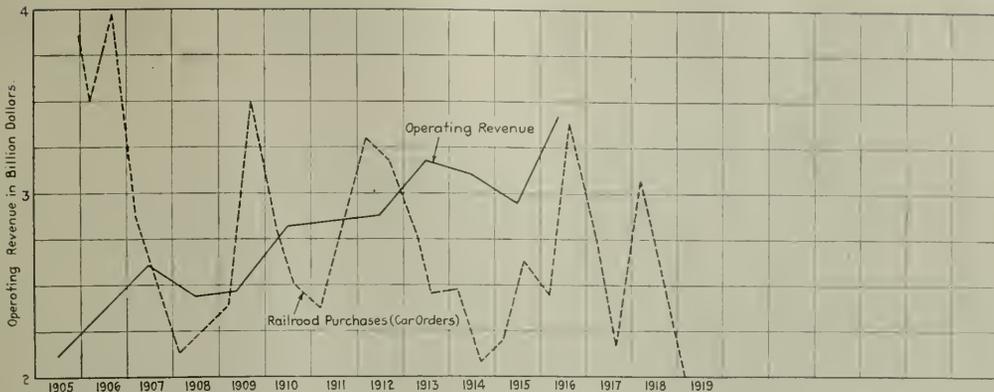


Fig. 1—Railroad Operating Revenue as Compared with Railway Purchases

Railway revenue, which furnishes the financial basis for car purchases, is represented by a relatively straight line, with slight vertical fluctuations and with an upward movement that shows little interruption. The curve representing car purchases, however, is highly irregular and is subject to extreme fluctuation.

The Next Step Toward Preventing Depressions

Stability of Railway Purchases Offered as Remedy by
Railway Business Association Committee

“As CAUSES of industrial and commercial depression, crop failures and money panics have been made unlikely. The next step toward continuity of general business and employment is to stabilize railway purchases.” This is the conclusion stated in a report made by the Com-

mittee on Stability of Railway Purchases of the Railway Business Association’s general executive committee.

The committee points out that if the several governmental units and the public utility companies were to pursue a policy of doing their heaviest improvement work in times when

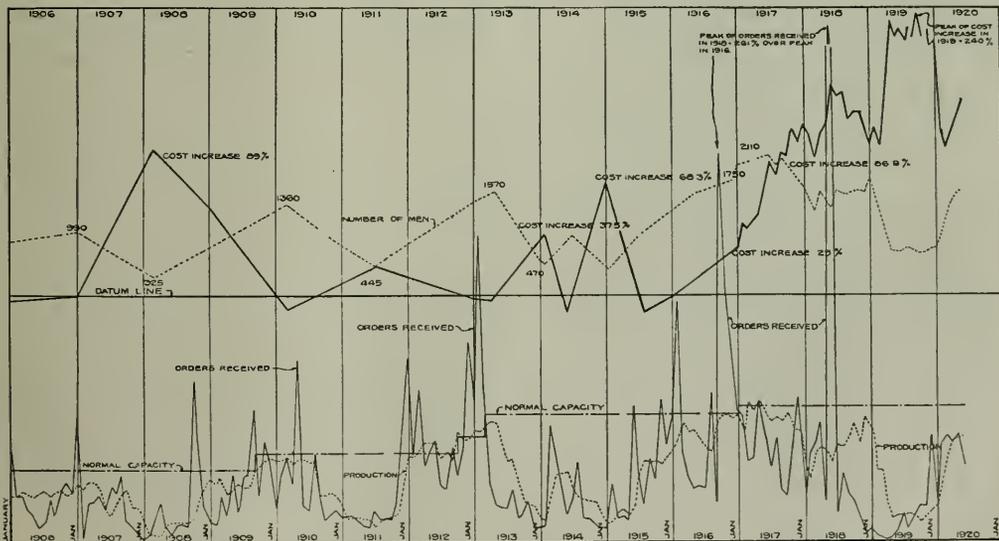


Fig. 2—The Experience of an Industrial Company Supplying Railway Materials

This shows strikingly the relation between volume of railway orders and the production cost level. With the decline in orders and production in 1907, the production cost increase was 89 per cent; in the same time the number of employees fell from 990 to 325. With the revival of railway purchases in 1909 and 1910 the number of employees rose to 1,360, and shop costs dropped to a lower level than had prevailed in the prosperous days of the end of 1906. Similar correspondence between the curves of railway orders, production, number of employees and production cost prevails throughout the chart. It is maintained after the outbreak of the war, though beginning with 1915 costs show a pronounced independent upward tendency.

general business is slack and unemployment serious, and the steam railways followed the same course, the ups and downs in forestry, mining, manufacture and trade would be

of the Committee on Stability of Railway Purchases, in cooperation with the president and secretary, to prepare the first of a series of documents setting forth the substance of

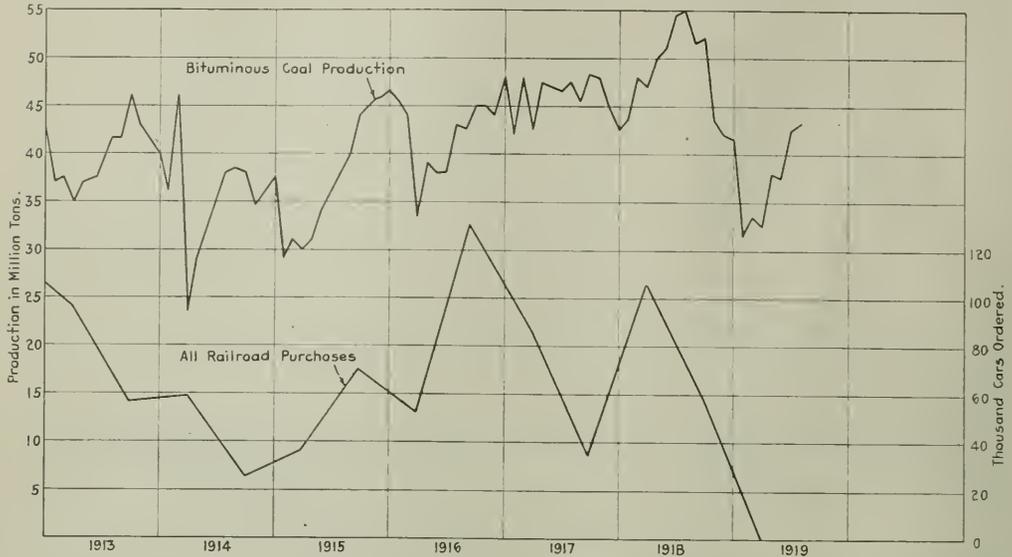


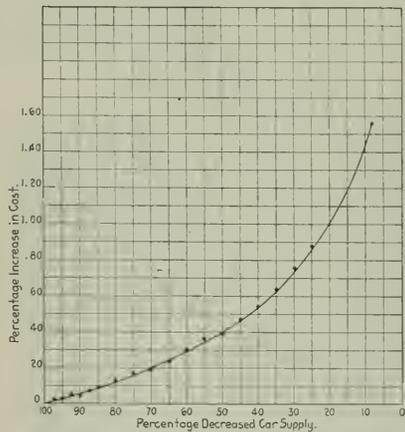
Fig. 3—The Relation Between Railway Car Purchases and Employment in Bituminous Coal Production

This chart, while it does not display the minute correspondence that is characteristic of the two preceding ones, indicates a general relation that is striking. Car orders dropped heavily in 1913; coal production first dropped and then recovered, but rushed downward rapidly early in 1914 by way of compensation. The subsequent upward swing appears first in the railway order curve late in 1914 and extends to the coal production curve with the beginning of 1915. The downward movement appears in the car order curve late in 1915 and in coal production in January, 1916. The car order slump in 1917 is not reflected in coal production; this is of course explained by war conditions, which accelerated business in some directions, while retarding it in others, including railway equipment manufacture. The long downward curve in 1918 appears first in railway purchases and afterwards in coal production.

greatly mitigated, if indeed acute unemployment were not thereby reduced almost to the negligible.

the report for circulation among the railway supply manufacturers and among the railway managers. The chairman of the committee is S. P. Bush, president and general man-

The general executive committee requested the chairman



Figs. 4 and 5—The Production of Bituminous Coal in Relation to Car Supply

The chart on the left refers to cost of production. "The particular cause of lost operating time here selected for analysis was car shortage," says the American Institute of Mining and Metallurgical Engineers, which prepared the chart. "Other causes such as mine disability or dull market, would doubtless have increased costs in the same manner. It is the interruption to operation, not the cause of the interruption, which raises prices." The upward sweep of the production cost curve is rapid and would apparently, if car supply reached zero, attain to that paradise of mathematicians, infinity. The chart is based on monthly records of car operators in the New River district of West Virginia which produced 7,231,343 net tons in 1917. The chart on the right shows the relation between intermittency of employment in bituminous coal production, the number of men required to get out the year's supply under that condition, and the consequent labor cost.

ager of the Buckeye Steel Castings Company, Columbus, Ohio.

Responsive to the authorization mentioned above the following has been drawn:

Digest of Report of Committee on

Stability of Railway Purchases

Certain strong railway systems have in the past or present boldly made large improvements in dull periods. Their theory was that the accumulation of idle locomotives in roundhouses and idle cars on sidings was the signal to buy more locomotives and cars; because never could they be bought so cheaply as then and never would there be so much available track and motive power wherewith to transport the materials of engine and car construction without crowding general merchandise traffic off the ways. The same applies to construction of track and all appurtenances of the railway, as well as terminal improvements and enlargements.

Not only are these facilities obtained within such periods at least cost for material and labor and at least inconvenience

the basis of carrying on addition and betterment work energetically during times of depressed traffic and earnings, thus avoiding the extreme ups and downs which affect the railway supply industry and which are so costly for all concerned. We have said that the government should give and the railways seize this opportunity to effect economy and to stabilize employment of labor and plant."

The committee has constructed 11 charts illustrating the bearing of railway purchases upon the welfare of labor and of general business. The charts are now printed for the members of the association and others interested.

BENEFITS GENERAL.

While stability for the railway supply industry would be a direct result of stabilizing railway purchases, the benefits would be widespread and would extend far beyond the limits of any one industry. "The stabilization of national industry through a soundly constructive railway transportation policy and economical railway purchasing" is the true aim of the committee, according to its report. "A soundly economic



Fig. 6—Locomotive Construction as Affected by Railway Purchases

The chart which shows graphically the effect that orders and deliveries of locomotives at the American, Baldwin and Lima plants have had upon the employment of labor there since 1900. The curves rise and fall in unison throughout the chart. Such variations as orders of 4,839 locomotives in 1906 and of 929 in 1908 are shown to be attended by such decreases in employment as from 19,500 in 1907 to 7,000 in 1908.

to general business, but the roads so promptly and economically equipping themselves are ready to carry the next peak of load when it comes. It has always been recognized by those close to the situation that such large railway buying has mitigated unemployment and eased the financial strain upon many industrial and commercial institutions. As adequate railway revenue is essential to a stabilization of purchases, the committee will observe the financial results of railway operation under the rate schedules recently initiated by the Interstate Commerce Commission with a view to offering such recommendations as experience may make desirable.

ORIGIN OF THIS COMMITTEE

The Committee on Stability of Railway Purchases was named in response to a clause in the annual report of the general executive committee for 1920:

"Promotion of such stability has long been a part of our work. We have continually declared that sufficient railway income should be permitted for accumulation of a surplus as

purchasing policy can hardly be inaugurated and carried forward unless the general policy governing the railway transportation industry is sound and constructive," the report adds.

E. B. Leigh, appearing on behalf of the Railway Business Association before the House Committee on Interstate and Foreign Commerce on September 15, 1919, testified to the magnitude of the railway supply industry:

"In general I make the statement that no occupation except agriculture employs so many people as do railroading and providing the needs of railroads. From raw material to finished product those employed in railway supply industries are believed to be pretty close to 2,000,000. Apparently another 2,000,000 are now employed by the railroads themselves, a large number of these engaged in the maintenance, improvement and extension of the properties.

"If new railroads were in the course of construction the number of employees would be increased by many thousand more whose existence makes no entry upon the statistics of

employment compiled by the Interstate Commerce Commission until the new road is completed and actually doing business as a common carrier."

indicates, be highly advantageous to the country even if it carried no other beneficial results in its train. The steel industry in the days before the formation of the United

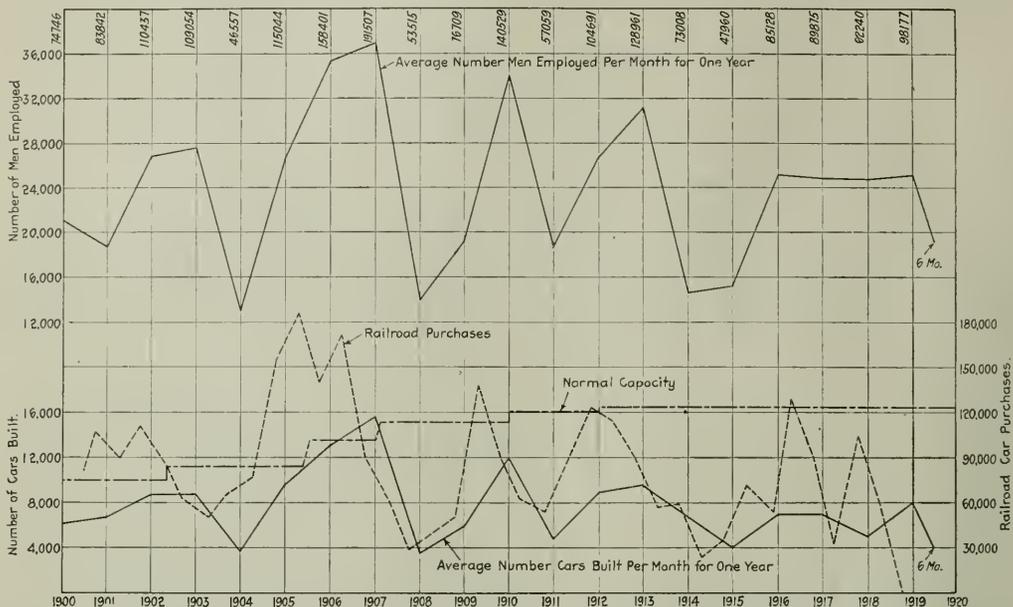


Fig. 7—The Car Building Industry as Affected by Railway Purchases

The curve showing the number of cars built follows the curve of railway purchases at an interval of some months, which represents the time elapsed between the receipt of the order for cars and the completion of the cars. The curve representing the number of employees varies directly and immediately with the production curve, dropping from 128,961 in 1913 to 73,008 in 1914, and rising to 85,128 in 1916. The production curve rarely reaches the line representing the normal capacity of the plants and remains far below that line for the years since 1907.

PRINCE AND PAUPER

The stabilizing of an industry so huge and so far-flung as the railway supply industry would, the committee report

States Steel Corporation, Andrew Carnegie once said, was either prince or pauper. The railway supply industry, while it never resorts to passing the hat, has its long-drawn-out

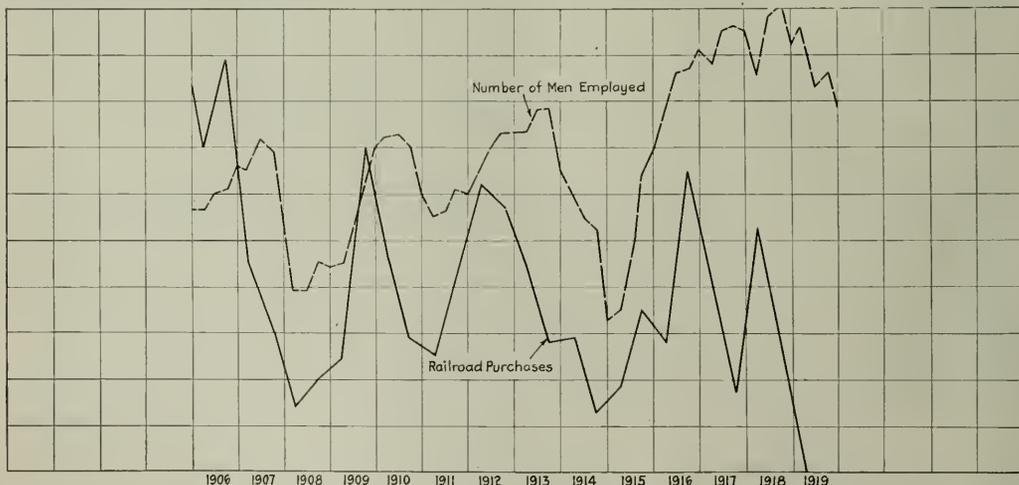


Fig. 8—Employment in the Steel Industry as Affected by Railway Purchases

Employment in the steel industry, as shown by the experience of the United States Steel Corporation since 1906. The curve showing railway purchases describes wide sweeps up and down the chart. The curve showing the number of men employed follows the railway purchase curve at a discreet distance, from which observers deduce that in relationship of the two the railway purchase curve is cause rather than effect.

pauper periods, which subsist on the comparatively princely intervals and which necessitate relatively high wages for capital and labor during the prosperous interludes if the industry is to be prepared to discharge the demands made upon it.

Idle time on the average has been estimated by some authorities as high as 50 per cent in the coal mining industry, 70 per cent in the entire steel industry, 62 per cent in the steel castings industry, 55 per cent to 60 per cent in the car building industry and 65 per cent in the locomotive building industry. If buying continues to be conducted in the present sporadic manner, further additions to these plants will be necessary to care for the next business advance, and these additions will themselves, over a period of years, re-

public utilities, as well as the federal, state, county and city governments, would conduct their buying moderately when trade is brisk and come boldly into the market for labor and materials when business is slack depressions would be greatly mitigated if not done away with altogether."

The reason, Mr. Johnson explained, why a railway could pursue such a policy successfully, though it would in many businesses not be feasible, lay in the fact that a railway, even though its business had fallen off, could predict with certainty that in a short time its facilities would be overtaxed and that certain additional facilities, both of way and of equipment, would be required. It could proceed to place its orders with certainty, just as Ole Hanson while he was Mayor of Seattle found he could do in the case of street

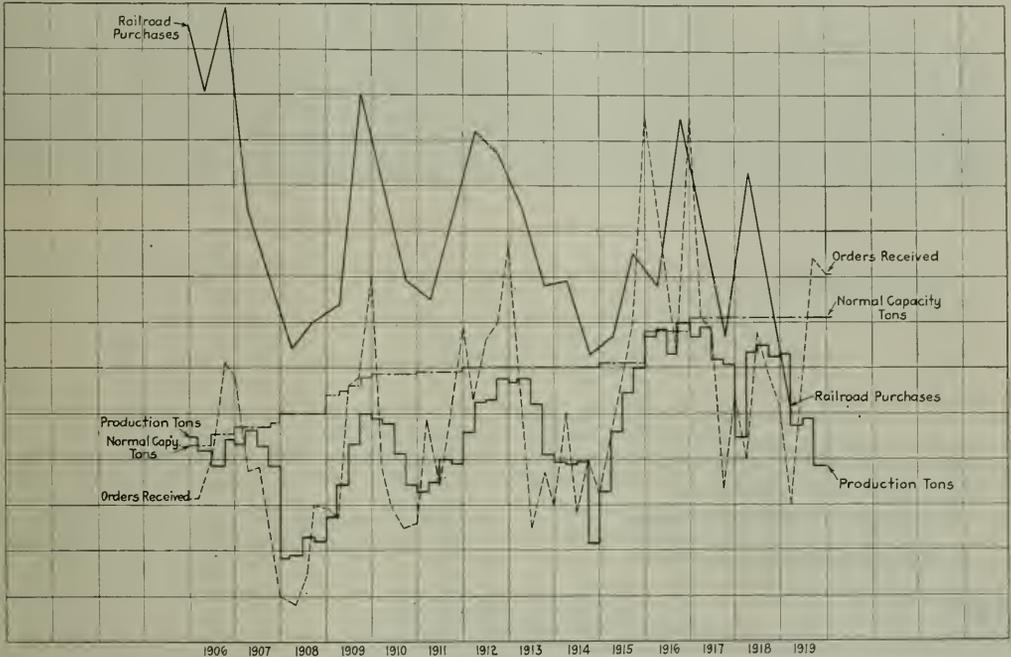


Fig. 9—Steel Production as Affected by Railway Purchases

The relation between railway purchases, orders received, total production and normal capacity in tons, in the experience of the United States Steel Corporation from 1906 to 1919. The railway purchases curve keeps close company with the orders received curve and in some instances displays the phenomenon of preceding it in upward or downward movements. This is true of the drops in 1909 and 1912. The production curve follows the ups and downs of the railway purchases curve throughout the chart.

main idle for much of the time. The total loss from the strikes of the year 1919 has been placed as high as \$2,000,000,000. It is possible that the losses due to shutdowns caused otherwise than by strikes would reach a figure equally high.

Can Anticipate Needs

Speaking of the need for stabilized railway purchases, President Alba B. Johnson in an appendix to a statement made in August, 1919, before the House Interstate Commerce Committee, said:

"Some citizens bite this idea to see whether it is bogus. They inquire with a quizzical smile why it is only the railroads that should buy in dull years. What, they ask, is to prevent every kind of business from stocking up when the store is empty of customers? Why need there ever be any depression? The truth probably is that if railways and other

improvements. Mr. Hanson on June 30, 1919, in answer to a letter from the Railway Business Association, wrote:

"We have held back street improvements, which are paid for by special assessments, for four years, making it possible for us to embark at once upon a career of money-spending in necessary public work. There are, as far as I know, very few people idle in Seattle today, not nearly as many as were idle before the war and during normal times."

EMPLOYMENT OF LABOR

Steady employment, the committee report says, "is the most essential element to the welfare and contentment of the worker."

"Undoubtedly periods of depression in the past have furnished labor with a very sound basis for some of its demands," the report continues, "and your committee is of the opinion that some reasonable stabilization of employment and



What Additions to Physical Property Are Necessary?

Little Increase in Traffic Possible Without Betterments in Terminals and Other Facilities

CAR SHORTAGE, like anæmia, is a symptom common to a number of basic ills. In the absence of other related facts, it is therefore difficult to tell which one of them is responsible. Anæmia may be the result of inadequate nutriment, a defective circulatory system, or improper heart action. By the same token, a car shortage may result from an insufficiency of cars, inadequate trackage, a lack of motive power, or all possible combinations of these defects. No matter how plentiful the cars, they cannot be delivered if the tracks over which they must be operated are congested, or if the locomotives which move them are insufficient or are in poor shape for want of proper care.

In view of these fundamental facts, it is patent that any case of inadequate service must be subjected to most exacting diagnosis if the conditions responsible are to be determined accurately. There are cases where a car shortage may be relieved as much if not more by providing more or better locomotives or more trackage and other auxiliary facilities as would be made possible by the purchase of additional cars.

Following the return of the roads to private control in the spring of the past year, the managements were confronted with an unprecedentedly large freight traffic and realizing that private control was on trial, they exerted every possible effort to handle the traffic offered with the facilities at their

disposal. As a consequence they succeeded in handling a greater freight traffic than was ever moved before in an equivalent period. In August, 1920, this reached a maximum of 42,706,830,000 net ton-miles.

CONSIDERABLE ADDITION to track mileage and increase in facilities for the care and repair of locomotives is necessary before the roads can be expected to effect appreciable improvement in car movement.

Large expenditures must be made for more adequate engine terminals, coaling stations and more satisfactory water supply.

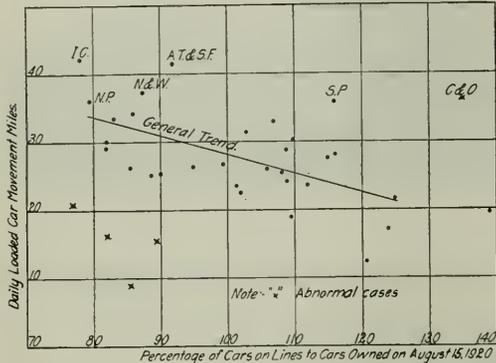
Improved yard facilities, side track extensions, grade separations, deferred bridge renewals, and new passenger stations will also require large sums.

The above figure is virtually the product of the number of cars loaded, the distance that the cars are moved each day and the number of tons of freight loaded in each car. Through the agency of the Association of Railway Executives and the American Railroad Association extreme pressure was imposed on the roads to exert every possible effort to secure a maximum loaded car movement, and there is reason to believe that the managements all entered fully into the spirit of the campaign to this end. However, the results secured differed widely. Some roads moved cars over 40 miles per day; others were unable to move them over 12 miles.

There is no doubt, a considerable variation in the efficiency of the supervision or in the *esprit de corps* on the various roads, but unquestionably a greater difference arises from local business conditions and the physical characteristics of the lines. Short terminal roads obviously will not make as good showings as long lines with simple terminal requirements. Another reason for this disparity of results may be illustrated by the chart showing the average daily car movements of 38 railways in various parts of the

country. In this chart the car movement for the month of August, 1920, is shown in relation to the percentage which the number of cars on each road on August 15 bore to the total number of cars owned by that road. In other words, the chart shows how the relative number of cars on the lines affects the loaded car movement. While this relationship is obviously influenced by a great many other conditions, the chart shows that generally better results in car movement were obtained on roads having a smaller number of cars on their lines than they own.

Considered in other ways, the chart indicates that some railroads have reached a limit in car handling capacity, and must of necessity make appreciable additions and improvements to facilities before they can hope to handle a larger



Approximate Relation of Car Supply to Car Movement

volume of traffic expeditiously. Conversely, the roads which have made the best showings in moving cars, taking due account of peculiar local conditions, are those which have been forehanded in their expenditures for additional trackage and terminal facilities.

While the roads have been successful in increasing the volume of traffic handled through the more intensive use of the facilities at their disposal, the above analysis demonstrates that further progress, insofar as it concerns the daily loaded car movement, is contingent upon additions to the fixed property. As one railroad president has recently expressed it in referring to the requirements of his own road, "We are obliged to spend about \$1,000,000 each month whether we want to or not to measurably keep up with the procession."

Another factor which has played no small part in enabling the roads to handle a large traffic with the existing facilities has been the heavy car loadings. The increase in car loading during the past 12 years is illustrated in the chart which shows the increase in the average car loading each year in relation to the increase in the average car capacity during the same period. A separate portion of this chart shows the percentage relation which the average car loading bears to the average car capacity. From this it is seen that whereas the average car loading was about 60 per cent of the average car capacity for the 8 years, 1909 to 1916, inclusive, it has been possible to obtain loadings of nearly 70 per cent of capacity during two of the last three years.

Car loading will fall off during every period of light traffic, but the pressure for heavy loading can be renewed whenever the demand for cars exceeds the supply. There is, however, little hope for much further increase in the load per car other than that to be obtained as a consequence of increase in car capacity. It is noted on the chart that there has been only a small increase in average car loading during

the past three years. However, it must be remembered that the results for 1918 were obtained very largely by the drastic regulations imposed on the use of cars at that time and the fact that the average was influenced largely by an unusually heavy traffic in bulk commodities in car load lots. Therefore the record obtained during the present year in the absence of war restrictions represents what could be done by the most strenuous efforts of the roads.

It appears, in consequence, that capacity for additional railway traffic must be obtained through an addition to the fixed properties that will permit of the movement of a larger number of cars. This immediately raises a question as to the distribution of funds appropriated to the various items making up the physical properties. In other words, it is of interest to know how the expenditures are to be divided among such items as additional main tracks, yards, engine terminals, sidings, station buildings, etc. One measure of this distribution is afforded by the manner in which the United States Railroad Administration expended the sum of \$541,000,000 appropriated for roadway and track improvement. A study of these allotments shows the following proportionate expenditures: additional main tracks, 10 per cent; yard tracks and sidings, 20 per cent; station structures, 6 per cent; shops and engine terminals, 15 per cent; branches and extensions, 6 per cent; with 40 per cent for miscellaneous items. Estimated expenditures by the railroads during 1920 indicate an almost identical distribution except that yard tracks and sidings were allotted only about 15 per cent and extensions only 2 per cent.

Another measure is afforded by the analysis made in the six billion dollar issue of the *Railway Age* of January 1, 1920, of the requirements of the railroads for additions and betterments during the three years beginning on that date. This analysis allotted 19 per cent to additional main tracks, 23 per cent to yards and sidings, 10 per cent to station structures, 8 per cent to shops and engine terminals, 15 per cent to branch lines and extensions and the remaining portion for miscellaneous purposes.

The difference between the results of these two analyses is readily explained. In general the additions and betterments undertaken subsequent to 1915 have been such as were designed to expedite traffic rather than to reduce the cost of operation. Moreover, they have generally comprised items of limited scope that could be carried out quickly so as to obtain the benefit of their completion as soon as possible. Instead of building large new yards, the roads have been adding tracks to existing ones. New passing tracks have been built or old ones extended. Second tracks have been added where the work was light rather than in locations requiring heavy work. The estimates in the six billion dollar issue, on the other hand, presume a broad construction program designed with a view to permanent results both in the handling of additional traffic and the reduction of operating expenses.

Motive Power Facilities

The forcible arguments for the need of additional engine terminal and shop facilities which were imposed on the roads during the winter of 1917-18 resulted in an intensive campaign to provide more adequately for the care and repair of locomotives. Engine terminal and shop construction was particularly intensive on the roads east of Chicago, but the Union Pacific may be cited as an example of a western road which has recently carried out a large renewal and enlargement program to this end. A study of construction news items during the past few months shows a preponderance of engine terminal items, indicating that these facilities still maintain the important place which they have held in the budgets for the last three years. One of the largest improvement items, that for the large new locomotive repair shop

for the Santa Fe at Albuquerque, N. M., indicates that the need for additional repair facilities is by no means fulfilled and that shop improvements in general require plans of broad scope involving considerable outlay.

Engine terminals often permit of the addition of stalls to existing houses so that the new facilities are made available at a minimum outlay and after but a short construction period. In considering the character of improvements to be made in the immediate future, it must be remembered that while many large new terminals were built during the last three years the pressure for emergency construction was particularly severe, so there is reason to believe that these minor additions to the older existing plants have already been carried out in the majority of cases where such extensions were feasible. Consequently, projects to be taken up in the future must consist more largely of new layouts or extensions to relatively new plants.

This conclusion is also borne out by the fact that obsolescence plays an important part in the renewal of engine terminals. There is a limit to the extent to which round-house stalls may be lengthened and turntables replaced to provide for the larger locomotives now to be accommodated. Also many terminal layouts are in such cramped quarters

water supply. Reports of contracts recently awarded include many new coaling stations with storage capacities ranging from 300 tons to more than 1,000 tons. Here again the question of obsolescence as well as inadequacy plays an important part. The high cost of labor places a premium on the use of equipment that is as nearly automatic as it is possible to make it.

Water supply is closely related to the growth of railway traffic. A plant that was adequate for a daily traffic of 80,000 gross tons cannot supply sufficient water for a train movement aggregating 160,000 tons. The Illinois Central, which has been a leader among railroads in keeping abreast with traffic requirements, has given water supply particular attention. Another element to be considered in this connection is the treatment of water in roadside plants which has undergone a revival during the last four years. Enough time has now elapsed for the development of data demonstrating the results gained from these installations and should lead to considerable expansion in the use of the water softening plants.

Yards and Terminals

There is no question but that the terminal, speaking in the sense of yard trackage, has been and continues to be the neck in the bottle of railway transportation. Even congestion of main tracks can frequently be ascribed to the inability to receive trains promptly at terminals. Generally speaking, yard tracks are being used more intensively than any other portion of the railway plant and as a consequence, there is practically no reserve capacity for periods of extraordinary traffic or reductions in the effectiveness of the operating forces such as took place in the course of the outlaw switchmen's strike last spring. The amount of money expended for additional yard tracks and sidings has been the largest item in roadway expenditures, and will no doubt continue to absorb a large portion of appropriations. The indications are that, as in the past three years, this money will be devoted largely to minor additions here and there for the purpose of correcting the defects or deficiencies in existing yards, or for the construction of relatively small new terminals. It is interesting to note in this connection that work on only two freight terminals of first magnitude was undertaken during the three past years. In the New Haven's Cedar Hill yard the work is only partially complete, while that on the Illinois Central's Markham yard was suspended soon after starting.

Belt line construction of the nature carried out by the Chicago & North Western at Milwaukee and Chicago in the period just previous to the war has been conspicuous by its absence, and a number of such projects postponed as a consequence of the war must soon come up again for consideration. As a single instance may be mentioned the proposed belt line of the Great Northern around St. Paul. One item of considerable promise is that of flood lighting of new and existing yards as a means of expediting operation, cutting down damage and discouraging pilfering. Yard improvements form an important part of the current budgets.

Multiple Main Tracks

A discussion of the terminal situation is not complete without reference to tidewater and lake terminals for the trans-shipment of freight from cars to ships or vice versa. The Lehigh Valley recently commenced work on an enormous terminal of this character on New York Bay, while the Central Railroad of New Jersey has under consideration a \$15,000,000 bridge project across Newark Bay which is designed primarily for the development of waterfront facilities.

Only a few railroads have undertaken second track work on a comprehensive scale during the last five years. The extensive improvement programs carried out by the Southern

that the addition of new or longer stalls becomes impossible. But even more important are the practical limitations imposed on any attempt to modernize an old layout. An antiquated terminal does not lend itself to alterations that will permit of the application of modern tools, lighting, ventilation, heating, inspection, and other items that go to make up the character of plant necessary for the expeditious handling of locomotives. Consequently, the need for improved terminal facilities is far greater than that to be estimated merely by comparing the number of engine stalls with the number of locomotives to be handled.

Two other elements of the fixed property are closely related to the motive power service, namely, coaling stations and

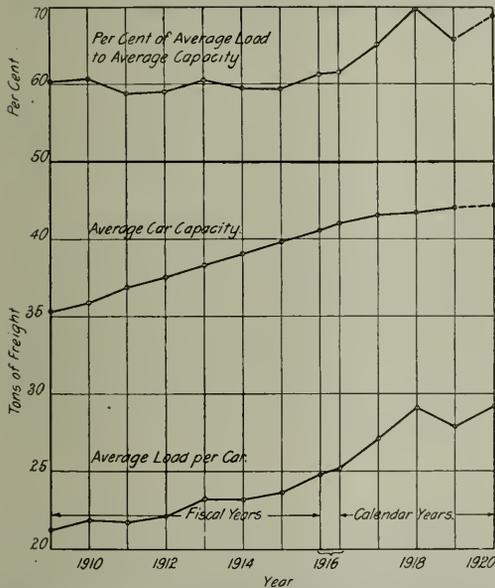


Fig. 2. Chart Showing Relation of Car Capacity to Car Loading

and the Union Pacific during this time have been so unique that they stand out in sharp contrast to the policies pursued by the other roads. In each case the need of the improvement was great and the corresponding benefits derived from the completion of the work have been in proportion. The Illinois Central and the Erie have done work of a similar nature although on a smaller scale, but on most other roads the only projects carried out were those entailing relatively light construction. Current budgets contain a few items for immediate consideration, but not in proportion to the amount that must be done eventually, since it is not within reason to presume that the few roads which have undertaken double track work on a large scale in recent years are the only ones which are in need of additional facilities of this character.

Bridge Construction

Bridge renewals are closely related to the problem of increased traffic carrying capacity of a railroad because of the limitations which old bridges place on the use of heavier locomotives. Any project for the use of heavier power on a railroad must usually carry with it plans for strengthening or renewing bridges on the lines on which the new locomotives as well as those on which the ones they replace are to be used. Bridge work on the railways, especially in structural steel, has been largely restricted in recent years. This tendency, in recent months, has not been limited to the railroads as indicated by the fact that orders taken by the steel fabricators during the last six months represent a tonnage ranging from 25 per cent to 60 per cent of the shop capacities. This means that a large number of renewals have been deferred which must be carried out eventually. At the present time a considerable number of railway bridge projects are under consideration which will take definite form just as soon as reasonable financing appears feasible.

A considerable volume of railway bridge work is concerned with the elimination of existing timber bridges or trestles, either by the use of steel or concrete structures or embankments with small culvert openings. Such projects always form an important item in railway budgets and the current budgets are no exception in this regard. Some idea of the eventual requirements of bridge work may be gained from the fact that three of the more prosperous roads in the middle west have permanent structures in only 35 per cent of their bridge openings, while there are roads in the south and southwest with as little as six per cent in permanent structures.

Other Classes of Improvement

Thus far the discussion has been limited almost entirely to additions and betterments to the fixed property which are designed to secure more expeditious movement of traffic. Owing to the fact that expenditures for improvements on the railways have been restricted very largely to this end, there has been an enormous accrual of deferred expenditures for improvements which the railroads are called upon to make for other reasons. Chief among these are those which will result in increased economy of operation. Under this head are included grade and line revision projects. Possibilities for obtaining equivalent results through the use of heavier power or through electrification have served to place a somewhat different aspect on the problem from that which it had in the past. Nevertheless, it is clear that much work of this character must be done.

Of the same nature are projects for the readjustment of engine district mileages for the purpose of reducing the overtime in train service. Studies for such changes have been carried on ever since the passage of the Adamson law, but thus far progress in this direction has been made only in cases where terminals could be abandoned because of obsolescence or inadequacy. As a case in point may be mentioned the New Buffalo (Mich.) engine terminal of the Pere Marquette which replaces an outgrown utility at Benton Harbor.

Still another class of improvements are those which the railroads must make because of the pressure of public opinion. These include passenger stations, grade separations and other public improvements. The president of one large system recently estimated that the aggregate deferred expenditures to this end on his line amounted to \$10,000,000. Items of this character were specifically excluded by the special committee of the Association of Railway Executives last summer, when presenting its recommendations to the Interstate Commerce Commission for loans to the roads from the revolving fund, but the perusal of construction columns and current budgets indicated that the demand for expenditures of this kind is being felt.

One especially large field for expenditures is that of grade separation. While this has been carried on extensively in the past within the corporate limits of cities, the nation-wide highway construction which is now in its inception, coupled with the increasing menace of the automobile accident, is sure to exert a powerful pressure for work of this character in rural communities.



Photo by courtesy of the Mississippi Warrior Service

One of the New Developments in Inland Waterway Transport



Putting on the Finishing Touches at Eddystone

How the Need for More Motive Power Will Be Met

New Locomotives, Remodeled Old Locomotives and Improved Operation of All Locomotives Imperative

ONE YEAR AGO the railroads of this country were still operating under federal control although living in the anticipation of an early return to private management. Throughout the period of government control, the impression undoubtedly prevailed that the condition of motive power had been allowed to deteriorate and that with the return to private management the railroads would be faced with the necessity for doing much toward the rehabilitation of the motive power. This impression was further substantiated by the fact that the government did not buy nearly as many locomotives as had been purchased in previous years and it was confidently expected that, again in possession of their properties, the corporations would immediately place some very large orders for locomotives.

The *Railway Age*, in reviewing this subject a year ago, estimated upon the basis of statistics relating to the growth of traffic and the increasing demands for motive power since 1905 that no less than 11,566 new locomotives would be required within the next three years. It is surprising to learn, therefore, that less than 1,700 locomotives were ordered during the past year.

The most obvious explanation for a curtailment in locomotive orders at this time is the difficulty experienced in

securing funds for the immediate purchase of new locomotives or for remodeling old ones. We are, therefore, confronted with the fact that the orders during 1920 that were most conspicuous for their size in proportion to the equipment

owned were not confined to those railroads that have the most ample resources. Orders placed by the Chicago, Milwaukee & St. Paul will add more than five per cent to the total number of locomotives owned by that railroad at the time the orders were placed. The Missouri, Kansas & Texas and St. Louis-Southwestern are both adding approximately eight per cent to the number of locomotives owned and, as the tractive effort of these new locomotives considerably exceeds the average of the locomotives already owned, the effective motive power on these railroads will actually be increased by a considerably greater percentage. In this connection, however, the most notable order of the year was placed by the Western Maryland for 40 heavy Consolidation locomotives representing an increase in the number

of locomotives on that railroad of over 16 per cent. During the year the New York Central Lines not only bought more locomotives than any other system, but placed these orders immediately after the termination of federal control. The following is quoted from a statement which this

THE PRICES paid for locomotives in 1920 are the highest on record, but the increased freight and passenger rates and the volume of traffic established new standards for the earning power of individual locomotives.

It is the earning or the saving power rather than the first cost that determines the dividend. Hence some locomotives purchased in 1920 may prove cheaper than the same locomotive purchased later at a lower price.

railroad recently issued to the public in regard to its policy. "When the government turned the railroads back to their owners, experts computed that approximately \$500,000,000 worth of new equipment was the imperative need of the hour. The New York Central Lines immediately placed their \$53,000,000 equipment order covering 196 locomotives, 265 passenger cars and 11,244 freight cars. Last March, assurances were given the shippers and the public generally that no time would be lost in meeting the needs of the service, in rehabilitating existing equipment and purchasing new rolling stock. The New York Central Lines are keeping faith."

Additional Motive Power Will Be Needed

It is true that the current depression in business has reduced the demand for motive power and that if this depression were to be prolonged indefinitely the railroads would have little need for additional power at this time. But it is very much safer to gamble on a speedy return to business activity than upon continued depression. It has been an invariable rule among successful financiers to place absolute dependence in the future of this country and there is no safer assumption in the world than that that growth and the traffic demands

on that railroad at the commencement of the year and, because of the high tractive power of these new locomotives, a considerably greater relative contribution to the effective motive power on that railroad. The acquisition of this power is all the more remarkable because at the beginning of the year 87.5 per cent of the locomotives on the Illinois Central railroad were reported in serviceable condition. The significance of this will be more fully appreciated when it is understood that at the same time only 75.1 per cent of all the locomotives on Class I railroads were reported as being in serviceable condition.

Is it not safe to assume that the very liberal policy pursued by the Illinois Central toward motive power expenditures has been in no small measure responsible for the acknowledged efficiency of this railroad and its popularity among shippers, particularly in competitive territory? It is also pertinent to point out further in connection with this order that no matter to what point business may decline within a year following the purchase of these locomotives, the railroad will have had the use of the locomotives in the meantime. Moreover, if these locomotives are used to replace less modern and less powerful locomotives, the railroad will doubtless save enough



Busy Days at Lima

of this country will continue to expand. Every cloud in our financial past has been found to have a silver lining and in planning for the future of the railroads it would be a grave mistake to be swayed from a constructive program of improvements by the immediate business outlook no matter how dismal.

Within the last ten years the annual revenue freight tonnage and passenger traffic has increased to the extent of 43 per cent. Business men usually figure upon an average annual increase of 4 per cent to meet the requirements resulting from a normal increase in the growth of this country and any railroad that is in a position to benefit in proportion to the average increase in business throughout the country must either look forward to increasing its capacity each year by at least that extent or to relinquishing some of the business which should normally come to it.

During the year the Illinois Central ordered 100 Santa Fe type freight locomotives, 25 Pacific type passenger locomotives and 25 Eight-wheel switchers. This represents an addition of 10 per cent to the number of locomotives in service

money in operating expenses thereby to more than discount any price drop in the cost of locomotives that might reasonably be anticipated within the coming year. The same line of reasoning might be applied to the purchase of locomotives this year rather than a year hence. In fact, the "Buy Now and Ship Now" movement to which this issue is dedicated, has a particular significance when applied to locomotives.

Analysis of the Situation

The following statement is contributed to the *Railway Age* by one of the best informed motive power executives in the country and may be accepted as an authoritative analysis of the current motive power situation.

"Until recently, when business rapidly declined, there has been a serious shortage of locomotives, due first to the large reduction in buying during government control, and second to the rapidly increasing cost of new locomotives in the past three years which has made it exceedingly difficult to finance new purchases.

"New power should by all means be added when possible

to finance the purchase but the increasing difficulty of financing such purchases demands as never before increasing the efficiency of the present equipment and getting maximum efficiency out of the present locomotives.

"During government control and up to the late Fall it was difficult to secure competent help to maintain the locomotives on the average railroad in proper physical condition. When labor became more plentiful the rapid decrease in gross earnings of the railroads made it necessary to reduce operating expenses, which was immediately reflected on most railroads in upkeep of the power.

"The tremendous overhead expense now carried by the railroads due to the concessions granted employees during federal control makes it practically impossible to reduce operating expenses in conformity with the rapid decrease in gross earnings."

Better Locomotive Terminals a Factor

The *Railway Age* has said too much in regard to locomotive terminals throughout the past year not to recognize at this time the important fact that an improvement in terminal

clearly demonstrate the need for the more intensive operation of locomotives:

	1918	1919	1920
Total number of locomotives reported in freight service, month of October	29,224	30,184	41,57
Gross ton-miles, month of October (thousands)	39,641,923	40,160,63	42,562,685
1,000 Gross ton-miles handled per locomotive	1,355	1,331	1,143

This statement, showing an actual decrease in the average gross ton-mileage handled by each locomotive reported in freight service, is eloquent proof of the necessity for those facilities which are designed to keep locomotives in service a greater percentage of the time. In this connection the statements required by the Interstate Commerce Commission showing the percentage of service hours for all locomotives will prove interesting reading when published and it is to be sincerely regretted that as a whole, individual railroads have not shown a disposition to compile these figures voluntarily nor use them locally to the best advantage.

Another interesting statement in this connection, which tends to further emphasize the necessity for better locomotive terminal and shop facilities, relates to the percentage of loco-



Virginian Mallet Nearing Completion at Schenectady

facilities tending to reduce the percentage of time a locomotive is held out of service is directly equivalent to adding a corresponding percentage of power to its equipment. If a railroad operating 1,000 locomotives an average of 10 hours daily could, by means of better terminal or shop facilities, increase this average to 11 service hours per day, it would serve the same purpose as the addition of 100 locomotives of similar type to its equipment. The motive power problem is by no means confined to the purchase of new locomotives nor to remodeling old locomotives, it is equally concerned with the intensive operation of existing power.

Any locomotive device that serves to extend the mileage between shoppings or any terminal facility such as a bigger ash pit or a better roundhouse that makes it possible to turn locomotives more rapidly adds something to the available tractive power which the railroad needs. Under many circumstances an investment in such facilities will effect a greater return in available tractive power than an investment of equal magnitude in new locomotives.

Despite the acquisitions of new locomotives and an increase in the average tractive power of all locomotives, the results for the month of October in comparison with previous years as shown in the following table are disappointing and

motives reported in serviceable condition as shown in the following:

	Nov. 30, 1918	Nov. 30, 1919	Nov. 30, 1920
Freight locomotives on lines reporting	28,997	29,801	35,447
Passenger locomotives on lines reporting	13,219	13,676	14,253
Switch locomotives on lines reporting	14,799	15,214	13,380
Total locomotives on lines reporting	60,172	61,613	63,580
Number in serviceable condition	47,462	46,417	48,747
Per cent serviceable	78.9	75.3	76.7

Most Obvious Way to Increase Capacity

In many cases the most obvious way to meet the demand for increased locomotive capacity has been found in remodeling old locomotives and the application of approved economy and capacity increasing devices to these locomotives. This is particularly applicable where the restrictions on locomotive weights are such as to limit new locomotives to weights not exceeding that of old locomotives susceptible to modernization and where the traffic is of a character that does not permit of further increase in train loads. Where these conditions obtain it has been found possible to remodel many old locomotives so that they are in every way equivalent to the most modern power applicable to the line, at less than half the cost of new locomotives.

The most notable accomplishment in this direction during

the past year has resulted in the reconstruction of cross compound Consolidation locomotives into strictly modern superheater locomotives of the same class on the Boston & Maine. This railroad is also planning the reconstruction of old Twelve-wheel locomotives into Eight-wheel switchers of modern design and has even extended its modernization program to include Eight-wheel passenger locomotives with 18 in. by 24 in. cylinders to which superheaters are being applied.

There is still a disposition in some quarters to strip the locomotive of economy and capacity increasing devices in order to cut down its first cost to the railroad. When it is clear that an addition of 10 per cent to the first cost of a "plain engine" may suffice to equip this locomotive so that its capacity or efficiency is increased 20 per cent the folly of buying locomotives on the basis of low first cost should be obvious. As a whole, locomotives purchased in 1920 represented the best in design and were equipped with as full a complement of auxiliary apparatus as can be properly maintained with the present shop and terminal facilities. A larger proportion of Santa Fe type locomotives and a smaller proportion of Mallet type locomotives were built than in recent years.

New Locomotive Characteristics

No new locomotive types made their appearance during the year but several interesting and promising developments were initiated. The new Decapod locomotive now in service on the Pennsylvania is a conspicuous addition to the art and the Consolidation locomotives ordered by the Western Maryland will doubtless embody certain features that will recommend this type to further consideration. The most notable contribution to the development of the locomotive during the year was made in the direction of capacity increasing devices. For the first time new Mountain, Mikado and Santa Fe type locomotives were constructed with thermic syphons designed to add 10 per cent to the capacity of the boiler.

The locomotive booster made its appearance during the year and promises a remarkable increase in capacity when applied to certain types of motive power dependent upon the class of service in which it is operated.

This device is in operation on only a few locomotives at the present time but quite a number of locomotives constructed recently have had trailer axles and other details designed to facilitate the application of the booster at a later date. During the year feed water heaters were applied to Mountain type locomotives for the New York, New Haven and Hartford but locomotive feed water heating has not made as much progress during the year as might have been expected in view of the savings which would surely result from the more general application of this principle.

Year	Number of locomotives	Aggregate tractive power (1,000 hp.)	Per cent increase over 1910	Average tractive effort per locomotive	Revenue freight traffic, (1,000 ton-miles)	Per cent increase over 1910	Passenger traffic, (car-miles)	Per cent increase over 1910
1910	58,947	1,588,894		27,282	255,016,910		32,338,496	
1911	61,327	1,681,496	6	27,949	253,793,702	..	33,201,695	3
1912	62,262	1,746,964	10	28,634	264,080,745	..	33,182,385	2
1913	63,378	1,847,798	16	29,702	301,398,752	18	34,575,873	7
1914	64,760	1,931,954	22	30,420	288,319,890	13	35,258,498	9
1915	63,850	2,014,202	27	31,546	276,830,000	9	32,384,248	..
*1916	65,021	2,075,520	31	31,921	243,699,938	34	34,213,596	6
*1917	63,828	2,145,698	35	33,617	365,771,825	43	39,476,859	22
*1918	64,410	2,196,648	38	34,104	401,946,000	57	42,566,343	32
*1919	64,669	2,303,950	45	35,517	365,000,000	43	46,202,827	43

*Classes I and II only.
†Class I only (estimated).

The greatest strides in American railroading have been accomplished by increasing the capacity and efficiency of the locomotive. How much remains to be accomplished in this

direction is apparent from a comparison between the average tractive effort of all locomotives as shown in the above tabulation and the average tractive effort of locomotives now under construction.

In some instances, owing to the traffic conditions or restrictions placed upon wheel loads, the limit has already been reached, and in these instances the full modernization of existing power affords the only remaining field for improvement. But on a vast majority of railroads there is still the opportunity for replacing small power units with new locomotives that in some instances will add 50 or more per cent to the tonnage of freight trains or will eliminate double-heading on passenger trains.

Outlook for the Future

Instances are not uncommon in manufacturing plants where the entire machine equipment has been scrapped to make place for new machines that would reduce the cost of manufacturing by 15 per cent. Opportunities for effecting greater economies than this through the replacement of old and obsolete locomotives with large modern locomotives everywhere abound; hence, it is reasonable to predict that locomotive orders must again assume large proportions, not only because of the normal 4 per cent increase that will be occasioned by the growth of the country but as a step toward improving the efficiency of the railroads and the character of the service which they can place at the disposal of the public. The inevitable replacement of wornout power is another item on which the builders can depend so that altogether there would seem to be a large amount of business which must sooner or later go to the locomotive builders.

A study of the underlying conditions that affect the cost of manufacturing locomotives clearly indicates the futility of hoping for any immediate and substantial reduction in locomotive prices applying to a volume of orders that is at all in proportion to the needs of the railroads. Labor costs figure prominently in the price of a locomotive and no one appreciates better than the railroad man the extent to which these costs have increased; first, because wages have doubled and second, because the efficiency of the individual worker is lower. While improvement may eventually be anticipated in this direction, it will hardly be rapid enough to manifest itself in any quick reduction in prices.

The Problem of Prices

Steel prices, comprising the principal material item entering into the cost of a locomotive, have fallen rapidly within the last few months and are still slightly above the levels established by the leading steel producer. There can be no question but that the Steel Corporation has made a sincere effort to stabilize steel prices and having adhered to these prices in a rising market will hold to the same prices in a falling market. Hence, while some shading of prices below these levels may be anticipated, it does not seem likely that with a large unfilled tonnage still booked at these stabilized price levels there can be any substantial reduction below these prices for some time to come. If locomotive costs are figured upon higher steel prices, they must be reduced; but, with the assurance that costs are based upon the prices established by the leading steel producer, no further reduction can soon be anticipated.

Transportation charges affecting both the raw materials entering into the cost of a locomotive and the finished product must also be taken into account in any discussion of locomotive prices and the railroads would certainly be the last to admit that there can be any reduction in these charges. The problem of prices is secondary to having the new equipment that is needed, when it is needed. Hence, it may be repeated, the "Buy Now" slogan applies with particular force to locomotives.



Railroad Yards at Toledo. Photo from Ewing Galloway

Little Progress in Reducing Equipment Shortage

Meagre Purchases During 1920. Constructive Policy Must Be Adopted to Retain Public Goodwill

THERE WERE ONLY SIX WEEKS in 1920 during which there was not a serious shortage of freight cars. In the past four and one-half years there have been only three short periods when the railroads have had more cars than were required to handle the traffic. During the last few months of the war there was a slight surplus and in the slump directly after the Armistice there was a very large number of idle cars for six months. During the coal strike of 1919 the idle cars exceeded the deferred requisitions by a few thousand for one month, and in the last six weeks, since the recession in business has reduced the volume of traffic, the surplus has increased to over 100,000 cars.

There is only one other instance of a serious and prolonged car shortage in recent years; namely, in 1905 and 1906. The demand by shippers for more equipment at that time resulted in orders for 650,000 cars being placed in those two years. On the other hand, during the four years of equipment shortage, from 1917 to date, the orders aggregated only 309,406; the total for four years is less than one-half the number ordered in the two years cited above.

The small volume of orders placed in 1916 was due to a variety of causes. When the car shortage first developed, the net earnings of the roads were higher than they had been for several years, equipment prices were not excessive and interest rates were low. Consequently, the number of cars ordered in 1916 was fairly large. In 1917 the price of steel increased greatly and this together with the preference given to the needs of the government reduced the volume of orders. When the roads were taken over by the government, plans were promptly made for the purchase of 100,000 cars. The delivery of these cars was delayed and no more orders were placed by the Railroad Administration during the 26 months of federal control.

Since the roads have been returned to the owners there have been various circumstances militating against a resumption of the normal volume of car purchases. Early in the year some of the stronger roads placed orders sufficiently large to increase their total freight equipment in proportion to the growth of traffic. The high interest rate, coupled with high prices, deterred many roads from buying cars. The

revolving fund of \$300,000,000 provided by the Transportation Act was intended to overcome this difficulty, and the Interstate Commerce Commission on May 21 authorized the use of at least \$125,000,000 for the purchase of equipment. The act was amended on June 5 to extend the period of repayment from 5 to 15 years, thus making the condition much more favorable for the roads. However, the Treasury Department took advantage of a technicality to withhold the funds. The commission has authorized loans amounting to \$118,621,385 as reported on November 24, but the loans actually made up to October 20 aggregated only \$56,190,325.

Aside from the problem of financing the equipment, some roads originating little traffic have probably been led to postpone buying due to the fact that the per diem rate was unremunerative on the basis of present prices and the percentage of equipment off the home roads very high. During recent weeks the downward tendency of the prices of basic commodities has probably been principally responsible for the scarcity, not only of orders, but also of inquiries.

Temporarily the problem of furnishing equipment for shippers has been solved. The recession in business has caused a decrease in the freight traffic and at the beginning of the year there was a surplus of over 100,000 cars. But a car surplus in a time of depression has little significance. The roads cannot evade indefinitely the responsibility for furnishing adequate equipment for moving not only a nor-

THE statement has been made that private management will fail because it cannot provide the capital required for new equipment. The advocates of government ownership will find some support for this contention in the record of car purchases during the past year. Despite the car shortage only 1,780 freight cars and 84,207 passenger cars were ordered in 1920.

Unless prompt action is taken, another serious shortage of equipment will occur when business again returns to normal.

mal traffic, but a reasonable overload. They cannot expect to retain the goodwill of the shippers unless they provide facilities for handling the traffic, not by emergency measures and constant delays due to car shortage, but with normal use of the equipment by the shippers and prompt attention to requisitions for cars.

During the major portion of the last four years the roads have not given adequate service. During federal control, shippers were induced to load more nearly to the maximum capacity and to release cars promptly. Since the roads were returned a similar campaign has been carried on, but as a regular policy shippers are not likely to take kindly to such measures as the use of a large amount of dunnage to insure maximum loading without any compensation or loading and unloading on Sundays and holidays, as has been advocated and practised in recent months.

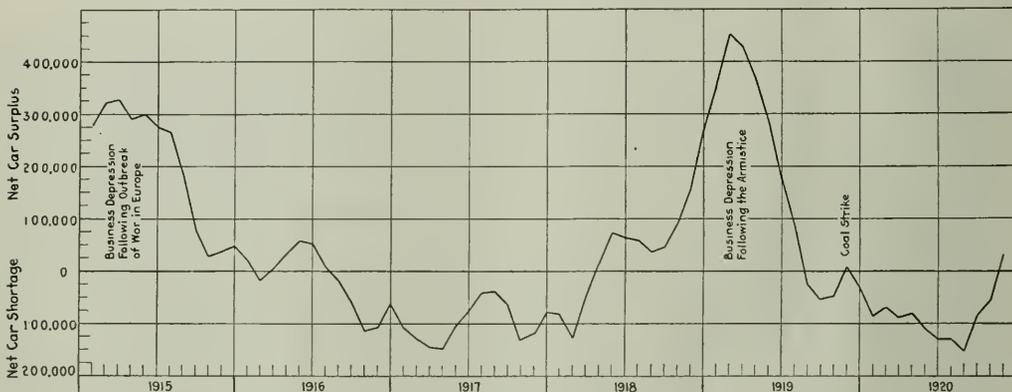
The viewpoint of the shipper has been well expressed in the following words by John M. Glenn, secretary of the Illinois Manufacturers' Association: "The railroads want adequate compensation for carrying freight; the shippers feel that in return for the increased compensation the railroads have been accorded, they are entitled to cheerful, expeditious service. * * * The additional tonnage carried by the

can be met by improved utilization of facilities and how many new cars will be needed. Each individual road has some local conditions to meet that will necessarily affect its policy in making equipment purchases. This article is confined to a discussion of the problem of car supply from the standpoint of all the railroads of the country considered as a system.

An analysis of the estimated requirement for freight cars was published in the *Railway Age* for January 2, 1920. It may be enlightening to review the conclusions stated in that article in the light of the results obtained during the past year. The principal points stressed in that article were as follows:

1—The freight traffic of 1918 although abnormally heavy was not in excess of what may be expected in the next two or three years. The average annual increase of revenue ton-miles is about 4.14 per cent.

2—The efficiency of utilization of cars as measured by the ton-miles per ton of capacity per year increases in times of car shortage and decreases when there is a surplus. As a yearly average, the ideal condition of no pronounced shortage or surplus is obtained when one ton of car capacity is provided for each 3,500 revenue ton-miles moved annually.



Net Freight Car Surplus and Shortage for the Past Six Years

(Normally a surplus of about 100,000 cars should be maintained to enable the railroads to fill requisitions promptly.)

freight cars of this country this year has been largely at the expense of the shippers, who, in order to load their cars heavier, have been obliged to supply a greater amount of dunnage. * * * The consignee does not want a heavily loaded car unless he has a ready market for the commodities and he does not want to pay freight charges on a shipment that may exceed his immediate needs unless there is some inducement."

Viewed from the broad economic standpoint, the proposal to continue rationing cars is indefensible. Studies made in the bituminous coal mining industry show that when the car supply is 75 per cent of the requirements, the cost of production is 16 per cent greater than when all demands for cars are met. If the car supply is one-half normal, the cost of coal is increased 40 per cent. Car supply undoubtedly influences the cost of many other industries in a similar manner and the sum total of the bill which American producers pay when a shortage of cars exists would make up the cost of the additional equipment required many times over.

Bearing in mind that private operation cannot be a success unless it pleases the railroads' customers—the shippers—the question arises to what extent the need for equipment

3—On the basis outlined, the equipment required for three years was calculated. Allowing for deferred retirements and a surplus to take care of the peaks of traffic, the number of cars that should be purchased annually for three years was estimated to be 237,000.

Reviewing these conclusions with the operating results for 1920 in mind, brings out some interesting points. The traffic for the year on the basis of the statistics for the first ten months appears to be only slightly greater than was estimated. If business conditions return to normal, the record should be exceeded in 1921. The most important factor is, of course, the relation of car capacity to traffic, but the results contribute little that will either substantiate or modify the earlier figure.

During the summer and fall, new records for the net ton-miles per car day were established, but this was the result of extreme efforts of both the railroads and the shippers to overcome the car shortage. Heavy loading and quick release of cars both depend on the co-operation of the industries and the highest efficiency in the use of cars seems incompatible with accommodation to the shipper. It may be that in the future slightly better use of the equipment can be secured under all conditions. If this is the case, the demand

for cars will be reduced somewhat. This can only be determined when statistics of car capacity and freight traffic covering a period during which shippers were given normal service become available.

In any attempt to estimate the equipment needs of the roads during 1921, the general business situation must be considered. The present decline in the volume of business cannot continue for a long period. Expert economists have stated that the upward turn will occur in April and this agrees with the views expressed by many leaders of industry. As has already been noted, the traffic of 1920 was not abnormally heavy, and it may be exceeded in 1921. There was a serious shortage of cars last year, and there is only one way to avoid another shortage whenever there is a revival of business; that is, to BUY NOW.

There are several cogent reasons why the railroads should not defer purchases. Most important of these is a stabilization of business. Irregularity of employment is one of the great economic wastes of the present day. If the railroads go into the market now for a fairly large number of cars, the effect would be felt through many allied industries with a favorable reaction on the railroads themselves. The recent reductions in the price of steel furnish another argument for going into the market at this time. The prices of the Steel Corporation and the independent plants are now on the same basis which will probably be maintained for some time. Although the prices of the car builders have been based on the corporation's scale, the quotations for various types of equipment are approximately 10 per cent below the high point of 1920. If the car builders were assured a larger volume of business, the cost might be lowered still further. It may not be out of place to mention that the car building plants have been operating at only a fraction of their normal capacity and the railroads will be obliged to anticipate their requirements by several months, particularly in case there is a sudden demand for large amounts of equipment.

Those who contend that the railroads should stay out of the market at this time base their argument on the assumption that this would insure a more drastic price reduction. Recent developments indicate that prices will eventually drop still further, but from all indications temporary stability has been reached on the present level. It would be out of the question for the railroads to defer purchases until prices touch bottom. The increases to recent high levels were reached step by step for a period of five years. The return to the future normal will also occur step by step and will no doubt require a much longer time.

The rise in prices during the Civil War occurred in approximately three years, but the pre-war level was not reached again for fifteen years. Railroads must buy more cars before the bottom of the market is reached. The important question today is not how to buy at the lowest price. The gain or loss in revenue in a few months due to insufficient car supply may outweigh that many times. The important matter is to make sure that when the revival of business occurs, as it inevitably will in a short time, the railroads will be able to handle the traffic.

In the past, the railroad managers have pointed to the low rate of return as the reason for not furnishing the necessary equipment. The provision of the Transportation Act providing a fair rate of return on railroad securities, was intended to permit the roads to add to their inadequate facilities. There is only one way for the railroads to retain public goodwill. They must start now to buy cars in order that the industries of this country shall receive at the hands of the railroads the service which they need for efficient operation.

The Passenger Car Situation

One year ago a careful estimate was made of the number of new passenger cars which would be required to restore passenger service to a condition reasonably approaching that to

which the American traveling public has been accustomed.*

The conditions assumed as reasonable were those existing during 1917, when each passenger carrying car carried an average load of 17.6 passengers. This was considered conservative, since during a period of nine years preceding the war the average passenger car load had never reached 16 passengers. On a hypothesis that the restoration was to take place over a period of three years, and after making allowance for deferred and future normal retirements as well as for prospective increases in traffic it seemed evident that some 8,000 cars would have to be purchased annually.

A review of the past year's developments indicates that, on the same basis, the requirements for new passenger equipment are even greater now than last year. Passenger-mile statistics for a group of representative lines published elsewhere in this issue reflect the tendency toward a continually increasing volume of traffic, apparently somewhat disturbed by the increased rates which went into effect September 1, but not sufficiently to overcome for long the effect of the normal upward trend. On the other hand the total production of passenger cars for domestic roads during the first ten months of 1920 was only 129 cars.

During the past year the demands for additions and betterments to all facilities were urgent. The railroad corporations, with limited cash and credit resources, have found it necessary to choose only the most urgently needed improvements for immediate prosecution. Roadway improvements, locomotive and freight cars have therefore been given attention practically to the exclusion of passenger equipment. The same conditions have applied also where improvements have been financed from the \$300,000,000 loan fund created by the Transportation Act. At the present time a number of roads are considering the purchase of new passenger equipment, and assuming an early improvement in business activity, will place their orders during 1921.

It is unlikely, however, that the passenger car programs, though increasing from year to year, will effect a marked improvement in the service for several years to come.

Pullman Cars

Following the release from Railroad Administration control, the Pullman Company resumed the construction of sleeping cars, which had been discontinued during operation of the Pullman Car Lines by the Railroad Administration. From March 1, 1920, to the end of the year about 500 new sleepers have been built. Some of these have replaced retirements from the 7,622 cars reported by the Pullman Company for the fiscal year ending July 31, 1919, but they represent the beginning of a program that will gradually restore the facilities to pre-war standards.



Photo from Keystone View Co., Inc., of N. Y.

At the Conception Station of the Central of Peru

*See the *Railway Age* for January 2, 1920, page 37.



Repair Shop and Enginehouse Equipment Needs

Large Numbers of Unserviceable Locomotives and Cars Furnish
a Strong Argument for Better Facilities

A MODERN STEAM LOCOMOTIVE intended for either heavy passenger or freight service is worth approximately \$70,000 and with 63,580 serviceable and unserviceable locomotives on American railroads, the total capital represented amounts to several billions of dollars. In fact, it is stated to be 50 per cent of the value of all the machinery, implements and tools used in all other industries of the country. Even a larger amount of capital is invested in over two million cars and yet a considerable proportion of both motive power and rolling stock is held out of service and earns no revenue because of antiquated, inefficient repair shop and enginehouse equipment. A manufacturer watches his big investments in machinery most carefully, knows how much the machines are worth, how much they earn and keeps them in operation; otherwise he fails. The railroads should be equally considerate of overhead charges and make both cars and locomotives revenue earners as much of the time as possible by providing facilities for their prompt and thorough repair.

Locomotives and Cars Out of Service

How long would a manufacturer do business if 25 per cent of his machinery was unserviceable? In 1918 and 1919, 20 per cent and 24.9 per cent, respectively, of the motive power of the country was held out of service awaiting repairs. Figures for the first ten months of 1920, compiled by the Car Service Division of the American Railway Association, show (Table I) that this proportion has been reduced to 23.3 per cent, of which 6.2 per cent of the loco-

motives are held for work requiring less than 24 hours and 17.1 per cent for work requiring more than 24 hours. No goal was set by the Association of Railway Executives for the reduction of locomotives held out of service, but it would be difficult to find justification for so large a proportion

as 23.3 per cent. The railroads are now able to handle the business offered to them, but this business is far below normal. Now is the time to get motive power into good operating condition and reduce the locomotives out of service waiting repairs to the lowest possible number.

It is not maintained that the lack of shop machinery and equipment is solely responsible for the large proportion of motive power out of service. Limitation of output due to labor conditions, scarcity of trained foremen and inexperienced workmen are all factors to be considered. That there is a serious lack of modern machinery in many shops and roundhouses, however, is generally admitted and the longer its installation is delayed, the greater the loss to the railroads.

Records of the Interstate Commerce Commission show that in 1917, 1918, and 1919, 5.6, 5.7 and 7.1 per cent, respectively, of the freight cars in the country were in bad order. Based on the first ten months of 1920, the bad order cars have been reduced to 6.9 per cent, but even this figure is far from the 4 per cent goal set by the Association of Railway Executives. Due to present business conditions, it is true that the railroads are not faced with a car shortage, but even the pessimists do not believe that the business depression will last indefinitely and it would seem the part of common sense to get as many cars as pos-

EVERYONE FAMILIAR with conditions admits the need for better machine tools and equipment for railroad shops and engine houses. Motive power and rolling stock will be in no condition to handle the increased traffic predicted for next Spring unless adequate arrangements are made for repair and maintenance.

A large proportion of the shop equipment needed should be bought now. Otherwise what may be gained by price reductions will be more than offset by losses due to delayed traffic.

sible repaired before the revival of business activity which is sure to come.

Strenuous efforts have been made in the past few months to reduce the number of bad order cars and one of the reasons it has been impossible to attain the goal of 4 per cent is the present lack of repair shop facilities. More shops should be erected and those already in existence should be better equipped. Particularly for steel car repair work, crane facilities are needed for handling cars and the more or less heavy material going into their construction. In addition to cranes, other machinery is needed for this work such as air compressors, air tools of all kinds, power punches and shears, presses, flanging machines and furnaces.

TABLE I—PROPORTION OF LOCOMOTIVES OUT OF SERVICE FOR REPAIRS

	Repairs requiring less than 24 hours	Repairs requiring more than 24 hours	Total
Week ending July 31, 1920	15.4 per cent	22.7 per cent	
Two weeks ending September 1, 1920	16.3 per cent	22.7 per cent	
Two weeks ending September 15, 1920	6.3 per cent	16.2 per cent	23.5 per cent
Two weeks ending November 1, 1920	6.3 per cent	17.1 per cent	23.4 per cent
Two weeks ending November 30, 1920	6.2 per cent	17.1 per cent	23.3 per cent

The slight reduction in bad order cars already obtained is largely due to the number of cars repaired by builders. During October, 1920, 3,920 cars were repaired by the 23 builders reporting to the Railway Car Manufacturers' Association, the total for the first ten months of the year being 25,180 cars. It is probable that an extensive car construction program will be outlined for the coming year and if so car builders will manifestly be unable to handle as much repair work as formerly. The importance of equipping railway shops to make quick, effective repairs to all kinds of freight and passenger cars can hardly be overestimated.

Facilities Needed for Modernizing

Of the 55,000 locomotives in service on American railroads, it is stated that only approximately 35,000 are equipped with superheaters, 43,000 with brick arches, 37,000 with automatic fire doors, 15,000 with power reverse gears, 2,000 with automatic driving box wedges, and 30 with feedwater heaters. In a paper read before the American Railway Association last June, George M. Basford said, that "by spending a few thousand dollars in modernizing, millions of dollars already invested in locomotives ten or more years old will earn greater dividends. These old engines stand as a big non-paying investment and a comparatively small amount spent for modern improvements will change them into a big paying investment."

Admitting the need of an intelligent and extensive modernization program, the question is, Are the railroads physically in a position to carry out this program? The answer must be, No.

"The difficulty in carrying forward an extensive reconstruction program," said C. B. Smith, mechanical engineer of the Boston & Maine before the American Society of Mechanical Engineers, "is in finding the shop facilities either on the railroad or among the locomotive builders in order to advance the work at a satisfactory rate of progress. On roads where the number of old locomotives which warrant rebuilding is sufficient to require a period of more than three years to complete the work, it would seem necessary to arrange for enlargement of shop facilities in order to hasten the reconstruction. If, however, adequate shop facilities are not forthcoming, the improvement program for locomotives must be confined chiefly to the application of superheaters and the substitution of piston for slide valves; together with the minor but relatively important betterments that may usually be applied at the shopping period. On some roads this work alone will require six years at the present rate."

The work of modernizing must go on and Mr. Smith's statement that some railroads are not equipped to apply

modern improvements to locomotives in less than six years indicates a condition that is far too common on American railroads. Present operation expenses must be reduced to a minimum by the installation of efficient locomotive devices, and it has been demonstrated that this will be impossible without more and better shop facilities.

Roundhouse Equipment Needed

Another factor which needs attention is the proper equipment of terminals for handling locomotives promptly and economically. A locomotive is earning revenue usually only a few out of each 24 hours and the part of this time lost at terminals offers a fertile field for improvement. It is essential that inspection pits be provided, together with ample ash handling facilities and coaling stations, all on a direct line to the roundhouse. In addition, each roundhouse, especially if at some distance from the back shop, should have a fairly complete machine tool equipment. This will avoid the extra cost of shipping each locomotive part requiring a small machine operation to the back shop and holding up the locomotive while waiting for the part to be returned.

The old excuse is that railroads cannot afford to install machinery in roundhouses, especially the smaller ones. The truth of the matter is that they cannot afford not to. An investigation conducted five years ago showed that locomotives were in the hands of the mechanical department 58.5 per cent of the time and there is no evidence that conditions as a whole have improved greatly since that time. The interest at 6 per cent on \$70,000, the price of a modern locomotive, is \$4,200 a year and the delay of this locomotive at terminals due to inadequate, wornout equipment costs far more than it would to install required new machinery and tools.

Effect of High Labor Costs

During federal control working hours for railroad employees were reduced from nine hours in most cases to eight hours per day and the result of this decrease in hours made necessary an increase in the number of employees, variously estimated at about 190,000. The larger number of employees, together with the pay increase granted to all, makes the labor cost over one hundred per cent greater than it was even as late as 1917. Table II shows the rates of pay for certain employees in locomotive and car repair shops and roundhouses.

TABLE II—HOURLY WAGES OF RAILROAD REPAIR SHOP EMPLOYEES

	1917	1918	1919	1920, January	July, 1920
Machinists	462	746	747	747	857
Boiler makers	462	736	767	767	897
Blacksmiths	446	744	749	749	879
Carpenters	322	536	633	633	763
Car repair men	338	574	696	696	696
Helpers	276	457	507	507	630
Unskilled help	224	361	433	433	533

The increase up to January, 1920, is shown in the fourth column of the table and in July the Railroad Labor Board increased approximately all of these rates by thirteen cents an hour retroactive to May 1. As indicated, practically all of the rates have increased 100 per cent since 1917 and it is self-evident that if the cost of locomotive repairs is to be maintained at a reasonable point every possible labor saving machine and device must be installed.

It is not believed that every small shop in the country should be equipped with heavy, specialized machinery capable of large production. For example, in a certain shop, the method of machining the keyway in a new cross-head is to lay out the keyway, drill four 7/8 in. holes to remove most of the metal and chip and file out the balance. This is a difficult and tedious job requiring the effort of a mechanic at 85 cents an hour for several hours. At first thought, it would be supposed that such a shop could not

afford to be without a keyway milling machine which would perform the operation more accurately, in one-third the time, and at a much less labor cost. The element which must not be forgotten, however, is that such a specialized machine is usually high priced and must be kept busy a large proportion of the time in order to pay carrying charges and show a profit in operation. The problem in this case can be settled in but one way. All new crossheads for the system should be made at one central production shop where there will be enough work to pay for the installation of modern, specialized machines.

In the shop referred to, which is typical of many others, there is a little old radial drill which has certainly seen its best days and, in fact, is so old that no records can be found as to the date of its purchase. This machine is used to drill 2 9/16 in. holes, 4 in. deep, in forged wrought iron stock using a high speed drill; but it goes without saying that no production records are broken. The old drill press does not have the necessary power and the head wobbles so badly on the radial arm that it is difficult to understand how a hole can be drilled at all. What possible reasoning can justify wasting even a helper's time at 46 cents an hour and a high speed tool on such a machine!

It may be that the smaller shops cannot afford to install special machinery, but in any case they certainly cannot afford to maintain in service drills and machinery of the type indicated. The time involved in performing machine operations with this type of tool and the labor cost of operating obsolete machines by high priced mechanics are prohibitive. All parts possible must be made in central production shops where specialized, high production machinery can be installed. The saving in cost of parts so manufactured much more than offsets carrying charges on the investment and the cost of shipping the manufactured parts to outlying points.

Similar Problems in English Shops

That more or less similar conditions and problems confront English railway shop managers as do our own is evident from a paper presented before the Institution of Locomotive Engineers by Colonel H. E. O'Brien, deputy chief mechanical engineer of the Lancashire and Yorkshire, Horwich, England. Col. O'Brien states that "while patient attention to methods of manufacture on existing machines will result in increased output, the best results will not be obtained unless the most modern and most highly productive and specialized machinery is installed on a commercial basis. The introduction of high speed steel between 1903 and 1910 put many machines simultaneously on the scrap heap or ought to." (The italics are ours).

Mr. O'Brien does not advocate the wholesale purchase of new and more powerful machines purely on an arbitrary basis. The decision to buy or not to buy must be based on a knowledge of the existing annual output of old machines and proposed new machines. "After all necessary allowances have been made," according to Mr. O'Brien, "it is hardly justifiable to purchase a new machine unless a return of approximately eight per cent on the capital expenditure is obtainable." Certainly no fault can be found with this line of reasoning and when shop foremen and executives clearly show their superiors by reliable figures that a certain machine will earn eight per cent on the investment, it will not be long before the necessary capital is forthcoming.

Capital Expenditures for Shop Equipment

It is impossible to ascertain exactly how much has been spent for new shop machinery and equipment in the past year, either to replace wornout machinery or for additions and betterments. The approximate amount is probably around \$7,000,000, which is by no means adequate to cover the needs and only goes to show how large a field there is

for the use of all kinds of machinery and equipment in railway shops and roundhouses. Reports from Chicago indicate that in that section approximately \$1,400,000 worth of machine tools have been purchased during the year. There has been considerable activity in the southwestern district and in the east it is understood that a \$2,000,000 project for increased shop and power house facilities is being considered.

Conclusions

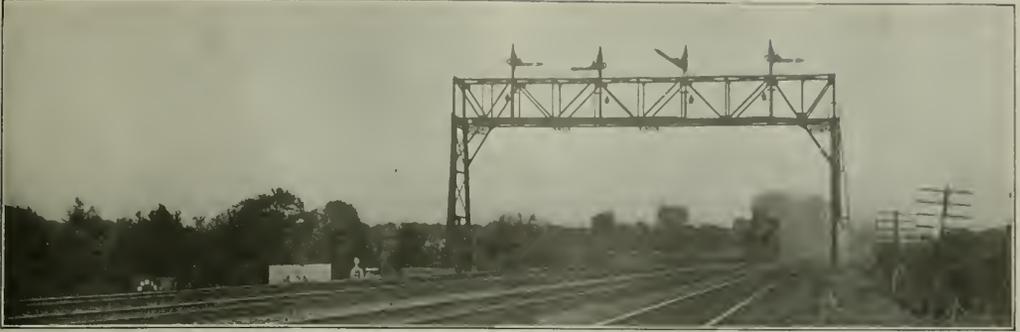
In January, 1920, the *Railway Age* estimated that over one hundred and forty-six million dollars should be spent for improved shop machinery and equipment in the next three years. Of this amount 38 per cent or approximately fifty-four million dollars was considered necessary for the purchase of machine tools. As previously stated, figures are not available to show how large a proportion of this capital was so invested, but it is practically certain that less than one-third of the amount was forthcoming. The estimates stand the test of common sense, however, and nothing has developed in the past 12 months to show that they were extravagant. Certainly the importance of the question and the absolute dependence of industry upon adequately maintained motive power and rolling stock make evident the folly of limiting repair facilities.

The necessity and wisdom of *buying now* depend largely upon the need for a given product. If the lack of a \$5,000 tool in a roundhouse is holding up \$70,000 locomotives even a few minutes a day, it is obviously poor business management to delay buying the tool in the hope it may come down to \$4,000 in price. There is a certain strength to the argument that permanent investments should not be made at present high rates of interest, but if everyone refused to buy, business would stop entirely and all would be losers. Business men as well as students of economics say that the present business depression will end in April or the early summer months when the railroads will again be required to move traffic exceeding their capacity. The shop and roundhouse equipment needed to keep cars and locomotives running at that time should be bought now. There can be no excuse for delay. What is lost in delays to traffic in May or June will far more than offset what is gained by possible reductions in the cost of machine tools and shop equipment.



Copyright Keystone View Co.

The Architecturally Beautiful Railway Station at Metz, Lorraine, France—Formerly Metz, Germany



On the New York Central. This road found a receptive market for a large bond issue in 1920

Attitude of Investors Toward Railroad Securities

New Speculative Interest in Stocks and Strong Confidence in Bonds Apparent in 1920

JOHN J. ESCH, chairman of the House of Representatives Committee on Interstate and Foreign Commerce, in an address at a dinner given recently in honor of S. Davies Warfield, president of the National Association of Owners of Railroad Securities, made the following statement relative to the rule of rate making provided by the Transportation Act:

"This provision is contained in Section 422 of the Transportation Act and was believed to be necessary to enable the roads to secure the money and the credit required to purchase additional equipment and betterments at lowest possible rates and take care of the present and immediately prospective wants of transportation. With the roads again under private operation and the guaranty of the standard return withdrawn, there must be proper encouragement given to the investing public if the carriers are to obtain the necessary funds to provide the additions, betterments and extensions required by an expanding commerce. The public cannot be compelled, but must be induced to invest. Stabilizing the credit of the carriers is a strong and necessary inducement. A public utility which has its income controlled through the regulation of its rates and its expenses, especially wages, also fixed by government authority, is entitled, upon moral if not legal grounds, to fair and just treatment."

The remarks of Chairman Esch are quoted here because they aptly point out the factors which influence the investing public and indicate the underlying question that must be answered in an article dealing with the Attitude of Investors Toward Railway Securities.

The question is—Has the investor been induced to put his money into railway securities as a result of the various de-

velopments that have taken place in 1920? The answer is that he has.

This answer is developed with due regard to the present state of the security market. It is evident, of course, that there has been but little market for securities of any kind during the past few months. Nevertheless, it does not require much investigation to determine that railway securities

are regarded in a new light as a result of the treatment guaranteed the railways under the terms of the Transportation Act.

It is not desired here to discuss the conditions that have caused the present low level of stock and bond prices. It is desired to discuss the attitude of the investor rather than his ability to invest: the latter point is, however, discussed in the latter part of the article.

The attitude of the investor has two important aspects. One of these is contained in the confidence that has been inculcated through the passage of the Transportation Act. The other is the effect on the investor of the present trend of earnings and the probabilities as to these earnings in the near future. At this particular moment the latter factor is not favorable. It is compensated

for, however, by a strong feeling of confidence in the railway situation. It is apparent on all sides that the public has caught the idea that the railways are to be given a square deal and that investments in railway securities will be reasonably safeguarded. There is in evidence, in fact, a certain feeling of popularity for railway securities at this particular time, encouraged to no small extent by a somewhat lessening confidence in industrial issues.

The favor that has been shown for railway securities has been especially evident in the interest in railway stocks. There is not as yet a market for new issues; reference is

THE BETTER TREATMENT guaranteed the railways by the terms of the Transportation Act has helped create a new feeling of confidence on the part of the buyer of securities.

Railway stocks and bonds are more popular than they were and equipment trust issues have been in special demand.

Prospects for 1921 are for declining interest rates. Hope is expressed for larger net income as coal and other railway material decline in price.

made to stock already outstanding. The trend of the prices of railway stocks during the year is shown in one of the curves on the chart. It is observed first that the average prices of the railway stocks chosen have been considerably below the average for industrials for some time. The rail-

The railway issues continued their decline up to about February. The imminent passage of the Transportation Act then assisted a rise in the level of railway stock prices which, while it was not appreciable and was in part in sympathy with the rise in industrials, was nevertheless sufficient in

Common Stocks	High 1916	Low	Low	High 1920	Low		Low 1920	Low Dec. 31
		Feb. 17, 1920, day before R.R. bill was reported	July 30, 1920, day before rate increase was announced		Feb. 11	Dec. 27		
Atchison, Topeka & Santa Fe	108 $\frac{7}{8}$	79	79	90 $\frac{3}{8}$, Nov. 5	76	Feb. 11	82 $\frac{1}{4}$	
Atlantic Coast Line	126	88	85 $\frac{1}{2}$	104 $\frac{1}{4}$, Oct. 5	82	Dec. 27	86	
Baltimore & Ohio	88 $\frac{1}{2}$	29 $\frac{1}{2}$	31 $\frac{3}{4}$	49 $\frac{3}{8}$, Oct. 15	27 $\frac{3}{8}$	Feb. 13	35 $\frac{3}{4}$	
Chesapeake & Ohio	71	49 $\frac{3}{4}$	51 $\frac{1}{4}$	70 $\frac{3}{8}$, Nov. 5	47	Feb. 13	60	
Chicago & North Western	134 $\frac{1}{2}$	78 $\frac{1}{2}$	68 $\frac{3}{8}$	91 $\frac{1}{2}$, March 10	60	Dec. 22	66 $\frac{1}{2}$	
Chicago, Milwaukee & St. Paul	102 $\frac{1}{2}$	32	33 $\frac{3}{8}$	44 $\frac{1}{2}$, Nov. 5	21	Dec. 21	29 $\frac{1}{4}$	
Chicago, Rock Island & Pacific	45 $\frac{3}{4}$	25 $\frac{3}{4}$	34 $\frac{3}{4}$	41, March 8	21 $\frac{1}{2}$	Dec. 21	27	
Illinois Central	109 $\frac{3}{8}$	84	82 $\frac{1}{2}$	97 $\frac{1}{4}$, Oct. 4	80 $\frac{3}{8}$	Feb. 13	86 $\frac{1}{8}$	
Lehigh Valley	87 $\frac{1}{2}$	41 $\frac{1}{4}$	42 $\frac{3}{8}$	56 $\frac{1}{4}$, Nov. 3	39 $\frac{3}{8}$	May 24	54 $\frac{1}{2}$	
New York Central	114 $\frac{1}{4}$	67 $\frac{1}{8}$	68	84 $\frac{1}{4}$, Nov. 5	64 $\frac{1}{4}$	Feb. 13	73 $\frac{3}{4}$	
Norfolk & Western	147 $\frac{1}{8}$	93	88 $\frac{1}{2}$	105 $\frac{1}{2}$, Nov. 26	84 $\frac{1}{4}$	June 16	99 $\frac{1}{2}$	
Northern Pacific	118 $\frac{3}{8}$	71 $\frac{3}{4}$	71	95 $\frac{1}{8}$, Nov. 5	66 $\frac{3}{4}$	June 12	84	
Pennsylvania	60	40 $\frac{3}{8}$	39 $\frac{1}{4}$	44, Oct. 7	37 $\frac{1}{8}$	May 24	39 $\frac{3}{4}$	
Southern Railway	36 $\frac{3}{4}$	20 $\frac{1}{2}$	27 $\frac{1}{2}$	33 $\frac{1}{4}$, Oct. 5	18	Feb. 14	23 $\frac{1}{4}$	
Southern Pacific	104 $\frac{1}{8}$	92 $\frac{1}{8}$	91	118 $\frac{1}{8}$, Nov. 4	88 $\frac{1}{8}$	Feb. 13	99 $\frac{1}{2}$	
Union Pacific	129 $\frac{3}{4}$	114 $\frac{1}{2}$	115	129 $\frac{1}{2}$, Nov. 4	110	Feb. 13	119	

way stocks did not rise during 1919 as did the industrials so that the space between the lines showing the respective average prices of the 20 railroads and 30 industrials was much greater during the latter part of the year than during the early months. The railway stocks rose to an extent in sympathy with the general upward movement but in the early summer this sympathetic rise ceased. There was in-

volume to indicate a beginning of return of confidence in the railway situation.

The outlaw strikes, the decreased net earnings and the serious freight congestion followed, with the result that the major part of the small rise that had taken place was more than lost. When the Interstate Commerce Commission announced its favorable decision in the question of increased



The Trend of Stock Prices, 1912 to 1920

stead a decline of railway stocks going on contemporaneously with the rise in industrials.

In 1920 the relative relationship has been quite different. A decline in industrial stocks began in November, 1919, which has continued with various interruptions to the present time. One of these interruptions was in March and April.

freight rates and passenger fares, confidence was again restored, so that in August, September and October there was another marked rise in railway stock prices. The falling off in business, the general liquidation of securities, etc., have since come into play so that railway stock prices at present are at a very low level.

The fact that the railways with their increased rates have failed to secure the net railway operating income of 6 per cent in any of the four rate groups has not assisted by any means in recent months in inculcating confidence. It is the general consensus of opinion among observers who are real students of the problem, however, that this is but temporary. They express the opinion, to be sure, that it is not likely that net earnings will increase for several months. They have confidence for the future. They point to the fact that when business picks up gross earnings will, of course, increase while in the meantime the railways should be able to make

rumors that have been started and the activity in the stocks involved exemplify clearly the popularity of the railway shares from the speculative point of view.

Railway Bonds

The attitude of the buyer of railway securities towards bonds is shown in quite a different manner from that towards stocks. Bond issues appeal to the investor, whereas stocks, on the whole, have a greater appeal to the speculator. The bonds have stated earnings, the failure to pay which means receivership. The result is, of course, that the bond market

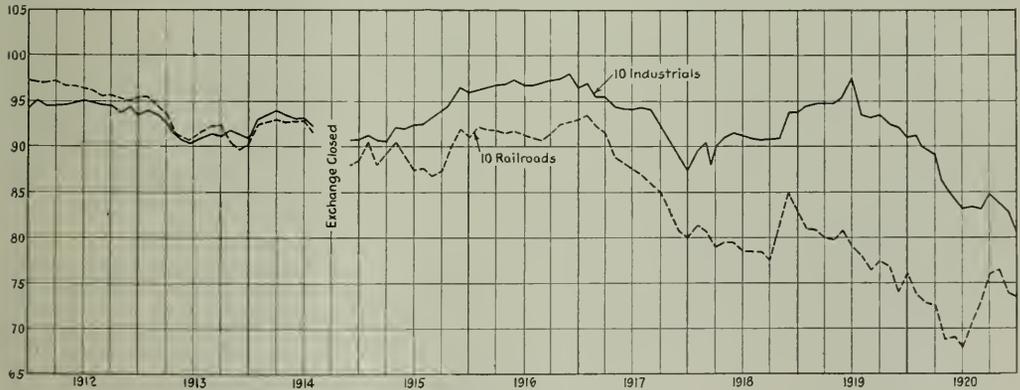
Bonds	Feb. 20, 1920. R.R. bill was reported Feb. 18	July 30, 1920, day before rate increase was announced	Low 1920	High 1920	Price Dec. 31
A. T. & S. F. Gen. 4's, 1995	78¼	74¼	69, May 21	82¾, Jan. 2	76¼
A. C. L. 1st 4's, 1952	76	71½	69½, July 8	80, Jan. 5	76½
B. & O. 1st 4's, 1948	64	59	57½, May 20	74½, Oct. 8	68
C. & O. 1st Cons. 3's, 1935	90¼	88	84, April 26	95, Jan. 7	90
C. & N. W. Gen. 4's, 1987	77	72½	67, May 4	80, Jan. 3	76
C. M. & St. P. Gen. 4½'s, 1989	78	68½	67½, July 22	80, Oct. 18	75
C. R. I. & P. Ref. 4's, 1934	64½	65¼	60½, Feb. 17	71, Oct. 2	67¾
I. C. 1st 4's, 1951	81	81½	79½, April 22	83½, April 16	83½
L. V. 1st 4½'s, 1940	86	78	77½, Dec. 20	87½, March 16	80½
N. Y. C. Mort. 3½'s, 1997	66¼	64¼	61¾, June 29	70½, Oct. 26	67½
N. & W. Cons. 4's, 1996	75¼	74¾	67¼, May 20	80, Jan. 2	77
P. Prior Lien 4's, 1997	81	75½	69, May 20	80½, Jan. 3	76
P. R. R. Cons. 4's, 1943	81¼	79	81¼, April 7	83¾, Jan. 16	81¾
S. P. Gold 4's, 1949	68¼	65½	61½, May 19	73, Jan. 10	70½
So. Ry. Con. 5's, 1994	82¾	80	77, May 21	90, Oct. 21	85½
U. P. 1st 4's, 1947	82	80½	74½, May 21	85¼, Jan. 5	80¾

important decreases in their operating expenses, with the result that when conditions are more normal the net earnings should be on a much improved basis. In this regard, particular attention is given to the decrease in coal prices. It is interesting to note that some of those who are selling securities express the hope that further increases in freight rates will not be necessary; they fear that such increases might have an unfavorable effect on confidence in the situation.

The foregoing is written with the thought in mind that the buyer of railroad securities, as a rule, regards railway stocks as speculative rather than investment securities. There are

more in a state of equilibrium and the movement of bond prices reflects different factors from those indicated in the movement of stocks. In discussing the attitude of the buyer of securities towards railway bonds, a further distinction arises in that whereas there have been few new issues of stocks in an extended period of time, new issues of bonds have been made this year in large amounts.

Under present conditions the importance of the attitude of the investor in railway bonds is out of all proportion to that of the attitude of the purchaser of railway stocks. The purchasers of bonds include principally the large fiduciary



The Trend of Bond Prices, 1912 to 1920

many railway stocks that rank as investments. These are pointed out in many cases as being priced on the stock exchange at present far below their real value. Those who deal in stocks have sufficient confidence in the railway situation to recommend such stocks highly. Another factor in connection with railway stocks has already been pointed out in the pages of the *Railway Age*. Reference is made to the live interest that has been shown in the stocks of companies that are spoken of as about to make segregations of their non-railway properties or as suggested for consolidation. The

institutions, such as the trust companies, the savings banks, insurance companies, etc. These institutions have something of a duty towards the public that is not necessarily expected of individual investors. As holders and guardians of the public's funds, they are properly expected to develop their investment policy, so that other things being equal, what they do is in the general public interest. Efficient transportation is one of the most important factors in the country's well-being and prosperity. Naturally, therefore, the investment of funds in railway bond issues is a matter of great

importance and in no small measure a public duty. It is an encouraging thing, then, to find that the railway situation is regarded in such a light by these institutions that they have a most favorable attitude towards investments in railway bonds.

The New Outlook for Railroad Securities

The following statement by a vice-president of one of the important life insurance companies will indicate how that company regards the situation:

"The new year brings a more hopeful outlook for the return of railroad securities to that sound position which they should occupy in American business. This is true in spite of the present falling off in railroad traffic.

"While recent reports have not shown as large earnings in some instances as was hoped for, it is believed that a return to better conditions in the business world will bring these earnings more nearly in line. It is to be hoped that there will be an early decision by the United States Supreme Court settling the dispute over the power of the Interstate Commerce Commission with respect to the regulation of intrastate rates. The inability of the carriers in some of the states to bring their intrastate rates up to a level with the rates authorized by the Interstate Commerce Commission, has of course had a considerable influence on passenger earnings, as well as freight earnings.

"Naturally the securities of the stronger railroads have emerged ahead of the weaker lines and some of the railroad securities have been good investments even during the unsettled period due to the war.

"The insurance companies have for years realized the basic necessity for railroad securities being of the very highest order for the reason that the success of the railroads is to so great a degree the foundation for business success generally in this country. It is evident that the business world generally is now recognizing this fact and the recent action of the Interstate Commerce Commission shows that there is a more hopeful outlook from the standpoint of government regulation. We look for a much better market for railroad securities, a market which will be of interest not only to the general investor but to the insurance companies, savings banks and other organizations which occupy fiduciary relationship."

The statement made by this insurance officer is borne out by the observations and experience of the bond houses. They have found during this year an entirely new attitude as to railway bonds. There has been a decided change in the attitude of investors, which change was evidenced during the year, first following the passage of the Transportation Act and more emphatically after the increase in rates in August. One of the interesting features has been the change in the middle west where in some quarters for a period in recent years railway investments have not been as well regarded as they might have been. This has now been changed and a ready market has been found for such securities during 1920. It has also been found in the large financial centers that railway bonds are becoming more popular at the expense of industrial issues.

The feeling on the part of investors seems to be that the industrials have been through a boom period which is now over and which will not exist again in the same degree for many years, whereas the railways have just begun to come into their own. Much stress is placed on the protection given the investor by the Interstate Commerce Commission, not only through the rule of rate making provided by the Transportation Act but by the provisions relating to the issuance of new securities, those relating to loans from the revolving fund for maturities, etc.

In speaking of the large financial institutions sight must not be lost of the fact that many of these organizations are

already large holders of railway bonds. These institutions through the National Association of Owners of Railway Securities, of which S. Davies Warfield is president, took a leading part in the working out of the Transportation Act. The fact that the law as finally passed has met with their approval is a matter of no small importance, for, of course, if the law had not supplied sufficient encouragement to investors the companies in question could hardly have felt justified in adding to their already large holdings.

The co-operation of the insurance companies is assured for the future through the new organization known as the National Railway Service Corporation organized by the National Association of Owners of Railway Securities. It is not necessary to enlarge upon the plan of financial assistance to the railways which the new company provides. It is sufficient to note here that its object is to assist in financing the purchase of cars and locomotives. The organization will supply through the investment institutions connected with it 60 per cent of the cost, while the remaining 40 per cent is to be supplied from the revolving fund administered by the Interstate Commerce Commission. Among the companies represented on the board of trustees are the New York Life Insurance Company, the Metropolitan Life Insurance Company, the Society for Savings of Cleveland, the Emigrant Industrial Savings Bank of New York, the Massachusetts Mutual Life Insurance Company, the Travelers Insurance Company, etc. The fact that companies of such standing as these stand ready to assist the railways financially should be clear enough indication of the new attitude of investors toward railway securities.

The trend of railway bond prices for the past two years has been generally downwards to about July of this year, when railway bond prices reached the lowest point which they had touched in many years. In August an upward movement began which ceased in October. Since that time, because of various market conditions, prices of bonds have again dropped so that now they are at a fairly low point, although not as low as earlier in the year.

During the year a number of large railroad bond issues were placed, at yields, on the whole, less than contemporaneous issues for strong leading industrials. About 80 per cent of the new issues were put on the market in April, May and June. The action of the Interstate Commerce Commission in discouraging borrowing at more than 7 per cent served as a retarding factor after that time and later it was not considered feasible to float loans because of the liquidation of business and the generally stagnant condition of the bond market. It is noteworthy that the equipment trust issues floated were especially popular and in great demand.

The Prospects for 1921

In looking ahead into 1921, the first thing that confronts the observer is the probable net earnings of the carriers for the coming months. It is likely that the net earnings for a few months in the immediate future will be somewhat disappointing. The recession in business will naturally have a drastic effect on gross earnings, which for a time will be clearly reflected in net railway operating income.

It seems to be the consensus of opinion that the present business depression will have worked itself out by about the latter part of spring or early summer. No one expects a boom to follow after that but observers do look for greater stability of business. They expect a cessation of the present rapidly declining prices and possibly a leveling up here and there of prices which may have fallen below the general level. Some do expect increasing prices at that time, but those who believe that there will be pronounced increases in the general level are in a small minority.

While business remains slack and gross earnings remain
(Continued on page 165)

General Review Section

General Railroad Developments During the Year.
Transportation Conditions During the Year 1920.
Higher Freight Rates Fail to Curtail Shipping.
Effect of Rate Increases Disappointing.
Settlements with the Railroad Administration.
Two Important Valuation Developments in 1920.
Labor Faces Economic Adjustments in 1921.
Fate of Railroad Administration Innovations.
A Year of Progress in Maintenance of Way.
Car and Locomotive Prices Reach Peak in 1920.
Prices for Engineering and Maintenance Material.
The Use of the \$300,000,000 Revolving Fund.
The Electrification of Steam Railroads.
Developments in Material Handling Methods.
Railroad Developments in Canada in the Year 1920.
The Problem of Rates on the Canadian Railways.
The Present Railway Condition in Mexico.
English Railway Developments During 1920.
Present Condition of the French Railways.
Short Line Association Increases Activities.



R. H. AISHTON
President of the American Railway Association



Railroad Executives at Washington for Conference with I. C. C. Standing left to right: Bird M. Robinson, F. D. Underwood, Julius Kruttschnitt, E. N. Brown, Daniel Willard, W. H. Finley, W. B. Storey, W. W. Atterbury. Seated—left to right: J. M. Herbert, Samuel Rea, A. H. Smith, T. De Witt Cuyler, Alfred P. Thom, E. E. Loomis.

General Railroad Developments During the Year

Period Since Return of Railroads to Private Management One of Transition and Readjustment

THE OUTSTANDING DEVELOPMENT affecting the railroads during the year was, of course, the return of the properties to corporate management on March 1. A review of the year's activities, therefore, consists largely of an account of the various measures that have been necessary to enable the roads to recover from the effects of the war and 26 months of "unified" operation by the government, and of the process of readjustment to the new conditions created by the Transportation Act.

When the year opened the return to private management had been definitely decided upon and the President had issued his formal proclamation relinquishing the roads as of midnight on February 29, but many of the conditions under which they were to be returned and the policy of regulation to be applied to them in the future were left in a state of great uncertainty until they were determined by the passage of the Transportation Act only a week before the date set for the relinquishment. In fact the conditions were so uncertain that the interests opposed to the relinquishment of federal control, including government ownership advocates in general and the labor leaders of the Plumb Plan League, kept up a bitter fight to the last minute for their retention by the government in spite of the

proclamation which had been issued on December 24, and even tried to persuade the President to veto the bill after it had been passed.

The railroads were returned to their owners on March 1 under a new law which afforded much brighter prospects for the future than they had enjoyed for many years, but with an immediate outlook far from encouraging and with what the Interstate Commerce Commission has since described as "an impaired transportation machine." The railroad companies resumed the reins of management with very little cash on hand as working capital, under a scale of expenses which the rate structure could not hope to provide for until after a readjustment, and in debt to the government for most of the additions and betterments made during the period of federal control. They were faced, at a time of high interest rates, with a need for vast sums for further development to enable them to catch up with the industrial growth of the country during the war period, with their

PRIVATE management was restored on March 1, with the rate and wage questions still to be settled, with an impaired physical plant, and under a law providing new conditions of government regulation.

Seriously hampered by the outlaw strikes, the railroads recovered sufficiently to break all previous records for business handled.

While rates and wages have been advanced conditions have not yet become stabilized and the full effects of the new law have not yet been demonstrated.

organizations more or less disrupted, and with the labor organizations bitterly hostile and demanding large increases in wages.

For about a month, with the encouragement afforded by the new law, a new spirit pervaded the railroad world and

the principal developments seemed to consist of the discontinuance of practices instituted by the government and those incident to a renewal of competition. Traffic soliciting offices were opened, advertising was resumed and occasional reports of an improvement in train service were made much of.

Switchmen's Strike

Then came the "outlaw" switchmen's strike, and by the middle of April transportation conditions were the worst ever known. Railroad officers who had in previous years spent a large part of their time in opposing the demands of organized labor for higher wages, began to express impatience at the delay of the Railroad Labor Board in passing upon the new demands. Shippers, who had rejoiced with the railroads at the termination of federal control, became critical again because the railroads could not handle their business, and the habitual critics of the railroads began to cry that private management had broken down. Private management had little to do with the wage problem, which, together with dissension in the ranks of unionism and the general spirit of unrest born of the war period, had brought on the strikes that tied up the railroad terminals, but private management had about the biggest job it had ever tackled in dealing with the physical aspect of the situation and in attempting to vindicate the claims that had been made for its superiority over the management that had been in charge for 26 months.

The railroad managers and the employees that remained loyal performed an almost superhuman task in keeping the railroads from a complete breakdown for a few weeks, and after the Railroad Labor Board had begun its hearings and most of the strikers had returned to work or had been replaced by new men, conditions began to improve. The cessation of work in most of the important terminals in the eastern part of the country had left such a congestion, however, and at a time when an enormous volume of traffic of all kinds awaited transportation, that a large number of railroad executives felt it necessary to call upon the Interstate Commerce Commission to exercise the emergency powers conferred upon it by the Transportation Act to assist them in dealing with the extraordinary conditions. The developments more particularly connected with transportation conditions and the combined efforts of the railroads, the commission and the shippers to restore order out of the chaos produced by the strike, are dealt with in another article in this issue.

Some Strange Contrasts

The railroad history of 1920 presents some strange contrasts. The railroads have handled a larger volume of traffic than in any previous year and their total earnings have consequently broken all records, but expenses have consumed a larger proportion than ever before and as a result the net operating income has been less than for any year in recent history. The year includes one month in which, on account of the switchmen's strikes, the railroads "ceased to function" to a far greater extent than during the period toward the end of 1917 when a similar statement was made of them as a reason for their taking over by the government, but it also includes several later months in which all previous records for the amount of traffic handled were broken.

The Labor Problem

It had been made clear some months before the railroads were returned that the Railroad Administration did not intend to readjust the rates in keeping with the increases in expenses that had occurred while it was in charge, and it was well recognized that one of the first problems to be solved in connection with the return of the roads was to

readjust their rates to a basis that would be self-sustaining. Developments in January and February, however, resulted in the wage question also being postponed until after the return of the roads and in such a way that it became the immediately pressing problem.

After the President had issued his proclamation relinquishing the railroads the railroad labor organizations renewed their insistence on a settlement of their demands for increased wages which had been pending before the Railroad Administration Board of Wages and Working Conditions for several months. The subsequent developments are outlined in another article entitled "Labor Faces Economic Readjustments in 1921," published elsewhere in this issue.

The settlement of the wage question and the gradual return to something like normal conditions both on the railroads and in the country generally has led to a marked increase in the efficiency and loyalty of railroad labor, but the labor situation has by no means been entirely cleared up. The Plumb Plan League, claiming to represent the railroad employees but including as individual members only about 200,000 of them, has kept up a steady campaign of vilification of railroad managements, largely in connection with its unsuccessful efforts to defeat for re-election the members of Congress who voted for the bill under which the railroads were returned to private management.

A controversy between the labor organizations and the railroads has also arisen from the demand of the former for the establishment of national boards of labor adjustment. The Transportation Act provides for the creation of boards of adjustment by agreement between the companies and the employees, composed of an equal number of representatives of each side and the labor organizations have insisted on the formation of national boards such as those maintained by the Railroad Administration, while the railroads have insisted on local boards to settle local grievances at home and to enable each road to retain some control over matters of discipline.

Rates Advanced

One of the first questions to which the railroads turned their attention after the return of the roads was naturally an advance in rates to enable them to pay expenses and earn the return prescribed by the new law. Committees had been appointed by the Association of Railway Executives before the return of the roads to study the question of how an advance could best be made, whether in accordance with a plan worked out by the traffic department of the Railroad Administration during 1919 when it had given some consideration to a rate advance, for increasing revenues by raising the low spots in the rate structure, or by a uniform percentage. It was finally decided that the required amount of revenue could be raised in the short time available for the readjustment only by a uniform percentage advance in each territory. Whereas former general rate advance cases had been instituted by the filing of tariffs which were later suspended pending hearings and an investigation, the new law placed a responsibility for the adequacy of rates upon the Interstate Commerce Commission and also authorized the commission to initiate rates.

Informal conferences were held by the representatives of the railroads with the commissioners and in response to inquiries the commission said that it would be appropriate for the roads themselves to formulate specific requests for the establishment of rates which in their judgment would produce the income authorized by law. In the early part of May separate petitions were filed by the carriers in the eastern, southern and western territories seeking general increases in freight rates by percentages which they estimated, if applied to the traffic of the year ending October 31, 1919, would produce a net return of 6 per cent upon the property

investment, assuming that expenses continued at the unit figures prevailing during the first part of 1920.

Hearings were held by the commission extending over more than five weeks during which comparatively little opposition was manifested by the representatives of the shippers who appeared, except by those who were so situated that they would be placed at a comparative disadvantage by a percentage instead of a specific advance; on the other hand, large numbers of representative shippers strongly urged the advance and declared they were far more interested in doing something to enable the railroads to improve their service than in the amount of the freight rate. There was some objection to the use of the property investment accounts of the carriers as even a temporary basis of valuation for the purpose of calculating a fair return and the National Association of Railway and Utilities Commissioners, through its solicitor, urged the commission to take time to build up a figure for the temporary value by a detailed consideration of such information as was available for each road.

After the close of the hearings before the commission, the Railroad Labor Board issued its report awarding an increase in wages amounting to about \$618,000,000 a year, which, it had been understood at the hearings, was to be added to the amount of the rate advance. The railroads filed supplemental proposals to provide for the additional amount by further advances in freight rates and also by advances in rates for passenger and other service not covered by the original applications.

On July 31, only 25 days after the close of the hearings, the commission announced its decision, dated July 29, allowing a 20 per cent increase in rates for passenger traffic and services accessory thereto, a surcharge of 50 per cent, to accrue to the railroads, upon the amount paid for Pullman accommodations, and increases in freight rates of 40 per cent in the eastern district, 35 per cent in the western district, 25 per cent in the Mountain-Pacific district, 25 per cent in the Southern district and 33 1/3 per cent on inter-territorial traffic.

These increases, the commission found, would be necessary under the conditions shown to exist, to meet the increased costs of labor and materials, and to produce as nearly as may be a net return of 6 per cent upon a valuation of \$18,900,000,000. The carriers had used to represent a minimum figure for the value upon which to calculate the return, their cost of road and equipment, aggregating \$20,040,572,611, plus a sum for working capital and materials and supplies, making a total of about \$20,600,000,000. A 6 per cent return on this amount would have been \$1,236,000,000 a year. Six per cent on the figure adopted by the commission is about \$1,134,000,000 or about \$100,000,000 more than the railroads had ever earned in a year and about \$200,000,000 more than the standard return, based on the average for the three years ending June 30, 1917, which was the basis of their guaranty during the period of federal control.

It was roughly estimated that the percentages of increases authorized by the commission would result in an increase in revenues of about \$1,500,000,000 a year if applied to both state and interstate traffic, allowing \$600,000,000 for the new increase in wages and \$900,000,000 to make up the deficiency in net operating income shown by the exhibits based on the constructive year ended October 31, 1919.

Attitude of State Commissions

At the request of the Interstate Commerce Commission, three representatives of the state railroad commissions took part in the proceedings in the rate case, concurred in the conclusions reached and issued a statement to the state commissions throughout the country to that effect; some of the state commissions, however, have failed to take action corre-

sponding to that of the Interstate Commerce Commission, while in some states they were prevented from so doing by state laws. The railroads had filed applications with the various state commissions similar to those filed with the Interstate Commerce Commission and after its decision the states were asked to put into effect increases corresponding to those allowed upon interstate traffic, on the ground that anything less would prevent them, to that extent, from realizing the percentage of return contemplated by the law. Increases upon intrastate traffic were approved by the various state commissions as follows:

	Freight	Passenger
Increases approved in full.....	24	23
No increase approved with exceptions.....	17	7
No increase allowed because statutory provisions prevent action by state commissions.....	5	13
Smaller percentage increase approved.....	5	..
Increases denied.....	2	3
Increases denied in part.....	..	2
	48	48

In response to petitions filed by the railroads alleging discrimination against interstate commerce as a result of the action of the states that refused to allow the full increases, the Interstate Commerce Commission instituted a series of proceedings of investigation and in the New York, Illinois and Wisconsin passenger fare cases it has rendered decisions ordering the state rates to be increased by the amount of the interstate advances. The cases involving rates in other states are in various stages of progress, many of them having been submitted to the commission after final arguments.

These state rate cases have brought sharply to the front the conflict between state and federal regulation and the state commissioners, generally, through their association, regardless of whether they had themselves allowed the full advances, have organized to contest the power of the Interstate Commerce Commission to interfere with state rates. They have been represented at the various hearings by counsel and by a committee and have announced their intention of contesting the commission's interpretation of its powers under the new law through the courts. Meanwhile the rate situation in the various states continues to be complicated by the jurisdictional question, as in some cases the railroads have secured federal injunctions against the state authorities and in others the state authorities got an injunction first.

The advances in rates were generally accepted as being adequate on the whole, although for many individual roads and for certain groups of roads they are still inadequate and the New England roads have begun formal proceedings before the Interstate Commerce Commission to improve their condition by obtaining larger divisions of the through rates. The September and October earnings were not sufficient to provide the 6 per cent return contemplated by the law but the gross earnings showed a less percentage of increase than the advance in rates and it is apparent that the full effect cannot be ascertained until later returns become available, as the situation was complicated by the failure to receive the advances in many states and also by the amount of traffic still moving under the old rates.

Payment of Guaranty Delayed

Because during federal control the rates were not raised sufficiently to provide for the scale of expenditures and the deficits were met from the Treasury, Congress provided in the Transportation Act for a continuation for six months after the roads were returned of the guaranty which was provided while the roads were under federal control. That is, they were to receive one-half of the average income for the three-year period ended June 30, 1917. The six-months' period was decided upon on advice from the Interstate Commerce Commission that it would take about that long for the proceedings necessary for a general increase in rates. The

guaranty, however, was extended only to such carriers as filed an acceptance agreeing to pay over to the government any excess in railway operating income above the guaranteed amount, and as a safeguard against extravagant expenditures by the railroads, it was provided that for the purpose of computing the guaranty no more should be charged to expenses for maintenance than an amount to be determined by the commission based on the expenditures for the pre-war test period as equated for differences in the cost of labor, materials, etc.

Acceptances of the guaranty were filed by 666 carriers and 35 elected to take their own chances. These included the Southern, the St. Louis Southwestern and the Pere Marquette, but most of them were small roads which were so situated that they expected to earn more than they did before the war. The 35 roads earned about as much as their guaranty but the roads as a whole had a deficit for the six-months' guaranty period of over \$200,000,000, which represents approximately the amount of the retroactive wage increase from May 1 to September 1.

The guaranty for the roads that accepted it was about \$420,000,000 so the amount payable by the government to make good the guaranty is something over \$600,000,000. Advances amounting to approximately \$250,000,000 were paid on account of the guaranty as provided for by the law on applications filed by the roads up to September 1 on certificates by the Interstate Commerce Commission, but when the commission attempted to assist the roads by issuing certificates for additional partial payments on account of the guaranty the certificates were held up in the Treasury Department by a decision by the comptroller of the Treasury that partial payments were not authorized by the law and that payments after the close of the guaranty period could only be made on certificates by the commission for the full amount due to make good the guaranty as finally ascertained.

After several efforts by the commission and the railroads to obtain a reconsideration of this ruling an effort was made to test it in the courts by the filing of a petition by the Grand Trunk Western in the supreme court of the District of Columbia for a writ of mandamus requiring the Secretary of the Treasury to honor the commission's certificate. This delay in collecting the guaranty, the need for which was accentuated by the back wage payments made in July, August and September, has seriously affected the cash position of the railroads and made it necessary for some of them to borrow money from the banks to meet current expenses. The final settlement of the guaranty is likely to be protracted by the many complications entering into the adjustment of the maintenance accounts, and claims affecting the income for the guaranty period may be filed at any time within two years. The Interstate Commerce Commission in its annual report recommended that Congress amend the law to clearly provide for partial payments of the guaranty.

Loan Fund

The Transportation Act also provided a revolving fund of \$300,000,000 to assist the carriers during the transition period immediately following the period of federal control by loans to meet maturing indebtedness or to acquire equipment or make other additions and betterments. The Interstate Commerce Commission immediately received applications for loans in such numbers and for such amounts that the fund would have been exhausted at once unless some definite plan of apportionment were adopted. The fund is to be loaned at 6 per cent, while the going rate for money has been considerably higher and most roads naturally attempted first to meet as much of their requirements as possible from the fund. The Senate had attempted to provide a larger fund, of \$500,000,000, but because of the opposition of the House the amount had been reduced and it became necessary

for the commission to give careful consideration to its apportionment, particularly as many of the roads most in need of the money were unable to furnish the security required by the law.

As the law was originally passed, the provisions for the loan fund were almost unworkable but an amendment was secured extending the maturity of the loans from 5 to 15 years and giving the Interstate Commerce Commission discretion as to the character of the security to be required. On May 29 the Interstate Commerce Commission held a hearing in respect of the general principles which should guide it in administering the fund and on June 7 it announced a tentative apportionment of the fund for various purposes but this still left open the question of the apportionment between various carriers. After some discussion and conferences the commission asked the Association of Railway Executives and the American Short Line Railroad Association to make recommendations on this point and the commission has been guided to a very considerable extent by their reports.

All of these preliminaries naturally tended to delay putting the fund at work and it was not until the latter part of the summer that any considerable part of the fund had been loaned. Another delay was caused by the position taken by the Treasury Department that it could not issue loans except upon an unqualified certificate from the commission that the railroad could not borrow money from other sources, whereas the commission had qualified several of its certificates with the words "except at excessive rates of interest." The commission finally got around this objection by deciding that the inability to borrow elsewhere referred to in the law meant a practical inability and that it could issue an unqualified certificate if it believed the interest rates that would have to be paid elsewhere to be excessive. The commission, however, adopted a policy of requiring carriers to borrow money for part of their needs from other sources as a condition of their receiving a loan from the revolving fund.

Loans have recently been certified by the commission as rapidly as the carriers have been able to make the necessary showing as to the facts which the commission is required to certify to the Treasury and as its organization has been able to pass upon the various details, but up to October 20 only about \$56,000,000 had been actually loaned from the fund by the Treasury Department. By the first part of November the commission had certified loans amounting to \$115,000,000 from the fund, of which approximately \$81,000,000 had been actually loaned by the Treasury but additional certifications have since increased the total to some \$150,000,000.

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Photo from Keystone View Co.

Construction of the Tunnels Connecting Two Railway Stations in Brussels, Belgium



New York Central Yards, Toledo, Ohio. Photo by Ewing Galloway

Transportation Conditions During the Year 1920

Co-operation Between the Railroads, the Commission and the Shippers Overcomes Handicaps

THE RAILROADS during 1920 handled a greater volume of traffic and under probably greater difficulties and more handicaps than in any previous year in their history. They also during the latter half of the year established new records in some respects for the efficiency with which the traffic has been handled with the available facilities, although in the first part of the year, as the result of causes entirely outside of their control, they probably came nearer to a complete breakdown than ever before.

The railroads then organized to beat all previous records of either government or private operation and, with the co-operation of the Interstate Commerce Commission and the shipping public, were making remarkable progress in the accomplishment of the program they had set for themselves when the slump in traffic began. In spite of the business slump during the past two months, it is now clear that all records for freight handled by the railroads in a year have been broken. While the complete statistics will not be available for some time, the figures now at hand indicate practically as great a ton-mileage of freight in 11 months of this year as was handled in the entire 12 months of 1917 and but for the slump in November the 11 months' record might have exceeded that for any previous 12 months with the exception of the year 1918.

For the 10 months ending with October the number of ton-miles of revenue and non-revenue freight was 373,526,000,000, as compared with 328,792,000,000 in the corresponding period of 1919, and 365,855,000,000 in 1918. The ton-mile statistics for November and December are not yet available, but the number of cars of revenue freight

loaded in those months was greater than in either 1919 or 1918. In November, 1919, the total ton-miles were 32,000,000,000 and in November, 1918, the total was 35,000,000,000, while in December in both years the total was 33,000,000,000.

From October 31 to December 25 the total car loading was 6,651,694 in 1920, as compared with 6,271,570 in 1919 and 6,281,389 in 1918.

The weekly car loading has fallen off from 1,010,000 cars in the week of October 23 to 796,858 in the week of December 18. In the latter part of 1918 traffic also fell off sharply after the armistice and in the latter part of 1919 it was reduced considerably by the coal strike. The increase in November and December this year as compared with last year is more than accounted for by the increased coal loading this year, but it is rather difficult to say to what extent the reduction since October is more than reasonable because the traffic of the corresponding period of 1917, which was greater than that for 1918 or 1919, was probably abnormally high and the car loading figures for 1917 are not available for comparison with those of this year. For the week of December 18 this year the loading was less than for the corresponding week of 1919.

Statistics of freight car performance just compiled by the Bureau of Railway Economics for October show that the railroads in that month handled 42,562,685,000 ton-miles of freight, as compared with 40,166,000,000 in October, 1919. This represents, with one exception, the largest volume of freight ever handled by the railroads in a month. In August, in which month a large volume of freight was offered to the railroads to beat the new freight rates which went into

ALL RECORDS broken for volume of freight traffic moved, in spite of a shortage of equipment and other facilities and the set-back received from the switchmen's strike.

The railroads have also established new records for efficiency in car performance. Average miles per car per day increased from 22.3 in February to 28.5 in October. Average carload increased in the same period from 28.3 tons to 29.9 tons. New records set for net ton-miles per car day and tons per train.

effect on August 26, the ton-mileage was 42,656,000,000. For each of the months of July, August, September and October the ton-mileage has been over 40,000,000,000, a figure attained in only two months before—August, 1918 and October, 1919. In fact each of the four months broke the freight traffic record for the respective months and the four months have established a record that may not be equalled for some time to come.

The average mileage per freight car per day in October, 28.5 miles, not only established a new record for the year but was greater than has been recorded for any month since May, 1917, when the railroads had started their drive to increase the efficiency of freight car performance just after the United States entered the war. The average load per car, 29.9 tons, was slightly less than for September, when it was 30.1 tons. In average train loading, net ton-miles per car day and net ton-miles per mile of road per day the railroads have broken all previous records for any single month.

The record of ton-miles handled in each month of the year, with comparative figures for 1919, 1918 and 1917, is as follows:

NET TON-MILES REVENUE AND NON-REVENUE FREIGHT

	1920	1919	1918	1917
January	34,607,000,000	30,178,000,000	27,619,867,000	32,652,615,000
February	32,562,000,000	25,474,000,000	29,678,260,000	28,386,350,000
March	37,638,000,000	28,813,000,000	37,706,100,000	31,674,619,000
April	28,208,000,000	28,593,000,000	37,992,810,000	34,279,892,000
May	37,569,000,000	32,276,000,000	37,506,935,000	38,552,222,000
June	37,742,000,000	31,881,000,000	37,667,517,000	38,477,862,000
July	40,232,000,000	34,916,000,000	39,347,137,000	37,137,162,000
August	42,656,000,000	36,416,000,000	40,776,125,000	36,044,332,000
September	40,651,000,000	38,678,000,000	39,579,023,000	35,469,005,000
October	42,562,685,000	40,166,632,000	39,621,923,000	38,224,083,000
November	32,539,248,000	32,539,248,000	35,564,236,000	36,404,612,000
December	33,462,298,000	33,462,298,000	33,639,389,000	31,960,171,000

With the lessened demand for transportation service and with greater efficiency in freight car performance, transportation conditions have become decidedly easier during the past two months.

The car shortage, which on September 1 amounted to 147,000 cars, has given way to a large surplus of equipment. For the week ending December 23 the Car Service Division of the American Railway Association reported a surplus of 127,723 cars, largely box cars, while there were still shortages amounting to 9,056, representing largely a demand for coal cars in the eastern districts.

The Interstate Commerce Commission has cancelled all of its priority orders, giving preference in car supply to coal shipments, and the programs for the shipment of coal to New England and to the Northwest via the lakes have been fulfilled. Up to December 25, 1920, the Geological Survey reports a total production of bituminous coal amounting to 547,264,000 net tons, which exceeds that for the corresponding period of 1917—546,025,000—when there was a heavy demand for coal and the production about equalled the demand. In 1918, in the corresponding period the production was 572,692,000 tons but this represented an excess which resulted in a much smaller output in 1919.

For the year 1920, the Geological Survey estimates a probable production of 555,000,000 tons.

Transportation conditions throughout the year have been dominated by two important factors, aside from the general effects of the war and those resulting from the fact that for 26 months the railroad properties had been out of the control of their own organizations and had been operated by a government organization.

These factors were the coal miners' strike which began in November, 1919, and the outlaw switchmen's strike which began in April. The coal strike caused such a depletion of coal stocks as to create an enormous transportation problem in relieving the shortage and building up new

reserves and the switchmen's strike for several weeks caused a paralysis of the efforts to cope with the problem and to handle the enormous volume of general freight demanding transportation. As a result, a situation was created which affected the entire industrial activity of the country. On the other hand the condition caused by the two strikes was so serious and demanded such a degree of forbearance and co-operation on the part of all concerned to deal with it at all, that without doubt, it may be said that the strikes were largely responsible for the great degree of success that was later attained.

Railroads Returned in Impaired Condition

The condition in which the railroads were returned by the government on February 29 is now fairly well understood by all who are at all conversant with transportation conditions, although at the time a great many people who had become dissatisfied with the results of government operation and conditions resulting from the war seemed to have a confident belief that all that was necessary was for the government to let go and for the former corporate managements to resume control to restore pre-war conditions. It is now well recognized that the roads were returned in an impaired physical condition, particularly as to equipment, as the result of the intensive use to which it had been subjected for three years, that the railroad facilities had not been expanded while the industrial capacity of the country had been enormously developed, that most companies were without working capital, their organizations had been considerably disrupted, and the morale of their employees was at a low ebb, while business was expecting more of the railroads than ever before.

The country had embarked upon a program of reconstruction and production in an effort to replace the shortage and waste of war times and to bring about a condition of prosperity following the period of uncertainty and depression which succeeded the armistice and the railroads were faced with an enormous demand for transportation. In fact they had already in January and February, the last two months under federal control, carried a larger volume of freight than ever before in those months.

The private managements on March 1 inherited a considerable amount of accumulated dissatisfaction among their employees as the result of the unsettled state of their negotiations with the Railroad Administration over matters of wages and working conditions. There was also undoubtedly a feeling of discontent among the men because of the adverse decision of Congress with regard to their proposals for a radical reorganization of the railway industry along the lines of the Plumb plan and because the demands of their leaders that the return of the railroads be postponed had been disregarded.

The Switchmen's Strike

Private operation had hardly got under way during March when the dissatisfaction among the classes of railroad employees which had received somewhat less consideration than others during the war period made itself manifest in a series of strikes of yardmen and switchmen, which began about the first of April and served seriously to retard railway operations not only during April but during two or three succeeding months. Although unauthorized by the recognized union leaders and branded as "outlaw" movements, the strikes could hardly have been organized in a way to have affected transportation more seriously. Many of the unorganized strikes occurred without warning, in many instances the men went on so-called "vacations" without presenting any demands and many men simply quit their employment to take more remunerative jobs elsewhere. The strikes were most complete in the great eastern cities which

are railroad terminals and gateways and also the centers for great industrial activity, and the effect of the withdrawal of labor from railroad service was wholly disproportionate to the number of men that left the service.

The congestion which had existed at important gateways and terminals was enormously magnified and necessitated the placement and maintenance of numerous embargoes. Hundreds of thousands of cars were left standing in terminals for days and weeks because of the shortage of switching forces, and not only was the ability of the railroads to accept new freight enormously reduced but the congestion backed up and the movement of such freight as was handled was slowed up. In some cases men who left the railroad service to take higher paid jobs with industries that were bidding for labor with which to produce goods that could be sold for almost any prices asked, soon found themselves out of jobs again because the railroads could not supply the industries with cars.

"In effect, it was as if about 750,000 cars for the time being had ceased to exist as facilities of commerce," said the Interstate Commerce commission in its annual report. "The April congestion caused by the strikes had the effect of reducing by fully one-third the equipment available as compared with that available on the resumption of private control."

"The general public will never know how close the rail and water transportation systems of the United States came to a complete cessation of functioning in the industrial heart of the country as the result of strikes beginning in April and which continued in diminishing force until midsummer," said Commissioner Aitchison in a recent address. "Indeed, because the stimulus of war was absent, the condition in the spring of 1920 was more menacing to the domestic welfare of the country than it was in the early winter of 1917 when federal control was assumed."

How the strike affected the volume of traffic handled may be observed in the table showing the ton-mileage month by month. Whereas in March the ton-miles aggregated over 37,000,000,000, in April they were reduced to 28,000,000,000.

Freight Car Accumulations

The only statistical measure of the congestion produced by the strike is the weekly report compiled by the Car Service Division of the American Railway Association showing the principal accumulations of loaded cars in excess of current movement. There had been congestion during the winter months and the accumulations had ranged from 74,000 in the week ending January 2 to 122,000 in the week ending February 20. On April 2 this had been reduced to 93,000, but on April 16 after two weeks of the strikes, accentuated by bad weather in some parts of the country, the total accumulations amounted to the unprecedented total of 288,000 cars. It was not until the middle of July that the accumulations were again reduced to below 100,000 cars and not until October 8 that the number was brought as low as 41,000, which is about normal for a year of heavy traffic. For the week of December 17 the accumulations were only 28,830 cars. During April the average daily accumulations were 208,698, of which 25,692 cars were held on account of embargoes. By the latter part of October the average had been reduced to 39,807, of which only 1,071 were held on account of embargoes and over half were held awaiting export or coastwise movement.

The worst period of the strikes lasted only about two weeks, during which time the railroads at many points were largely dependent upon office men, officials, inexperienced laborers and even college student strike-breakers for such switching service as was performed. After a week or so the newspapers practically ignored the strike, although to those

particularly interested it was apparent that it was the dominating feature of the situation for the next 10 weeks or more.

Almost every important rail gateway and junction point from Kansas City and St. Louis east to Philadelphia and New York was affected, and even after the railroads had regained something like a normal switching force in point of numbers a large proportion of the men were inexperienced; they had chaotic conditions to deal with and the accumulations of delayed loads were so great that all movement was slowed up for several weeks. The car shortage, which had prevailed since August 1, 1919, was magnified by the slow movement. Shippers could not get their products handled and receipts of raw material were slow and irregular. Goods were in transit much longer than usual, which placed a strain on credit facilities and many plants had to shut down temporarily.

The result was an enormous flood of protests to Washington, to the railroads and to state and even municipal authorities. Shippers and even some railroad men who had previously complained of the wage increases made by the Railroad Administration began to criticize the Railroad Labor Board for inaction. Particularly vociferous were the complaints of the coal operators and the large consumers of coal, who had been striving to overcome the shortage resulting from the miners' strike, and whose demands for cars had greatly exceeded the supply even before the switchmen's strike. The general congestion caused delays in the placing of empty cars at the mines and coal already in cars was delayed in reaching the consumers. In March the Car Service Commission had inaugurated a campaign to furnish cars enough for a weekly production of 11,000,000 tons of bituminous coal and this was attained during the last week of March, but in April production fell to 8 or 9 million tons a week. For several weeks during the latter part of the year production has exceeded 12,000,000 tons a week.

Unscrambling the Freight Cars

The railroads on March 1 had taken over the Car Service Section of the Railroad Administration, which the latter had taken over from the American Railway Association at the beginning of federal control. It was reorganized as the Commission on Car Service of the American Railway Association, but with a considerably reduced force and very uncertain powers. One of its first tasks was to try to bring about a relocation of the freight cars which had been pooled by the Railroad Administration and which, by reason of the transportation conditions of the latter part of 1919, had become badly scattered from the standpoint both of the needs of traffic and of ownership.

When the railroads were taken over on January 1, 1918, 44 per cent of the cars were on their home lines. When they were returned on March 1 only 21.9 per cent of the cars were at home. Too many coal cars were in the west, where they had been sent at the time of the coal strike and where they had been retained by the increasing demands for local traffic. Too many of the box cars that had moved eastward with grain in the fall of 1919 had similarly been held in the east, although a large part of the grain was still to be moved and the western district was clamoring for cars with which to get rid of the accumulation. Relocation orders were issued by the Commission on Car Service for the movement of large numbers of cars but observance of the orders was slow and on some roads they were honored only if it was entirely convenient to do so.

Interstate Commerce Commission

Asked to Use Emergency Powers

After a few weeks of the uphill struggle, a large number of railroad executives decided that the odds against them were too great and called upon the Interstate Commerce

Commission to exercise its emergency powers. The railroad men were not unanimous in this decision. Some felt that they were making progress and that to ask for help would be a confession of weakness and might lead to the exercise of a greater control over them than they desired. Some felt that the railroads should be able to organize themselves in such a way as to render it unnecessary to ask the Interstate Commerce Commission for assistance. The opinion which prevailed, however, was that while progress was being made the set-back they had received was so great that valuable time would be lost if they failed to take advantage of any possible assistance. The Interstate Commerce Commission possessed powers which the railroads themselves could not exercise; they were restricted by laws against discrimination, and many of them felt that while they were willing to set aside selfish interests in order to co-operate for the common good and the public interest, the extent to which they should do so should be determined by some outside authority and not be dependent upon varying degrees of willingness to sacrifice the interest of a single road to the interest of the entire situation.

On May 15 the executives filed with the Interstate Commerce Commission an informal petition in which they stated their urgent need for additional freight cars and locomotives which there was no immediate opportunity to procure, and that relief in the movement of the commodities most essential at that time—foodstuffs, perishables, livestock, coal and newspaper—could only be afforded by the use and movement of the existing equipment in the most effective manner. In the public interest the roads called upon the commission to exercise the emergency powers granted it by the Transportation Act, with respect to the giving of priority and preference in the movement of necessary food, fuel and other vital commodities; the relocation of empty equipment; the necessary postponement or delay of loading or movement of other less important commodities; and the reduction of passenger service as far as might be necessary in order that to the extent necessary the carriers might be relieved from the operation of federal and state laws and orders recognized under ordinary transportation conditions.

The commission had already formed a Bureau of Service to assist it in carrying out its functions with respect to car service, with F. S. Robbins as director and with a small organization. Acting upon the carriers' petition and upon information already in its possession, the commission determined that an emergency existed of so exigent a nature that its powers ought to be exercised immediately and without the holding of any hearing at the time.

I. C. C. Service Orders

The railroads' petition had suggested the setting up of a list of essential commodities entitled to priority in transportation and requests for priority to nearly every important commodity were received by the commission, but the commission was not impressed with the need for or desirability of a general priority plan. Later it was impressed with the necessity of special consideration for the movement of coal but its first service orders issued on May 20 were directed toward relieving the congestion and bringing about the relocation of cars. Service Order No. 1 required and authorized the railroads to forward traffic by the routes most available to expedite its movement and relieve congestion, without regard to the routing by shippers or other carriers or to the ownership of cars. The second order required various western carriers to deliver, within a period of 20 days, about 30,000 open-top cars to their eastern connections and the third order required eastern carriers to deliver about 20,000 serviceable box cars, preferably cars owned by western carriers, to their western connections within a period of 30 days.

Car Relocation

After the expiration of the orders they were continued with some modifications by the Car Service Division until approximately 130,000 box cars had been sent westward and an approximately equal number of coal cars had been returned to eastern roads. The Car Service Division also issued many orders for smaller movements of cars from road to road or from district to district, in accordance with the needs of traffic, and compliance with the directions of the Car Service Division has been so general that it was not necessary for the commission to issue formal orders of this character.

The plan adopted has sometimes been referred to as "pooling," but while the demands of traffic were considered paramount to the ownership of the cars most of the orders issued had the effect of returning cars at least in the direction of the home roads and the percentage of home car on home lines has steadily increased throughout the year.

Terminal Committees

In addition to issuing the orders, the commission co-operated with the railroads in many other ways. It appointed terminal committees at 30 railroad and traffic centers, assigning to each a representative, usually a safety inspector, who acted as chairman and made reports to the commission. The other members of the typical terminal committee included a representative designated by the railroads; a shipper, preferably one who had served as a member of a somewhat similar committee during federal control; and a representative of the state railroad or public service commission. The railroad representative was usually the chairman of a local car service committee appointed by the Commission on Car Service following the practice adopted in 1917 but abolished after March 1.

Each of the committees was expected to do what could be done informally, by conference, advice and negotiation, to keep its gateway open and to advise the commission as to needs. The commission committees acted in close contact with the committees of railroad operating officers organized by the Car Service Commission, and both played an important part in relieving the unprecedented congestion. One of the principal methods used at first was to take advantage of the rerouting privileges under Service Order No. 1. The use of the embargo was also considerably developed and action was taken in various directions calculated to meet local conditions.

The commission issued its first priority order on June 19, the effect of which was to require coal-loading carriers to use coal cars primarily for the transportation of that commodity and to require roads not loading coal to deliver such cars to their coal-loading connections, to the extent of the ability of such connecting lines to receive and absorb that class of equipment. The railroads were also required to place an embargo upon consignees who detained coal cars unreasonably. This order was followed from time to time by others, designed to promote the movement of an adequate supply of coal to New England via tidewater and to the Northwest via the lakes as early in the season as possible so that it would not have to move later through unusual rail routes with loss of efficiency of equipment and further congestion of gateways. Various other orders were issued, representing modification of earlier orders, curtailing the supply of cars to wagon mines and giving preference to public utilities and public institutions.

The coal transportation situation was greatly complicated, not only by the real shortage of coal following the strike of last year, but by the price situation which resulted from the unusual scramble for this basic commodity. Many large consumers who had made the usual form of contracts for coal early in the year failed to receive their supplies because of

the greater attraction of the "spot" market on which the demands were concentrated. Many others had failed to make contracts because of a hope that prices would go down. The result was that even after coal production had been greatly stimulated the coal was being unevenly distributed and the railroads and the commission were criticized for many situations resulting from the competition among coal operators and sellers for the cars and among consumers for the coal. The coal industry is largely over-developed and even when the railroads are able to furnish enough cars to supply all the coal needs of the country they are not able to supply all the mines with cars enough to handle their full output.

This year the coal demands were met only at the expense of shippers and consumers of other commodities that require open-top cars, such as construction and road-building materials. Loud protests were made by these shippers, both at hearings and in other ways, against the preference accorded the coal traffic, but while every effort was made by the commission to mitigate the inevitable hardship, and from time to time, by amendments to the definition of coal cars in its orders, cars were released for other traffic, and permits were issued authorizing the use of specified numbers of cars for commodities other than coal when the public interest seemed to require such action, the commission took the position that fuel was a first essential. The commission's orders were usually issued after conferences with and recommendations from the railroads, the coal operators and the other interests most concerned.

The first priority orders issued by the Interstate Commerce Commission stated that an emergency existed requiring immediate action "because of a shortage of equipment and a congestion of traffic, aggravated by unfavorable labor conditions." Later, after a large proportion of the switchmen had returned to work and the dissatisfaction among the employees had been largely dispelled by the award of the Railroad Labor Board, the commission left out the reference to labor conditions in its orders, and in its latest orders "congestion of traffic" was omitted as a reason.

Campaign for Increased Efficiency

It had early become apparent that the railroads were not going to be able to add materially during the year to their supply of equipment or of other facilities. Their properties had been returned on rather short notice, interest rates were high, their credit had been improved somewhat by the passage of the Transportation Act but bankers and investors were waiting to observe its actual effect as indicated in the commission's decision as to increased rates, and the revolving fund of \$300,000,000 provided to assist the carriers in financing new equipment and improvements required many preliminaries before it was actually put at work, while payment of a large part of the six-months' guaranty was also delayed.

It therefore became necessary to minimize the effects of a shortage of equipment by increasing transportation efficiency and by car conservation. Whereas railroad men had been inclined to place a large part of the responsibility for the unsatisfactory conditions upon the shortage of cars and other facilities, the effects of the switchmen's strike were so serious as to make it necessary to concentrate on efforts to bring about an improvement in operating efficiency by increasing the average car load and increasing the average daily mileage of each car. In this respect there has been close co-operation between the Bureau of Car Service of the Interstate Commerce Commission and the Car Service Division of the American Railway Association, the individual carriers and numerous organizations of shippers.

The terminal committees did an important work in urging upon shippers and consignees the necessity for loading and unloading cars promptly and for loading cars as nearly to

capacity as possible and the commission in numerous public statements also called attention to the need for reviving some of the methods of patriotic co-operation practiced during the war. Statistics bearing on efficiency of operation have been analyzed day by day and the attention of the operating executives was called with good results to many situations warranting attention.

The Railroads' Advisory Committee

Shortly after the commission had been asked to exercise its emergency powers the railroads, through the Association of Railway Executives, appointed an Advisory Committee of nine railway executives, representing the various sections of the country, to direct the co-operative efforts of the railroads in a drive for "more transportation" and to serve as a point of contact with the Interstate Commerce Commission. The committee itself did not attempt to become as active as the Railroads' War Board, which was located in Washington during 1917. It worked largely through the Commission on Car Service, which was reorganized on July 1 as the Car Service Division of the American Railway Association, but Daniel Willard, chairman of the committee, was exceedingly active in an informal way, representing the railroads in conferences with the Interstate Commerce Commission and shippers' association and in making public addresses, and generally directing the campaign.

At a meeting of the Association of Railway Executives in New York on July 16 the campaign was given a definite aim by the adoption of resolutions under which all members of the association and other carriers were urged to devote their utmost energies to the more intensive use of existing equipment and the railways undertook, with the co-operation of the public, to attain the following definite objects:

- (1) An average daily minimum movement of freight cars of not less than 30 miles per day;
- (2) An average loading of 30 tons per car;
- (3) Reduction of bad order cars to a maximum of 4 per cent of total owned;
- (4) An early and substantial reduction in the number of locomotives now unfit for service; and
- (5) More effective efforts to bring about the return of cars to the owner roads.

Average Car Mileage

The average of 30 miles per car per day, for all roads, had never been attained, so far as available records show. The annual average attained in 1917, under the direction of the Railroads' War Board, was 26.1 miles per car per day. In 1918 the Railroad Administration averaged 24.9 miles, in 1919, 23.1 miles, and in January and February, 1920, 22.8 and 22.3 miles, respectively. The average for March was slightly better, 23.8 miles, but in April, as the result of the strike, it fell to 19.4. Since then there has been an increase in each successive month, until in October an average of 28.5 miles was attained. The average for the seven months, March to September, was equal to that made by the Railroad Administration in the year 1918, while the average for October was higher than was ever attained by the Railroad Administration and was the best ever recorded except in May, 1917, when an average of 29 miles was attained.

Car Loading

The average car load set by the railway executives as their goal, 30 tons, had been surpassed only in August and September, 1918, when the Railroad Administration had the power to force heavy loading as a part of the war program. In those months an average load per car of 30.4 and 30.2 tons had been attained. The annual average attained by the railroads in 1917 was 27 tons, in 1918 the Railroad Administration had an average of 29.1 tons, which was reduced in 1919 to 27.8, and in January and February, 1920,

the average was 28.3. In March the average was the same as for the preceding two months, in April it was increased to 28.6, in May it fell to 28.3, but from that time on it steadily increased to 30.1 in August and September. In October the average fell again to 29.9.

The combined effect of heavier loading and more rapid movement of cars is reflected in the statistics of net ton-miles per car day. The average for 1917 was 495, for 1918, 491, and for 1919, 441. In March of this year the average was 495, in April it fell to 379, but since then it has shown an increase in each month: June, 505; July, 526; August, 561, and September, 568. The best performance during the war was 542 miles per car per day in June, 1917, while the best performance of the Railroad Administration was 535 in August, 1918. The averages for August and September this year are the highest ever recorded.

The heavier car loading was also reflected in the average trainload, which was increased from 725 tons in March to 788 tons in August. This was a new record, but the average in September fell to 767. The best previous record was 778 tons in September, 1919.

In the return of cars to their home roads substantial progress has been made in spite of the heavy demand for cars throughout most of the year. The percentage of home cars on home lines had been increased from 21.9 on March 1 to 38.7 on December 15 and by that time all orders for the relocation of cars had been fulfilled or withdrawn. With

ceeded by surpluses amounting to 32,368. The railroads were materially assisted in the handling of the grain crops by the fact that so many of the farmers refused to ship their grain to market because of the fall in prices, which will spread the movement over a longer period, and as a result most of the complaints which were made regarding car shortage in the west were those which were made early in the season and those made in anticipation. Surpluses of cars began to be reported from the Southwest by the first part of November.

The heaviest traffic month this year was August. Conditions had been rapidly improving for two or three months and a considerable volume of freight was offered to the railroads just before August 26 for the purpose of getting it into the hands of the railroads before the new increased freight rates went into effect. During the first part of September there was a slight falling off, which was soon recovered, and the car loading increased until the week of October 23, when it was 1,010,961 cars, or within 500 cars of the record set by the Railroad Administration for a week in September, 1919. Since October 23 there has been a gradual decline, although the loading figures were larger than during the corresponding weeks of 1919 or 1918, until the week of December 18, and the total ton-mileage for October was slightly less than it was in August, although greater than for any previous month.

"The situation was met," said Commissioner Aitchison

Item	Sept.	August	July	June	May	April	March	Feb.	Jan.
Traffic density (net ton-miles per mile of road per day).....	5,917	5,998	5,657	5,531	5,292	4,120	5,432	4,901	4,866
Train-load (net ton-miles per train-mile).....	767	788	769	758	746	666	725	693	672
Car-load (net ton-miles per loaded car-mile).....	30.1	30.1	29.7	29.1	28.3	28.6	28.3	28.3	28.3
Per cent loaded of total car-miles.....	66.8	68.1	67.7	69.5	71.2	68.4	72.3	71.9	70.8
Car-miles per car-day.....	28.4	27.5	26.2	25.0	24.3	19.5	23.8	22.3	22.8
Net ton-miles per car-day.....	568	561	526	505	489	379	495	453	457
Cost per freight train-mile (selected accounts).....	\$2,102	\$2,460	\$1,897	\$1,879	\$1,780	\$1,874	\$1,793	\$1,912	\$1,859

the lessened demand for equipment it was believed that the cars would find their way home under the general application of car service rules and an equalization plan put into effect on October 1.

Very little progress has been made in reducing the number of bad order cars and locomotives. Under the intensive use to which they have been subjected for the past four years it was difficult enough to keep the percentages of un-serviceable cars and engines from going higher. The percentage of bad order cars has been less than in 1919, but it increased from 7 in March to 7.3 in October. The statistics of un-serviceable locomotives have not been kept continuously on a comparable basis. On December 1, 17.2 per cent were held out of service for repairs requiring over 24 hours and 6.2 per cent for repairs requiring less than 24 hours. On June 12, 26.9 per cent of the locomotives were un-serviceable.

Car Shortage

During January and February there was a shortage of freight cars ranging from 70,000 to 80,000. For the week ending March 31 the average daily shortage was 87,600. By June 1 this had been increased to 105,000, by July 1 it was 123,000, by August 1, 125,000, and by September 1, 147,000. This large shortage during the summer months led to many fears that it would be greatly increased by fall when the height of the crop moving season was reached, and much attention was paid to building up the car supply of the western roads, but the increase in the efficiency of car movement actually brought about a decrease in the shortage during September and October, while the number of cars loaded continued to increase.

By October 1 the shortage had been reduced to 80,000, and there has been a steady reduction since until during the week ending November 22 the shortage of 30,724 was ex-

in an address made the early part of November, "squarely and courageously, in a business-like way, without political interferences or pressure of any character whatsoever, under the orderly process of law, by privately operated railroads, directed along consistent lines to secure that unity of object and policy that was the end sought in placing the carriers under federal control during the war. The sum total of cars and rolling stock at the termination of federal control was inadequate to meet the strain which was soon placed upon the transportation system. The effect of the strikes and stoppage of traffic which occurred within six weeks after the roads were returned to their owners, was equivalent to the obliteration of one-third of all the rail equipment of the country suitable for freight carrying service. As the result of the unceasing efforts of railroad operators and employees, with the assistance of the shippers, and under the policy laid down by the commission and enforced and carried out in detail by the carriers individually and through their Car Service Division, the back of the car shortage has been broken, and we are now facing the possibility of a surplus of equipment."

The accompanying table, prepared by the Bureau of Statistics of the Interstate Commerce Commission, gives a comparison of significant averages for September, 1920, with the seven months immediately preceding.

ON NEW YEAR'S DAY let us resolve to make 1921 our banner year for efficiency, loyalty and co-operation. We are entering the new year in a period of readjustment which doubtless will continue to affect us for some time. This should not cause discouragement, but rather inspire to greater ambition. Let it be our watchword this year to perform the common duties of each day uncommonly well.—C. S. Krick, general manager, P. R. R., to the employees.



Higher Freight Rates Fail to Curtail Shipping

Increased Passenger and Pullman Charges, However, Have a Restraining Influence on Travel

WHEN THE Interstate Commerce Commission, acting in accordance with the provisions of the Transportation Act, granted the carriers increases in freight and passenger rates amounting to about \$1,500,000,000 annually, those unfriendly to the new law predicted that the increased rates would curtail freight and passenger traffic. These increased rates have now been in effect for about four months, and it is possible to "prove up" the results to a limited extent.

The first full month in which the new rates were operative was September. More freight was moved during that month than was ever moved in a single month during the pre-war period, or during federal control. A total of 40,999,843,000 net ton-miles was produced, the third consecutive month in which all monthly records previous to July, 1920, were broken. In July, 40,232,000,000 net ton-miles and in August, 42,706,835,000 net ton-miles were produced. The decrease between August and September was due to an interruption in industrial activity because of the observance of Labor Day and to the fact that there was one less day in September than in August. Again, in October, the second full month in which the new rates were operative, the net ton-miles produced exceeded all monthly records prior to August, 1920. A total of 42,562,000,000 net ton-miles were produced, the second highest total ever achieved and only 144,835,000 net ton-miles below the record-breaking August total. These statistics indicate that instead of an immediate decrease in freight traffic because of increased charges, the amount of business handled by the railroads remained at a record-breaking level for these two months.

Similar figures for later months are unfortunately not available but there are other statistics by means of which the amount of freight handled after the application of increased tariffs can be shown. The number of cars of revenue freight

loaded weekly from the time the increased freight rates went into effect to the latest available weekly record are shown in the accompanying Table I.

This table shows that the number of cars of freight loaded each week increased steadily from 947,743 cars during the week ending September 4, the first week after the increased rates went into effect, to 1,010,951 cars during the week ending October 23. This does not indicate that higher transportation charges exerted a restraining influence on the volume of freight offered for movement but rather that it moved independently of these increases.

Early in the fall business experienced a gradually increasing recession. The railroads in common with other industries began to feel the results of this recession early in November when the amount of freight offered for movement decreased materially. This is clearly shown in the car loading records in Table I by a drop from 1,010,951 cars loaded in the week ending October 23, to 910,592 cars loaded in the week ending November 6. As the depression became more general the car loading further decreased, reaching the lowest stage in the week ending November 27, when

the number of cars of freight loaded totaled 797,673.

That this decline is not due to increased rates is shown by the fact that (1) if the shipping public had been unwilling to pay higher freight rates, the car loading records would not have increased steadily for almost two months; and, (2), in spite of business depression the amount of freight handled by the railroads after the increased rates were made effective continued to be heavier than in the same period of either 1918 or 1919, as shown in Table I. It may be concluded, then, that such statistics as are now available indicate that increased freight rates have not exerted a restraining influence on the volume of traffic offered to the railroads for movement.

THE SIMULTANEOUS advent of a general business recession and the increased freight and passenger rates resulted in declines in both freight and passenger traffic. Analysis of the available statistics indicate that, despite the higher charges the volume of freight offered for movement continued heavy until the railroads, in common with other industries, felt the results of the depression. Higher passenger rates have had a restraining influence on travel.

There is one other factor in support of this conclusion, i. e., there has been no general opposition to higher freight charges, either during the Interstate Commerce Commission's hearings or since their application, except on the part of certain individuals who advocate government ownership. It is logical to assume, then, that if the public is as alive to the necessity

TABLE I—CARS OF REVENUE FREIGHT LOADED, BY WEEKS

Week ending	1920	1919	1918
September 4	947,743	904,393	872,560
September 11	872,043	946,970	974,269
September 18	983,913	994,951	970,458
September 25	994,687	987,041	991,980
October 2	975,946	957,596	971,895
October 9	1,009,787	982,171	959,723
October 16	1,005,663	972,078	927,134
October 23	1,010,951	977,051	920,111
October 30	973,130	935,479	892,392
November 6	910,592	826,000	873,070
November 13	919,909	808,000	810,000
November 20	880,528	854,601	857,377
November 27	797,673	739,197	735,628
December 4	872,162	789,286	837,806
December 11	814,897	761,940	820,300

for higher transportation charges as it appears to be, commodities and merchandise will be shipped, regardless of higher freight rates, if markets can be found.

Effect of Increased Rates on Passenger Traffic

In regard to passenger traffic, complete statistics with which to appraise the results are, unfortunately, not yet available. Observation of general conditions, however, leads to the conclusion that increased passenger rates have tended to curtail travel to some extent. This is indicated in Table II, which contains the records of several of the larger passenger carrying roads radiating north, south, east and west from Chicago, and which shows the number of passengers carried

are reflected in the volume of passenger traffic before they are seen in the records of freight traffic. The periods in which the business recession and the declines in freight and passenger traffic occurred indicate that this was the case and it is therefore impossible to attribute the declines in passenger travel entirely to an unwillingness on the part of the public to pay higher passenger fares.

In other words, there are two factors, namely, business recession and increased rates, which combined have tended to curtail passenger travel. Which has been most instrumental in effecting this decline is not determinable. Yet it can safely be said that the increased passenger tariffs have exerted some influence. This is especially true of sleeping car passengers who pay the 50 per cent surcharge. L. S. Taylor, vice-president of the Pullman Company, recently stated before the Interstate Commerce Commission that the collection of the surcharge, which accrues wholly to the railroads, had considerably reduced the number of passengers riding in sleeping cars. It may be possible that the reductions which have taken place in sleeping car passengers are no larger than the reductions which have taken place simultaneously in the number of coach passengers, but it is probable that the reduction in the number of sleeping car passengers has been greater.

Another factor which supports the conclusion that the higher passenger rates have tended to curtail travel, is that the public has not accepted the passenger rate increases with as good grace as it has accepted the freight rate increases. This is reflected partially in the attitude of the various state commissions, 16 of which have denied comparable increases in intrastate passenger rates, seven of which have allowed in-

TABLE II—PASSENGERS CARRIED ONE MILE

Months	New York Central		Illinois Central*		Atchafalaya, Topeka & Santa Fe		Chicago & North Western	
	1920	1919	1920	1919	1920	1919	1920	1919
August	333,298,424	303,494,098	104,406,410	107,502,809	211,626,359	156,756,916	149,465,332	137,990,037
September	306,327,881	283,403,210	90,869,561	99,864,463	187,207,563	155,963,871	131,855,022	134,444,506
October	255,917,204	246,664,670	79,877,680	95,688,413	185,314,264	150,469,111	113,507,496	121,760,161
Per cent decrease...	23.2	18.7	23.4	11	12.4	4	24	11.07

*Figures do not include suburban traffic.

one mile in August, September and October, 1920, as compared with the records for the same months of 1919. While it is true that there has always been more or less of a decline in passenger traffic beginning in August and continuing until spring, the records for these representative lines show that this year this decline has been more noticeable than before.

What portion of this larger decline in passenger travel is attributable to the business recession which was taking place during this period is impossible to determine. However, it is known from past experience that general business recessions

increases with exceptions, and two of which have denied comparable increases in part, making a total of 25 commissions which have not agreed with the Interstate Commerce Commission in its findings.

In conclusion, it might safely be said that developments subsequent to the Commission's rate award indicate, (1) that increased freight rates have had little influence on the amount of freight offered for movement, and (2) that increased passenger rates have had an unfavorable effect on passenger travel to an extent still undetermined.



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An Aerial View of the Yards at Cologne, Built During the War



The I. C. C., with Three State Commissioners, Hearing the General Rate Advance Case. Left to right: J. A. Guher, Mark W. Potter, J. B. Eastman, C. B. Atchison, H. C. Hall, C. C. McChord, E. E. Clark (chairman), B. H. Meyer, W. M. Daniels, H. J. Ford, R. C. Dunn, W. D. B. Ainey, (Robert W. Woolley missing).

Effect of the Rate Increases Disappointing

So Many Uncertain Factors Are Involved That It Is Impossible to Predict Final Result

THE UNPRECEDENTEDLY LARGE increases in freight and passenger rates which became effective on August 26 as the result of the Interstate Commerce Commission's decision in Ex Parte No. 74, have failed thus far to produce the desired and expected effect on either the operating revenues or the net operating income of the railroads as a whole.

In September the full effect of the increases in rates was not shown because a large volume of traffic was handled by the railroads during that month that was billed during the previous month at the old rates and also because the full amount of the increases was not allowed in many states as to intrastate traffic. In October and November the same condition continued as to state rates and by November the amount of traffic had fallen considerably below what had been anticipated at the time the increases in rates which would be necessary to produce a 6 per cent return were calculated. The Interstate Commerce Commission has now rendered several decisions ordering increases in state passenger fares corresponding to the advances made in interstate rates, but it has not yet passed on any of the state rate cases involving the refusal of the state authorities to allow increases in freight rates for intrastate traffic.

Complete statements of the earnings and expenses of the railroads for September and October have now been available for some time and the individual statements of many

roads for November are now at hand. While it would be futile to base any predictions as to the results to be expected for a full year on the experience for two or three months during which conditions were changing so rapidly and at a time when the outlook is so uncertain as to the future course of either traffic or expenses, some tentative conclusions of interest may be drawn from the results of two months during which the freight traffic was greater than had ever before been handled in corresponding months and when passenger traffic, although showing a slight reduction, was at least not below normal.

The increase in freight rates was 40 per cent in the Eastern district, 25 per cent in the Southern district, 35 per cent in the Western district, 25 per cent in the Mountain-Pacific district, and 33 1-3 per cent for interterritorial traffic. It was estimated that the average increase for the railroads as a whole should have been about 34 or 35 per cent. The increase in passenger rates was 20 per cent and there was also a surcharge of 50 per cent of the rates for Pullman traffic to accrue to the railroads.

September Results

In September, 5 per cent more ton-miles of freight were handled than in September, 1919. An increase of 35 per cent in rates, therefore, should have produced something

COMplete STATEMENTS of the earnings and expenses are available only for the months of September and October.

A large amount of business handled during September was billed at the old rates.

The full amount of the rate increases has not been granted on intrastate traffic by some states.

Business fell off in November considerably below what had been anticipated when the rates to produce 6 per cent return were calculated.

like a 40 per cent increase in freight revenues. The increase was, however, only 26.2 per cent. A change in the character of the traffic handled might have made some difference, but most of the failure to realize the full percentage of increase in September must undoubtedly be attributed to the very large volume of freight offered to the railroads in the week before the new rates went into effect.

The volume of passenger traffic in September, 1920, was slightly less than in September, 1919. The passenger earnings increased 17.4 per cent, the failure to reflect the full percentage of increase being doubtless attributable principally to the effect of the old rates in many states. The total operating revenues in September were 23.6 per cent greater than those for September, 1919. Mail revenue increased 82.6 per cent, but express revenue decreased 13.5 per cent, and all other revenue increased 23.1 per cent.

The increase in total operating revenues was about \$117,000,000, but operating expenses showed an increase of \$111,000,000, or 27.9 per cent, while taxes increased 41.4 per cent, and the net operating income for the month, \$75,310,311, was 3 per cent less than the net operating income in September, 1919, under the old rates. This represented about the amount which the railroads had been guaranteed per month by the government for the preceding 26 months, but it fell considerably short of enough to produce a 6 per cent return. On the basis of the experience of the

per cent. However, their operating expenses were only 24 per cent greater than in September, 1919, and their net operating income was \$9,615,340, an increase of 78.3 per cent. Their net operating income for September, however, to produce a 6 per cent return, should have been about \$15,000,000.

The roads of the Western district had an increase of only 19.3 per cent in freight revenues, 13.4 per cent in passenger revenues and 18.3 per cent in total revenues, while their expenses increased 25.4 per cent, and their net operating income, \$39,584,374, was 13 per cent less than that for September, 1919. The Western roads should have earned about \$46,000,000.

October Results

For October the net operating income was larger than September, \$86,455,487, an increase over October, 1919, of 13.3 per cent, but the roads should have earned in October \$112,708,000, or 10.4 per cent of a year's net income. Total operating revenues increased by \$132,000,000, or 26 per cent, but the operating expenses increased \$120,000,000, or 29.7 per cent. Taxes had also increased by 35 per cent. Freight revenues increased only 30.5 per cent, although the freight ton-miles had increased nearly 6 per cent, and passenger revenues increased 15.2 per cent. There had been, however, a slight decrease in passenger traffic.

The Eastern roads in October had a net operating in-

REVENUES AND EXPENSES OF STEAM ROADS—SEPTEMBER, 1920

Account	United States			Eastern District			Southern District			Western District		
	1920	1919	Increase over 1919 Per cent	1920	1919	Increase over 1919 Per cent	1920	1919	Increase over 1919 Per cent	1920	1919	Increase over 1919 Per cent
Total operating revenues.....	\$616,200,796	\$498,611,917	23.6	\$284,583,984	\$222,710,194	27.8	\$89,305,640	\$71,019,329	25.7	\$242,311,172	\$204,882,394	18.3
Freight	437,657,926	346,668,124	26.2	201,030,182	153,071,000	31.3	64,913,234	50,207,210	29.3	171,714,510	143,389,914	19.8
Passenger	129,438,552	110,219,099	17.4	59,007,206	48,721,493	21.1	18,595,167	15,769,959	17.9	51,836,179	45,727,647	13.4
Total operating expenses.....	511,482,938	399,904,337	27.9	244,960,457	186,680,484	31.2	77,894,997	62,814,071	24.0	189,627,506	150,409,532	25.4
Net operating revenue.....	104,717,836	98,707,780	6.1	39,623,527	36,029,710	10.0	11,410,643	8,205,258	39.1	53,683,666	54,472,812	d 1.4
Net operating income.....	75,310,311	77,648,722	4.0	26,110,597	26,774,698	d 2.5	9,615,340	5,615,340	78.3	39,584,374	45,480,087	d 13.0
Operating ratio—per cent	83.01	80.20	....	86.08	83.82	....	87.22	88.45	....	77.85	73.41	....

d—Decrease.

REVENUES AND EXPENSES OF STEAM ROADS—OCTOBER, 1920

Account	United States			Eastern District			Southern District			Western District		
	1920	1919	Increase over 1919 Per cent	1920	1919	Increase over 1919 Per cent	1920	1919	Increase over 1919 Per cent	1920	1919	Increase over 1919 Per cent
Total operating revenues.....	\$642,135,312	\$509,760,115	26.0	\$293,221,671	\$222,535,379	31.8	\$93,360,749	\$76,301,726	22.4	\$255,552,892	\$210,923,010	21.2
Freight	480,839,394	368,546,313	30.5	220,308,900	159,520,941	38.1	70,609,437	55,641,272	26.9	189,921,057	153,384,100	23.8
Passenger	114,044,152	99,033,423	15.2	50,442,666	41,430,561	21.8	17,045,062	15,529,522	9.8	46,556,424	42,073,340	10.7
Total operating expenses.....	526,578,838	408,879,339	29.7	249,031,007	186,880,964	33.3	79,773,678	64,452,020	23.8	197,774,207	154,339,385	28.0
Net operating revenue.....	115,556,424	103,880,806	11.2	44,190,668	35,647,475	24.0	13,587,071	11,849,706	14.7	57,778,685	56,383,625	2.5
Net operating income.....	86,455,487	76,294,127	13.3	30,128,416	23,680,353	27.2	10,998,230	9,148,202	18.7	45,328,841	43,465,431	4.3
Operating ratio—per cent	82.00	79.62	....	84.93	83.98	....	85.45	84.47	....	77.39	73.27	....

d—Decrease.

three-year test period prior to federal control the net operating income for September should be approximately 10.11 per cent of that for a full year, and that percentage of a 6 per cent return for the Class I roads would be \$112,708,800. The shortage for the month, therefore, was \$34,000,000, which can not be made up except by abnormally large earnings in some other month. However, about \$2,700,000 of back wages was charged to the September account which belongs to earlier months.

The Eastern roads in September fared slightly better than did the roads as a whole as compared with September, 1919. Their net operating income was \$26,110,597, a decrease of 2.5 per cent, but to earn 6 per cent a year on the valuation ascribed to them by the commission they should have earned \$47,000,000. Their freight revenues increased 31.3 per cent and their passenger revenues 21.1 per cent, while total operating revenues increased 27.8 per cent and operating expenses 31.2 per cent.

The Southern roads had an increase in freight revenues of 29.3 per cent, or more than the percentage of rate increase applied to their district, but passenger revenues increased only 17.9 per cent and total operating revenues 25.7

per cent. However, their operating expenses were only 24 per cent greater than in September, 1919, and their net operating income was \$9,615,340, an increase of 78.3 per cent. Their net operating income for September, however, to produce a 6 per cent return, should have been about \$15,000,000. The roads of the Western district had an increase of only 19.3 per cent in freight revenues, 13.4 per cent in passenger revenues and 18.3 per cent in total revenues, while their expenses increased 25.4 per cent, and their net operating income, \$39,584,374, was 13 per cent less than that for September, 1919. The Western roads should have earned about \$46,000,000. For October the net operating income was larger than September, \$86,455,487, an increase over October, 1919, of 13.3 per cent, but the roads should have earned in October \$112,708,000, or 10.4 per cent of a year's net income. Total operating revenues increased by \$132,000,000, or 26 per cent, but the operating expenses increased \$120,000,000, or 29.7 per cent. Taxes had also increased by 35 per cent. Freight revenues increased only 30.5 per cent, although the freight ton-miles had increased nearly 6 per cent, and passenger revenues increased 15.2 per cent. There had been, however, a slight decrease in passenger traffic. The Eastern roads in October had a net operating in-

come of \$30,128,416, as against \$48,840,000 which they should have earned to produce October's proportion of a 6 per cent return on their valuation. This was an increase of 27.2 per cent, however. Their freight earnings showed an increase of 38.1 per cent over October, 1919, and passenger earnings 21.8 per cent. The roads of the Southern district had a net operating income of \$10,998,230, an increase of 20.2 per cent, but nearly \$5,000,000 less than the October proportion of a 6 per cent return. Their freight revenues increased 26.9 per cent, but passenger revenues increased only 9.8 per cent. The Western roads had a net operating income of \$45,328,841, as against \$48,000,000 which they should have earned. The increase was 4.3 per cent over 1919. The freight revenues increased 23.8 per cent and passenger revenues only 10.7 per cent. The general slump in traffic which has been so noticeable throughout November and December had begun as far back as October or September, although it was not sufficient to show in the total figures until the first part of November. As there has been a falling off for some time in miscellaneous and manufactured freight which pays comparatively high rates, the failure to realize the expected percentages

of increase in freight revenue may be due to an increasing proportion of low-rated traffic.

The November earnings have not yet been reported by a sufficient number of roads to make a representative showing. While they are showing large increases in net as compared with November, 1919, this is attributed largely to the fact that the November, 1919, reports were considerably affected by the coal strike.

The principal items in the September and October reports for the roads as a whole and by districts are given in the accompanying tables.

Effect on Individual Roads

An analysis of the effect of the new rates on the earnings of individual roads would require a complicated study to show the proportion of a year's net income that they should earn in September and October and of the comparative volume of traffic, while the valuation figures on which the 6 per cent return is to be figured have not yet been determined. For some roads the results seem to have been very satisfactory, but for others the results are very disappointing. A good many roads had suffered a decrease in traffic.

For September, 21 of the roads having annual operating revenues in excess of \$25,000,000 had less net operating income than they did in September, 1919, under the old

rates. These were the Boston & Maine; Cleveland, Cincinnati, Chicago & St. Louis; Erie; Lehigh Valley; Michigan Central; New York Central; New York, New Haven & Hartford; Pere Marquette; Pittsburgh, Cincinnati, Chicago & St. Louis; Atlantic Coast Line; Southern; Atchison, Topeka & Santa Fe; the Chicago & North Western; Chicago, Milwaukee & St. Paul; Chicago, Rock Island & Pacific; Minneapolis, St. Paul & Sault Ste. Marie; Missouri Pacific; Oregon Short Line; Oregon-Washington Railroad & Navigation Company; Texas & Pacific, and Union Pacific. The Boston & Maine, Pittsburgh, Cincinnati, Chicago & St. Louis, Atlantic Coast Line, and the Oregon-Washington Railroad & Navigation Company had deficits.

In October there were 18 roads that earned less for net than they did the year before. The Lehigh Valley; Pittsburgh, Cincinnati, Chicago & St. Louis; Atlantic Coast Line; Southern; Chicago & North Western; Missouri Pacific; Texas & Pacific, and Union Pacific, that in September earned less than a year before, in October had increases as compared with October, 1919, but the Wabash; Louisville & Nashville; Chicago, Burlington & Quincy; Great Northern, and Southern Pacific, that had had increases in September, had decreases in October. None of the larger Class I roads having annual revenues exceeding \$25,000,000, however, had deficits in October.

Settlements With the Railroad Administration

Slow Progress Being Made—More Than 11,000 Claims Presented
—Settlements with 20 Companies

EIGHTY-SEVEN RAILROADS and transportation companies have now filed their complete claims with the Railroad Administration for a final settlement of their accounts with the government arising from the period of federal control. Settlements have been made with 20 companies and negotiations have been well advanced with a large number of others. A large number of additional roads are expected to submit their claims in the early part of the year but some of the larger systems, whose accounts are especially complicated, are making extensive studies of the condition of their properties and do not expect to be able to present their claims for nearly a year.

Among the larger roads that have filed claims but have not yet begun their negotiations for a settlement with the Railroad Administration are the Great Northern, Northern Pacific, Missouri Pacific, Southern, Chicago, Rock Island & Pacific, St. Louis-San Francisco, Pere Marquette and Atlantic Coast Line.

The Railroad Administration has recently announced that it has reached final settlements and paid out to the several companies the following amounts:

Ablene & Southern	\$150,000.00
Buffalo, Rochester & Pittsburgh	1,000,000.00
Cincinnati, Indianapolis & Western	400,000.00
Spokane, Portland & Seattle	1,600,000.00
Fort Dodge, Des Moines & Southern	300,000.00
El Paso Union Passenger Depot	5,665.86
Sioux City Bridge Company	98,546.92
Northwestern Pacific	525,000.00
Mississippi Central	220,000.00
Louisiana & Mississippi Railroad & Transfer	33,231.81
Chicago, Milwaukee & St. Paul	13,750,000.00
St. Louis National Stock Yards	100,000.00
Eastern Steamship Lines	250,000.00
Rio Grande Southern	105,000.00
Midland Valley	550,000.00
Bennettsville & Cheraw	29,500.00
Clyde Steamship Company	162,224.00
Chesapeake Steamship Company	62,303.00
Des Moines Terminal Company	15,500.00
Fort Worth Belt	75,000.00

The Gulf, Mobile & Northern also effected a settlement by which it agreed that it owes the government \$100,000.

The payment of claims on final settlement is largely made up of balance of compensation due, but includes all other disputed items as between the railroads and the administration during the 26 months of federal control.

The Railroad Administration has not made public the amounts of the claims against it nor of its counter-claims against the railroads but it is understood that some of the larger claims are as follows: Chicago & North Western, \$45,586,030; Great Northern, \$29,827,000; Southern, \$84,700,000; Pullman Company, \$24,422,264.

The administration has also made a claim against the Southern for \$71,650,000.

All claims include items for money due on a regular statement of account, including that due for rental, and in the case of roads that have not signed contracts with the Railroad Administration, they usually include a claim for special compensation in addition to the standard return. The largest items in the claims of the railroads are for undermaintenance of way and structures and equipment and for materials and supplies, and there are counter-claims by the government on the same accounts. Most roads owe the government for additions and betterments made during federal control and there are claims by most roads against the government for losses in connection with additions and betterments made for war purposes or for other purposes for which the railroads claim they should not pay. To December 1 a total of 11,239 of such claims had been presented, of which a large proportion have been adjusted or are in process of settlement.

The Chicago & Eastern Illinois has taken its claim for compensation for the period of federal control to the court of claims but has since received an offer of settlement from the Railroad Administration.



Two Important Valuation Developments in 1920

Kansas City Southern Decision and Transportation Act Create
New Conditions—Field Work Nearly Ended

THE TWO OUTSTANDING developments in valuation work during 1920 were the decision of the United States supreme court in the Kansas City Southern case and the recognition of valuations as a basis for the returns to the carriers in the Transportation Act. In the Kansas City Southern decision, handed down on March 8, the supreme court of the United States sustained the contention of the railways that the Valuation Act requires the Interstate Commerce Commission to ascertain and report "the present cost of condemnation and damages or of purchase in excess of present value" of common carrier lands. The Transportation Act of 1920 expressly stipulates that the return to the carriers shall be fixed at a specific rate of return on the value of their properties as determined by the Commission from time to time. While efforts have been made during 1920 to complete the inventories of carriers' properties, the effect of the Kansas City Southern decision has been to prevent the fixing of a final value upon any property as yet and to hold up the service of other tentative valuations until the data called for with respect to land can be collected.

Progress in Inventory Work

Prior to January 1, 1920, the field work had been completed in the Southern district and had practically been completed in the Central, Western and Pacific districts, while a considerable amount of work still remained to be done in the Eastern district. During the year this field work

was completed in all districts except the Eastern where, by reason of the more complicated conditions, it is still under way in all branches and it is not expected that it will be completed until late in 1921. The Division of Valuation is now concentrating attention on the completion of engineering reports on those roads 500 miles or more in length and it is expected that these reports will be completed on most of these roads during this year.

UNITED STATES supreme court decision in Kansas City Southern case made it necessary for the Commission to revise its methods of valuing land. Field work completed in all districts except the Eastern. Accounting department has suffered severely from shortage of experienced employees but this is now being relieved. Many engineering, land and accounting reports should be completed this year.

Recognition of valuation in Transportation Act gives new incentive for completion of work.

Up to the present time the work of the land department has not kept pace with that of the engineering section, but that work is now being expedited. With certain changes in methods which are now being developed, it is expected that most of the field work will have been completed in all districts other than the Eastern by July 1, while the latter district with its larger number of cities with their more extensive terminal properties will require several months additional.

The greatest difficulty has been encountered in promoting the work of the accounting department. Owing to the impossibility of retaining adequate efficient forces with the salaries in effect early in the year, it frequently happened that 25 per cent of the entire force in an office changed in a single month. From January 1, 1918, to June 30, 1920, there was a turnover in employees in the accounting department of more than 70 per cent, while on the latter date the accounting section had only about 70 per cent of its quota of authorized employees. However, salaries were advanced somewhat about July 1, since which time the forces have been on a somewhat more stable basis and are now recruited to

practically their quota. It is therefore expected that the work of the accounting department will be brought up rapidly so that many engineering, land and accounting reports will be served on the carriers during the early months of this year.

Present Status of Valuations

Prior to November 6, 1919, the Interstate Commerce Commission had served 55 tentative valuations on the carriers, of which 9 were on Class I and 14 on Class II roads. Since that date, following the filing of the Kansas City Southern

case, further serving of tentative valuations was held up awaiting the decision; since the over-ruling of the contention of the Division of Valuation by this decision on March 8, 1920, no further tentative valuations have been served, although engineering reports have since been submitted to 41 other Class I roads and land reports also to 29 of these roads. The Interstate Commerce Commission itself has not yet handed down any final valuations, and the so-called valuations which were reported for the Texas Midland, the Kansas City Southern and the Winston-Salem Southbound (without, however, including a single sum value) must now

COMPARISON BETWEEN COST OF REPRODUCTION NEW, PRESENT VALUE OF CARRIER LAND AND *INVESTMENT IN ROAD AND EQUIPMENT AS SHOWN ON CARRIERS' BOOKS OF CLASS I CARRIERS

	Miles of road	Cost new	Land	Cost new and land	Investment in R. & E.
Tentative valuations (9).....	4,668	\$222,309,428	\$20,285,397	\$242,594,825	\$344,579,273
Preliminary reports (41).....	47,165	2,633,732,084	327,455,634	2,961,187,718	2,813,695,883
Grand total (50).....	51,853	\$2,856,041,512	\$347,741,031	\$3,203,782,543	\$3,158,275,156

*As of date of valuation, figures extracted from I. C. C. Statistics of Railways.

EASTERN GROUP. CLASS I CARRIERS

Carrier	TENTATIVE VALUATIONS				
	Cost new	Land	Cost new and land	Investment in R. & E.	Miles of road
Elgin, Joliet & Eastern System.....	\$36,418,605	\$3,386,896	\$39,805,501	\$38,683,120	27
Chic. T. H. & S. E.....	22,247,890	1,017,415	23,265,305	24,927,762	363
PRELIMINARY REPORTS					
Ann Arbor System.....	\$12,857,069	\$683,720	\$13,540,789	\$18,741,167	354
Bangor & Aroostook.....	34,784,867	615,561	35,400,430	23,363,164	574
Boston & Maine System.....	231,775,788	44,752,340	276,528,128	195,903,526	2,295
Montpelier & W. R.....	1,937,229	75,551	2,012,780	1,124,320	42
Central New England.....	15,483,002	1,911,772*	17,394,774	22,342,396	136
Hartford, Conn. West.....	5,037,461	669,632*	5,707,093	4,386,613	124
C. & E. L.....	72,331,056	5,420,799	77,751,855	78,990,280	1,225
C. & I. & L.....	27,782,784	2,122,271	29,905,055	37,225,990	509
C. C., C. & St. L.....	143,779,304	15,490,541	159,269,845	144,375,812	1,687
Maine Central System.....	64,925,379	2,214,367*	67,139,746	54,983,162	1,132
Portland Terminal.....	5,253,647	2,601,263	7,854,910	5,138,223	73
N. Y., N. H. & H.....	248,599,023	71,000,000*	319,599,023	195,505,844	1,252
T., St. L. & W.....	16,746,019	1,700,149	18,446,168	39,381,687	450
Pere Marquette.....	65,342,361	4,603,567	69,927,228	87,100,297	1,792
Vandalia.....	42,351,590	6,060,896	51,858,294	136,366,572	651
Terre Haute & Peoria.....	3,445,808			6,267,319	178
Total: 18 valuations and preliminary reports.....	\$1,041,080,882	\$164,326,947	\$1,205,407,829	\$1,014,807,254	12,974

*Carriers' Return to Order No. 7.

SOUTHERN GROUP. CLASS I CARRIERS

Carrier	TENTATIVE VALUATIONS				
	Cost new	Land	Cost new and land	Investment in R. & E.	Miles of road
A., B. & A. System.....	\$25,114,141	\$2,357,676	\$27,471,817	\$39,255,787*	663
Geo. Sou. & Florida.....	10,297,657	1,213,456	11,529,113	17,375,374	392
Norfolk Southern System.....	24,076,990	3,010,888	27,087,878	30,617,459	902
Winston-Salem Southbound.....	5,428,444	1,015,655	6,444,099	5,598,558	90
PRELIMINARY REPORTS					
Central of Georgia.....	\$62,252,124	\$11,357,324	\$73,609,448	\$62,003,324	1,489
Southwestern R. R.....	9,170,145	1,769,732	10,939,877	5,191,100	333
Charleston & West. Car.....	9,814,315	1,875,745	11,690,060	10,297,563	341
Florida East Coast.....	43,557,372	4,409,548	47,966,920	48,207,859	739
Mobile & Ohio.....	47,027,163	3,908,595	50,935,758	43,897,658	923
N. C. & St. L. Sys.....	56,309,554	4,857,487	61,167,041	42,066,246	1,100
New Orleans Great Nor.....	7,298,789	208,225	7,507,014	16,045,669	243
Southern Ry. in Miss.....	4,881,786	564,783	5,446,569	6,105,656	237
Gulf & Ship. Island.....	9,498,259	1,354,196	10,852,455	14,170,083	308
Ga. R. R. & Hank, inc. Ga. R. R. (Lessee org.).....	14,041,901	102,493	14,144,394	5,430,000	301
Total: 14 tentative valuations and preliminary reports	\$338,768,640	\$37,519,403	\$366,288,043	\$335,647,336	8,061

*Investment as of December 31, 1915, after reorganization—taken from I. C. C. Statistics.

WESTERN GROUP. CLASS I CARRIERS

Carrier	TENTATIVE VALUATIONS				
	Cost new	Land	Cost new and land	Investment in R. & E.	Miles of road
New Orleans, Tex. & Mex.....	\$8,865,636	\$141,686	\$9,007,322	\$15,780,645	173
Kansas City Southern Sys.....	46,732,105	4,530,642	51,262,747	101,050,970	879
San Pedro, Los A. & S. L.....	43,127,960	4,098,083	47,226,043	76,351,598	999
PRELIMINARY REPORTS					
Arizona Eastern (inc. Phenix & Eastern).....	\$12,178,415	\$778,654	\$12,957,069	\$19,227,648	374
Rock Island System.....	32,833,390	45,770,812	388,201,208	341,401,305	7,686
Grand Canyon Ry.....	1,365,674	6,267	1,371,941	1,988,785	64
M., St. P. & S. M.....	108,066,929	6,634,182*	114,701,111	116,953,635	3,144
Northwestern Pacific.....	37,461,314	691,879*	38,153,193	65,984,697	506
Duluth, South Shore & Atl.....	19,221,742	939,096	20,170,838	43,167,021	539
Mineral Range R. R.....	3,230,437	113,582*	3,344,019	3,317,151	64
St. Louis Southw'n Sys.....	60,845,317	5,823,190	66,668,507	94,250,627	1,579
Spokane, Port. & Seattle.....	55,906,902	6,093,285*	62,000,187	61,266,414	498
Texas & Pacific.....	66,290,979	1,127,432*	67,418,411	109,250,603	1,853
Trinity & Brazos Valley.....	10,528,256	459,638	11,027,894	11,792,807	303
Western Pacific.....	60,817,087	6,122,412	66,939,499	86,985,845*	939
Great Northern.....	378,204,335	40,000,600	418,204,935	384,273,853	7,090
O.-W. R. R. & N. Co.....	123,490,123	18,347,128	141,837,251	156,642,559	2,129
Oregon Short Line.....	107,018,378	2,666,841*	109,685,219	113,094,103	2,129
Total: 18 valuations and preliminary reports.....	\$1,486,191,990	\$143,894,681	\$1,632,086,671	\$1,807,820,566	30,818

*Carriers' Return Order No. 7. *Investment as of December 31, 1917, after reorganization—taken from I. C. C. Statistics.

be withdrawn and revised by the Commission in order to bring them into compliance with the decision in the Kansas City Southern case.

Comparisons Between Cost of Reproduction New and Investment in Road and Equipment Accounts

As the work of the Division of Valuation approaches a point where comparisons can be made between its figures and the carriers' records of investment in road and equipment, intense interest is naturally being manifested in these returns. In testifying before the Interstate Commerce Commission in the rate hearing on May 26 and 27, 1920, Thomas W. Hulme, vice-chairman of the President's Conference Committee on Valuation, presented comparisons between the cost of reproduction new, including the present value of carrier land as reported by the Division of Valuation, and the investment in road and equipment as shown on the carriers' books of Class I roads (shown in the accompanying table). Of the 9 Class I roads with an aggregate of 4,688 miles of road on which tentative valuations have been served, the cost of reproduction new plus the present value of land totaled \$242,594,895 as compared with the carriers records of investment in road and equipment of \$344,579,273, or a decrease of \$101,984,448. On the other hand, in the 41 preliminary engineering and land reports covering 47,165 miles of lines, the aggregate cost of reproduction new plus the present value of land was \$2,961,187,718 while the investment in road and equipment was \$2,813,695,883 or an excess of \$147,491,835.

In view of these figures, which were based on 1914 prices, Mr. Hulme concluded that: "When one takes into consideration the fact that the first roads for which the government undertook its valuation work were either small roads, selected for the purpose of testing out proper methods, or were roads that were then in the hands of receivers or had recently been in the hands of receivers, or been subject to reorganization, and compares the results obtained from the earlier investigations with the results obtained from the preliminary reports of roads that have gotten along very well, but in which there are included but a few of the larger railroad systems of the country, one will naturally conclude that as the stronger and bigger systems are reached, the total of the reports as to cost of reproduction on the 1914 prices and the land values ascertained under the methods used by the Commission, will produce results considerably in excess of the road and equipment accounts."

If valued on more recent prices this comparison would be even more favorable, Director Prouty of the Division of Valuation stating before the Commission in January, 1920, that he had reported to the director general of railroads that the costs in 1918 were approximately 175 per cent greater than those of 1914. Later studies indicate that similar costs in the latter part of 1919 and the early part of 1920 are about 212 per cent of the 1914 costs.

In respect of the financial status of the Bureau of Valuation, Director Prouty stated recently before the appropriations committee of the House of Representatives in connection with the request of the Commission for an appropriation of \$2,000,000 for the valuation work for the fiscal year 1922, that the current appropriation for the bureau is \$1,750,000 but that it is now spending at the rate of \$2,750,000 a year, or \$225,000 a month. This rate of expenditure, he said, would probably continue for the balance of the fiscal year. For the first six months of the next fiscal year, that is, the last half of the calendar year 1921, an expenditure of \$200,000 a month would be sufficient and for the second half of the fiscal year it would be necessary to expend approximately \$200,000 to keep the valuation up to date and about \$100,000 a month for original valuation work.

The Kansas City Southern Decision

As the state commissioners have supported the Division of Valuation in its position that it was impossible to report intelligently the present cost of condemnation and damages or of purchase in excess of present value of common carrier lands required in the Valuation Act and that, if reported, this information would be of no practical significance, it is not surprising that the National Association of Railway and Utilities Commissioners began to agitate the amendment of the Valuation Act to eliminate this requirement as soon as the full effect of the Kansas City Southern case was realized. As a result of their efforts, Senator Cummins and Congressman Esch introduced bills in their respective houses of Congress last year to effect the desired change. Owing to the adjournment of Congress shortly after their introduction no hearings have yet been held on these bills. The passage of this amendment was strongly urged at the recent convention of the National Association of Railway and Utilities Commissioners.

Conclusion

The work of valuation has now been transferred almost entirely from the field to the office. The Division of Valuation has undertaken certain basic studies and collected general information preliminary to reporting the cost of land as required by the Valuation Act. With this information at hand the Division of Valuation will be in a position to complete a large number of reports during the year for transmission to the Commission.

It now remains for the Interstate Commerce Commission to complete these reports in form for service on the carriers prior to the determination of their final value. As stated above, the provision in the Transportation Act stipulating that the present rate of return shall be effective only until March, 1922, makes it of great importance that the Commission shall be more fully informed at that time regarding the valuation of the properties of the carriers in order that it may then fix their rate of return more intelligently and accurately.

Further importance is attached to the completion of this valuation work by the provision in the Transportation Act requiring carriers to return to the government one-half of all that they earn over six per cent, for without a valuation of its property it is doubtful whether any railroad will be willing to accept an arbitrary figure as a basis on which this six per cent should be computed. It is therefore to the mutual interest of the roads and the government that this work be completed at the earliest possible date. In an effort to bring this about it has been suggested that in the Eastern district, where the work is most seriously delayed; the roads assist the Commission to complete inventories on the Commission's own basis and without prejudice to their decision.

LET US FACE 1921 with hope, confidence, courage and work. We have had innumerable drawbacks, but by expediting train movement, as well as speeding up the repairs to bad-order cars, and with the cordial co-operation of our patrons increasing the loading and decreasing the time consumed in loading and unloading cars, we have been able to handle with reasonable efficiency the business offered, and are prepared to go into the new year confident that the difficulties of the past will solve the problems of the future. To the public, I wish to express my appreciation of its understanding of our trials, and I pledge myself to continue to do the best that can be done with all we have. To those retiring officers and employees whose lives of service entitle them under our rules to well-merited pensions, I give the thanks of the company for their faithful efforts, and express the hope that the rest which they have earned may be filled only with happiness.—New Year's Greeting from N. D. Maher, president, Norfolk & Western.



Railroad Labor Board. Top row, left to right: Horace Baker, Albert Phillips, R. M. Barton, chairman; W. L. Park, J. H. Elliott. Bottom row, left to right: A. O. Wharhan, G. W. W. Hanger, J. J. Forrester, H. T. Hunt.

Labor Faces Economic Readjustments in 1921

Post-War Reconstruction Indicates a Change This Year in the Problem of the Railway Employee

ORGANIZED RAILROAD LABOR was very busy during 1920. Much was demanded by the carriers and some classes of labor responded well. But labor's "busyness" was not confined to the rendering of service. It was due largely to efforts to: (1), get the highest wages possible before the inevitable economic readjustments came; (2), unite the various railway brotherhoods in order to present a solid front in all controversies and to strengthen their weapon—the strike; (3), combat unrest and dissension in their own ranks; (4), throttle the growth of the new "outlaw" organizations; (5), dictate the actions and complexion of Congress; and (6), perpetuate the rules and working conditions favorable to labor obtained during the period of federal control.

Labor was successful, either wholly or in part, in its efforts toward the first four goals. It failed to reach the fifth. Whether it will reach the sixth is still undecided. From the employees' viewpoint, therefore, labor had a good year, but labor, like all economic factors, is subject to the law of action and reaction. The reaction has without doubt started.

The conditions prevailing at the time of the return of the railways to private operation were such that the carriers could only "carry on" until the application of the labor provisions of the Transportation Act proved them either successful or unsuccessful. Insofar as opposition to certain

of the organization movements is concerned, the carriers have for some time seen that the economic readjustment taking place throughout the country could not but affect the railroad labor problem, and their attitude consequently has been partly due to faith in the eventual return to "an honest day's work for an honest day's pay." As the year closed this faith began to be justified.

When the railroads were taken over by the government in December, 1917, there were pending wage demands of the various classes of employees amounting to about a billion dollars annually. The necessity for solving the labor problem was given by the President as one of the reasons for the institution of federal control, and it was "solved" by granting wage increases totaling over a billion dollars, by adding about 250,000 employees to the payroll, by extending the principles of the eight-hour day and time and one-half for overtime to almost all classes of employees, by abolishing piece work and bonus systems, by strengthening organized railroad labor through negotiating wages and rules only

with brotherhood representatives, by consummating national agreements as to working conditions with several of the larger organizations, and by largely destroying the morale and efficiency of the individual worker through centralized control, standardization of wages and working conditions, and disruption of wage differentials built up by years of negotiation.

ORGANIZED railroad labor, after a year of success in obtaining higher wages and promoting unity, faces the inevitable economic readjustments connected with post-war business reconstruction in 1921.

The railroads face easier labor conditions, increased individual efficiency and a return to "an honest day's work for an honest day's pay" basis.

Attitude and action of Railroad Labor Board will have a large influence upon a mutually satisfactory adjustment of the differences.

Labor Developments in 1920

The salient labor developments during 1920 were the wage awards made by the Railroad Labor Board, appointed and functioning under the terms of the Transportation Act, the trend of the larger brotherhoods toward unity and the dissatisfaction and unrest prevailing among the employees, expressed in part by the unsuccessful yardmen's strikes.

During the first two months of 1920—the last two months of federal control—the labor organizations were primarily engaged in attempting to defeat the passage by Congress of the Esch-Cummins Bill, and in urging the passage of the Sims Bill (Plumb Plan). During the period in which new railroad legislation was under consideration by Congress many threats of political action against representatives and senators voting for the Esch-Cummins Bill were made. In addition, threats of strikes were made; a general strike of members of the United Brotherhood of Maintenance of Way Employees and Railroad Shop Laborers was called for February 17, and members of the Brotherhood of Railroad Trainmen were asked to vote on a proposed walkout. Unlike its attitude at the time of the passage of the Adamson law in 1916, Congress refused to be coerced and the labor campaign against the Transportation Act failed.

Labor Demands Action on Its

Requests for Wage Increases

Meanwhile, brotherhood leaders had been carrying on a vigorous fight for action on the billion dollar wage demands which had first been presented during the preceding summer and fall. Beginning early in February a series of conferences between Director-General Hines and leaders of the brotherhoods were held, resulting in the director-general's decision on February 11 that the advances in question should not be granted in view of the approaching termination of federal control.

The director-general's report and decision were referred to President Wilson, who informed the labor leaders of the "unalterable position of the government." The President contended that a temporary basis of living costs ought not to be made the occasion for a permanent wage increase. However, in order that the consideration of wage matters should not be postponed indefinitely he proposed to bring about the earliest practicable organization of any machinery which should be provided by the new railroad legislation, or, in the event that such provisions were not included, to use his influence to get the companies and employees to agree on a special tribunal to settle the matter. He also promised to constitute a committee of experts to begin an immediate investigation of the entire problem for the purpose of expediting its solution.

Following the President's decision and in accordance with his expressed desires, the threatened strikes of maintenance of way workers and trainmen were indefinitely postponed. The labor leaders in their reply to the President's decision objected to waiting for the creation of a tribunal by legislation, but tentatively accepted his proposal for the creation of a joint tribunal composed of representatives of the railroads and employees, on the condition that a final decision be handed down within 60 days after the agreement to establish this tribunal.

When the labor leaders definitely learned of the new labor provisions included in the bill by the congressional conferees at the suggestion of Director-General Hines, they redoubled their efforts to defeat its passage. Open threats were made against those voting in favor of its passage. This campaign of coercion caused resentment among senators and representatives, and the final votes, 249 to 150 in the House, and 47 to 17 in the Senate, were indicative of their reaction.

The signing of the bill by President Wilson on February

28 was followed immediately by a letter from the President to the heads of the 15 organizations which had been fighting for action on their wage demands, announcing that their requests would be handled through the machinery created by the new law. In so acting the President automatically disposed of the organizations' counter proposal that a joint special commission be appointed to render a decision in 60 days.

Accepting the inevitable, the labor leaders adopted resolutions expressing their objections to the Transportation Act but stating that "as American citizens we feel that in the interest of railroad labor there is nothing left for us to do at present except to co-operate with each other in the prompt creation of the machinery provided for in this law."

Labor's next political move was likewise a failure. The so-called Anderson amendment to the Esch-Cummins Bill, introduced and backed by the brotherhoods as part of their fight to continue centralized enforcement of discipline as it was during government control, was defeated in Congress.

Development of Organization Unity

During the progress of the congressional hearings and the negotiations between Director-General Hines, President Wilson and representatives of the brotherhoods, the unions further merged their interests. This tendency toward unit action was abetted by the fact that both Director-General Hines and President Wilson negotiated with the 16 brotherhoods as one group and considered their demands as a whole. The result was the development of the "Associated Standard Recognized Railroad Labor Organizations," a term used thereafter in all labor negotiations. An officer of the American Federation of Labor is the authorized spokesman for this alliance which was given teeth by an agreement, made in February by the executives of 15 of the principal organizations of railroad employees, that in case of a controversy which might result in a strike, a vote of all the organizations parties to the agreement would be taken so that, if the vote carried and "extreme action" was decided on, all would strike at once.

The railroads were returned to private operation, then, with higher wage levels, changed working conditions, greater unity between the railway unions, wage demands totaling a billion dollars, strike votes, "postponed" strikes and general unrest.

Preliminary conferences between representatives of the carriers and of the labor organizations aimed at settlement of the wage controversy were begun on March 10. The director-general opened the first meeting and urged settlement of the wage question by this means rather than by reference to the new Railroad Labor Board. After almost a month of negotiation the carriers' representatives declined the employees' requests on the ground that they could not assume the responsibility of adding such a burden to the cost of transportation. This transferred the entire controversy to the Labor Board, only the nominations for which had been made.

The "Outlaw" Yardmen's Strike

The dissatisfaction of the employees because of the long delays reached a crisis at this time and resulted in a series of strikes of yardmen, largely members of the "outlaw" yardmen's associations, which seriously interfered with terminal operation throughout the country. Directed, as this strike was, at the alleged inaction of the brotherhood leaders and at the carriers, it soon found railway officers and executives of the labor brotherhoods fighting side by side to defeat the movement. There was no other course open to either carriers or labor executives. The latter were fighting to uphold contracts they had signed with the railroads and for the life of their organizations. The railroads were fighting to uphold their part of the contracts with the brotherhoods

and because granting the demands of the "outlaws" would have meant not only raising the wage level of all classes of employees, but destruction of the usefulness of the Labor Board before it had begun to function. The only beneficial effect of the strike was to expedite the appointment of the Labor Board. President Wilson submitted his nominations for members of the board on April 14 and they were promptly approved.

Hearings Before the Railroad Labor Board

The hearings which resulted in the Board's award on July 20 were started at Washington on April 20. The first official act of the Board was to deny representatives of the "outlaw" strikers a hearing of their grievances on the ground that they had not complied with the terms of the Transportation Act and that cases brought before the Board in accordance with the procedure outlined in the Act should have precedence.

The presentation of the employees' demands occupied the board's sessions from April 20 until May 8, when the board moved to its permanent home at Chicago and began hearing the carriers' side of the controversy. The hearings continued until June 2, when the board went into executive session to formulate its award.

Meanwhile, the sporadic strikes of yardmen continued with gradually decreasing effectiveness. The strike situation was brought to the attention of the President and again he entered the controversy by suggesting to the board that it make some announcement as to its probable award which would allay the unrest. The board accordingly set a "deadline," July 20, for its decision, and on that date granted railway employees advances in wages totaling approximately \$620,000,000 annually and retroactive to May 1.

The board's final decision dealt wholly with wages and specifically deferred for later consideration the questions raised as to rules and working conditions. The executives of the brotherhoods met in Chicago, and only one, the Order of Railway Telegraphers, voted to reject the award. Later the chiefs of the organizations ordered a nation-wide referendum with a strong plea against strike votes. And the brotherhoods gladly accepted the board's decision. With the gradual collapse of the "outlaw" strikes, railway labor troubles seemed to be settled for a time at least.

Other Labor Board Rulings

Several subsequent decisions, whose importance was overshadowed by the magnitude of the July 20 award, were rendered by the Labor Board. The employees of the American Railway Express Company were awarded advances of approximately \$30,000,000 per year, retroactive to May 1. Employees of the Bangor & Aroostook were awarded the same rates as were awarded to other railroad employees in the board's decision of July 30. Lighter captains employed on railroad-operated barges in New York harbor were awarded an increase of \$25 per month effective on March 1. Hearings were begun on October 18 on the demands of employees of short line railroads for the same rates of pay as Class I railroads. These hearings continued until November 24. A partial decision was rendered on December 11, but it is expected that the final decision of the board will be given early in 1921.

Political Activities of Labor

As stated before, the railway brotherhoods threatened political action against those senators and representatives who voted for the Esch-Cummins Bill. With the aid of the Plumb Plan League and the American Federation of Labor an extensive propaganda was carried on in the national political campaign against them, but without success. The returns from the election show that most of the senators and

representatives who voted for the bill and who were candidates for re-election were re-elected, and, while many of those who voted for the bill were defeated, this was more due to the Republican "landslide" than to the work of the labor organizations.

National Boards of Adjustment

and National Agreements

The year closed with two vital controversies still "hanging fire," the establishment of boards of adjustment and the perpetuation of the national agreements placed in effect during the period of federal control being still in an unsettled condition.

The Transportation Act provides that national boards of adjustment may be established by "agreement between any carrier, group of carriers, or the carriers as a whole, and any employees or subordinate officials of carriers, or organization or group of organizations thereof." The representatives of the employees have stood firmly for the creation of national boards, whereas the carriers have stood as firmly for the creation of boards either for the individual roads or for systems of roads. The brotherhoods' stand is in line with their fight for the passage of the Anderson amendment, *i. e.*, for centralized control over rules and working conditions as far as possible in order to allow unit action.

Many railway executives feel that if national boards of adjustment should be established the principle of the "open shop" in railroad work would be ended and the "closed shop" substituted, with a resulting standardization of working rules, regardless of the varying conditions on the carriers. Others do not entertain the same fear of national boards of adjustment.

During the hearings in the short line railroad case, labor's representatives asked for an executive session of the board at which they could present information regarding existing labor conditions. This request was granted and on November 29 they plied the board with veiled threats based on alleged inability to keep their men in hand unless their demands for the immediate establishment of machinery to handle disputes regarding rules and working conditions were granted. The establishment of such boards is not mandatory under the terms of the Transportation Act nor are there specific provisions authorizing their establishment by the Labor Board. These facts have been recognized by the board; and although it cannot take definite action in the matter, it has offered aid in consummating an agreement between the carriers and employees.

At the present time three bureaus, each composed of three members of the Labor Board, are handling minor wage controversies. It is possible that in the event that the carriers and the brotherhoods are unable to agree upon the establishment of boards of adjustment, these bureaus, or the board as a whole, depending upon the magnitude of the cases, will handle controversies regarding rules and working conditions as it is authorized to do by the Transportation Act. This would throw a large amount of detail work on the members of the board and tend to interfere with their thorough consideration of more important wage matters. Whatever solution of the question is adopted, present conditions clearly indicate that some machinery must be created as soon as possible if the spirit of the Transportation Act is to be carried out.

The question of the perpetuation of the national agreements with several of the larger brotherhoods, consummated during the period of federal control, is another legacy of 1921. It is intimately connected with the question of the establishment of national boards of adjustment, inasmuch as it apparently represents another phase of labor's desire to centralize and nationalize control over rules and working

conditions. The whole controversy is scheduled to come before the board on January 10, 1921.

Representatives of both the carriers and the brotherhoods have been working for some time on their respective presentations in this case. Without doubt the labor leaders will fight vigorously for the continuation of the national agreements, and the carriers' representatives will as vigorously oppose their continuance. Of the controversies likely to arise in 1921, that over the national agreements appears to be the most important.

The Outlook for 1921

In looking into 1921, the railway executives seem to have reason to be optimistic, the labor executives pessimistic. The present period of readjustment, with its decreasing living costs and demand for labor, predicts easier labor conditions, increased efficiency and conservatism.

Since September immigrants have been swarming into the United States at the rate of 900,000 a year, while the consulates abroad report that unless legislation interferes the exodus from Europe to America will be measured only by ship capacity. It has been estimated that 10,000,000 Europeans are planning to migrate to America as soon as possible. The estimate for Italy alone is 8,000,000. It is freely predicted, therefore, that unless some restrictive legislation is passed both in the United States and abroad immigration in 1921 will greatly exceed the previous high record of 1907 when 1,285,349 immigrants entered the United States. These conditions led the House of Representatives recently to pass a bill restricting immigration for 14 months and the measure is now before the Senate.

While there is still an admitted shortage of some classes of railroad labor in certain sections, to a large extent transfers from one department to another and from unskilled classes to skilled classes and the employment of new men to complete forces will take care of this difficulty. It may be said, of course, that the largest number of immigrants will be attracted to the cities and into the industries. This would probably be true if the wages paid in industries were as stable as those paid for railway work. Even now, however, a discrepancy between the wages paid in the industries and by the railroads for similar work can be seen. Such

conditions would result in bringing into railway work all of the new labor needed and a shortage of railroad labor would cease to exist, at least temporarily.

What, then, can be expected in 1921? Insofar as the individual worker is concerned, there will be an increase in efficiency through the restoration of morale and discipline. This, in turn, will be attributable to, first, the economic readjustment which inevitably creates unemployment, lower living costs and lower wages, and, second, the surplus of labor due to increased immigration. Furthermore, the railway worker, receiving wages above the going rate, will not readily subscribe to radical, thoughtless action imperiling his position and income.

On the other hand, the indications are that dealings between the railroad labor organizations and the carriers will have to be carried on diplomatically in order to avoid open breaks. Vigorous political and nationalization offensives will probably be continued by the executives of the larger brotherhoods. The outcome of the resulting conflict will depend largely upon the attitude and action of the Railroad Labor Board. At the present time it is not apparent that the board realizes the magnitude of the effect its decisions have had and will have on the whole economic fabric of the nation. It is certain that the public will be awakened to the far-reaching effect of the developments in the railroad labor situation and that, once awakened, will demand firmness in determining the future reward and working conditions of labor.

THE STATE LAW REPORTING COMPANY, Woolworth Building, New York city, announces that it has taken the contract for reporting the hearings before commissioners and examiners of the Interstate Commerce Commission throughout the United States. The work requires the taking of testimony at about 3,000 meetings a year, and the writing out of approximately 1,000 pages a day, and the contractor is required to maintain a number of branch offices throughout the country, from which reporters are sent out to attend hearings held within a certain radius. Sometimes ten or fifteen hearings are held on the same day. The Interstate Commerce Commission employs 40 to 50 examiners who conduct hearings.



Photo by Ewing Galloway

Aerial View of Union Station, Senate Office Building and Post Office, Washington, D. C.



Waiting Room and Ticket Office of a Union Station Used by Six Railroads

Fate of Railroad Administration Innovations

A Survey of the Present Status of the Important Changes Inaugurated During Federal Control

ALTHOUGH MANY of the innovations introduced by the United States Railroad Administration in its unified operation of the railroads and in the handling of their traffic no longer remain in their original form, they have left their influence upon railroad practices in a manner that will be felt for a long time in the future. Some of these changes had long been advocated by railroad men themselves, while others were made possible only by the unusual conditions ushered in by unified control. But whatever may have been the immediate causes of these innovations, the results have been threefold. Certain of them have been discontinued almost in their entirety because centralized control could not, or did not, take cognizance of local conditions which private operation could not disregard. Others have been abandoned because the restoration of competitive conditions made their continuance impossible. A third class comprise those which have been retained in modified form to meet new conditions, and because they present distinct advantages in improved service.

It is the purpose of this article to review the more important of these innovations and to indicate their present status. The changes which will be discussed include the establishment of consolidated city ticket offices, the unification of terminals, the drastic curtailment of advertising, the establishment of joint railroad and shippers' committees on rate matters, the pooling of equipment, the elimination of duplicate train service, the joint use of freight and passenger stations, the discontinuance of off-line agencies, and the

practice of collecting freight for solid train movements, together with the allied "sailing day" plan.

Consolidated Ticket Offices Remain

One of the innovations which was brought most prominently before the public was the consolidated ticket office. Although the system has been abandoned at many points and has been modified in part where retained, many of the original offices are still in existence with but few roads withdrawing. It was recognized by the railroads at most places when they returned to competitive conditions that the consolidated ticket offices were economical and performed a service to the general public which the separate offices could not render. While many of the roads have considered that the system was detrimental to them individually, they have believed that the handicaps and disadvantages of the loss of identity, and the creation of certain routes of travel at the expense of the smaller roads could be offset by a unit system of identification within

the office and by thorough and active solicitation of traffic outside. The system of allotting a designated space within the consolidated office to a road which provided its own employees at the counter, is the plan in effect where joint, if not consolidated, offices are maintained.

At Chicago three roads have withdrawn from the consolidated ticket office to open separate offices, while 19 roads remain at the original location. The consolidated offices at New York, San Francisco and a number of other points

COMPETITIVE CONDITIONS have necessitated the discontinuance of many of the changes or innovations which were introduced during the period of control by the Railroad Administration.

Some of these, however, have proved of distinct advantage under private management and are being retained in such form as will best suit the new conditions.

Consolidated ticket offices and joint railroad and shippers' committees on rates have been quite generally continued.

nave also been continued. At St. Louis, Mo.; Dallas, Tex., and Kansas City, Mo., the roads have returned to the unit plan of segregation, while at Minneapolis, Minn., since the consolidated office has been broken up, the Chicago, Burlington & Quincy, the Chicago, Rock Island & Pacific and the Great Northern operate a joint office.

Unification of Terminals Retained in Part

Among the innovations of the Railroad Administration which have been retained in part is the plan for the unified operation of terminals. It has been generally agreed that the roads derived numerous benefits from the joint operation of terminals. Many handicaps were also present so that the return to private operation has led to modification, and in many instances abandonment of the plan. Even excluding the unusual conditions resulting from the war, it has become evident that the terminal facilities of the roads have not kept pace with the growing needs of the traffic. For this reason considerable increases in economy of operation and in efficiency of service have been effected through continued consolidation of certain terminal facilities. For example, the Stock Yards District Agency at Chicago, which was formed in August, 1918, through the consolidation of 21 individual railroad agencies, is still in successful operation and is likely to remain permanently. Another co-operative movement, the joint agency established at the Chicago Board of Trade Building in September, 1917, for the convenience of shippers in the collection of freight charges on in-bound grain, and participated in by all roads having Chicago terminals, also bids fair to become permanent.

At the same time, a number of factors incident to the return to the competitive conditions of private management tend to make impracticable the joint operation of terminals. Generally, roads which have built terminal facilities at great expense do not find it expedient to share them with competing roads which have acquired no such facilities. Another consideration has been the difficulty of finding any one road in a terminal center with facilities adequate to take care of the combined business of the other carriers. A third difficulty has been the objections on the part of shippers and consignees to the inconvenience of having to go considerable distances to collect and send freight when their business houses have been located in close proximity to the terminal of the road which they patronized. As a fourth reason, the carriers find it necessary under competitive conditions to adopt measures which will permit them to handle the maximum amount of individual business.

The plan has thus been continued up to the present only in a modified and limited form, but it will exist permanently as a possibility in the provision of the Transportation Act that empowers the Interstate Commerce Commission in transportation crises to "require such joint or common use of terminals, including main-line track or tracks for a reasonable distance outside of such terminals as in its opinion will best meet the emergency and serve the public interest and upon such terms between the carriers as they agree upon, or, in the event of their disagreement, as the Commission may after subsequent hearings find to be just and reasonable."

Advertising Resumed in Different Form

When the government took over the railroads as a war-time measure all activities tending to the development of traffic, with the exception of the agricultural development work were stopped. Later, the signing of the armistice and the attendant recession of business forced the Railroad Administration to revive advertising to stimulate travel. With the return of the roads to private control, competitive conditions have necessitated more elaborate campaigns, but the roads are now concentrating more on campaigns of crea-

tive and constructive advertising designed to promote tourist travel, to populate and cultivate new areas, to present service changes and to educate the public regarding railroad conditions. This last—advertising to secure and hold the good will of the public—to work hand and hand with patrons and inform them—may be said to be the underlying principle of present practices.

In this endeavor to bring to their patrons the facts surrounding the operation of the railroads the plan developed by the Illinois Central serves as a striking example. This road is sending a personal representative to interview farmers resident along its lines to ascertain their views and needs. The information thus secured is compiled and then circulated among all the employees throughout the territory served by the road, thus bringing the employees as well as the patrons of the road to understand the problems that both encounter.

Before federal control most of the roads passing through undeveloped parts of the country maintained special departments to promote the settling of these areas as well as to co-operate with the industries they served. These are now being re-established. Thus the Northern Pacific recently created a department of immigration and industry to take over this work. Most of the railroads serving developed areas maintain supervisors of agriculture or departments to co-operate with the growers, shippers and dealers throughout their territory. The supervisor of agriculture of the Union Pacific and the Oregon Short Line recently compiled a list of shippers of agricultural products in their territory, together with a list of the dealers in these products located in the large distributing centers. These lists were mailed to shippers and dealers in an effort to facilitate the sale and marketing of agricultural products. These methods and plans are not new. The interesting and important fact is that they are now receiving more attention.

Joint Railroad and Shippers' Committees on Rates Continued

One of the innovations introduced by the Railroad Administration was the creation of joint committees of shippers and railroads to pass on rate matters, which procedure was inaugurated early in July, 1918. This step was the outgrowth of a desire to arrive at decisions on rates by conference and agreement more promptly than was possible by separate action before the Interstate Commerce Commission with its resulting controversies. From this beginning the advantages of joint action have become increasingly evident to both carriers and shippers. Unlike numerous other innovations which have gone by the board wholly or in part with the restoration of competitive conditions, the joint conference plan is in successful operation at present and seems likely to have a permanent place in transportation practice.

That the plan was appreciated by the shippers is evidenced by the fact that on March 10, 1920, a committee representing the Southern Traffic League proposed a plan of continued co-operation with the railroads in the adjustment of rates to produce the 5½ per cent return fixed by the Transportation Act. The League made the proposal that the carriers and shippers work jointly on a new system of tariffs designed to produce the required revenue and opposed the former practice where the carriers customarily presented tariffs to the Interstate Commerce Commission for approval which the shippers had not seen, and which they would consequently oppose in their entirety because of objections to certain features.

The shippers, however, have not been alone in advocating the plan for co-operation. The roads have appreciated their aid in securing needed rate increases, as is evidenced by the fact that representatives of the executive departments of 17 trunk line railroads met with the executive committee

of the National Industrial Traffic League on November 19, 1920, at the annual meeting of the organization in New York to discuss and analyze complaints of the shippers, and to arrange for close co-operation between shippers and carriers.

At this conference the carriers assured the shippers that (1) there is no preconceived or concerted plan of the carriers to change rates, rules, regulations or practices for the sole purpose of obtaining increased revenue in addition to that which has been found necessary by the Interstate Commerce Commission; (2) rate committees and tariff bureaus will be instructed to devote their first attention to readjustments contemplated by the carriers' recent application to the Interstate Commerce Commission, to the prompt publication in regular tariff and supplement form of the authorized rates, and to prompt decisions on the applications of the shippers for readjustment of old rates and establishment of new rates; (3) the responsible traffic officers of the railroads will undertake to review and consider carefully other changes of rates, rules, regulations and practices, initiated or recommended by the rate committees with a view to forestalling any such changes as may be inopportune, and (4) the roads agree to give the same attention to classification matters.

On its side the League (1) insists upon transacting its business with the traffic executives of the railroads who are responsible for the maintenance of proper relations between the carriers and the public; (2) desires the traffic executives to act as the point of contact with the American Railway Association in matters of demurrage and other traffic affairs which are national in scope; and (3) desires the traffic executives to act as the point of contact with the Railway Accounting Officers' Association in all accounting matters in which the shippers are interested.

The result of the meeting was the establishment of joint committees to co-operate in handling matters of mutual interest to shippers and carriers which may arise in the future. With such movement as this gaining headway, it would seem that the plan for joint conferences between shippers and the railroads is to have a lasting effect.

Pooling of Cars Abandoned

The pooling of equipment, a feature of railroad operation introduced during federal control, was partially abandoned three months before the roads were returned to their owners. Realizing that the pooling of equipment made it impossible to secure its adequate maintenance the director general issued orders to the roads to return the cars to their home lines as far as possible before the termination of federal control. This order was successful in effecting an increase in the proportion of cars on home roads from 25.3 per cent on December 1, 1919, to 28.3 per cent on February 1, 1920, although this figure fell to 21.9 per cent before the roads were returned to private management on March 1, in spite of the efforts of the director general and the regional directors. Since that date, however, there has been a steady increase in the number of cars returned to their home lines, until an average of 32.5 per cent of the cars were on home lines on November 15, 1920, as compared with a pre-war normal proportion of about 50 per cent.

Thus it is evident that the pooling of cars as a general practice and in the form in which it existed during the period of federal control, has been abandoned, although the Transportation Act authorizes the Interstate Commerce Commission to order the pooling of equipment whenever "shortage of equipment, congestion of traffic or other emergency requiring immediate action exists in any section of the country."

Duplicate Passenger Service Restored

Prior to federal control competitive passenger train service had been intensively developed between many points. These

efforts to gain competitive business found no place under government operation where the roads became units in a vast monopoly. Not only that, but the exigencies of war made conservation and economy of operation of primary importance, while service to the public assumed a secondary position for the time. As a result of these conditions the 15 trains which had been running each way between Chicago and St. Louis daily were reduced to 9, and similar reductions were made elsewhere.

The return of the roads to their owners reversed this situation. The movement toward the return to a competitive basis began when the Pennsylvania, before government control was terminated, restored its Broadway Limited between New York and Chicago. Since that time other roads have gradually resumed operation of competitive trains until at the present time service between such highly competitive points as Chicago and St. Louis, Omaha, Minneapolis and St. Paul, between New York and Philadelphia and between other points is practically on the pre-war basis. A number of roads in all sections of the country are also shortening the running time on many of their competing trains, a movement which gives further indication of the return to the old conditions.

Joint Freight and Passenger

Stations Abandoned Largely

Joint freight and passenger stations have been in existence almost as long as the railroads. Federal control, however, brought about a marked increase in their number because of the elimination of competition between carriers. At many of the smaller terminals where competing roads had maintained separate freight and passenger stations consolidations were effected for the purpose of reducing expenses. In some cases this was successful; in others it resulted in added expense because of terminal congestion. With the return of the roads to private control and competitive operation most of the carriers have found it advisable to restore and operate their separate terminals, although some have found it best to continue as a party to the joint arrangements. Among the latter the continued use of the Pennsylvania terminal at New York City by the Baltimore & Ohio serves as a striking example.

Off-Line Agencies Reopened

Competition has also necessitated the restoration of the off-line agencies which were closed early in federal control. Even during government control the re-establishment of these offices had been forcibly brought to the attention of the Railroad Administration, for their withdrawal had caused a storm of protest from the shipping public, which was unable to secure the former service from employees uninformed regarding all of the railroads. The administration sought to remedy this complaint by the establishment of public service freight bureaus, but these were never well developed.

This necessity of service to the shippers, though important in obtaining their good will, was, however, but a means in the all-important solicitation of business when the roads were returned to a competitive basis. The off-line agency is a business-getter, established and maintained to that end. Therefore, with the return of the roads to private control they have practically all been re-established.

In re-opening these agencies the railroads have, nevertheless, modified their pre-war practices to the extent that many of them have replaced expensive street level offices with less showy quarters upstairs where new business can be secured as readily by active solicitation and competent service.

Solid Train Movements and the "Sailing Day" Plan

The plan for solid train movements and designated shipping days represents that class of innovations the economy of which had long been recognized by railroad men. In fact,

solid train movements were already employed as far as possible on a number of roads prior to federal control. The possibilities of the plan were found to be greatly extended with the non-competitive conditions obtained under government control where traffic formerly divided between several roads could be concentrated on one line, as was done with flour from Minneapolis, lumber from the northwest and meat from the packing centers. But the plan for solid freight train movements and for setting certain shipping days for specific places was abandoned to a large extent upon the return of the roads to the competitive conditions of private control, for no carrier is willing to turn its share of any business over to a competing road in order that a rival carrier can run a solid train. It is only in cases where the carrier secures enough business itself to make up a solid train that the plan is continued. The demands of the shippers for more individual attention were important factors in bringing this about. "Sailing days" for merchandise cars, for example, have been wholly done away with, although in the case of live stock shipped to Chicago the shipping day plan has been retained.

Among other innovations was the development of the embargo and permit system. Facing a traffic congestion which threatened to paralyze the transportation system of the country and acting under its broad powers, the Railroad Administration early developed a plan for permits and embargoes. These measures have been perpetuated as means for dealing with similar emergencies by provisions in the Transportation Act which specify that the Interstate Commerce Commission is "to give directions for preference or priority in transportation, embargoes or movements of traffic under permits, at such time and for such periods as it may determine and to modify, change, suspend, or annul them."

One of the measures of the Railroad Administration which aroused the most active hostility was the plan for consolidated purchases. Although it did not extend beyond cars, locomotives, rails and ties, it was the cause of bitter controversy throughout the period of government control. Following the return of the roads to private management the centralized control of purchases disappeared. Interest in the plan has been revived recently, however, by a statement from Senator Cummings advocating consolidated purchases by the railroads.

It is evident from the above survey that a number of the innovations inaugurated by the Railroad Administration have been found equally sound under the conditions of private operation. It is equally evident that many of the changes heralded as notable advances in railroad operation are not applicable under competitive conditions, and that railroad practices as a whole will not differ widely in the future from pre-war methods.

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Photo Keystone View Co.

Railway Station at Juncal, Chile

Manufacturers Call Meeting to Fight National Adjustment Boards

THE DEMAND of organized railroad labor that National Boards of Adjustment be formed to handle all controversies over rules and working conditions, instead of settling such controversies by conference between representatives of the company and its employees as formerly, will be protested at a convention of manufacturers, merchants, railway executives and shippers to be held at the Congress Hotel, Chicago, on January 12, two days after this question is scheduled to come before the Railroad Labor Board. Approximately 500 delegates, representing all sections of the country, are expected to attend the meeting. Acquiescence in the railway brotherhood's plan would mean the opening wedge for collective bargaining and the "closed shop" in all branches of American industry, according to the convention call issued by the National Conference of State Manufacturers' Associations, through its president, William Butterworth, who is also a director of the Illinois Manufacturers' Association and vice-president of the Chamber of Commerce of the United States of America.

In explaining the primary purpose of the convention, the call says in part:

"The Transportation Act of 1920 created the Railroad Labor Board which has jurisdiction over railway employees' wages when controversies are appealed to it. The act also provides that Boards of Adjustment be established by agreement between any carrier, group of carriers, or the carriers, as a whole, and any employees or organization, or group of organizations, which, if established, will have jurisdiction over all working conditions and grievances other than wages. These Boards of Adjustment, however, can only be created by consent of employers and employees.

"The railway brotherhoods are insisting upon the creation of National Adjustment Boards. The railway executives are opposing it because, if created, it means the nationalization of railways under the domination of the labor unions and the destruction of discipline, efficiency and loyalty, which are necessary to the efficient and economical operation of the common carriers for the benefit of the people. If the railroads are thus shackled, the resulting conditions must necessarily be reflected in the organization of every manufacturer. It means the 'closed shop' and union domination over all industries alike. This, today, is perhaps the most vital issue facing the manufacturing and producing interests in the United States, and should have immediate attention.

"Therefore, all industrial associations, the purpose of which is the general good of the manufacturing interests, and all corporations, firms and individuals having to do with the production of manufactured articles, and all employers' associations and employers are requested to send delegates to this convention to formulate a clear and fearless expression of opinion, appoint proper committees to carry out the conclusions, to take such steps as will bring to the attention of the country the serious situation that will follow should the railroad brotherhoods succeed in carrying out their purpose, and to transact such other business as may come before the convention.

"Various organizations already have taken cognizance of this matter and have passed resolutions against it. Among these were the Chamber of Commerce of the United States of America, the National Association of Manufacturers, the National Industrial Council, the National Industrial Traffic League, and various individual chambers of commerce, trade and other organizations. The convention of the National Conference of State Manufacturers' Associations, however, will be the first country-wide attempt to express the opinions of the manufacturers of America whose interests will be vitally affected if the railway brotherhoods are successful."

Discussions of the open shop, its effect on employees, companies, production, cost of production and union labor and the immigration problem are also scheduled.

THE DOMESTIC PRODUCTION OF COPPER IN 1920 is estimated by H. A. C. Jensen, of the United States Geological Survey, Department of the Interior, to be about 1,235,000,000 lb., compared with 1,286,000,000 lb. for 1919.



A Year of Progress in Maintenance of Way

Much Still Remains to Be Done Before the Properties Will Have
Been Restored to Normal Condition

THE FIRST MAINTENANCE of way season following the return of the railroads to private management was characterized by a general effort to restore the deficiencies which had accrued during the period of government control. Owing to the fact that a large part of the maintenance of way season fell within the limits of the guarantee period established by the Transportation Act, the managements were restricted in a measure by the absence of specific information on the exact interpretation which would be placed by the Railroad Administration on the provision for maintenance of way expenditures during this period. In general they pursued the course of liberal expenditures on much the same scale as would have been the case had the properties been established on a thoroughly independent basis. Whether or not they are to be penalized in their efforts to take up the deferred maintenance during the six-months' guarantee period is still an open question.

Following the return of the roads to a more independent status after September 1, most of them continued the policy of liberal expenditures, although inability to collect compensation due them from the government and reduced earnings caused some of the lines to undertake retrenchment considerably in advance of the normal reduction to the winter basis.

A large part of the maintenance of way season was coincident with a period of remarkable business expansion, coal shortage and labor disturbances in the operating departments of the railroads. These conditions imposed three obstacles to efficient maintenance: an inadequate supply of material, a labor shortage and a congestion of traffic. These influences served to interfere with a realization of the full results in the

programs for taking up the deferred maintenance but the degree to which these factors affected the results varied widely with the location and physical characteristics of the roads.

One of the foremost deficiencies was an inadequate supply of rails. At the beginning of 1920, the United States Railroad Administration had in stock only 375,000 tons of rail, while 200,000 tons in addition were on order undelivered by

the mills. To this available supply must be added 73,500 tons obtained on an emergency order last February, making a total of about 650,000 tons, which represents the entire tonnage of rails made available by the United States Railroad Administration for 1920 renewals. This, however, does not include all of the tonnage provided because, thanks to the corporate organizations of the roads, orders were placed with the mills for delivery following the return to private management. No accurate information is available in regard to the amount of rails delivered during the past year, but it was unquestionably too small to effect any reduction in the accrual of deferred rail renewals.

Taking the country as a whole, the situation as to ties presented a more favorable aspect. Owing

to the failure to establish a satisfactory means of anticipating the needs of the railroads under private management, tie purchases were largely deferred until after March 1. Nevertheless, many of the roads were able to obtain practically their full requirements. Other roads were not so fortunate and have entered the new year with accrued tie requirements considerably in excess of normal. One tendency of the past year in tie purchases which is unquestionably a direct result of the two years of centralized tie purchases was that many roads which had formerly procured their ties locally or within

DURING THE ACTIVE maintenance of way season of 1920 the railroads made a concerted effort to restore their properties to a normal condition. Inadequate supplies of materials, local shortages of labor and congestion of traffic, imposed serious obstacles in the way of this undertaking.

Efforts of the management to raise the personnel standard in the maintenance of way forces were aided in the closing months of the year by the sharp change in condition of the labor market.

limited distances from their own lines entered markets in remote territories. Another tendency observed was the impetus given to timber preservation during the past year. A number of new treating plant projects were undertaken largely because certain railroads formerly given to the use of untreated ties have become committed definitely to the use of preservatives.

The Labor Situation

Labor conditions during the past year were unusually spotty. In spite of the hue and cry that went up early in the year regarding an insufficiency of farm labor to gather the crops, the railroads in strictly rural territory had far less difficulty in securing an adequate supply of men. In some of the industrial centers, on the other hand, labor was exceedingly scarce and inefficient. In fact, it was the opinion of some maintenance officers that conditions were worse than at any time previous. One interesting phenomenon largely influenced by the scarcity of labor was the introduction of contract maintenance work on a few roads, particularly in the form of cost plus agreements. Another phase of the situation is illustrated by the apparent restoration in full of all former practices with respect to the employment of labor through fee labor agencies.

No review of the labor problems of 1920 is complete without reference to the organizations of maintenance of way employees and the relations between the organizations and the managements. In the maintenance of way field, the United Brotherhood of Maintenance of Way Employees and Railway Shop Laborers came into the limelight at the beginning of the year through the publicity given to its venture into the co-operative manufacture and distribution of wearing apparel, several glove and underwear factories being purchased outright by the union. Of far greater significance to the country as a whole was the issuance of a national strike order by the grand president, A. E. Barker, which was to have become effective on February 17. This led to a widely quoted exchange of letters and telegrams between President Barker and Director General Hines and President Wilson, with the result that the strike was called off. In April the organization suffered some internal troubles as a result of which President Barker and George Seal, grand secretary, resigned and a group of the members seceded to form a separate organization known as the American Brotherhood of Maintenance of Way Employees.

In general the policy pursued by the maintenance of way officers toward the men during the past year has been one for the restoration of the old-time loyalty to the company.

There has also been an increased recognition of the fact that a corps of foremen of a caliber necessary for the efficient prosecution of the work can only be maintained if good timber for the development of such gang leaders is to be found among the rank and file. The higher wages paid following the award of the Labor Board on July 20 did much to improve the situation in this regard, especially in rural districts where many of the roads are now able to secure a notably higher grade of men than was possible for some time in the past. The eight-hour day, which has been a stumbling block in certain phases of maintenance work, has been maintained rigidly in most quarters, although during periods of the severest labor shortage some roads were forced to employ men on the 10-hour basis, partially to obtain the required output and partially as a means of holding a force which was not satisfied with the compensation obtainable for eight hours' work. With the decline of business operations during the late fall months, the aspect of the labor situation was entirely changed and many roads are now endeavoring to improve the character of the maintenance forces.

Heavy Traffic and Congestion Interferes

Traffic conditions interfered with the conduct of maintenance in three ways, through the shortage of cars, restrictions on the use of tracks, and reduced work train service. With traffic heavier than at any time in the history of the roads, the pressure to place in revenue service all equipment that was in any way suitable to that end, and to eliminate all possible interference with the use of tracks was unusually severe. This not only reduced the progress of the work but served to increase the cost. In those centers where the out-law switchmen's strike took on the broadest scope and was of greatest duration, work train service was restricted for the simple reason that there were not enough train crews to man these trains.

In conclusion, the maintenance of way forces accomplished all that could be expected of them in view of the obstacles in their way and there has been a noticeable improvement in the condition of railway tracks. In the case of railway bridge and building work, there has been more of a tendency to carry the work over into the future. As a consequence, it may be said that insofar as renewal of rails, extensive ballasting, and renewals of structure are concerned, the railroads still have the great bulk of the work before them and with both materials and labor available on a basis that has not obtained in five years, the opportunity for real progress is at hand.



Photo by Ewing Galloway

Klondike Train at Bennett, Alaska



Illinois Central Car Yards at Chicago. Photo by Ewing Galloway, N. Y.

Car and Locomotive Prices Reach Peak in 1920

Equipment Ordered During Year Cost Two and One-Half to Three Times 1910-1914 Average

THOSE RAILROADS that purchased locomotives in 1920 paid prices for them averaging about two and one-half times the pre-war prices. The prices of freight cars were even higher in proportion than this, all-steel cars being priced at three times the pre-war figures and cars of composite construction at more than three times the pre-war prices. The increase in passenger car prices was not as pronounced, the 1920 values having been slightly over twice the 1910 to 1914 average.

Detailed figures are given in this article showing this price relationship as between 1920 and the pre-war period. There is also given a table showing the prices paid for the U. S. R. A. standard equipment allocated to the railroads and, what is more important, data showing the prices which have been paid by a number of railroads for equipment which they have ordered in 1920. For purposes of showing more particularly the price trend during the year, there are also shown details of the prices of the basic iron and steel commodities which enter into the manufacture of all types of railway motive power and rolling stock.

Table I is a chart compiled for valuation purposes by the President's Conference Committee on Federal Valuation. The chart represents careful studies made by the engineers of that organization in co-operation with the equipment builders. The studies cover 10½ years, and to derive the figures shown, data were assembled covering the prices of 10,500 locomotives, nearly 275,000 freight cars and some 1,600 passenger coaches. The prices in all instances were "as sold" and cover the date of

sale, not the date of delivery. The base price of 100 in the chart is taken for the period 1910 to 1914, both inclusive. The comparative percentages are worked out for the years 1910 to 1919 and for the first six months of 1920; the last figures are the ones of chief interest in this connection. The

prices for the first six months of 1920 are given in the following percentages of the 1910-1914 base price:

Locomotives	251
Freight cars:	
All-steel	300
Composite	313
Passenger coaches	218

PRICES PAID for locomotives in 1920 were two and one-half times the average of prices for the years 1910-1914; for all-steel freight cars, three times; for freight cars of composite construction more than three times and for passenger coaches more than twice.

Present downward tendency of basic iron and steel prices is reflected in reductions in equipment prices of about ten per cent from year's peak.

This information is made available through new conditions.

In using the figures for the first six months it must be borne in mind that approximately two-thirds of all the orders placed during the year were placed before July 1. The price trend for the year was slightly upward from January to May or June. It then ran on a level to about the latter part of October, and since that time it has fallen to slightly below the January figure. In view of these facts, and that but few orders have been placed in the last three months, it is apparent that the percentages given for the first six months are quite representative of the greater part of the orders placed for the entire year.

Table II giving the prices paid, or to be paid when finally ascertained, for the allocated U. S. R. A. standard equipment, needs but little comment. These prices are those set in connection with the equipment trust agreement made last spring to finance these cars and locomotives. They are, of course, for the year 1918, that being the year in which the orders were placed. It is interesting to note in this connection that Table I shows no freight car per-

centage for 1919, no orders having been reported for that year in the valuation studies.

Table III vies with Table I as being one of the most

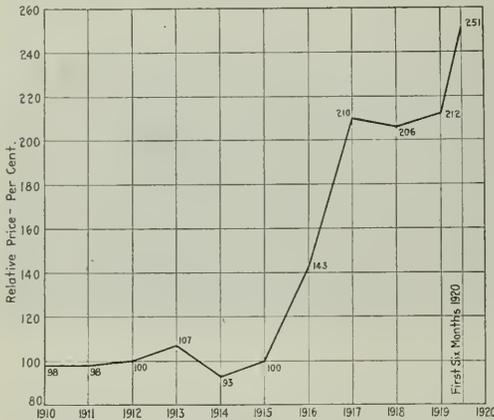


Fig. 1. Relative Prices of Locomotives 1910 to First Six Months of 1920 Shown in Terms of Average Prices 1910-14 as 100

interesting compilations of its kind which has ever appeared in the columns of the *Railway Age*. It gives in detail the prices paid per unit for a large proportion of the

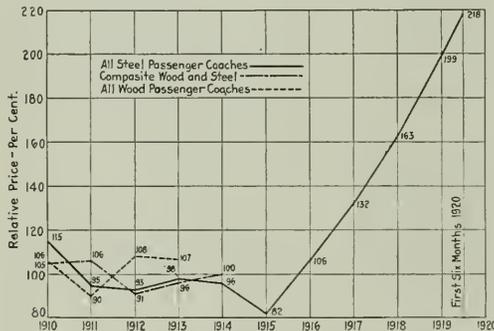


Fig. 3. Relative Prices of Passenger Coaches, 1910 to First Six Months of 1920 Shown in Terms of Average Prices 1910-1914 as 100

cars and locomotives, orders for which were placed during 1920. The information is made available this year for the first time through the publicity, if such it may be called, given applications of the carriers for loans from the revolving fund or in the case of the approval by the Interstate Commerce Commission of issues of equipment trust certificates. The carriers show in their applications the details of the expenditures which the loan or equipment trust issue covers. The commission has adopted a policy of making this information public when its action, favor-

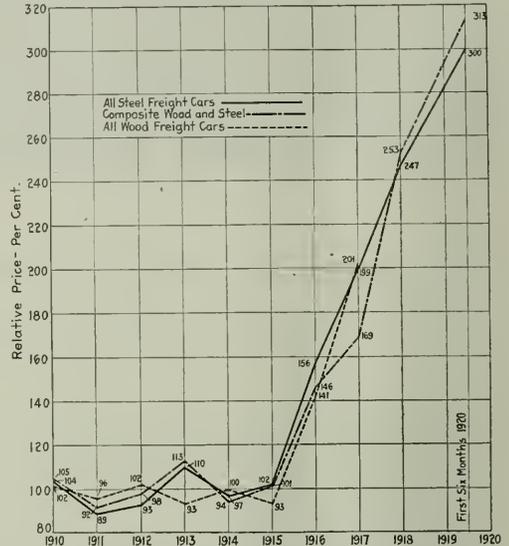


Fig. 2. Relative Prices of Freight Train Cars, 1910 to First Six Months of 1920 Shown in Terms of Average Prices 1910-1914 as 100

able or otherwise, is announced; the information, however, is not available before that action is announced.

The details given vary in nearly every case, depending upon conditions. In compiling the data given herewith, the information made available by the commission has been supplemented by details obtained from other sources. Thus in the usual instance the road shows the number of locomotives (or cars) involved, the type and the total cost of the equipment of that particular type. For instance, a road may indicate that it desires to finance the purchase of

TABLE I—COMPARISON OF PRICES OF EQUIPMENT, BASED ON DATA RECEIVED FROM SIX PRINCIPAL EQUIPMENT COMPANIES IN THE UNITED STATES, USING THE WEIGHTED AVERAGE PRICE OF 1910 TO 1914 AS 100 PER CENT OR "BASE"

Price as sold 1910-14, incl. Year or period	Locomotives			Freight cars			Passenger coaches		
	147,709¢ dollars per ton	All steel 2.57 cents per pound	Per cent	Composite wood and steel 2.51 cents per pound	All wood 2.26 cents per pound	Per cent	All steel 11.24 cents per pound	Composite wood and steel 9.91 cents per pound	All wood 9.22 cents per pound
1910-1914, incl. Base	100	100	100	100	100	100	100	100	100
1910	98	104	105	102	115	105	106	106	106
1911	98	89	92	96	95	106	90	90	90
1912	100	93	98	102	93	108	108	108	108
1913	107	110	113	93	93	96	107	107	107
1914	93	97	94	100	96	100	...	...	...
1915	100	102	101	93	82	...	...	...	...
1916	143	156	146	141	106	...	...	...	...
1917	210	199	201	169	132	...	...	...	...
1918	206	247	253	...	163*	...	...	...	...
1919	212	...	...	...	199*	...	...	...	...
1920 (first six months)	251	300	313	...	218	...	...	...	...

*Car companies report no steel passenger coaches contracted for in 1918 and 1919. Per cents for 1918 and 1919 estimated by car companies.

10 Mikado locomotives at a total cost of \$800,000, and 10 Pacific locomotives at a total cost of \$680,000. From this it is evident that the Mikado locomotives will cost \$80,000 each and the Pacifics \$68,000 each. If the order

reference is made to an issue of equipment trust notes. The data in the case of freight cars is similarly compiled, except that instead of total weight the details given relate to the capacity and class of construction. In the case of passenger cars the class of construction is given.

The feature concerning prices that is probably most im-

TABLE II—PRICES OF U. S. R. A. STANDARD AND OTHER ALLOCATED EQUIPMENT

Type	Capacity	Construction	Maximum price	Minimum price
Sgle. sh. box	100,000	St. frame	\$3,072.45	\$2,815
Dble. sh. box	80,000	St. uni.	2,932.40	2,725
Hopper	110,000	Steel	2,829.32	2,505
Gondola	160,000	Comp.	2,745.01	2,645
L. S. gondola	140,000	Steel	3,212.85	3,100
P. R. R. hopper	140,000	Steel	3,488 flat price	

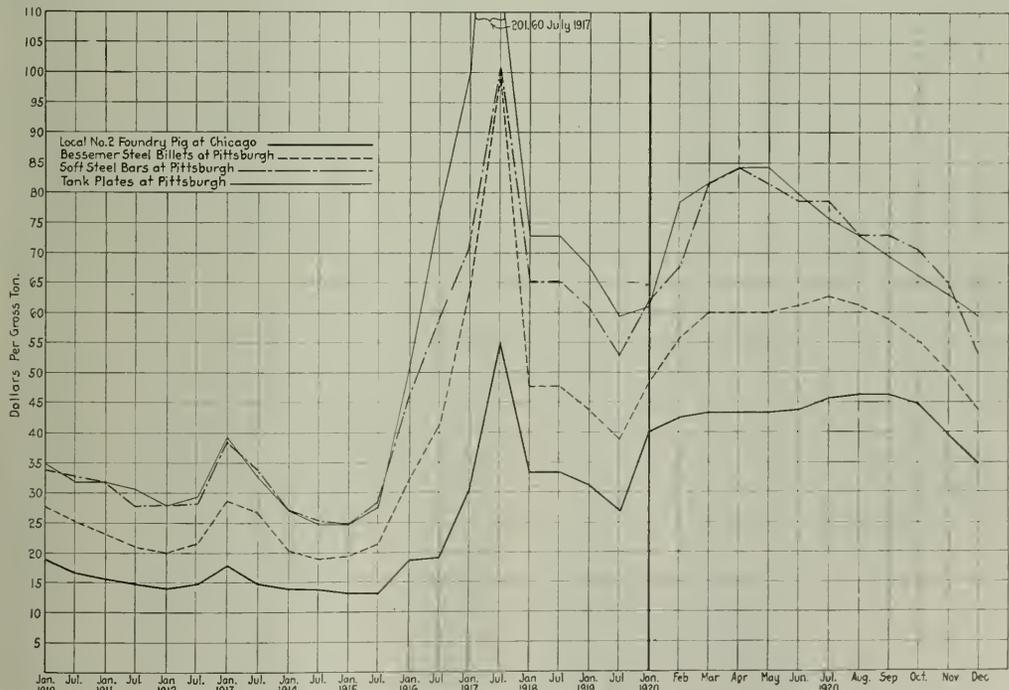
LOCOMOTIVES				
Type	Weight, lb.	Maximum price	Minimum price	
Lt. Mikado	290,800	\$53,556	\$49,400	
Hvy. Mikado	320,000	58,529	51,850	
Lt. Mountain	320,000	56,995	55,000	
Hvy. Mountain	352,000	61,782	55,700	
Lt. Pacific	270,000	51,290	49,575	
Hvy. Pacific	300,000	54,025	52,300	
Lt. Santa Fe	352,000	62,003	58,975	
Hvy. Santa Fe	390,000	67,317	60,450	
Lt. Switch (0-6-0)	165,000	36,049	31,675	
Hvy. Switch (0-8-0)	214,000	43,912	37,750	
Lt. Mallet (2-6-2)	440,000	78,322	71,650	
Hvy. Mallet (2-8-2)	540,000	91,958	81,575	
30 P. & R. Consol.		59,029	51,678	
26 P. & O. Mallet		87,830	83,400	
11 C. of N. J. Mikado		60,529	53,500	
3 K. C. S. Pacific		51,000 flat price		
7 T. & P. Pacific		52,955 flat price		
16 T. & P. Santa Fe		59,914 flat price		
2 T. & P. Santa Fe		59,089 flat price		
5 Ft. W. & D. C. Pacific		50,298 flat price		

TABLE IV—IRON AND STEEL PRICES

Local No. 1 Foundry (Chicago)	Bessemer steel billets at Pittsburgh, per gross ton	Soft steel bars at Pittsburgh, cents per lb.	Tank plates at Pittsburgh, cents per lb.	
				per gross ton
1910, January	19.00	27.50	1.50	1.55
July	16.56	25.00	1.45	1.41
1911, January	15.50	23.00	1.40	1.40
July	14.87	21.00	1.23	1.35
1912, January	14.00	20.00	1.15	1.15
July	14.70	21.50	1.25	1.30
1913, January	17.90	28.30	1.70	1.75
July	14.70	26.60	1.50	1.45
1914, January	13.75	20.13	1.20	1.20
July	13.75	19.00	1.12	1.10
1915, January	13.00	19.35	1.10	1.10
July	13.00	21.38	1.25	1.22
1916, January	18.50	32.00	2.03	2.25
July	19.00	41.60	2.63	3.44
1917, January	30.00	63.00	3.15	4.45
July	55.00	100.00	4.50	9.00
1918, January	33.00	47.50	2.90	3.25
July	33.00	47.50	2.90	3.25
1919, January	31.00	43.50	2.70	3.00
July	26.75	38.50	2.35	2.65
1920, January	40.00	48.00	2.75	2.72
February	42.25	55.25	3.00	3.50
March	43.00	60.00	3.63	3.63
April	43.00	60.00	3.75	3.75
May	43.00	60.00	3.63	3.75
June	43.40	61.00	3.50	3.55
July	45.25	62.50	3.50	3.38
August	46.00	61.00	3.25	3.25
September	46.00	58.74	3.25	3.25
October	44.50	55.00	3.13	3.09
November	39.40	49.75	2.87	2.81
December	34.50	43.50	2.35	2.65

has already been placed, we have supplemented this information from our own records with the name of the builder and the total weight in working order. We have also indicated the issues of the *Railway Age* in which the order was reported and the action by the commission noted. The notation "L.F." indicates that this action referred to an application from the loan fund, while "E.T." indicates that

portant at the present moment is the trend of prices. It has been difficult to secure definite details as to the prices which have been paid for equipment ordered in the last



The Prices of Four Basic Iron and Steel Commodities Which Enter Into the Manufacture of Cars and Locomotives

TABLE 111—EQUIPMENT ORDERED IN 1920

				Locomotives		Price		Reported in Railway Age Issue of	
Road	No.	Type	Weight	Builder	Each	Total	Financing	Order	
Ann Arbor	3	0-8-0	200,000	American	38,925	116,775	Aug. 29 (L.F.)	March 19	
Atchison, Topeka & Santa Fe	30	2-8-2	322,920	Baldwin	.....	.....	.....	.....
	10	2-10-2	375,400	Baldwin	.....	.....	.....	.....
	10	4-8-2	338,310	Baldwin	.....	.....	.....	.....
Atlantic Coast Line	50	4-6-2	277,000	American	85,978	4,298,900	July 16 (L.F.)	April 2	
	5	0-4-0	163,600	Baldwin	57,407	1,435,175	Dec. 31 (E.T.)	March 28	
	5	2-8-2	300,000	Baldwin	47,600	1,238,000	Dec. 31 (E.T.)	April 9	
Baltimore & Ohio	50	2-8-0	211,000	American	84,000	4,200,000	Dec. 31 (L.F.)	Sept. 24	
Bangor & Aroostook	6	2-8-0	300,000	American	60,000	360,000	July 16 (L.F.)	July 9	
Central of Georgia	7	4-6-2	316,000	American	67,857	475,000	Aug. 6 (L.F.)	April 30	
Chesapeake & Ohio	20	2-8-2	441,000	American	39,990	1,799,800	Dec. 17 (L.F.)	April 9	
	3	0-10-0	295,000	American	63,650	318,250	Dec. 17 (L.F.)	April 9	
Chicago & North Western	40	2-8-2	302,000	American	73,413	2,936,520	Dec. 10 (L.F.)	July 30 & Sept. 10	
	20	4-6-2	260,000	American	66,625	1,332,500	Dec. 10 (L.F.)	July 30	
Chicago Great Western	10	2-8-2	284,400	Baldwin	35,200	352,000	Aug. 20 (L.F.)	Feb. 13	
Chicago, Rock Island & Pacific	10	2-10-2	383,000	American	78,673	1,180,085	Nov. 12 (L.F.)	April 30	
	10	2-8-2	327,000	American	66,705	667,050	Nov. 12 (L.F.)	April 30	
	10	4-8-2	340,000	American	70,103	701,030	Nov. 12 (L.F.)	April 30	
Chicago, St. Paul, Minneapolis & Omaha	6	2-8-2	320,000	American	72,450	434,700	Aug. 27 (E.T.)	.....
	4	2-8-2	164,000	American	46,400	185,600	Aug. 27 (E.T.)	.....
Cleveland, Cincinnati, Chicago & St. Louis	10	0-8-0	217,000	Lima	47,559	475,592	Dec. 31 (L.F.)	April 9	
	10	4-6-2	282,000	American	58,380	583,800	Dec. 31 (L.F.)	April 9	
	50	2-8-2	328,000	American	68,040	3,401,968	Dec. 31 (L.F.)	April 9	
Great Northern	45	2-8-2	320,000	Baldwin	51,111	2,750,000	Aug. 6 (L.F.)	March 12	
Gulf, Mobile & Northern	2	2-8-2	205,800	Baldwin	37,900	227,400	Nov. 19 (L.F.)	Aug. 6	
	4	Switch	.....	.....	.....	.....	.....	.....
Illinois Central	50	2-10-2	380,000	Lima	67,700	4,385,000	Oct. 29 (E.T.)	May 28	
	25	4-6-2	278,000	American	64,925	1,623,125	Dec. 31 (L.F.)	March 28	
	25	0-8-0	217,000	Lima	47,300	283,800	Dec. 31 (L.F.)	April 9	
Michigan Central	10	4-6-2	282,000	American	58,340	584,000	Dec. 31 (L.F.)	April 9	
	10	2-8-2	328,000	American	69,251	692,505	Dec. 31 (L.F.)	April 9	
Minneapolis & St. Louis	15	2-8-2	262,000	American	64,365	964,475	Dec. 31 (L.F.)	June 25	
New York Central	20	0-8-0	217,000	Lima	47,328	2,366,400	Dec. 31 (L.F.)	April 9	
	20	4-6-2	282,000	American	58,440	1,166,800	Dec. 31 (L.F.)	April 9	
	10	2-6-6-2	364,000	American	82,400	824,000	Dec. 31 (L.F.)	April 9	
	3	0-8-8-0	468,000	American	92,000	276,000	Dec. 31 (L.F.)	April 9	
Northern Pacific	6	2-8-2	476,000	American	101,964	611,785	Nov. 5 (L.F.)	May 7	
	20	4-6-2	296,000	American	70,444	1,408,878	Nov. 5 (L.F.)	May 7	
	25	2-8-2	335,000	American	73,370	1,834,215	Nov. 5 (L.F.)	May 7	
	24	0-6-0	214,000	American	51,748	1,241,953	Nov. 5 (L.F.)	May 7	
Southern Pacific	15	2-10-2	388,500	Baldwin	.....	.....	.....	.....
	10	2-8-2	.....	Co. shops	75,540	1,888,500	Nov. 12 (L.F.)	April 30, July 23	
	2	Electric	.....	Bald. West	42,500	85,000	Nov. 12 (L.F.)	.....
	10	0-6-0	155,700	Baldwin	37,770	906,500	Nov. 12 (L.F.)	April 30, July 23	
	14	0-6-0	.....	Co. shops	.....	.....	.....	.....
Western Maryland	20	2-8-0	296,000	Baldwin	75,000	1,500,000	Oct. 1 (L.F.)	Sept. 24	

FREIGHT CARS

						Price		Reported in Railway Age Issue of	
Road	No.	Type	Capacity	Construction	Builder	Each	Total	Financing	Order
Atchison, Topeka & Santa Fe	500	Condola	100,000	St. fr.	Am. C. & F.	3,003	1,501,500	July 16 (L.F.)	Mar. 26
	1,250	Refrig.	80,000	St. unfr.	Am. C. & F.	4,750	11,875,000	July 16 (L.F.)	Mar. 26
	1,250	Refrig.	80,000	St. unfr.	Has. & Bar.	.....	.....	.....	.....
Atlantic Coast Line	100	Phosphate	.....	St. unfr.	Std. Steel	2,960	296,000	Dec. 31 (E.T.)	.....
	500	Vent. Box	80,000	St. unfr.	Std. Steel	3,718	1,859,090	Dec. 31 (E.T.)	May 28
	400	Hopper	100,000	Steel	Std. Steel	3,021	1,208,364	Dec. 31 (E.T.)	Aug. 6
	100	Phosphate	.....	St. unfr.	.....	3,324	332,466	Dec. 31 (E.T.)	.....
Baltimore & Ohio	1,000	Box	80,000	St. unfr.	Mt. Vernon	2,629	2,629,000	Dec. 31 (L.F.)	.....
	1,200	Hopper	100,000	Steel	Pressed Steel	2,800	2,800,000	Dec. 31 (L.F.)	May 7
	500	Refrig.	70,000	St. unfr.	Am. C. & F.	2,800	1,400,000	Dec. 31 (L.F.)	Sept. 17
Central of Georgia	100	Stock	.....	St. unfr.	.....	2,500	250,000	Aug. 6 (L.F.)	Aug. 6
	500	Vent. box	.....	St. unfr.	.....	3,000	1,500,000	Aug. 6 (L.F.)	.....
	200	Gondola	.....	St. fr.	.....	1,800	560,000	Aug. 6 (L.F.)	.....
Chesapeake & Ohio	1,000	Gondola	200,000	Steel	500 Fr. St.	6,000	6,000,000	Dec. 17 (L.F.)	June 4
	50	Caboose	.....	St. unfr.	Std. Steel	4,464	223,200	Nov. 12 (L.F.)	.....
Chicago, Rock Island & Pacific	500	Gondola	.....	St. unfr.	Reitendorf	2,300	1,150,000	Dec. 31 (L.F.)	April 9
	500	Stock	100,000	St. unfr.	Pullman	2,284	1,142,000	Dec. 10 (E.T.)	May 21
Chicago & North Western	500	Stock	80,000	St. unfr.	Gen. American	2,605	1,302,500	Dec. 10 (E.T.)	Aug. 6
	250	Refrig.	80,000	St. unfr.	Am. C. & F.	4,872	1,218,000	Dec. 10 (E.T.)	Sept. 10
	50	Caboose	.....	St. unfr.	Am. C. & F.	4,112	205,600	Dec. 10 (E.T.)	Sept. 10
Chicago, St. Paul, Minneapolis & Omaha	125	St-ck	.....	.....	.....	2,720	342,400	Aug. 27 (E.T.)	.....
Cleveland, Cincinnati, Chicago & St. Louis	500	Box	108,000	Steel	Std. Steel	3,662	1,830,760	Dec. 31 (L.F.)	Apr. 9
	500	Auto	80,000	Steel	Has. & Bar.	3,722	1,860,760	Dec. 31 (L.F.)	Apr. 9
	1,750	Hopper	110,000	Steel	Am. C. & F.	2,577	5,154,100	Dec. 31 (L.F.)	Apr. 9
	250	Hopper	110,000	Steel	Std. Steel	.....	.....	.....	.....
Great Northern	500	S. d. Stock	80,000	St. unfr.	Has. & Bar.	2,950	295,000	Dec. 31 (L.F.)	Apr. 23
	500	Ore	150,000	Steel	Am. C. & F.	2,540	2,540,000	Aug. 6 (L.F.)	Feb. 20
Illinois Central	1,000	Refrig.	60,000	St. unfr.	Pullman	4,255	4,255,000	Oct. 29 (E.T.)	July 9
	200	Flat	100,000	Steel	Reitendorf	2,370	474,000	Oct. 29 (E.T.)	July 23
	300	Stock	80,000	St. fr.	Am. C. & F.	1,930	876,000	Oct. 29 (E.T.)	July 23
Chicago, St. Paul, Minneapolis & Omaha	500	Caboose	.....	.....	Freese & Swenson	3,000	150,000	Oct. 29 (E.T.)	.....
Michigan Central	1,000	Auto	100,000	Steel	Am. C. & F.	3,722	3,721,520	Dec. 31 (L.F.)	Apr. 9
	500	Hopper	110,000	Steel	Pressed Steel	2,577	1,288,675	Dec. 31 (L.F.)	Apr. 9
	500	S. d. Stock	80,000	St. unfr.	Has. & Bar.	2,950	295,000	Dec. 31 (L.F.)	Apr. 23
	100	D. d. Stock	80,000	St. unfr.	Has. & Bar.	5,125	312,500	Dec. 31 (L.F.)	Apr. 23
	250	Refrig.	69,000	St. unfr.	Mer. Des.	4,008	1,602,000	Dec. 31 (L.F.)	Apr. 23
Minneapolis & St. Louis	500	Box	.....	.....	.....	3,000	1,500,000	.....	.....
	500	Gondola	.....	.....	.....	3,200	1,600,000	.....	.....
	500	Refrig.	.....	.....	.....	3,800	760,000	.....	.....
	200	Other	.....	.....	.....	2,600	1,300,000	.....	.....
New York Central	1,000	Box	100,000	Steel	Std. Steel	3,660	3,660,000	Dec. 31 (L.F.)	Apr. 9
	750	Auto	100,000	Steel	Am. C. & F.	3,720	3,720,000	Dec. 31 (L.F.)	Apr. 9
	250	Auto	100,000	Steel	Std. Steel	.....	.....	.....	.....
	1,500	Hopper	110,000	Steel	Std. Steel	2,443	3,664,000	Dec. 31 (L.F.)	Apr. 9
	494	S. d. Stock	80,000	St. unfr.	Mer. Des.	2,930	1,457,200	Dec. 31 (L.F.)	Apr. 23
	200	D. d. Stock	80,000	St. unfr.	Has. & Bar.	3,122	624,500	Dec. 31 (L.F.)	Apr. 23
Northern Pacific	300	Hart. conv.	100,000	St. fr.	Am. C. & F.	3,745	1,123,374	Nov. 5 (L.F.)	Apr. 23
	100	Air dump	.....	.....	.....	5,000	300,000	Nov. 5 (L.F.)	.....
	100	Caboose	.....	St. center sills	Pac. Car. & Fdy.	3,500	350,000	Nov. 5 (L.F.)	Oct. 22
	1,000	Box	.....	St. unfr.	.....	2,500	2,500,000	Nov. 5 (L.F.)	.....
Southern Pacific	2,000	Box	80,000	.....	Co. Shops	3,200	6,400,000	Nov. 12 (L.F.)	Apr. 9
	1,600	Flat	100,000	.....	Co. Shops	2,400	2,400,000	Nov. 12 (L.F.)	Apr. 9
	1,000	Stock	80,000	.....	Co. Shops	2,750	2,750,000	Nov. 12 (L.F.)	Apr. 9
	500	Auto	100,000	.....	Std. Steel	3,110	1,555,000	Nov. 12 (L.F.)	May 21
	250	Ballast	100,000	.....	Mt. Vernon	3,682	920,500	Nov. 12 (L.F.)	Apr. 9
	65	Caboose	.....	.....	Co. Shops	3,492	227,100	Nov. 12 (L.F.)	Apr. 9

PASSENGER CARS

Road	No.	Type	Construction	Builder	Price		Reported in <i>Railway Age</i> Issue of	
					Each	Total	Financing	Order
Atlantic Coast Line.....	25	Coaches	Steel	Pullman	\$34,036	\$850,905	Dec. 31 (E. T.)	May 21
Chicago & Northwestern....	25	Coach	Steel	Am. C. & F.	26,771	669,275	Dec. 10 (E. T.)	Sept. 10
	9	Smoking	Steel	Am. C. & F.	25,979	233,811	Dec. 10 (E. T.)	Oct. 22
	2	Postal	Steel	Am. C. & F.	27,500	55,000	Dec. 10 (E. T.)	.....
	23	Baggage	Steel	Am. C. & F.	22,000	506,000	Dec. 10 (E. T.)	.....
	3	Mail and Baggage	Steel	Am. C. & F.	27,500	82,500	Dec. 10 (E. T.)	.....
Illinois Central.....	20	Suburban	Steel	Pullman	29,880	597,600	Oct. 29 (E. T.)	Sept. 17
	12	Compartment	Steel	Pullman	36,539	438,468	Oct. 29 (E. T.)	July 23
	18	Baggage	Steel	Pullman	26,650	479,700	Oct. 29 (E. T.)	July 23
	5	Dining	Steel	Pullman	51,005	255,025	Oct. 29 (E. T.)	July 23

month or two, one of the reasons being that details are not yet available for the public, the other and equally important reason being that so few orders have been placed. It is for this reason primarily that there are introduced in Table IV the relative prices of several basic iron and steel commodities which enter into car and locomotive manufacture. These prices have also been platted on a diagram, but, however they are shown, the rise to the peak in the early months of the year and the rapid decline in the latter

months is plainly indicated. The prices of cars and locomotives presumably do not vary exactly with these commodity prices, but the lag behind them is not great. Investigation shows that car and locomotive prices have shown a decline in the last month or two. They are now approximately 10 per cent below the peak prices of the year. This, however, is discussed in greater detail in other articles in this issue, so that extended comment on this factor is not necessary.

Dividend Changes on Railroad Stocks in 1920

Chicago & North Western Reduced Rate. Nickle Plate Declared Dividends on Three Classes

INASMUCH as the larger proportion of the railroads accepted the government's guaranty of net railway operating income for the six months following the termination of federal control, the dividend changes for the year were not many. The Chicago & North Western reduced its regular dividends on the common stock from 7 to 5 per cent and on its preferred from 8 to 7. The precarious situation of the New England roads resulted in the passing of dividends on the Boston & Maine and Maine Central. The New York, Chicago & St. Louis, however, which declared 2½ per cent on its second preferred stock only last year, this year declared 7½ per cent on that class of stock, 10 per cent on its first preferred, and 5 per cent on its common stock. Increases in dividends were also made by the Chicago, Indianapolis & Louisville, the New Orleans, Texas & Mexico and the Western Pacific.

In the case of the Boston & Maine, the reorganization provided that dividends should be paid on the preferred stock if earned at the rate of 4 per cent from January 1, 1919, to January 1, 1924, and at the rate of 6 per cent thereafter. A dividend of \$2.67 per share was declared in January as an adjustment covering eight months to September 1, 1919. It was the first dividend on the preferred stock since March 1, 1913. On July 1 dividends were paid on this stock as follows: Class A, \$2.00 per share; Class B, \$3.20; Class C, \$2.80; Class D, \$4.00; Class E, \$1.80. The uncertainty as to the matter of divisions of through rates made it necessary in December, however, to omit the dividend which would have been paid January 1, 1921.

The reductions of the regular dividends on the Chicago & North Western common and preferred stocks were made in June. The rate on the common was reduced from 1¾ per cent quarterly (7 per cent annually) to 2½ per cent semi-annually (5 per cent annually) and on the preferred from 2 per cent quarterly (8 per cent annually) to 3½ per cent semi-annually (7 per cent annually). An officer of the company explained the reason for this action thus: "The rate of dividends on the preferred and common stocks had been reduced because, in the judgment of the board, the uncertainties of the present railroad situation made such a course advisable."

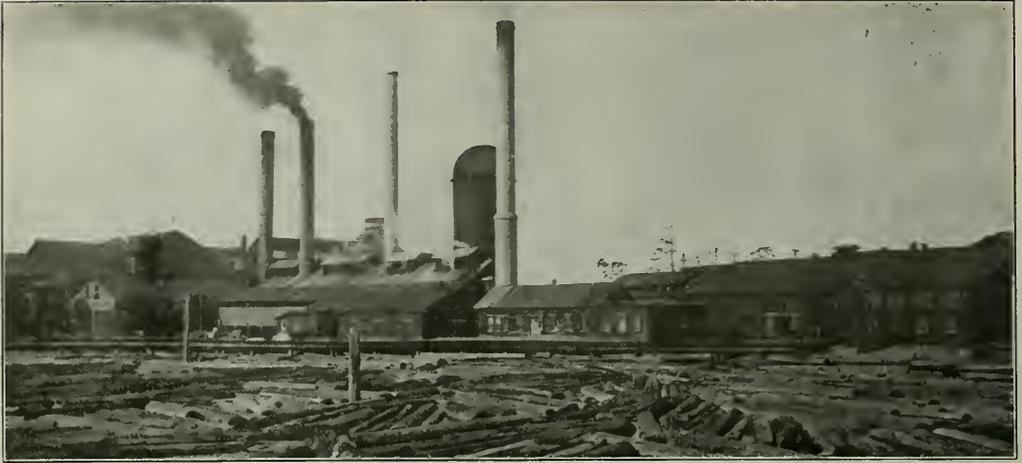
Dividends on the common stock of the Chicago, Indianapolis & Louisville were resumed in January after an intermission of two years with the declaration of a semi-annual dividend of 1¾ per cent. This was followed by a 1½ per cent dividend in June.

The Maine Central's usual dividend on the preferred stock has been at the rate of 1¼ per cent quarterly. At a meeting in November no action was taken on the matter of the usual quarterly dividend, this being the first time in the company's history that one has not been declared.

The New York, Chicago & St. Louis this year declared dividends of 10 per cent on its first preferred stock, 7½ per cent on its second preferred, and 5 per cent on its common stock. As to the preferred stock, 5 per cent was declared in January, representing presumably the payments due in January and July, 1919; the remaining 5 per cent on this stock was declared in June. Dividends on this first preferred stock have been paid at the rate of 5 per cent for many years. On the second preferred stock, dividends were paid at the rate of 2½ per cent in January and July, 1917, and in January, 1918. The next dividend was 2½ per cent in July, 1919. The dividends declared on this stock in 1920 were 2½ per cent in April and 5 per cent in July. The common stock dividend of 5 per cent declared in December was the first dividend on this stock since March, 1913, when 4 per cent was paid.

DIVIDEND CHANGES

Name of road	Per cent declared in 1920	Per cent declared in 1919	Annual rate in 1920	Annual rate in 1919
Boston & Maine, preferred—				
All series	2.67	..	..	..
Series A	2.00	..	..	..
Series B	3.20	..	..	..
Series C	2.80	..	..	..
Series D	4.00	..	..	..
Series E	1.80	..	..	..
Chicago & North Western, common	6	7	5	7
Chicago & North Western, preferred	7½	8	7	8
Chicago, Indianapolis & Louisville, common	35	..	3½	..
Maine Central, preferred	33	5	..	5
New Orleans, Texas & Mexico, common	11	..	..	..
New York, Chicago & St. Louis, common	5	..	..	..
New York, Chicago & St. Louis, 1st preferred	10	..	..	5
New York, Chicago & St. Louis, 2nd preferred	7½	2½	..	..
Western Pacific R. R. Corp., preferred	53	4	..	4



A Lumber Mill in the Humboldt Region of California. Photo by Ewing Galloway, N. Y.

Prices for Engineering and Maintenance Material

Well-Defined Reduction in Prices of Most Basic Materials—Indications That Others Will Follow

THERE HAS BEEN a well-defined reduction in the prices of most of those basic materials which make up the bulk of the purchases of the railroads for tracks and structures and also determine, in large measure, the contract prices for bridge and building work. This decline has been quite general throughout the entire fields of iron and steel and of lumber, while as to those particular materials for which no reductions have been announced, every indication points to an adjustment in the near future which will bring the remaining items to the general level.

Rails on Lower Basis

The case of rail is of particular interest because of the primary importance of this item and also on account of the close relation which the history of this commodity bears to the welfare of the railroads. Following the formation of the United States Steel Corporation, early in the present century, the prices of Bessemer and open-hearth rails were fixed at \$28 and \$30 per gross ton, respectively, and these prices were maintained until May, 1916, when they were advanced to \$33 and \$35. They were raised again in December, 1916, to \$38 and \$40 and this higher level was maintained all through 1917.

In 1918, following the formation of the United States Railroad Administration, rail prices ceased to have a real meaning. However, the nominal figures of \$55 and \$57 were set up as the established prices and a few orders for small

tonnages from roads outside of the Railroad Administration brought prices ranging from these figures to as much as \$65 per ton. In 1919, in the course of the efforts of the Industrial Board organized to fix a scale of prices agreeable to both the steel manufacturers and the government, the

tentative figures of \$45 and \$47 were named for Bessemer and open-hearth rail, respectively, but owing to the fact that Director General Hines considered these figures too high and refused to be bound by them, a deadlock ensued which may be said to have continued as long as the Railroad Administration remained in existence. The United States Steel Corporation, however, established these figures as the standard prices for rails and continued them in effect during 1919 and 1920. The independent manufacturers contended that they were too low and set up quotations \$10 or more in excess of them.

When the railroads came into the market last fall for 1921 rail, a further uncertainty arose.

There was talk of higher prices and the manufacturers would not agree to close contracts on the existing basis. Consequently, the railroads arranged for rolling reservations with prices left undecided. However, the influences which have caused the general reductions in prices became effective and various announcements made by officers of the United States Steel Corporation have served to continue the established prices tentatively into 1921. No specific action has been taken by

PRICES OF MOST of the basic materials used in tracks and structures have declined.

Steel Corporation quotations of \$45 and \$47 appear to be the prevailing prices for rail.

Lumber and tie prices in the course of readjustment.

Cement prices have not been reduced.

Thus far it is difficult to predict the trend of prices for finished products in the form of equipment or fixed structures.

the independent manufacturers as regards rails, but in view of the fact that they have generally adjusted their quotations for other iron and steel commodities used in the maintenance of way department to the established bases, it is believed that the \$45 and \$47 quotations have been pretty well established as the prevailing prices.

In the meantime another factor has been introduced in the revision of the United States Steel Corporation's extra charges for the use of various specifications or test requirements. Thus, the charge for the nick and break test has been raised from \$0.80 to \$1.60. The Pennsylvania's specifications as applied to 130-lb. rail call for extras totaling \$8.90 instead of \$5.80, while the A. R. E. A. 1920 specifications call for a premium of \$11.80 per ton.

The history of prices for track fastenings for the last 20 months has followed the same general trend as that of rail. The prices adopted by the Industrial Board were established as standard by the leading steel interest, but disregarded by the others, who gradually advanced their prices until they were 75 per cent or more in excess of the fixed standards. These established base prices, however, applied only to orders for very remote delivery, so that the actual prices for reasonable deliveries were really those asked by the independents.

In the last few months with the falling off of business and the announcement that the established prices would be continued into 1921, the other manufacturers have gradually lowered their prices to the "corporation" figures. At the same time there has been some readjustment of the established prices. For instance, the price of track spikes, which was as high as 7 cents per pound in 1917, was fixed at 3.35 cents by the Industrial Board in March, 1919. During the past year the actual sale prices for spikes advanced to about 4.25 cents. This was carried down with the decline but instead of going to 3.35 cents, the hitherto established standard, a new figure of 3.65 cents seems to have become the base. A somewhat similar situation maintains with respect to track bolts. Iron tie plates which were fixed at 2.90 cents in March, 1919, were sold at 4 cents or more, but have recently been offered at 3 cents.

In the case of fabricated structural steel there has not been enough business in recent weeks to establish prices for the railroads, but owing to the fact that there is a well-defined relation between the prices of plain and fabricated materials, the prevailing price of the former offers a reasonably good index of the pound price required by the fabricator. Therefore, it suffices to say that the prices of 2.65 and 2.45 cents established in 1919 for plates and shapes, respectively, have now been definitely restored and there have even been some suggestions of reductions below these established figures. The prices paid for finished structural steel in 1920 were somewhat higher than in 1919, and practically the same as in 1918, but in view of the definite reduction in the plain material prices, there should be a considerable reduction in the present fabricated prices. In this connection, it is well to note that the spread between the price of the plain and fabricated materials is always smallest when the shops have a minimum of work in hand, as is the case at present.

Lumber and Ties

The lumber trade has gone through an interesting transition during the past year. Following the abandonment of price fixing by the War Industries board, the price of lumber advanced steadily. With the increased impetus to business at the beginning of 1920, there was a runaway market. The demand exceeded the supply and prices previously unheard of resulted. This led to an abrupt cessation of building activities, with the result that the mills were unable to curtail production as rapidly as the demand for lumber fell off. As a consequence of this the stocks of the mills were speedily

restored to normal, but the prices did not decline materially until about September, 1920. By the middle of December there had been reductions from 10 to 35 per cent below the prices prevailing in July. Thus, we find that some items of southern pine are only slightly above the general range of prices in January, 1918, while as to other items the cost is still appreciably higher. In the case of Douglas fir the reduction in mill prices has been more pronounced because the change in railway rates has effected some modification of the differential between Douglas fir and southern pine prices in various markets. As a consequence, Douglas fir mill prices have fallen from 20 to 40 per cent and are at present not far in excess of the January, 1918, figures.

The history of the tie market during the months which followed the return of the railroads to private management is one of vital interest to railway men concerned with the purchase and use of ties, because of the radical reorganization of purchasing methods instituted during the period of government control. Purchases were centralized, uniform prices were set up and standard specifications were established. Because the changes had been so marked and owing to the fact that the return from government to private management was timed so as to come almost exactly between the seasons of tie purchase and tie delivery, no little anxiety was felt in many quarters concerning the disruption of commercial relations in the tie industry with the change of control.

In a measure these fears were justified by the subsequent occurrences. Many of the roads made no arrangements for the purchase of ties until after the return to private control, with the result that in some quarters there was a general scramble to obtain the available supplies. This was notably the case in the saved tie markets of the south, the condition being aggravated by the fact that this urgent demand for ties came at a time when the commercial lumber mills were flooded with orders in the regular lumber trade. A further complication resulted from the fact that certain Eastern roads which had normally obtained appreciable portions of their supplies locally entered tie markets far outside of their normal fields of operation.

But one result could follow this train of circumstances—the established government prices for ties were superseded by higher quotations following closely the general tendency of the lumber market. This condition was not universal. The railroads that had been so fortunate as to obtain the bulk of their supplies from small producers along their own lines fared much better. Some roads so situated were able to procure ties in the required amounts at the United States Railroad Administration tie prices throughout most of the year, although there were some adjustments upward in the early fall. These roads generally adhered closely to the standard specifications promulgated by the Railroad Administration, but in the markets subjected to more severe competition on the part of the purchasers the standard specifications were frequently modified. Certain railroads also restored the specifications which they had observed before the period of government control.

With the advent of the readjustment period, during the late months of 1920, and following the break in the lumber market there was a general falling off in the prices of sawed ties, corresponding in a general way to the reduction in lumber prices. With this a complete change of front has taken place in the tie market; contractors have endeavored to deliver more ties than contracts called for, and several roads have found it desirable to reduce their supplies by throwing quantities of ties on the market. In the meantime railway tie agents are being approached daily by dealers with large supplies of ties ready to deliver. The adjustment of prices possible under such a condition in the market has not been completed, particularly in the case of hewn ties, but it is expected that some roads will soon be able to reduce

their prices to the small producer appreciably below the Administration standards.

Cement Prices Not Reduced

The Portland cement prices are distinctive in having shown little or no indication of deviation from the prices prevailing for the last year or more. The trend of prices since October, 1917, is indicated by the following figures taken by averaging quotations prevailing in from 6 to 10 middle-western cities between Pittsburgh and the Twin Cities, inclusive, these prices being per barrel, not including package: March, 1917, \$1.61; October, 1917, \$1.94; March, 1919, \$2.24; November, 1919, \$2.15; October, 1920, \$2.55. The last figure represents an advance of 50 per cent over the price of March, 1917.

Finished Products

In the case of finished products in the form of equipment or fixed structures the reduction in prices thus far has not been so noticeable. As a case in point, inquiry of the leading signal manufacturers soliciting information as to the tentative prices during the coming year brought no response that predicted a reduction in price. Some of the replies intimated advances up to 25 per cent, but the majority expressed an inability to estimate price tendencies at this time.

Boards of Referees May Consider Maintenance Claims

WASHINGTON, D. C.

THE BOARD OF REFEREES appointed by the Interstate Commerce Commission to report to the President what would be just compensation for the use of the property of the Western Pacific during federal control has made a formal ruling that it has jurisdiction over all claims arising out of federal control, and is not confined to the question of the annual rental, thereby overruling an objection by the Railroad Administration to the introduction of testimony to prove under-maintenance. The ruling is as follows:

"Counsel for the respondent has objected to certain evidence offered by plaintiff upon the ground that the jurisdiction of this board 'is limited to the making of a report to the President as to the amount of annual rental which shall form the basis of an agreement with the carrier as provided in section one of the federal control act' and that the evidence is offered in support of items of compensation that cannot be stated in our report in the form of annual rent. In support of the objections counsel relies upon the following language of section 3 of the federal control act:

Said boards * * * shall report * * * the just compensation, calculated on an annual basis and otherwise in such form as to be convenient and available for the making of such agreement as is authorized in section one.

"In our opinion the objections should be overruled for the following reasons:

"Section 3 of the federal control act provides that all unadjusted claims for just compensation shall be submitted to boards of referees for consideration and report. That section also provides that such boards shall make a report of the just compensation in each case so submitted. In our opinion the provisions of section 3, upon which counsel for the respondent relies, merely prescribe the form in which our conclusions as to the just compensation shall be reproduced in the report which the statute requires us to make, therefore, those provisions do not limit our jurisdiction and have no reference to jurisdiction. So far as we are now informed we can, in literal compliance with the statute, report every item of just compensation claimed in this case, which may be proved, either calculated on an annual basis or otherwise

in such form as to be convenient and available for the making of such agreement as is authorized in section one of the federal control act.

"Section one of the federal control act, after reciting that the President having in time of war taken over the possession, use, control and operation of certain systems of transportation, gave the President power, within certain maximum limits, to agree with the owners of the systems of transportation as to their just compensation. In the event of failure to reach an agreement the following provisions of that statute become operative:

That all claims for just compensation not adjusted (as provided in section one) shall, on the application of the President or of any carrier, be submitted to boards, each consisting of three referees to be appointed by the Interstate Commerce Commission.

"The statute contemplated that the report of the board of referees would enlarge the power of the President to agree with claimant carriers, the provisions to that effect being as follows:

The President is authorized to enter into an agreement with such carrier for just compensation upon a basis not in excess of that reported by such board, and may include therein provisions similar to those authorized under section one. Failing such agreement, either the United States or such carrier may file a petition in the court of claims for the purpose of determining the amount of such just compensation, and in the proceedings in said court the report of said referees shall be prima facie evidence of the amount of just compensation and of the facts therein stated.

"During the period of federal control railroad corporations of course could not compute the amount of their claims that might arise for under-maintenance of their property and for many acts of omission or commission ascribable to the United States during that period, but it was then obvious that at the end of federal control losses from under-maintenance and all forms of losses to the railroad corporations could be measured and claimed. Having in mind the ending of federal control and the relinquishment of the railroad properties to the owners thereof, Congress passed an act, the transportation act, 1920, which provides in part as follows:

Sec. 200 (a). Federal control shall terminate at 12:01 a. m., March 1, 1920; and the president shall then relinquish possession and control of all railroads and systems of transportation then under federal control and cease the use and operation thereof.

Sec. 202. The President shall, as soon as practicable after the termination of federal control, adjust, settle, liquidate and wind up all matters, including compensation, and all questions and disputes of whatsoever nature, arising out of or incident to federal control.

Sec. 203 (a). Upon the request of any carrier entitled to just compensation under the federal control act, but with which no contract fixing or waiving compensation has been made and which has made no waiver of compensation, the President, (1) shall pay to it so much of the amount he may determine to be just compensation as may be necessary to enable such carrier to have the sums required for interest, taxes and other corporate charges * * * and (2) may, in his discretion, pay to such carrier the whole or any part of the remainder of such estimated amount of just compensation.

(b) The acceptance of any benefits by a carrier under this section—

(1) Shall not deprive it of the right to claim additional compensation, which, unless agreed upon, shall be ascertained in the manner provided in Sec. 3 of the Federal Control Act.

"A full consideration of the issues presented to us in this case at this time leads us to the conclusion that as during the period of federal control the jurisdiction of boards of referees, in cases submitted to such boards, appears to have been substantially the same as to the subjects to be considered as was the President's, to make settlements by agreement, so in the present case the board of referees has jurisdiction to determine the compensation as to all claims arising out of or incident to federal control which the President under the transportation act is authorized to adjust and settle. Therefore, the objections are overruled."



New York Central Car Shops at Toledo. Photo by Ewing Galloway, N. Y.

The Use of the \$300,000,000 Revolving Fund

Loans Certified by I. C. C. Now Over \$170,000,000—Payments by Treasury \$130,000,000

THE \$300,000,000 LOAN FUND provided by Section 210 of the Transportation Act is one of the most interesting of the many interesting features of the Transportation Act. It represented something entirely new in railroad finance. The uses to which it has thus far been put indicate that its inclusion in the railroad law marked real progress. The fund has served as an important factor in the rehabilitation of the railroad systems of the country.

Terms of the Law

The full text of Section 210 of the Transportation Act, as amended by Section 5 of the Sundry Civil Appropriations Act of June 5, 1920, is given elsewhere in this article. It will be noted that the section provides that applications for loans may be made, "For the purpose of enabling carriers by railroad subject to the Interstate Commerce Commission properly to serve the public during the transition period immediately following the termination of federal control." A loan may be made to a carrier to enable it "to meet its maturing indebtedness, or to provide itself with equipment or other additions and betterments." It is further provided that application for a loan may be made "at any time after the passage of this Act and before the expiration of two years after the termination of federal control." The commission may certify its approval of a loan if it finds that the loan "is necessary to enable the applicant properly to meet the transportation needs of the public, and that the

prospective earning power of the applicant and the character and value of the security offered are such as to furnish reasonable assurance of the applicant's ability to repay the loan within the time fixed therefor, and to meet its other obligations in connection with such loan." The loan must be repaid within a period not exceeding 15 years from the making thereof. All loans bear interest at the rate of 6 per cent, payable semi-annually, and payments of principal and interest are to be placed to the credit of the revolving fund.

It is also provided that the commission must find that "the applicant, in the opinion of the commission, is unable to provide itself with the funds necessary for the aforesaid purposes from other sources." The amount appropriated, as above noted, was \$300,000,000.

Principles Established

Among the first steps taken by the commission in its handling of the \$300,000,000 loan fund thus provided for, was to establish certain principles. These were announced on June 7. They

were to the general effect that there should be used for equipment \$125,000,000 (of which \$75,000,000 was to be for freight cars and \$50,000,000 for locomotives), for additions and betterments to promote the movement of cars \$73,000,000, and for maturities \$50,000,000. An amount of \$12,000,000 was set aside for the short line carriers.

The matter of the loans was taken up with the Association of Railway Executives as to the applications of the larger

THE LOAN FUND provided by Section 210 of the Transportation Act has proved of material assistance to rail carriers in securing new equipment, making other additions and betterments and meeting maturities.

Delays have been experienced in administering the fund because of questions as to interest rates of accompanying finance and as to payments by Treasury; but these difficulties are now overcome.

Loans now approved total over \$170,000,000.

roads and with the American Short Line Railroad Association as to the short lines. A special committee of the former met on June 25, July 15 and July 22, with W. A. Colston, director of the commission's division of finance, participating. A report was made on June 26 and a final report on July 28. In this report the committee announced its approval of loans as follows:

Association of Railway Executives' Recommendations

Additions and betterments to existing equipment: To 15 carriers, \$10,724,785. This expenditure, it was noted, would restore to efficient service 15,162 cars.

Freight and switching locomotives: To 31 carriers, \$27,173,186. In this case of recommending loans to aid in the purchase of new locomotives the committee followed a suggestion of the commission that the locomotives purchased should be financed 50 per cent from the loan fund and 50 per cent by the carriers. Thus, it was expected that the loans, totaling \$27,173,186, would assist in the expenditure of \$53,346,372, covering 636 freight locomotives and 277 switching locomotives. No recommendations for loans to aid in the purchase of passenger locomotives were made.

Freight train cars: To 21 carriers, including the Fruit Growers' Express, \$51,754,455. Inasmuch as it was the desire of the commission to have this money used for as many cars as possible, the recommendations in general provided for the financing of only 25 per cent of the cost of the cars from the fund, the remaining 75 per cent to be financed by the carrier. There were, however, certain exceptions. The amount of \$51,754,455 was expected to aid in the purchase of 46,027 freight train cars of a total approximate value of \$146,646,510. The commission had suggested that if possible 20,000 refrigerator cars be provided for. The committee's recommendations covered only 7,950, but explicit reasons were given showing that such cars in sufficient quantity were being obtained through the assistance of the loan and in other ways.

Reserve for smaller carriers other than short lines: The committee recommended the setting aside of \$3,000,000 for these carriers for equipment and \$2,000,000 for additions and betterments to way and structures.

Maturities: To nine carriers \$28,800,875.

The provisions of the Transportation Act relating to the loan fund are as follows:

By section 5 of the Sundry Civil Appropriations Act, June 5, 1920, paragraphs (a), (b) and (c) of section 210 of the Transportation Act, 1920, were amended so as to read as follows:

"Sec. 210. (a) For the purpose of enabling carriers by railroad subject to the Interstate Commerce Act properly to serve the public during the transition period immediately following the termination of Federal control, any such carrier may, at any time after the passage of this Act, and before the expiration of two years after the termination of Federal control make application to the commission for a loan from the United States to meet its maturing indebtedness, or to provide itself with equipment and other additions and betterments, setting forth the amount of the loan; the term for which it is desired; the purpose of the loan and the use to which it will be applied; the present and prospective ability of the applicant to repay the loan and meet the requirements of its obligations in that regard; the character and value of the security offered; and the extent to which the public convenience and necessity will be served. The application shall be accompanied by statements showing such facts in detail as the commission may require with respect to the physical situation, ownership, capitalization, indebtedness, contract obligations, operation, and earning power of the applicant, together with such other facts relating to the propriety and expediency of granting the loan applied for, and the ability of the applicant to make good the obligation as the commission may deem pertinent to the inquiry.

"(b) If the commission, after such hearing and investigation, with or without notice, as it may direct, finds that the making, in whole or in part, of the proposed loan by the United States, for one or more of the aforesaid purposes, is necessary to enable the applicant properly to meet the transportation needs of the public, and that the prospective earning power of the applicant and the character and value of the security offered are such as to furnish reasonable assurance of the applicant's ability to repay the loan within the time fixed therefor, and to meet its other obligations in connection with such loan the commission shall certify to the Secretary of the Treasury its findings of such facts; also the amount of the loan which is to be made; the time, not exceeding fifteen years from the making thereof, within which it is to be repaid; the terms and conditions of the loan, including the security to be given for repayment; that

Short Lines: \$12,000,000. This was covered by the American Short Line Railroad Association.

It is not necessary to show a recapitulation comparing these recommendations with the suggestions of the commission. The recommendations are shown in full in the detailed list by roads which is given below.

The Going Rate for Money

The handling of the loan fund, thus so auspiciously started, has met with two rather disconcerting snags since these recommendations were made. One was in connection with the interest rate which the roads should secure in the financing to meet the government loan. The attempt was made to keep the interest rate down to 7 per cent. Some carriers were able, through special conditions, to meet this condition, despite the fact that the going rate for money at the time was $7\frac{1}{2}$ or 8 per cent. This difficulty was finally overcome, but not, however, until it had caused much delay. The commission relented in a measure from its strictness. The fact that the loans made from the fund were at 6 per cent no doubt had considerable to do nevertheless with holding down interest rates.

Treasury Holds Up Payments

The other snag arose in connection with the certifications to the Treasury. The law requires the commission to certify to the Secretary of the Treasury "that the applicant, in the opinion of the commission, is unable to provide itself with the funds necessary for the aforesaid purposes from other sources." In some of the certificates issued, including the Illinois Central, Burlington, Santa Fe, Great Northern, etc., the commission added the words "except at excessive rates of interest." Because of this technicality, the Treasury held up the payments of the money and created considerable unpleasantness on all sides. A hearing was held by the commission and it decided on the basis of the arguments brought out at that time, that the inability referred to by the law meant a practical business inability. That is, it held that a railroad is in effect unable to borrow money elsewhere when in the commission's opinion the rate of interest elsewhere is excessive. It has since issued "clean" or unqualified certificates. Its decision in this matter, announced in November, said:

the prospective earning power of the applicant, together with the character and value of the security offered, furnish in the opinion of the Commission reasonable assurance of the applicant's ability to repay the loan within the time fixed therefor and reasonable protection to the United States; and that the applicant, in the opinion of the Commission, is unable to provide itself with the funds necessary for the aforesaid purposes from other sources.

"(c) Upon receipt of such certificates from the commission the Secretary of the Treasury shall immediately, or as soon as practicable, make a loan of the amount recommended in such certificate out of any funds in the revolving fund provided for in this section and accept the security prescribed thereby by the commission. All such loans shall bear interest at the rate of 6 per centum per annum, payable semi-annually, to the Secretary of the Treasury, and to be placed to the credit of said revolving fund. The form of obligation to be entered into shall be prescribed by the Secretary of the Treasury, but the time, not exceeding fifteen years from the making thereof, within which such loan is to be repaid, the security which is to be taken therefor, and the terms and the conditions of the loan shall be in accordance with the findings and the certificate of the commission."

The loans for equipment authorized by section 210, Transportation Act, 1920, may be made to or through such organization, car trust or other agency as may be determined upon or approved or organized for the purpose by the commission as most appropriate in the public interest for the construction, and sale or lease of equipment to carriers, upon such general terms as to security and payment or lease as provided in this section or in subsections 11 and 13 of section 422 of the Transportation Act, 1920.

"(d) The Commission or the Secretary of the Treasury may call upon the Federal Reserve Board for advice and assistance with respect to any such application or loan.

"(e) There may be appropriated out of any moneys in the Treasury not otherwise appropriated the sum of \$300,000,000, which shall be used as a revolving fund for the purpose of making the loans provided for in this section, and for paying the judgments, decrees, and awards referred to in subdivision (e) of section 206.

"(f) A carrier may issue evidences of indebtedness to the United States pursuant to this section without the authorization or approval of any authority, State or Federal, and without compliance with any requirement, State or Federal, as to notification."

Under a literal interpretation of the concluding clause of paragraph (b) of Section 210 of the Transportation Act, 1920, as amended, the majority of railroads would be unable to qualify for loans. The remainder of the railroads, while able to make the showing that they are unable to obtain funds from such sources, generally cannot make the further showing required by the statute that "the prospective earning power and character of the security offered are such as to furnish reasonable assurance of the applicant's ability to repay the loan within the time fixed therefor and to meet its other obligations in connection with such loan." Under these conditions it would be practically impossible to make any loans, and Sections 210 of the Transportation Act, 1920, as amended, would be reduced to a nullity.

In order to give force and effect to the statute, the inability to obtain funds from other sources must be construed as an inability to secure funds upon such terms which the carrier with due regard for the public interest would be justified in accepting, and it must be held that an excessive rate of interest or other unduly burdensome or injurious conditions which the exercise of sound business discretion will not permit constitute inability, within the meaning of the statute, to obtain funds from other sources.

National Railway Service Corporation

Another of the interesting features in connection with the revolving fund is the provision reading: "The loans for equipment authorized by Section 210, Transportation Act, 1920, may be made to or through such organization, car trust or other agency as may be determined upon or approved or organized for the purpose by the commission as most appropriate in the public interest for the construction and sale or lease of equipment to carriers, upon such general terms as to security and payment of lease as provided in this section."

This provision was not in Section 210 as originally drawn but was added afterwards when the difficulty was made apparent of financing the carriers' needs under the depressed financial conditions at that time. It was suggested by the National Association of Owners of Railway Securities which has since formed the National Railway Service Corporation for the purposes named. The American Short Line Railroad Association has formed a similar organization known as the Consolidated Railway Equipment Corporation.

The National Railway Service Corporation proposes to finance the purchase of equipment on the basis of 40 per cent from the loan fund and 60 per cent from the large insurance and banking institutions associated with the parent association. It will issue two series of equipment obligations, aggregating \$60,000,000 and maturing in 15 years. Equipment is furnished under one of two plans—one the conditional sale basis, the other the lease basis. Ten roads are in negotiation with it and in the case of the Baltimore & Ohio the commission approved a loan of \$5,200,000 to the corporation for the account of the carrier.

Results to Date

The Interstate Commerce Commission in the annual report issued in the early part of December said that it had received 140 formal applications for loans, of which 36 had been approved in whole or in part. Thirty-one had been withdrawn and two denied.

Up to that time the total amount of loans approved was \$115,767,710, divided as follows:

To meet maturing indebtedness.....	\$57,790,750
To aid in the acquisition of locomotives and cars.....	28,698,743
To aid in the making of other additions and betterments.....	29,278,215
	<hr/>
	\$115,767,710

In the following are shown the loans thus far reported as approved:

Ann Arbor.....	\$35,000
Ann Arbor.....	250,000
Aransas Harbor Terminal.....	135,000
Atchison, Topeka & Santa Fe.....	5,493,600
Atlanta, Birmingham & Atlantic.....	200,000
Baltimore & Ohio.....	3,000,000
Baltimore & Ohio.....	5,200,000
Baltimore & Ohio.....	200,000
Bangor & Aronstook.....	5,000,000
Boston & Maine.....	6,696,479

Carolina, Chulcheld & Ohio.....	2,000,000
Central New England.....	1,000,000
Central of Georgia.....	300,000
Chesapeake & Ohio.....	7,850,000
Chicago & Western Indiana.....	8,000,000
Chicago, Burlington & Quincy.....	4,446,525
Chicago Great Western.....	997,830
Chicago Great Western.....	240,000
Chicago, Indianapolis & Louisville.....	200,000
Chicago, Rock Island & Pacific.....	2,000,000
Chicago, Rock Island & Pacific.....	7,862,000
Delaware & Hudson.....	1,125,000
Eric.....	8,000,000
Eric.....	1,840,700
Fort Smith & Western.....	156,000
Fredericksburg & Northern.....	20,000
Great Northern.....	17,910,000
Gulf, Mobile & Northern.....	515,000
Hocking Valley.....	1,955,000
Illinois Central.....	4,511,750
Kansas City, Mexico & Orient.....	2,500,000
Long Island.....	718,000
Maine Central.....	1,653,000
Missouri Pacific.....	8,671,760
New York Central.....	26,775,000
New York, New Haven & Hartford.....	9,630,000
Northern Pacific.....	6,000,000
Pennsylvania.....	6,780,125
Rutland.....	61,000
Salt Lake & Utah.....	64,000
Shearwood.....	29,000
Seaboard Air Line.....	6,073,400
Term. R. R. Assn. of St. Louis.....	898,925
Texas & Pacific.....	3,000,000
Virginian.....	2,000,000
Western Maryland.....	1,372,800
Wheeling & Lake Erie.....	2,460,000
Wisconsin, Brunswick & Southern.....	50,000
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	\$172,586,294

The loans certified are being delayed somewhat by the Treasury Department. On October 20, the loans actually made totaled \$56,190,325. There is a good deal of red tape to go through in fixing up the security the road is to offer, etc. The treasury has only a small force working on the matter, so that it is considerably behind the commission's certifications. The loans actually made to date are approximately \$130,000,000.

Details by Roads

In the remainder of this article there are given the details concerning each road which has been granted a loan from the \$300,000,000 loan fund, as well as the status of the larger part of those applications which are now before the commission. The list is given by roads and is explained as follows:

The word *Recommended* refers to the recommendations given in the report of the special committee on the loan fund of the Association of Railway Executives. The sums recommended are divided into their respective classes and are given at the end in totals. In case action on the application is not noted, as many details concerning the use to which the money is to be put are given as are available. These details are available in all cases for way and structures from the committee's report and are shown in parentheses.

The word *Loaned* refers to the commission's action. In each case details are given as to the commission's findings. The use to which the money is to be put, the additional financing that is to be done by the carrier and other information, insofar as this information is readily available or as space will permit.

The sum given under the *Recommended* head is not necessarily comparable with the sum finally granted by the commission. In many cases the applications were amended and in some cases additional applications were filed which were not reported.

The details follow:

Ann Arbor

Recommended: \$275,000 for way and structures.
Loaned: \$35,000 to aid in purchase of 3 switching locomotives; estimated cost \$116,000, of which 30 per cent is from loan, 50 per cent in equipment notes, 30 per cent cash.
Loaned, also: \$250,000 for way and structures. Estimated cost \$500,000, 50 per cent from loan. Includes improvements of and additions to facilities at Toledo, costing \$400,000 to enable Pennsylvania Railroad to operate through Ann Arbor terminals to connection with Pere Marquette at Alexis, Ohio, making a through Detroit line.

Aransas Harbor Terminal

Loaned: \$135,000 to aid carrier to reconstruct and improve line from Aransas Pass, Tex., to Gulf of Mexico at Port Aransas, Tex., damaged by hurricane. Required that \$275,000 be supplied by security holders or communities interested, and that government loan be used for capital expenditures only.

Atchison, Topeka & Santa Fe

Recommended: \$2,149,450 for locomotives, \$7,850,550 for freight cars; total \$10,000,000.

Loaned: \$5,493,600 to aid in purchase of 2,500 refrigerator cars; estimated cost \$11,875,000; 500 gondola cars, \$1,501,500, and 50 locomotives, \$4,298,900; total \$17,675,400, of which carrier to supply \$12,181,800.

Atlanta, Birmingham & Atlantic

Recommended: \$200,000 for maturities.

Loaned: \$200,000 to aid in meeting maturity of \$475,000 due July 19, 1920. Required that carrier finance remaining \$275,000 at 7 per cent, which carrier complied with.

Baltimore & Ohio

Recommended: \$2,087,000 for existing equipment and \$5,000,000 for way and structures (additional main tracks, yard tracks, sidings, interlockers, telephone train dispatching, shop machinery, bridges, trestles, culverts, heavier rail); total \$7,087,000.

Loaned: \$3,000,000 for way and structures.

Loaned, also: \$5,200,000 to National Railway Service Corporation for account of Baltimore & Ohio for freight-train equipment at a total estimated cost of \$14,233,000, of which railway to supply about \$9,000,000. The National Railway Service Corporation has been approved by the commission as an agency through which loans to carriers for equipment will be made, under special authority conferred upon the commission by the Transportation Act.

Bangor & Aroostook

Recommended: \$20,000 for way and structures and \$180,000 for locomotives; total \$200,000.

Loaned: \$200,000. Of this \$180,000, of which carrier is to supply 50 per cent. Remaining \$20,000 for shop machinery and tools, a coal storage plant and passing tracks. Carrier also to supply \$58,000 for other necessary additions and betterments.

Boston & Maine

Recommended: \$1,036,490 for existing equipment; \$2,188,564 for way and structures (retaining walls and rip rapping, renewal of bridges, automatic signals, extension to sidings, interlockers, improved water supply, engine house and yard facilities); also \$1,814,047 for way and structures (extension of yard tracks, roundhouse and engine terminal facilities); \$1,245,000 for locomotives; total \$6,284,101.

Loaned: \$5,000,000 to cover maturities of \$8,843,000 in 1920 on condition that road finance the refunding of the remainder of this indebtedness. Loaned, also: \$6,696,479 to aid in purchase of locomotives and to assist in additions and betterments to existing equipment and way and structures at estimated total cost of \$7,869,000. Carrier required to finance about \$1,212,000.

Buffalo, Rochester & Pittsburgh

Recommended: \$496,750 for maturities.

Carolina, Clinchfield & Ohio

Recommended: \$2,000,000 for maturities.

Loaned: \$2,000,000 for maturities. Required that carrier before receiving loan should effectively finance the other obligations by sale of not less than \$5,000,000 income debentures or at more than 6 per cent and to be sold or exchanged at not less than par without other cost to carrier. Requirement complied with.

Loaned, also: \$1,000,000 for maturities.

Central New England

Recommended: \$300,000 for way and structures.

Loaned: \$300,000 for additions and betterments to way and structures at cost of \$500,000, of which company required to finance \$200,000.

Central of Georgia

Recommended: \$237,500 for locomotives and \$577,500 for freight cars; total, \$815,000.

Loaned: \$815,000 to assist in purchase of 100 stock, 500 box and 200 gondola cars and 7 Mountain type locomotives; estimated cost \$2,785,000, of which carrier required to finance \$1,970,000.

Chesapeake & Ohio

Recommended: \$4,750,000 for way and structures, \$1,058,750 for locomotives and \$1,658,750 for freight cars; total, \$7,467,500. Recommendation of \$4,750,000 for way and structures contingent upon carrier supplying \$2,500,000 additional; for double-tracking, grade reduction and other work necessary to extend operation of Mallet locomotives and large capacity coal cars.

Loaned: \$3,759,000 to aid in purchase of 25 locomotives and 1,000 100-ton freight cars, total cost about \$8,119,000, of which carrier to finance \$4,360,000.

Chicago & Alton

Recommended: \$359,400 for existing equipment and \$134,000 for locomotives; total, \$493,400.

Chicago & Eastern Illinois

Recommended: \$385,940 for existing equipment and \$502,060 for way and structures (shop machinery and improvements to trestles); total, \$888,000.

Chicago & Western Indiana

Recommended: \$1,805,000 for way and structures.

Loaned: \$8,000,000. Of which \$6,000,000 to aid carrier in meeting collateral trust notes due by extension, September 1, 1920; carrier required to finance on basis satisfactory to I. C. C. remaining \$8,000,000 of its maturing obligations. Remaining \$2,000,000 of loan for additions and betterments. These included improvements at power house at 48th street, Chicago, \$165,000; installation of block signals between 15th and 81st streets, \$191,000; completion of elevated yard along Canal street between 23rd and 29th streets, \$933,000; and construction of new yard in vicinity of Chicago Drainage Canal for Belt Railway of Chicago, \$300,000.

Chicago, Burlington and Quincy

Recommended: \$1,472,775 for locomotives and \$2,973,750 for freight cars; total, \$4,446,525.

Loaned: \$4,446,525 to assist in purchase of 45 locomotives, 500 stock cars, 1,000 refrigerator cars, 1,000 box cars and 1,000 gondola cars; estimated total cost of \$14,840,550, of which carrier finances \$10,394,025.

Chicago Great Western

Recommended: \$872,660 and \$270,000 for existing equipment: \$150,500 for way and structures and \$276,000 for locomotives; total, \$1,169,160.

Loaned: \$997,830 to aid in purchase of 10 heavy locomotives costing \$552,000; to assist carrier in reconstructing 697 box, 200 hopper and 75 refrigerator cars at estimated total cost of \$1,142,660 and for additions and betterments to way and structures, \$301,000. Carrier contributes \$997,830. Item of \$301,000 includes installation of additional yard tracks at Olewein, to cost \$120,000, installation of additional roundhouse equipment at Olewein and larger turntables at Chicago and Des Moines, \$181,000.

Loaned, also, in December: \$240,000 to enable carrier to meet interest on bonds of Mason City & Fort Dodge, a subsidiary line.

Chicago, Indianapolis & Louisville

Recommended: \$200,000 for way and structures and \$300,000 for cars; total, \$500,000.

Loaned: \$200,000 to enable carrier to construct modern steel car repair shop at LaFayette, Ind.

Chicago Junction

Recommended: \$1,100,000 for way and structures (yards and car shop).

Chicago, Milwaukee & St. Paul

Recommended: \$4,940,000 for way and structures (ballast, rail, bridges, yard tracks and sidings, fuel stations, water stations, shop buildings, shop machinery and tools, track elevation) and \$3,150,000 for freight cars; total, \$8,090,000.

Chicago, Rock Island & Pacific

Recommended: \$1,257,000 for existing equipment; \$5,000,000 for way and structures (additional yard tracks and sidings, shop machinery and tools, ballast, bank widening, rails, bridges); \$879,583 for locomotives and \$509,667 for freight cars; total, \$7,646,250.

Loaned: \$2,000,000 to assist in meeting maturities, carrier required to finance in same connection, \$6,000,000.

Loaned, also: \$7,862,000, including \$1,425,000 for additions and betterments to existing equipment and \$6,437,000 for additions and betterments other than to equipment.

Cincinnati, Indianapolis & Western

Recommended: \$33,500 for way and structures (shop machine tools).

Delaware & Hudson

Recommended: \$2,250,000 for way and structures.

Loaned: \$1,125,000. Carrier to supply \$1,125,000, making a total of \$2,250,000 to be used for elimination of Whitehall tunnel at cost of \$500,000, for a new yard at Glenville, \$1,250,000 and one at Port Henry, \$500,000.

Electric Short Line

Application for loan for \$42,250 for equipment and additions and betterments denied, on ground that its prospective earning power being doubtful the security offered is inadequate.

Erie

Recommended: \$168,532 for existing equipment; \$1,496,897 for way and structures, \$1,242,500 for locomotives, \$250,000 for freight cars and \$5,879,125 for maturities.

Loaned: \$8,000,000 to assist carrier to finance 1920 maturities, aggregating \$23,516,500; also to enter into contracts with holders of these bonds issued by its predecessor companies, extending maturity dates 10 years. Company expected to finance on terms and conditions prescribed by I. C. C. remainder of its 1920 maturities, aggregating \$15,516,500.

Loaned, also: \$1,840,700 to aid in reconstructing freight equipment and in making improvements to existing equipment and for additions and betterments to way and structures. Total estimated cost \$6,680,000, of which carrier to finance \$4,840,000.

Evansville, Indianapolis & Terre Haute

Recommended: \$400,000 for way and structures (bridges, rails, ties and ballast).

Fort Smith & Western

Recommended: \$215,000 for way and structures (side tracks, yard tracks and ballast) and \$75,000 for locomotives; total, \$290,000.

Loaned: \$156,000 for purchase of equipment; for additions and betterments to existing equipment and way and structures; total cost estimated \$425,356, of which carrier to finance about \$270,000.

Fredericksburg & Northern

Loaned: \$20,000 for 3 years to aid in purchase of one second hand locomotive.

Fruit Growers' Express

Recommended: \$6,750,000 for freight cars.

Great Northern

Recommended: \$1,550,000 for way and structures; \$1,375,000 for locomotives; \$637,500 for freight cars and \$15,000,000 for maturities; total, \$18,562,500.

Loaned: \$17,910,000, including \$15,000,000 to assist carrier in meeting maturities; \$2,010,000 to aid purchase of freight cars and locomotives and \$900,000 for way and structures.

Gulf Coast Lines

Recommended: \$30,500 for existing equipment; \$200,000 for way and structures (yards and sidings, shops, shop machinery, heavier rail); \$150,000 for locomotives and \$667,063 for freight cars; total, \$1,047,563.

Gulf Mobile & Northern

Recommended: \$256,050 for existing equipment, \$145,000 for way and structures (interlockers, heavy rail ballasting) and \$113,700 for locomotives; total, \$514,750.

Loaned: \$515,000 to aid in purchase of 6 locomotives at cost of \$227,400 and for additions and betterments to existing equipment and to way and structures at cost of \$401,500. Carrier required to finance \$114,000. Locomotives and freight cars to be purchased include 45 heavy Mikado locomotives and 1,000 75-ton ore cars. Total cost \$5,300,000, of which carrier to finance \$3,290,000.

Expenditures for additions and betterments to total \$1,800,000, of which carrier to finance \$900,000. For strengthening existing equipment, \$200,000; for fencing right of way, \$100,000; for cottages for housing employees at White Fish, Mont., \$100,000; for car repair sheds in North Dakota, \$400,000; for additional yard tracks at Allouez, Wis.; Hillyard, Wash., and other miscellaneous passing and station tracks, \$600,000; for additional or improved water supply at Devon, Mont., and miscellaneous use, \$100,000; for shop buildings and tools at Whitefish, Mont., engine terminal and elsewhere, \$300,000.

The item of \$15,000,000 for maturities is to enable carrier to meet in part maturing collateral trust notes due September 1, 1920, aggregating \$20,000,000. This part of loan to be repaid not later than September 1, 1921, when amount of repayment will be available to the government to meet demands of other carriers for loans before the expiration of period provided by law for disbursement of revolving fund. Carrier also required to pledge itself to apply to I. C. C. for loan to construct or build 500 refrigerator cars, 25 per cent of cost of which will be financed by loan and 75 per cent by carrier.

Gulf Ports Terminal

Applied for loan of \$500,000 to enable resumption of construction of 26 miles of unfinished line between Pensacola and Mobile on which roadbed finished for 18 miles and also for the betterment of 46 miles of road now in operation and the purchase of some additional equipment.

Loan denied and new application for \$300,000 also denied on ground that applicant not a common carrier, that it did not show loan necessary to enable applicant properly to meet the transportation needs of the public and that security offered not sufficient.

Hocking Valley

Recommended: \$159,471 for existing equipment and \$1,352,958 for way and structures (additional main tracks, yard tracks, sidings, shops); total, \$1,512,429.

Loaned: \$1,665,000.

Illinois Central

Recommended: \$2,987,500 for locomotives and \$1,524,250 for freight cars; total, \$4,511,750.

Loaned: \$4,511,750 to aid in purchase of 75 locomotives, 1,000 refrigerator cars, 200 flat cars, 200 stock cars and 52 caboose cars; total cost \$12,072,000, of which carrier to finance \$7,560,300.

International & Great Northern

Recommended: \$40,000 for way and structures (for 90-lb. rail), \$312,500 for locomotives and \$750,000 for freight cars; total, \$1,102,500.

Kansas City, Mexico & Orient

Loaned to receiver \$2,500,000 to aid in meeting maturing indebtedness, consisting of receiver's certificates due December 1, 1920. Loan covers full amount of apparent maturities and was approved after conclusive showing that operation of carrier would have had to be suspended unless the aid of a loan were given.

Long Island

Recommended: \$500,000 for way and structures (additional yards, yard tracks, storage yards and interchange tracks) and \$218,500 for locomotives; total \$718,500.

Loaned: \$718,000 to aid in purchase of 4 switching and 6 ten-wheel locomotives at cost of \$437,000 and in making additions and betterments to way and structures costing \$500,000. Carrier required to finance \$218,000 of cost of equipment.

Louisiana & Arkansas

Recommended: \$162,574 for way and structure (additional yard tracks, ties, plates, yard and passing tracks, heavier rail).

Louisville & Jeffersonville Bridge

Recommended: \$162,574 for way and structures (additional yard tracks, coal station, water station, ash pit, heavier rail and bin).

Maine Central

Recommended: \$65,900 for existing equipment and \$533,132 for way and structures (heavier rails, ballast, shops, shop machinery and renewal of bridges); total, \$599,032.

Loaned: \$653,000 to aid in purchase of 10 locomotives, 6 caboose

cars and work equipment; estimated cost \$534,780, and in making additions and betterments at total cost \$783,132. Carrier required to finance \$665,706.

Loaned also: \$1,000,000.

Minneapolis & St. Louis

Recommended: \$546,500 for way and structures (additional main tracks, yard tracks, sidings, engine terminal facilities, shops, shop machinery, ballast); \$487,500 for locomotives and \$1,240,000 for freight cars; total, \$2,274,000.

Missouri, Kansas & Texas

Recommended: \$1,050,000 for locomotives and \$300,923 for freight cars; total, \$1,350,923.

Missouri Pacific

Recommended: \$2,843,179 for structures (rails, bridges, trestles, additional yard tracks, signals and interlockers, telegraph and telephone lines, fuel and water stations, shop buildings, engine houses, shop machinery, tools, wharves and docks) \$97,250 for locomotives and \$1,454,000 for materials; total, \$4,394,429.

Loaned: \$8,671,760 for purposes noted.

New York Central Lines

Recommended: \$2,406,842 for existing equipment; \$12,101,928 for structures; \$2,925,875 for locomotives; \$10,107,950 for freight cars; total, \$27,542,595.

Loaned: \$26,775,000 to aid New York Central and subsidiary lines to provide themselves with new equipment and additions and betterments to existing equipment and to way and structures at total estimated cost of \$56,625,000. Carriers required to finance about \$20,000,000. Total proposed expenditure of \$56,625,000 includes \$39,800,000 for new equipment, of which \$29,850,000 to be financed by company and \$9,950,000 from loan; also, \$5,287,000 of additions and betterments to existing equipment to be financed from loan, and \$11,538,000 of additions and betterments to way and structures to be financed by loan. New York Central and subsidiaries have themselves financed by sale of securities since termination of federal control \$63,625,000 for refunding and other necessary corporate purposes.

Expenditures of \$39,800,000 for equipment mentioned include 250 refrigerators, 1,500 50-ton all-steel box, 2,500 50-ton all-steel automobile, 4,000 55-ton hopper, 694 single deck stock and 300 double deck stock cars; total cost \$29,084,315, of which \$21,812,736 to be financed by carriers and \$7,271,579 from loan. Also 66 eight-wheel switching, 40 Pacific, 10 light Mallet, 3 heavy Mallet and 60 heavy Mikado locomotives at total cost of \$10,715,685, of which \$8,037,264 to be financed by carriers and \$2,678,421 from loan.

The details by the lines of the New York Central system follow.

NEW YORK CENTRAL (INC. BOSTON & ALBANY)

\$4,490,000 to aid in purchase of equipment; estimated cost \$17,960,000, of which carrier is to finance \$13,470,000. Includes 1,000 50-ton all-steel box; 1,000 50-ton all-steel automobile; 1,500 52-ton hopper; 494 single deck stock and 200 double deck stock cars; 50 eight wheel switching; 20 Pacific; 10 light Mallet and 3 heavy Mallet locomotives.

\$2,486,000 for additions and betterments to existing equipment, all financed from loan.

\$5,500,000 for additions to way and structures, all financed from loan, including engine terminals and facilities, freight yards and freight facilities siding and extensions, interlockers, shop machinery and miscellaneous betterments.

MICHIGAN CENTRAL

\$2,045,000 to aid in purchase of equipment; estimated cost \$8,180,000, of which carrier to finance \$6,135,000. Includes 1,000 50-ton all-steel box; 500 50-ton all-steel automobile; 100 single deck stock; 100 double deck stock and 250 refrigerator cars, and 6 eight-wheel switching and 10 Pacific locomotives.

\$1,885,000 for additions and betterments to existing equipment, all financed from loan.

\$613,000 for additions and betterments to way and structures all financed from loan. Includes passing tracks, repair tracks, storage tracks, yard tracks and engine terminals.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS

\$3,415,000 to aid in purchase of equipment, estimated total cost \$13,660,000, of which carrier to finance \$10,245,000. Includes 500 50-ton all-steel box; 500 50-ton all-steel automobile; 2,000 55-ton hopper and 100 single deck stock cars and 10 eight-wheel switching, 10 Pacific and 50 heavy Mikado locomotives.

\$529,000 for additions and betterments to existing equipment, all financed from loan.

\$4,560,000 for additions and betterments to way and structures, all financed from loan. Included double tracking, passing and storage track, shop tools, machinery and signals.

CINCINNATI NORTHERN

\$21,000 for additions and betterments to existing equipment, all financed from loan.

\$92,000 for additions and betterments to way and structures, all financed from loan. Includes passing tracks, interlockers, and tools.

TOLEDO & OHIO CENTRAL

\$214,000 for additions and betterments to way and structures, all financed from loan. Includes yard tracks, passing tracks, yard facilities, shop tools and machinery.

ZANESVILLE & WESTERN

\$60,000 for additions and betterments to way and structures, all financed from loan. Includes engine terminals and yard tracks.

LAKE ERIE & WESTERN

\$366,000 for additions and betterments to existing equipment, all financed from loan.

\$243,000 for additions and betterments to way and structures, all financed from loan. Includes passing track, interlockers, shop machinery and tools, engine house stalls.

KANAWHA & MICHIGAN

\$256,000 for additions and betterments to way and structures, all financed from loan. Includes passing tracks and sidings.

New York, New Haven & Hartford

Recommended: \$8,130,000 for way and structures (development of freight yards, engine terminals, shops, tools, automatic signals) \$1,750,000 for locomotives; total \$9,880,000.

Loaned: \$9,630,000 to aid in purchase of new equipment and in additions and betterments to way and structure at total estimated cost of \$13,525,000.

Norfolk Southern

Recommended: \$78,000 for existing equipment; \$200,000 for way and structures (flattening curves, reducing grades and strengthening bridges, so as to materially increase train haul of engines).

Northern Pacific

Recommended: \$2,400,000 for way and structures, \$1,853,978 for locomotives and \$1,746,022 for freight cars.

Loaned: \$6,000,000 including \$3,600,000 to aid in purchase of equipment and \$2,400,000 for additions and betterments to way and structures, total estimated cost \$16,000,000, of which carrier is to finance \$10,000,000.

Equipment to be purchased includes 6 Mallet, 20 Pacific, 25 Mikado and 24 switching locomotives; 306 Hart convertible, 60 air dump and 1,000 steel underframe box; betterments to equipment, \$300,000, making total of \$9,690,208.

Proposed expenditures for additions and betterments to way and structures include: \$362,000 for widening cuts and fills; \$407,454 for ballast; \$1,103,400 for rail and other track material; \$556,557 for bridges, trestles and culverts; \$473,787 for grade crossings and crossing signals; \$538,600 for additional main track; \$334,750 for additional yard tracks, sidings and industrial tracks; \$104,679 for signals and interlocking; \$109,122 for telephone and telegraph lines; \$56,685 for tunnel and subway improvements, \$222,168 for freight and freight and passenger stations, office buildings, etc.; \$105,456 for water stations and appliances; \$104,038 for fuel stations and appliances; \$644,121 for shop buildings, engine houses and appliances; \$475,542 for shop machinery and tools; \$37,327 for electric power plants, etc.; \$506,000 for pile drivers, cranes, etc.; \$201,000 for car sleds; total \$6,368,905.

Pennsylvania Railroad

Recommended: \$6,780,125 for way and structures (grain elevator, engine house facilities, yard tracks, shops).

Loaned: \$6,780,125 for purposes mentioned.

Philadelphia & Reading

Recommended: \$1,088,125 for locomotives.

Rutland

Recommended: \$61,198 for way and structures (bridges, rebuilding swinging bridge at Fort Ticonderoga).

Loaned: \$61,000 to aid in making additions and betterments to way and structures; total estimated cost \$89,000; of which carrier is to finance \$28,000.

Salt Lake & Utah

Loaned: \$64,000 to aid in purchase of new equipment; loaned also \$235,400 to assist in making other additions and betterments and in financing pressing maturities carrier has undertaken to finance for new equipment \$213,563 for other additions and betterments, \$78,600 and for maturities, \$43,336.

Shearwood Railway

Loaned: \$29,000 to enable carrier to meet maturing indebtedness and to provide additions and betterments.

Seaboard Air Line

Recommended: \$750,000 for way and structures and \$2,291,000 for maturities.

Loaned: \$6,073,400 to aid in inquiring refrigerator cars at cost of \$1,058,000 in making additions and betterments at total cost of \$750,000 and in meeting 1920 maturities, aggregating \$8,248,000. Carrier required to finance \$3,982,600. Additions and betterments include ballasting, rail renewals, bridging, shop machinery and facilities, cinder pit and fuel facilities and additional industry tracks.

Southern Pacific

Recommended: \$1,397,500 for locomotives and \$6,102,500 for freight cars; total \$7,500,000.

Application denied on ground that the showing made in respect to inability of company to secure necessary funds from other sources, unconvincing. I. C. C. said that only money borrowed by applicant since termination of federal control was \$15,000,000 by the sale of equipment trust certificates, which was characterized as "relatively unimportant, considering the value of the applicant's property, its available assets and its prospective earning power." Carrier had proposed to use loan to assist in purchase of cars and locomotives costing \$17,233,600, of which \$12,204,600 was to be financed by company.

Tampa Northern

Recommended: \$57,000 for way and structures (heavier rails and additional tracks) and \$100,000 for maturities; total \$157,000.

Terminal Association of St. Louis

Loaned: \$898,925 to aid in meeting demand notes and in making additions and betterments. Amount for maturing obligations \$377,750, total amount of such obligations \$1,511,000; carrier required to finance for period not less than one year at not more than 7 per cent, the remainder of maturities, \$1,133,250. Amount for additions and betterments, \$519,175; carrier itself to finance usual amount; includes improvements to Eads bridge costing \$129,000; a new yard at cost of \$44,900; completion of upper Wiggins yard, \$170,000; a viaduct, \$35,000; equipment for car repair, shop \$2,300; additional trackage, \$109,250 and extension to Brooklyn shops, \$494,700.

Texas & Pacific

Recommended: \$1,091,000 for existing equipment; \$1,688,000 for way and structures (new yard and engine facilities additional passing tracks, shop machinery, train, despatching circuits, water supply); total \$2,779,000.

Loaned: \$3,000,000.

Toledo, St. Louis & Western

Recommended: \$510,000 for way and structures (yard tracks, storage tracks, new roundhouse, heavier rail and ballast), \$375,000 for locomotives; total \$885,000.

Trans-Mississippi Terminal

Recommended: \$750,000 for maturities.

Virginian

Recommended: \$2,000,000 for way and structures (completion of double track on ruling grade)

Loaned: \$2,000,000 to aid company in extending its facilities to handle adequately its rapidly expanding traffic; carrier has itself financed large expenditures for equipment and other additions and betterments.

Wabash

Recommended: \$200,000 for existing equipment; \$977,200 for way and structures (enlargement of shops, shop tools, heavier rail); also \$191,225 for way and structures (strengthening of bridges for heavier power), \$162,500 for locomotives; total \$1,530,925.

Western Maryland

Recommended: \$622,800 for way and structures and \$750,000 for locomotives; total \$1,372,800.

Loaned: \$1,372,800 to aid in purchasing 20 freight locomotives at cost of \$1,500,000 in making additions and betterments to way and structures at total cost of \$622,800; carrier required to finance \$750,000 one-half of cost of locomotives. Has already financed purchase ten modern car floats at cost of \$500,000. Additions and betterments to way and structures at total cost of \$622,800 include passing sidings, \$27,800; engine terminal and yards at Bowest, Pa., \$100,000; dredging at Fort Covington, Baltimore, \$95,000 and enlargement and extension of coal pier at Baltimore \$400,000.

Loaned, also: \$1,050,000.

Wheeling & Lake Erie

Recommended: \$1,461,540 for way and structures (additional freight yards, engine terminals and repair shops), \$3,600,000 for freight cars.

Loaned: \$2,460,000 to aid in meeting 1920 short term maturities and in making additions and betterments to way and structures. Carrier required to finance on account of 1920 short term maturities, \$1,200,000.

Wisconsin, Brunswick & Southern

Loaned: \$90,000 to aid in meeting maturing indebtedness and proving additions and betterments to way and structures at total estimated cost of \$125,000. Carrier required to finance about \$35,500.

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Railway Station at Lucerne, Switzerland, As Seen From the Air



About a Mile East of the Elkhorn Tunnel on the Norfolk & Western

The Electrification of Steam Railroads

A Brief Survey of Operating Results on the Norfolk & Western and the C. M. & St. P.

THE PART that electrification will play in solving the traffic problem of the future is problematical. A large increase of traffic is inevitable and means must be provided for handling it. The extent to which electric operation will be adopted in the near future will be influenced materially by the success of the operation on those roads which are already electrified.

Comparatively little can be gained by a study of operating results of electrified roads in foreign countries because conditions are very different from those in the United States. In this country interest has been centered on the Norfolk & Western and the Chicago, Milwaukee & St. Paul. Tunnels on these two roads did restrict steam operation, but operation on neither road was circumscribed by tunnel and terminal requirements. Each new application of electric operation presents an individual problem, but many difficulties common to all roads have been and are being worked out on the two roads mentioned. The purpose of this article will be briefly to survey the operating results so far as data concerning them are available in a usable form.

When electric operation on the Norfolk & Western is studied, the proper consideration should be given to a certain few fundamental facts. For example, locomotive main-

tenance costs have been high but it is logical that they should have been under the circumstances. The locomotives were put into a service heavier than anything which had been done before or has been done since; moreover, there was no

precedent to follow in designing equipment for such service. Furthermore, the maintenance of any machine is to a large extent dependent upon the amount of work done by the machine, and the work done per mile and per day is greater for the Norfolk & Western locomotives than for any other locomotives, steam or electric. For example, about 60 per cent as much power is used by 12 locomotives operating over 28 miles of line on the Norfolk & Western as is used by 42 locomotives operating over 440 miles of line on the St. Paul. The power consumption on the Norfolk & Western during 1919 was 67,395,000 kw. hr., while that on the St. Paul was about 120,500,000 kw. hr. During 1918 the Norfolk & Western electric locomotives used 74,325,992 kw. hr., while the St. Paul used about

OPERATING PROBLEMS common to a large number of railroads with heavy grades and tunnels have been worked out on the Norfolk & Western and the Chicago, Milwaukee & St. Paul with the aid of electric operation. The operating conditions on the two roads are very different, in that one may be likened to a big yard with very heavy switching operations, while the other is a long section of single track road on which the length of locomotive divisions has been doubled.

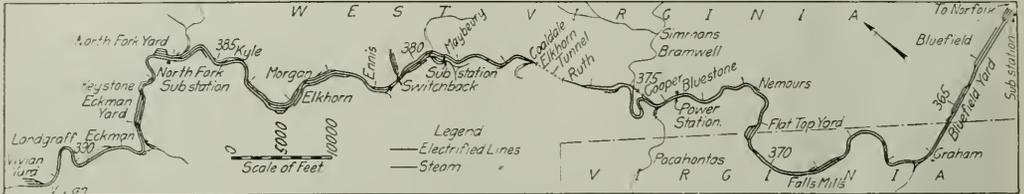
130,177,000.

In spite of many difficulties the electric system has been made to give excellent results and operating men agree that it has been the only practical solution for the division's problem.

The function of the electrified section is that of collecting

from mine sidings and yards in the coal fields the entire eastbound coal tonnage and transporting it up the grades and over the summit to the classification yard at Bluefield, which is a division point. The coal is partly classified at Bluefield and is then moved east by steam power to the various destination points, chiefly to the Norfolk & Western marine shipping pier at Lamberts Point near Norfolk, Va. All coal traffic originates west of the Flat Top yard, about 6 miles east of the summit of the heavy grade, and although a large amount

the 2 per cent grade at 14 m. p. h. where originally three Mallet locomotives were used at a speed of about 7½ m. p. h. The effect of increased speed is especially marked at the single track Elkhorn tunnel, which is over 3,000 ft. long on a 1.5 per cent grade. Because of ventilation requirements, under steam operation, it was necessary to reduce the speed up the grade to about 6 m. p. h., requiring about seven minutes to clear the block. With electric operation this movement is made in about three minutes. Since electric operation



Map of Electrified Section, Norfolk & Western. Fully 60 Per Cent. of the Line Is on Curves

of the coal which originates on the electrified division goes west, the shipments to the east constitute the bulk of the traffic handled electrically. Some coal originating east of the summit is shipped to the west, and this is also handled by electric service to yards near the western end of the electrified section. There is probably more Norfolk & Western coal shipped to the west than to the east, but over the electrified section the total eastbound tonnage is now about six times as great as the westbound. About 80 per cent of the eastbound traffic originates between Eckman and Coaldale.

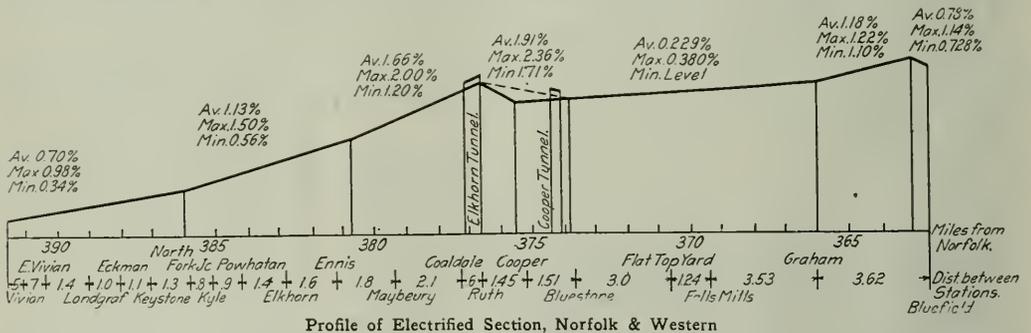
Steam road locomotives are still used over the electrified section for through merchandise freight and for passenger trains, but electric locomotives are used regularly as helpers on three eastbound passenger trains and for most of the through freight trains. An electric helper is also occasionally

was installed the Elkhorn grade has not caused restriction of main line traffic.

Train Operation

Several different methods of operation have been tried during the past five years. All trains do not do the same work, but following a locomotive and train crew through a typical day's work will give an idea of how the coal trains are handled.

A train of westbound empties, consisting of from 90 to 110 cars, is made up by a steam switcher in the Bluefield yards. The electric crew take the locomotive to the caboose track where they pick out their caboose and couple it on the rear of the train. The locomotive then goes to the head end of the train and proceeds out. The train is run at both the 14



Profile of Electrified Section, Norfolk & Western

used to help other delayed passenger trains to make up time. The principal duty of the electric locomotives, however, is to make-up and haul extra, eastbound coal trains over the electrified division into Bluefield.

Reason for Electrifying

Decision to electrify the Elkhorn grade was made because this section of the road restricted the amount of main line traffic that could be handled. The increasing traffic, together with the heavy grades and added tunnel complications, had made it practically impossible to handle the traffic over this section with steam power. Because of the mountainous country through which the division runs it was not economically practicable to build more tracks and the only solution lay in handling heavier trains at higher speeds.

Two electric locomotives now haul a 3,250-ton train up

and 28 m. p. h. speeds from Bluefield through the Elkhorn tunnel.

The train then drops down the heavier grade, regenerating power to the line. The empties are set off at various sidings on the way down the hill. When the last of the empties are to be set off, the caboose is uncoupled on the main line and is allowed to roll down the hill until it meets the locomotive as it comes out of the lower end of the siding. They then proceed to the Eckman yards. Had they taken westbound tonnage from Bluefield they would probably have proceeded to Vivian.

At Eckman all or a part of a 3,250-ton train is made up and taken up the grade to the Elkhorn tunnel with the aid of a pusher. If only a part of a full tonnage train is taken east from the Eckman yards the balance will be picked up at other points on the way to the summit.

The method of starting such a train is particularly interesting. When the engineer on the front end is ready to start he backs the train against the pusher. At this signal the engineer on the pusher applies power forward and holds with full load current on the motors until the front end locomotive has taken its share of the load. The pusher then starts forward automatically.

A special hook is used for uncoupling the pusher at the top of the grade, allowing it to go back for another train. The head-end locomotive then regenerates power down the steep grade east of Elkhorn tunnel. With a full tonnage train the one locomotive returns practically full load current to the line.

The train then proceeds to Flat Top yard where the pro-



Typical Overhead Construction on the Norfolk & Western

cedure depends on whether the crew is making its first or second trip for the day. In the former case, it is usual for the train to be left at Flat Top, the locomotive returning west, either light, with empties, or occasionally with westbound loads. In the latter case the train fills out to 4,700 tons at Flat Top yard and proceeds to Bluefield, a pusher being provided on Bluefield Hill. At Bluefield the time allowed for preparing the locomotive for its next trip is forty minutes.

Since the system was put in operation in 1915 more than 50,000 trains have been taken over the electrified section without a regeneration failure. Retaining valves are not used.

Power Dispatching

All of the power for the electrified section is developed in one steam power house located at Bluestone. From the power house it is transmitted at 44,000 volts, 25-cycle single-phase to five substations, where it is stepped down to 11,000 volts and delivered to the trolley. The load sometimes changes from nothing to 25,000 kw. in a few minutes. One 3,250-ton train requires from 12,000 to 14,000 kw. for starting on a 2 per cent grade and about 8,000 kw. are required to move such a train up the grade at 14 m. p. h. Half of this power is used by each of the two locomotives and about one and one-half minutes are required to reach the speed of 14 miles. Naturally it is difficult under these circumstances to operate with a high load factor. A system of operation has been adopted, however, that has resulted in a 50 per cent load factor and a coal consumption of something less than 3 lb. of coal per kw. hr.

A record of all electric train movements is kept by the power dispatcher at the power house. Telephones are placed along the right-of-way at all important signal towers or bridges. When a conductor has received his train he calls

the power house and reports that he is about to start east or west from a certain place with a train of a certain tonnage and number of cars. This is recorded by the power dispatcher on a log sheet and he also has the stokers and blowers speeded up to meet the coming increase of load. If it is not practicable to carry the increase of load with the number of boilers in service the power dispatcher asks the conductor to delay starting for a few minutes.

If for any reason a train is stopped at a signal for more than three or four minutes the power dispatcher is again informed that it is about to proceed. This method permits the power house operator to anticipate the load, to forestall excessive peak loads and as a result operate with a minimum number of boilers and generators and obtain a high load factor and relatively high efficiency.

Overhead Maintenance

The 000 Phono-electric contact wire is supported by a 00 solid copper secondary messenger which in turn is supported by a 1/2 in. stranded steel primary messenger. The greater part of the main line overhead is supported by steel channels supported by tubular steel poles. In yards a built-up steel pole is used in connection with a cross catenary. The 44,000-volt transmission lines are carried on one of the steel poles.

A small car equipped with an elevating platform and also an insulated ladder, known as the "hot ladder," were provided for trolley maintenance. Now the platform car is seldom used and practically all overhead maintenance work is done with the ladder. As the name suggests the "hot ladder" is used for working on the catenary when the circuit is live.

As first installed a certain percentage of the auxiliary mes-



The Bluefield Yard. Sleet Like This Did Not Interrupt Traffic

senger was steel and the balance was copper. The action of the gases from the steam locomotives caused the steel wire to rust badly and it is gradually being replaced with 00 solid copper wire. This change will practically double the current carrying capacity of the overhead wires where iron was used as the secondary messenger.

A megger is used for testing insulators. If the test shows a resistance of less than 2,000 megohms the insulator is replaced. It is then taken back to the shop where cleaning may or may not bring the resistance, as measured by the megger, back to infinity. Wood pull-off insulators when taken down are dried out in the shop and revarnished.

In bonding the track originally, two 00 pin type, copper wire bonds were installed per joint, but in replacement only

one bond is put in. This maintains satisfactory continuity and the slight loss in conductivity is unimportant with 11,000-volt current distribution. The bond maintenance has been kept down by this practice.

Sleet is not common in the southern part of West Virginia but has to be contended with occasionally. When there is sleet on the contact wire four pantographs are put up on the locomotives instead of the usual two. During sleet conditions, as shown in one of the illustrations, there was an insulator flash-over caused by a tree limb being blown over a trolley insulator. This slightly interfered with traffic, but aside from this, and occasional arcing at the pantograph shoe, the sleet caused no trouble.

The wear on the contact wire has been measured and found to be between three and four thousandths of an inch per year on the main line. On branches and stub end yard tracks it has been somewhat higher.

Locomotive Maintenance

Maintaining the locomotives has at times taxed the ingenuity of all concerned. Frames have broken, been repaired and finally a new design of frame has supplanted the old. About half of the locomotives have been equipped with the new frames. The first new frame was installed early in 1920 and as yet none have failed. Crank pins and side rods suffered a similar fate, but the result of the repair and replacement has been highly satisfactory. Chattering wheel slip at first added much to the wear and tear on the locomotives, but it is now the exception rather than the rule.

Several other changes made in the locomotives are of general interest. For example, split babbitted bearings were used as main motor bearings, but were found unsatisfactory because of alignment difficulties and because of throwing oil, some of which would get into the motor windings. It was



The Repair Shop at Bluestone

also necessary to provide drip pans under the gears to keep oil off the track. The split bearings are being replaced by the solid bearings with bronze inserts. These throw very little oil, do not show the tendency to run hot that the split bearings did and the bronze inserts are designed to prevent the motors from dropping down on the pole pieces in case the babbitt should flow.

There is a pinion on each end of each motor shaft. At first one of these pinions was shrunk on and keyed to the shaft, the other being shrunk on only. Now they are both shrunk on to the tapered ends of the shaft. The faces of the original pinions were flat and flush with the ends of the pinion teeth. The new pinions have an extended hub on the outer end, threaded so that a puller can be used and have an extended cup at the inner end grooved so that the oil which creeps along the shafts will be thrown back into the

bearing well. A special transformer is used for heating the pinions before they are shrunk on.

Iron collector rings were at first provided for the main motors, but, seemingly due to vibration, they pitted and wore the brushes badly. Copper rings were substituted which have given satisfaction, many of them having the glossy chocolate brown finish considered ideal for commutators.

Several changes have been made on the water rheostats. Small particles of metal from the electrodes caused the outlet cylinders to stick in the gland. This was corrected by making a new gland with a collar which extended upward from the bottom of the rheostat tank for several inches into the liquid. The longest electrodes were also reinforced and the



A St. Paul Passenger Train as Seen from the Observation Car

level of the liquid is not allowed to get below the bottom of the plates. Originally the center electrodes could be lifted out of the rheostat tank while grounded electrode remained in the tank. This permitted a variation of distance between electrodes when assembled. The ground plates are now made integral with, and lift out with the others. Current limit relays have been applied to prevent the outlet cylinders rising too rapidly and thereby overloading the motors and slipping the wheels.

Headlights were removed from the top of the cab where they were close to the pantograph and were placed on the forward and rear trucks.

A number of minor changes have been made to provide for better accessibility, better lubrication and for wear of certain parts.

The firemen or helpers, as they are called, say they consider the electric simpler than steam locomotives. Inquiry into this statement brings out the explanation for this statement. Except in very few cases trouble or faulty operation of any part of the locomotive can be located and remedied by the helper. Even if a motor should burn out it can be cut out and the locomotive operated with three of the four trucks. Under these circumstances, of course, it may be necessary to reduce the tonnage.

The outstanding and pertinent facts are that a new type of locomotive was made to perform a service never before performed and was put into this service practically without experiment. Difficulties have been surmounted as they appeared and at no time have the electric locomotives been unable to handle the business that came over the division.

Electric operation has made it possible to handle the ever-increasing traffic that originates on this division. The far-sighted policy of adopting it has been profitable to the Norfolk & Western and the working out of the problems involved has been a service to all other roads confronted with similar problems.

Chicago, Milwaukee & St. Paul

Many factors were involved in reaching a decision to carry out the large electrification program of the C., M. & St.

P. and probably the most important of these was the desire to create a market for power. No complete figures have been published to show that the enterprise has been a success financially, but the data available indicate that such is the case. Some conception of the status of affairs may be obtained by a consideration of the following:

Operating and Capital Costs

The Pacific division has been operated electrically less than a year, so costs can now be considered only on the Missoula and Rocky Mountain divisions. A comparison of freight traffic operating costs from figures made available in 1918 shows that all costs affected by motive power on the Idaho division, which is steam-operated, were 90 per cent



The St. Paul Right of Way on the Western Slope of the Bitter Root Mountains

greater than those on the Missoula electrified division. On the Musselshell steam division they were 33 per cent greater and on the Rocky Mountain electric division these costs were 11 per cent greater than on the Missoula electric division.

The cost of maintaining and operating the transmission lines, substations, and trolley system, for the year 1919 is given in the table and a final figure showing the approximate total operating costs involved in the delivery of the electric energy to the locomotives.

OPERATING COSTS FOR 1919

Account	Total all services	Per unit
255. Power substation buildings.....	\$5,457	\$606.00 per building
257. Power transmission system.....	1,773	4.87 per mile
259. Power distribution system.....	78,461	179.00 per route mile
261. Power line poles and fixtures.....	24,299	55.50 per mile
306. Power substation apparatus.....	40,224	2,870.00 per station
383. Train and yard power produced.....	102,152	7,300.00 per station
395. }		

Total \$255,396

1. Cost per thousand gross-ton miles trailing freight as actually distributed in accounts..... 28.8c
 2. Cost per thousand's gross ton-miles train freight as actually distributed in accounts..... 24.9c
 3. Cost per thousands gross ton-miles trailing freight on basis distribution in proportion to freight k.w.h.r..... 30.2c
 4. Cost per thousands gross ton-miles train freight on basis distribution in proportion to freight k.w.h.r..... 26.2c
 5. Cost per actual k.w.h. delivered to loc. motives..... 1.1c
- The above unit figures include the cost of power.

Power is purchased from power companies and the cost of power at the high tension bus or point of delivery was 22.3 cents per thousand gross ton-miles trailing for freight service and 38.1 cents per thousand gross ton-miles trailing for passenger service. The freight traffic for the year was 2,476,085,000 ton-miles trailing and the passenger traffic 378,080,000 ton-miles trailing. The figures for the passenger service are approximate, as the ton-mile data are based on the assumption of an average weight per car, no record of particular cars handled in all the separate trains being available.

The above figures were taken from reports that have been issued from time to time and from them it appears that the savings in operating costs may vary from 20 to 90 per cent.

This must be balanced against an additional capital charge, due to electrification, of about \$23,000 per route mile. The construction cost, exclusive of locomotives, was \$17,579 per route mile. In the first figure given, the value of the steam equipment displaced has been subtracted.

Power Supply

All power for the electric operation is purchased and is delivered to the railroad as 100,000-volt, 3-phase, 60-cycle current. Power for the section between Avery, Idaho, and Harlowton, Montana, is obtained from the Montana Power Company. To prevent the total power demand from exceeding a certain value, apparatus called a power indicating and limiting system is installed. When the power demand reaches a predetermined value, the trolley voltage is reduced automatically. The train speeds are, of course, also reduced accordingly and the reduction of voltage and train speeds continue until the total power demand falls off to something less than the predetermined value. Such a system was installed between Harlowton and Deer Lodge, Montana, in 1918 and on the sections between Deer Lodge and Avery, Idaho, early last year. Train speeds are reduced by this system from 2 to 13 per cent of the time, depending upon the amount of the traffic and the arbitrary value of the limit setting.

Power for the Pacific electric division which extends from Tacoma to Othello, Wash., is purchased from Inter-Mountain Power Company. This section was formally put under electric operation on March 5 last.

Motive Power

The first consignment of locomotives was purchased from the General Electric Company and consisted of 12 passenger, 30 freight and 2 switching locomotives. The freight and passenger locomotives were identical except for the gear ratio between the motor pinions and the gears on the main driving axles, as it was considered desirable at that time to have only one type of locomotive for both kinds of service. These locomotives are of the 4-4-4-4-4-4 type and the 12 passenger locomotives have now been regearred for freight service.

Two more switchers have been added and 15 new passenger locomotives were purchased and delivered during the latter part of 1919 and the early part of 1920. Ten of these were supplied by the Westinghouse Electric and Manufacturing Company and are of the 4-6-2-2-6-4 quill geared type and the other five were supplied by the General Electric Company and are bi-polar gearless locomotives with a 2-4-8-8-4-2 wheel arrangement. These locomotives were described in the following issues of the *Railway Age*: December 3, 1919, page 819; January 16, 1920, page 238 and March 26, 1920, page 1051.

Operating Results

The manner in which trains are handled with electric locomotives will be described in a series of three articles which will appear in early issues of the *Railway Age*.

The following are some particularly pertinent statements pertaining to the results of electric operation which have been made during the past year by different men familiar with conditions on the road:

"Nearly 30 per cent more tonnage can be handled by electric operation in about 80 per cent of the time it formerly took to handle the lesser tonnage by steam operation.

"The consensus of opinion of the roadmasters and superintendents of the electrified zone is that there is no more slipping of the locomotive wheels on the rail and consequently no more damage to the top of the rail under electric operation than there is with steam locomotives. It has not been found that there is any greater tendency for the rails to creep on account of regenerative braking on de-

scending grades than there was under the braking action of steam locomotives. No case has been found where electric locomotives moving at a high rate of speed have tended to displace the rail on the ties or the ties on the ballast. Roadmasters agree that the electric locomotive is easier on the track than steam locomotives because of less rigid construction. It is stated that the flange wear on curves under electric operation is actually less than under steam operation for the reason that the electric locomotives are less rigid in their wheel arrangement than the steam locomotives.

"One of the marked economies effected by electrification is the reduction of train and enginemen's expense, on account of the increased ton-miles per train mile and per engine-mile and the reduction of equipment repair and roundhouse expense.

"The spacing of trains to hold down the power demand has in combination with the action of the power indicating and limiting system worked out very well. When the load factor was running 60 per cent or higher, the automatic slowing up of trains involved an increased expenditure for freight train and enginemen's time of about 10 per cent. With a load factor of from 50 to 55 per cent, however, the limiting action takes place through only a small part of the day, and while there is a considerable reduction in the maximum demand, there is little effect on the operation.

"As to ease of starting trains, this feature of electric operation is noticeable, conducing to increased comfort of passengers.

"The technical result of the electrification has been quite a success. The financial result, due particularly to fuel and labor conditions, and the indirect value due to publicity of this operation, are equally satisfactory.

"Even allowing for the increased investment charges, the items of operating expense, depending directly upon motive power, are so reduced and additional benefits indirectly obtained are so great as to justify consideration of extending the electrification even on sections with easier grades."

The Pennsylvania's New Agreement With Trainmen

THE MANAGEMENT of the Pennsylvania Railroad System on December 29 concluded with the representatives of its engine and train service employees a mutual working agreement, regarding the settlement of future labor differences, which, it is expected, will eliminate any question of strikes on that road, as far as train operation is concerned; and a statement has been issued by the company, explaining what has been done, substantially as follows:

This agreement is the outcome of a series of meetings between representatives of the company and of the engine and train service employees, which began in Philadelphia on December 21 and terminated at Pittsburgh on the 29th. Both sides are ready to apply the new principles with the beginning of the new year.

The classes of employees who, through their accredited representatives, have joined with the management in this matter are the enginemen, conductors, firemen, hostlers, trainmen and switch-tenders. As a medium to carry out the purposes of peaceful settlement there has been established the "Joint Reviewing Committee of the Pennsylvania Railroad System" for the settlement of all controversial questions affecting the engine and train service men. Through this committee, the employees involved will, for the first time in the history of this railroad, have equal voice and vote with the management, as the committee will constitute a court of review involving grievances, rules and working conditions, including discipline.

The joint reviewing committee will be composed, on behalf of the management, of two representatives from each of the four "regions" of the system, and, on behalf of the employees, of the general chairmen of the men in the engine and train services. The vote of all members, whether representatives of the management or of the employees, will be of equal power and not less than a two-thirds vote will be necessary to reach a decision upon any question presented.

In all matters, except individual discipline cases, the full committee will vote, and its decisions will constitute precedents, which will be binding equally with respect to similar existing or future cases, upon the management and the employees in all four regions of the system uniformly.

Discipline cases will be handled somewhat differently, as they involve a personal element which must be accorded recognition. It has, therefore, been decided that when such a case comes before the joint reviewing committee, the two representatives of the management in the region in which the case arises, together with the representatives of the employee involved, shall not sit as members of the committee, during consideration of that particular case, but shall act as counsel for the presentation of their respective claims. The remaining members will hear the case and determine the matter at issue. This will insure expeditious handling and fair judgment upon all discipline cases.

The work of the joint reviewing committee will be supplemented by an extension of and improvement upon the methods of handling differences and grievances which were in effect prior to the war. Each division superintendent will have a meeting once a month with the local chairmen of the engine and train service employees under his jurisdiction, at which either side may present matters for consideration. Each general superintendent will have a monthly meeting with the general chairmen, and the general manager of each region will also hold monthly meetings with the general chairmen.

Appeals may be taken in the order named, and appeals from the decision of a general manager will be taken to the joint reviewing committee of the system. Thus, in the final determination of any matter, the employees, through their representation upon the joint reviewing committee, will have equal power with the officers in determining the issue. In this manner, the employees will participate in each step in decisions affecting their personal welfare and the conditions under which they work.

The joint reviewing committee will meet monthly in order that all pending matters may be promptly determined.

For the purpose of definitely establishing decisions and interpretations of committees upon the whole of the company's lines a provision has been adopted to the effect that whenever an agreement is reached regarding any particular controversy, between the representatives of the management and men—whether at a superintendent's meeting, a general superintendent's meeting, or a general manager's meeting—the settlement agreed upon will at once be placed in effect; but its terms will be immediately reported to the joint reviewing committee. The joint reviewing committee, in its turn, will at its earliest convenience, either ratify the ruling as adopted, or modify it as may be thought best; and the principles so established will then become binding upon the management and employees in all regions, and will govern all existing and future cases of a similar nature.

"The management feels justified in expressing the conclusion that the understanding reached should not only make future strikes wholly unnecessary, but should obviate even the necessity for ever taking a strike vote among the engine and train service employees of this railroad, if both sides live up to the friendly spirit in which the understanding has been established."



Developments In Material Handling Methods

The Railroads Are Making Increasing Use of Mechanical Equipment in the Movement of Freight

THE MOST INTERESTING of recent developments in the use of material handling machinery on the railroads has been in its application to the handling problems presented in the movement of freight. It would probably not be far from the truth to say that all important facilities planned or built recently for handling less-than-carload freight have been so designed as to permit of the use of material handling devices. Also during the past year or so various existing layouts for handling loose bulk material in carload lots, which are predicated entirely on the utilization of machines, have been completed recently or planned during the past year. In pointing out the advantages to be derived from the use of the various material handling devices it is necessary also to describe, in some detail, the layouts in which the machines function.

Among the larger recently constructed freight terminals, in which improved methods of handling freight have been tried out with gratifying results, may be mentioned the New York Central terminal at Cleveland. Briefly, this layout consists of an inbound house 38 ft. wide and an outbound house 75 ft. wide. Both houses are 1,262 ft. in length and are separated by four sets of two railroad tracks which are in turn separated by island platforms 16 ft. 6 in. wide. A

platform 50 ft. in width located at the far end of the layout connects the two houses and the island platforms. Double leaf hand-operated trucking bridges, placed at approximately the one-third points, provide additional connections between the two houses and the platforms.

The mechanical equipment includes fleets of storage battery tractors and trailers and dollies in standard forms and in special forms for special service; lift type storage battery trucks and skid platforms; portable sections of gravity roller conveyor, and a hoist for handling the heavier shipments.

Outbound freight is received from street vehicles and usually is loaded directly onto the trailers. The sections of portable gravity roller conveyor which are mounted in frames designed to suit the conditions are useful in effecting the transfer of the ordinary run of packages from the street vehicle to the trailers. The hoist, which consists of a suspended I-beam runway extending 8 ft. out into the drive and 16 ft. into the house, and which is equipped with two three-ton geared trolley hoists, which operate independently, serves in transferring the heavier packages from the street vehicles to the trailers.

Each trailer is loaded, always, with freight destined for one car. After loading, the trailers are classified by hand into groups destined for a certain section of the house and assembled into trains of six or more trailers. Generally it is possible to so make up the train that the trailers may be cut off progressively, beginning at the rear. When all loaded

THE railroads probably offer as great an opportunity for the application of material handling machines as any other single industry. Such devices are used by the roads in construction, in maintenance, in the shops, at locomotive terminals and for various other purposes. In view of the fact, however, that for years the roads have been handicapped by insufficient terminal facilities it is the application of machines to handling problems at terminals that is of outstanding interest at this time.

trailers have been delivered the tractor makes the return trip, picking up the empties on the way.

Each section of the inbound house is equipped with a large number of skid platforms and one lift type truck. The inbound shipments are handled from the cars by tractors and trailers and where possible the trailers are loaded with freight for one consignee and always with freight destined for one section of the house. When the size of a consignment justifies it, the trailers are unloaded onto the skid platforms where the shipment is held for delivery to street vehicles, the last shift being made with the lift trucks. This arrangement permits of deliveries being made without the re-handling of the shipment, thus saving much labor and reducing the likelihood of damage to a minimum.

Modernizing Existing Layouts

Mantua (Pa.) transfer freight station of the Pennsylvania Railroad, which consists of a building 1,200 ft. long and 16 ft. to 30 ft. wide, flanked on both sides by 13 tracks, having a combined capacity for 360 cars, may be cited as typical of the remarkable results obtainable from modernized layouts.

Approximately 135,000 tons of package freight is handled annually at this station. Until recently the transfer movement was made with hand trucks, each trucker handling about 10 tons of freight daily. With the hand trucks replaced with a fleet of 11 storage battery tractors and approximately 600 trailers three men are able to handle an average of 70 tons of freight daily. As a result of this installation night work has been dispensed with, the working day has been shortened and an important saving has been made in the cost per ton of freight handled.

Motor Trucks Replace Trap Cars

Probably the most interesting recent development in freight handling on the railroads is the use of motor trucks for interchange and trap car shipments at Cincinnati, which was described in detail in the *Railway Age* for August 6, 1920. Briefly, this is a system for transferring less-than-carload freight between local freight stations by the loading of package freight at the stations into demountable containers or truck bodies which are transferred from motor chassis by mechanical means and are then moved from one station to another on motor trucks.

The mechanical equipment required in this service includes the motor trucks, the demountable bodies, and facilities at each station for transferring the bodies from the

trucks to the floor of the station, and vice versa. The transfer machines consist of a light steel superstructure erected over the driveway and floor locations of the demountable bodies. This supports the electric hoists which are provided with a weaving device to insure accurate aligning of the demountable body with the truck chassis, and are equipped with Sprague standard hoist units of 7½ to 10 hp. for lifting, and 2½ hp. traveling motors.

As a result of this installation the cost of handling freight between the 35 stations has been reduced 35 cents per ton, 15 per cent of the existing platform area has been released for other use, nearly 200 cars have been released from continuous trap car service for the handling of other commodities and switching service has been done away with involving approximately 300,000 switching cuts annually.

A New Application for Car Unloaders

The grain elevator recently completed by the Pennsylvania Railroad at Baltimore and described in detail in the *Railway Age* for July 2, 1920, presents some interesting developments in the application of machines for handling loose bulk material. This plant is equipped with four grain car unloaders, each machine consisting of a sidewise-tipping cradle mounted on an endwise tipping table, an appliance for opening the car doors automatically and a grain receiving hopper placed on the side of the tipping table. In operation the machine tips the car on its longitudinal axis 30 deg. towards the side on which the receiving hopper is located, thus forcing the car door open. This causes the grain near the car door to run out, then with the car still in this position, it is tipped endwise 45 deg. by the table, first with one end up and then the other, so that grain in the ends of the car will run out.

The entire operation of unloading a car with this unloader requires less than 10 minutes. Only three employees are required to operate the unloader and attend the car during the process. In other words, the machine will accomplish as much in 10 min. with three men as four men can accomplish in 45 min. with the use of a power shovel.

As the grain is dumped from the cars it falls into a steel hopper discharging to a 42 in. belt conveyor which delivers to cross belts running to four receiving legs or elevators for delivery to the garner. From here it falls by gravity to scales from which it can be delivered to the cleaner and dryer.

Nine shipping legs are provided for elevating grain for shipment.

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Photo by Keystone View Co.

A View of Salida, Colorado, Showing Railway Yards



Members in Session in the New Parliament Building in Ottawa. Photo Copyright, Keystone News Company

Railway Developments in Canada in the Year 1920

High Gross and Low Net Earnings; Increase of Government Ownership and Management; Future Prospects

By J. L. Payne,

Comptroller of Statistics, Department of Railways and Canals

COMPLETE OPERATING RESULTS for the calendar year 1920 are not yet available; but sufficient information is at hand to warrant the statement that the railways of Canada established a record in the matter of high gross earnings. They also established a record for high operating expenses. The result was the lowest net earnings per mile of line for many years. Materials and labor cost so much more than in preceding years that, notwithstanding the fillip given to receipts by higher rates, the railways fell behind. It is to be feared that on this side of the line, as on the other, there is a prevalent opinion that railways have some occult way of escaping the high cost of living which is denied to individuals. This would appear to be the case, since the application of the railways for better tolls to enable them to hold their heads above water was sternly and vigorously opposed.

It may be well to make clear the basic reason for this attitude on the part of boards of trade and other Canadian bodies. The Canadian Pacific is unquestionably prosperous. It has resources which other lines lack, and those resources have an important bearing on its net earnings. Nevertheless, the Canadian Pacific has been suffering a steady diminution of net earnings in common with the few other roads in the

Dominion which are able to do a little better than make one hand wash the other. For example, for the ten months ended October 31 last it showed a gain of \$29,701,408 in gross receipts over the same period in 1919. In spite of this it had a decrease of \$1,543,090 in net earnings; for while gross earnings had increased by 20.8 per cent, operating expenses had increased by 27.4 per cent. Yet the Canadian Pacific has been able to maintain its substantial dividend payments on common stock, and when the case of all the railways is presented there are many people who see only this single road which has done well.

Just how seriously the railways of Canada were pinched during 1920 may be easily figured out by studying the still unpublished official figures for 1919. In that year 36 units out of 72 failed to earn operating expenses. Of the remaining 36, only 14 were able to pay fixed charges, and of these 14 just 5 had net corporate earnings available for dividends. It is only fair to say that this result was not unique for 1919.

That has been the situation, except in lesser degree, for at least the past six years. It was probably intensified in 1920.

It is quite true that gross earnings have shown most encouraging advances during the past decade in particular. In 1910 they were \$173,956,217; for 1920 they probably

IN THE 10 YEARS ended 1919, gross earnings per train mile increased 209 per cent, while operating expenses increased 323 per cent. Yet such relief as has been offered in increased rates has been bitterly opposed.

The government now operates 52 per cent of the railway mileage, although the question of government ownership has never received serious public consideration

All conditions at the moment are more or less adverse; it may be characterized as a period of "anxious waiting."

exceeded \$430,000,000. It is, however, quite misleading to base assumptions of prosperity on a single fact of that nature, as students of transportation statistics know full well. Gross receipts must always be measured by certain established standards before their real importance can be determined. Thus, while in Canada an increase of 147 per cent may be assumed to have taken place during the past decade in the volume of total receipts, the increase per mile of line has been only 110 per cent. Put in another way, and answering to a test which goes to the very pith of the whole matter, while in the ten years ended 1919 gross earnings per train mile grew by 209 per cent, operating expenses per train mile grew by 323 per cent. That is really a startling change.

Earnings Up 25 Per Cent; Expenses Up 51 Per Cent

There is still another way of setting forth the results of this crucial test. While in 1914 the credit balance created by the difference between gross earnings and operating expenses per train mile was equal to 35.8 per cent, in 1919 that percentage had shrunk to 11.8. During that same period, 1914-19, while gross earnings went ahead by 24.7 per cent per mile of line, operating expenses expanded by 51.2 per cent. It is important to keep the facts for the years since 1914 clearly in mind; for it was coincident with the outbreak of war that severe pressure came upon the railroads. It may help to a better appreciation of the position into which that pressure forced the railways of the United States and Canada if at this point the significant difference between the opportunities of a railway corporation since the commencement of the war period and nearly all other classes of corporations is emphasized.

While the latter were able to adjust their selling prices almost at will, raising them to whatever levels they deemed expedient to meet the rising cost of production, the purveyors of transportation were held rigidly to the earning rates which had been fixed before 1914. It was not until 1918 that any relief at all was granted. Then that relief was bitterly opposed. It was not sufficient, however, except for immediate purposes. The cost of materials and labor continued to rise. After enduring these conditions for two years, a further advance in rates was permitted in 1920. This, at all events, was what happened in Canada. Everybody is familiar with what the unchecked carriers by water did during that same long period of steadily ascending prices. They raised their rates 100, 200, 400 and up to 800 per cent. What would have been the financial position of the railways of North America today if they had been as free to regulate their tolls as were these carriers by water or as were other producers? This is neither an inept nor an unreasonable question.

Government Acquires Grand Trunk

By every test which may be fairly applied the railways of Canada have been having a hard time since 1914. Their experience has made many hundreds of millions of dollars of investment unproductive. This has been peculiarly true of the year 1920, because it brought many roads to a very serious state. Yet they have all borne these adverse conditions heroically, and no one may charge them with not having tried to help themselves as far as was humanly possible. They enforced economies both directly and indirectly. That is to say, they cut operating expenses with a ruthless hand, and brought every available device of administrative skill to bear on the reduction of train mileage and car mileage, while on the other hand they increased the carload and trainload. They achieved wonders in all these respects. And still they had to sit down at the end of the year and face a further shrinkage of net earnings. If this were the story of an individual or an ordinary commercial corporation it would provoke sympathy. The railways have learned to grin and bear it.

Aside from financial consideration, the outstanding fact

in the history of Canadian railways in 1920 was the absorption of the Grand Trunk into the Canadian National Railways system. This followed the setting up of that system in 1918, when the Intercolonial and Prince Edward Island railways, which had been the standing examples of government ownership as growing out of the pact of Confederation in 1867—the Canadian Northern, the National Transcontinental, the Grand Trunk Pacific and the Grand Trunk Pacific Branch Lines were thrown into a single operating group. Thus in May, 1920, with the bringing in of the Grand Trunk, the principle of public ownership and operation was directly applied to a little over 52 per cent of the entire railway mileage of the Dominion. It will not be out of place, even though it may represent in some degree the reiteration of what has already appeared in these columns, to present in succinct form the causes which operated to bring about this exceedingly important change in the Canadian railway situation.

It began with the collapse of the Canadian Northern and Grand Trunk Pacific, which really took place in 1914, but was not carried to the point of positive assumption of full operating responsibility by government until near the end of 1917. In fact, some of the steps were not formally taken until 1918. It must be definitely understood that what took place in this regard was dictated by the imperative demands of necessity arising out of the fact that the bonds of these roads had been guaranteed to a high proportion by both the federal and provincial governments. It will not be necessary at this time to take up space in setting forth the full measure of these obligations. It must suffice to say that the Dominion Government deemed it a public duty to keep these properties in operation. As the chief guarantor, the Dominion Government felt impelled to do this for the further reason that it was the only avenue of possible escape from further serious losses. The interests of the growing west also demanded it, since nearly all the mileage was in that section of the Dominion. Under any circumstances the responsibility would remain unaltered.

The Grand Trunk, while hard hit by reason of its primary guarantees on account of its subsidiary, the Grand Trunk Pacific, was not without resources. But the time for financing on a comprehensive scale was inopportune. Moreover, the government needed the old established system in the east to complete the scheme of the Canadian National Railways. The time was favorable for such a change, and after protracted negotiations the matter was brought to an issue early in 1920. The shareholders of the Grand Trunk approved a bargain under which, without going into a mass of details, the government should be given control by becoming the purchaser of the common and preferred stock rights. With that control there passed at the same time to the government practically full responsibility for the liabilities of the Grand Trunk. The operating rights were taken over in May last, and the terms of purchase, subject to certain statutory limitations, will be adjusted by the usual process of arbitration. That process is now under way.

Not Due to Definite Policy

Before passing to the consideration of what this tremendous change means, and may mean, so far as the Canadian people are concerned, the fact cannot be too strongly accentuated that these happenings did not follow the adoption of a definite policy in favor of substituting public for corporate ownership. They came about as the direct result of irresistible circumstances. The matter was not made an issue before the electors. There was scarcely time to do that. Anyway, the liability arising out of the guarantees could not be pushed aside no matter what might be the wishes of either government or people; and that liability dominated all considerations. To put it in homely phrase—and there is no other way of doing it so lucidly—the people of Canada

had endorsed the bonds of certain railways which subsequently fell into bankruptcy, and have been obliged to take over the properties secured by those bonds in order to try and reduce the ultimate volume of loss to themselves. They were the trusting endorser. They have never expressed any judgment on the broad question of state control as against private control, since necessity dictated what they should do rather than considerations of policy.

There will be a natural interest across the line in this vast enterprise bearing the stamp of nationalization, and the first question would probably be with respect to results. For the fiscal year 1920 the responsible minister announced a deficit of \$47,000,000. For the preceding year it was several millions under that total on the basis adopted by the Department of Railways and Canals. In an impressive and well-organized speech the minister frankly told Parliament that the deficit for the year did not include any fixed charges attaching to the Intercolonial, the Prince Edward Island or the National Transcontinental. He could not have presented more than an estimate; for the capital accounts of these roads have not been kept on the basis applied to corporate lines. The Minister of Finance has recently intimated that an effort will be made to set up a correct account.

This aspect of the matter is so important that a word or two of explanation would appear to be necessary before the situation as to fixed charges can be understood. In official statistics the sum charged on account of capital outlay is placed at \$330,062,719; but that is the bare cost of construction, and neither includes any interest charges during the building period nor subsequently. Therefore, to compare the Intercolonial with the Canadian Northern, for example, is impracticable. If accumulated fixed charges were now added, the total would, of course, be very materially increased. This was made plain to Parliament by the Minister of Railways some months ago. As the capital account of these three government roads has not been made comparable with the accounts of other units in the Canadian National group, it would scarcely be proper for the writer to indulge in a purely speculative calculation. Others, however, have made the attempt and their figures run into large totals. It must suffice to say that whatever may be the correct capital account, it would, to the extent of the fixed charges attaching hereto, swell the deficit announced by the minister. When the account is brought down to the present time, it would, quite unavoidably be swollen by the accretive power which is exhibited in the proverbial rolling snowball—in other words, by the compounding of interest charges over a long period of years. Moreover, into the final account must be thrown the advances made to the Canadian Northern and Grand Trunk Pacific, and which now aggregate more than \$150,000,000.

What of the Future?

What of the future? No one could pretend to do more than guess. The Canadian National system, with its lines running from coast to coast, and branching northward and southward in many directions, will be as dependent as other lines on the development of traffic. As settlement proceeds—and the immigration authorities tell of the brightest prospects in that respect—the government roads are bound to receive the stimulation which such a movement carries with it. They are in a position to meet large demands for public service, although they are still short of urgently required equipment. That is in process of being remedied. They are in capable hands from the administrative point of view, and there is a reasonable prospect that by cutting out a considerable parallel mileage in the west economies in operating cost may be brought about. On the other hand, there is great pressure upon the government to build new branches and to extend existing lines into parts of the country where

land has been taken up by settlers. That pressure can only be relieved by favorable action. Some considerable work in standardization has also to be done.

The people of Canada are aware of the burden which rests upon their shoulders to the extent of announced deficits, and they have been candidly told that this burden will be swollen by very considerable charges which have not yet been calculated. There are no signs, in the press or on public platforms, that they are either alarmed or fretful. On the contrary, the attitude of the public mind expresses resignation. They understand that a great task has been assigned to the men who are operating the government system; but D. B. Hanna, the president and chief executive head, appears to command general confidence. There is a feeling that the best is being made of a situation which will not lose any of its grave aspects by the raising of an uproar. They are willing to give the management a free hand and to await results. But they would be surprised if, while they are waiting, a visitor from the United States should ask them why they had swung so pronouncedly over to the side of state ownership. They would tell him at once that the matter had never been considered on its merits; that what had been done had grown out of their position as endorsers of railways bonds. And that would be the whole truth.

Practically No Additions to Mileage

Coming back to the railway field as a whole, it may be said that wholly trivial additions have been made to mileage during the past two years. F. P. Gutelius, of the Delaware & Hudson, said the other day before a Canadian tribunal that any railway which was built under present conditions would not be able to earn fixed charges. That is probably true. We have just seen that many roads which were constructed in the years when prices were low are unable to earn any return on investment. Worse than that, a high percentage of them cannot pay their way at all. This situation as to earning power no doubt has had something to do with the practical stoppage of railway building in Canada; but the controlling reason is to be found in the fact that our transportation needs, apart from new districts in the west, have probably been met. While our railway mileage expanded by 130 per cent within two decades our population grew by but 70 per cent. Out of that grew our railway problem and the scheme of nationalization to which somewhat extended reference has been made.

Canadian railways are slowly picking up on lost time in the matter of equipment. During the war period they could do very little in that respect. They actually stood still for four years. Now they have to pay terrifying prices, both at home and abroad. But every road in North America knows all about that.

The labor situation is satisfactory in the sense that there are no strikes on nor are any threatened. We have never had serious trouble with the unions on this side of the line. The unions themselves are represented by rather superior men, conservative and considerate in their attitude, and nothing has ever happened to arouse bitterness. At the same time, the railways of Canada feel acutely the pinch of labor conditions. Whatever advances are made in the United States are invariably demanded and conceded on this side.

The whole situation might be summed up within the words "anxious waiting." All the conditions are at the moment more or less adverse. Traffic has not increased since 1918; in fact, it has rather decreased in volume. On the other hand, rates have been advanced to a point which is supposed to take care of the increased cost of operation; but the story of shrunken net earnings is plainly told in the railway accounts. Meanwhile, it is doubtful if the people of North America clearly realize that they are getting transportation service at a lower ton-mile cost than that borne by the people of any other country under the sun.

The Problem of Rates on the Canadian Railways*

Delicate Question to So Adjust Them As to Be Fair to Government and Privately Owned Railways

By E. W. Beatty
President, Canadian Pacific

THE YEAR 1921 is apt to be of great significance in the railway progress of Canada. It will be a year of test and it will be incumbent upon all the companies to reduce costs by economy and efficiency in order that rates may be reduced as speedily as possible. Canadian transportation companies cannot expect the Canadian people to continue paying high rates if by any act of the railway companies expenses can be reduced sufficiently to permit of these rates being lowered.

Under the present conditions of operation the rates are none too high—in fact, would prove inadequate if the volume of traffic even slightly diminished. The period, however, is one of readjustment and the tendency towards lower costs will undoubtedly become more marked during the coming year. These conditions must be taken full advantage of in order that rates may be adjusted to a more normal basis. That this will be done goes without saying as there is not a transportation officer living who would not prefer the prosperity of his enterprise to be accomplished on a moderate scale of rates and a heavy and free movement of traffic rather than in any other way.

A Unique Situation

Canada is blessed or handicapped, according to your point of view, with a very expensive railway mileage, a mileage somewhat out of proportion to its population and the transportation necessities of the country at the time a great deal of it was constructed. That improvident construction has brought about an evolution in administration which has been considered inevitable. It has brought a condition which is unique and has no parallel in any other country in the world so far as I know. It means the ownership of the principal systems by the government and the Canadian Pacific respectively and the extent of their respective systems are almost equal.

The situation, which is unique, is that of a private enterprise competing with a government owned enterprise, both, however, subject to regulations by an independent tribunal, the Railway Commission. The existence of this condition naturally creates a situation which imposes upon the government an obligation to exercise an almost judicial attitude towards its chief transportation competitor, while at the same time pressing by all legitimate means the interests of the National Railways against that competitor. It is not necessary for me to elaborate the fact that such an attitude is as difficult as the position is delicate, and to exercise even-handed justice in such circumstances requires an intimate appreciation of national necessities and of the national consequences of a policy which involves unfair discrimination.

The appreciation of service rendered, when it is properly rendered, is the greatest possible protection to a corporation, and if the government's position is difficult by reason of its large direct interest in one enterprise, still the government reflects in its policies the sentiment of the people as a whole, and the sentiment of the people is in a vast majority of cases towards fair competition. But I have another reason for suggesting that the situation gives not the slightest ground for alarm, and that is the acceptance by the government of an existing condition not altogether of their making and a deter-

mination, as expressed through their responsible Ministers, that fair and equal competition will be indulged in.

Real Problem Is That of Rates

Two theories have been advanced as to the national attitude or the attitude of Parliament towards the question of railway rates. One is that the rates should be such as would enable the National Railways to become self-supporting both as to operating expenses and fixed charges almost immediately. The other is that the rates should not have been increased but that the resultant deficits should have been borne out of the national treasury and the treasury of the Canadian Pacific Railway respectively. Both are equally unsound and as usual the correct course is to be found somewhere between the two extremes. It would be quite improper that you and I and all individuals and companies should be taxed more than they otherwise would be taxed so as to enable shippers of freight to have their produce transported at rates which are less than reasonable. It would be equally improper that the whole burden of maintaining National Railways should immediately be placed upon those who utilize the properties because in the position of that company with its numerous added properties, built not for co-ordination but for competition, it should not be expected to become paying until the development of the country caught up with the extensive over-construction.

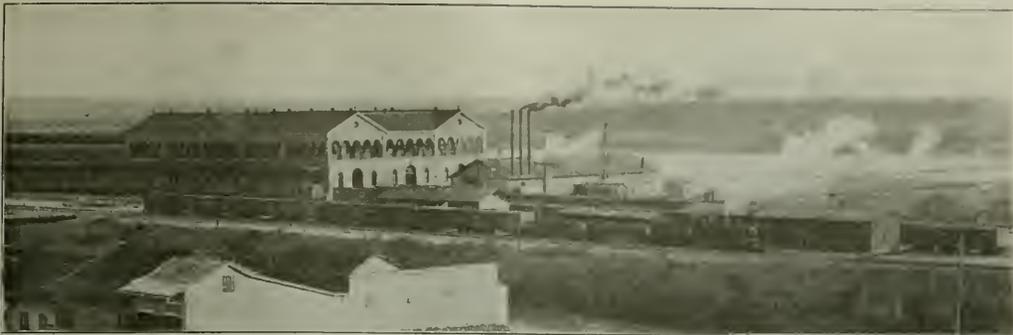
While it is, in my opinion, not desirable that governments should intervene in railway administration unless forced to do so, it has one immediate result in enabling them, and through them the people they represent, to appreciate in a fuller measure and in a greater degree the difficulties involved in railway administration, and the burden imposed by unsuccessful operation.

A Recent Misapprehension

The recent temporary advances in freight rates and passenger rates have been, I think, somewhat seriously misapprehended in many places in Canada—a misapprehension which would be removed by a closer scrutiny of the conditions under which the operations are now being carried on and would result in a more generous attitude towards the railway companies.

One of the small beginnings which have added to the difficulty of the railway situation in the United States was this very lack of appreciation of the railway companies' needs by public tribunals up to the year 1917. The railways were not altogether free from blame in bringing this about, because initially their attitude of inelasticity in dealing with the public developed a sentiment which found reflection in the Acts of Congress relating to transportation and to the administration under those Acts of the Interstate Commerce Commission. That commission seemed, in former years, to regard it as its paramount duty to permit the railways to suffer if by so doing the interest of the public was temporarily advantaged. Obviously this was an incorrect view, the duty of any commission so established being to protect the interest both of the companies and the proprietors of them and the public, rather than that their influence should be directed in favor of either one or the other of the parties in any controversy affecting the railway and the public.

*Extracts from an article in the annual Financial Survey of the Toronto "Globe."



Custom House and Freight Train. National Railways of Mexico, Tampico, Mex. Photo Copyright, Underwood & Underwood

The Present Railway Condition in Mexico

Capital Needed for Rehabilitation of Motive Power and Cars and Expansion of Facilities

By W. M. Whitenton

Assistant Chief Operating Officer, Missouri, Kansas & Texas

THE WRITER recently returned from a two weeks' trip covering approximately 3,000 miles of railroad in the Republic of Mexico, entering through the Laredo gateway and returning through the Eagle Pass gateway, visiting the cities of Monterey, San Luis Potosi, Mexico, Guadalajara, Aguascalientes, Durango, Torreon and Monclova.

The last time previously that I was in the Republic of Mexico was in the Spring of 1908. Naturally, I was interested in the changes which have taken place since that time. My greatest surprise was in finding the roadbed of the lines over which I traveled in such a good physical condition. Most of the line from Laredo to Mexico City is laid with 85 lb. rail, in good condition, with good joints, ample ballast and ties. Considerable work has evidently been done on this track during the past five or six months, as the line, surface and drainage, is excellent. Our train jogged along at a speed of 40 to 55 miles per hour with comfort.

Between Mexico City and Guadalajara, Aguascalientes and Durango, and Durango and Torreon, there is a mixture of 75 and 85 lb. rail, all in very good condition, but the track does not show the excellent condition which prevailed so noticeably between Laredo and Mexico City, although there is no "real bad track." Some of it has good ballast, while there are stretches where there is no ballast.

The line between Torreon and Monclova is in good ordinary condition—75 lb. rail and fairly good line and surface—but it shows evidence of insufficient tie renewals. Between

Monclova and Eagle Pass the line is light 56 lb. rail which is in need of ties, and the banks are narrow. This is the poorest piece of track I saw on the entire trip.

Bridges in the Durango-Torreon district suffered a great deal from the revolution. All the wooden structures were destroyed; some of them several times. They have been rebuilt, however, but in many instances only temporarily. A good many of the steel structures were dynamited and damaged by various other means. Most of these have been replaced and repaired.

Summing up the track conditions, I would say that it will, on an average, compare favorably with much of the track in the United States, and is capable of sustaining a considerable traffic, provided it is given a reasonable maintenance allowance.

Station and shop buildings, roundhouses, and various other similar facilities, in the territories where the revolution dominated, show considerable damage; in many instances they were entirely destroyed. It will require a considerable expenditure to replace these facilities. There has been

no real progress made the past ten years in the way of additional tracks, yards, station buildings, etc.

The Aguascalientes shop, ten years ago, would have been considered a modern shop, capable of turning out 25 locomotives per month in classified repairs; the car shops capable of taking care of several hundred cars in heavy repairs. At the present time they are working approximately 2,200 men in both the locomotive and car departments, averaging about 20 locomotives per month and repairing several

THE TRACK conditions compare favorably with much of the track in the United States.

The greatest need is for equipment and rolling stock, the roads having suffered a loss of about 10,000 freight cars and 400 locomotives during the revolutionary period. A considerable amount of passenger traffic is being handled in box cars.

The present railroad administration is up-to-date.

Friendly feeling expressed toward our country.

hundred cars, which is a fairly good output for the plant.

The greatest need of the railways of Mexico is equipment and rolling stock. The lines suffered a loss of about 10,000 freight cars and about 400 locomotives during the revolutionary period. They now have about 350 locomotives awaiting shop, and have a shop capacity of about 75 locomotives per month provided they could get material with which to carry on the work. Labor is plentiful.

There are many hundred remnants of destroyed freight cars. These have all been gathered and assembled at certain convenient points and will be repaired as funds can be provided for this class of work. The passenger equipment is in rather deplorable condition, due to lack of repairs during the past ten years, and a large amount of the passenger traffic is being handled in box cars.

One rather unusual thing is the fact that passenger fares in Mexico have not been changed for more than 25 years; however, it is the opinion that the rates will be increased about the first of January. Freight rates, like ours, have increased the past ten years, and they are on a fairly remunerative basis.

Labor organizations in Mexico are well founded. All of the different crafts and classes are organized and have their general chairmen and committees the same as we have them in the United States. Train service employees receive good remuneration. Station and yard employees are also on a good basis. The shop crafts and track laborers, however, have not been so well taken care of, but are on a fair living wage considering conditions and surroundings.

The present railroad administration is up-to-date and composed of practical men. The director general is a man of about 22 years' experience, having been trained in the early days under the leadership of American railroad men, and for the past few years he has been superintendent and general superintendent of part of the National Lines. He appears to be a man well versed in railroad operation. His

National Lines system. One of these is a yardmaster by the name of Clark, at Durango, and another is R. E. Comfort, terminal superintendent at Vera Cruz.

As I view the situation the crying need of the Mexican railways is capital for the rehabilitation of the rolling stock and motive power and the expansion of facilities in order to take care of what must necessarily follow a stable government—an increased volume of traffic.

I found a most friendly feeling expressed everywhere for the United States and for the Americans. Peace and quiet prevailed everywhere during the entire trip and the only evidence of revolution to be seen were the scars which have been left behind. I am of the opinion that the present government is the strongest that has been in power since the abdication of the old Diaz regime and with proper support I am confident it will be friendly to the United States and that the railroads of this country can well afford to assist the railroads of Mexico in getting on their feet and in opening their transportation and traffic gateways.

Car Loading Decreases

WASHINGTON, D. C.

THE NUMBER OF CARS loaded with revenue freight during the week of December 23 was less than for any week in 1920 except one week during the switchmen's strike last April, according to the weekly report of the Car Service Division of the American Railway Association. The total was 639,275, as compared with 684,784 in 1919 and 549,975 in 1918. The heavy reduction as compared with the week before was due to the Christmas holiday but this is also the second week in which the loading has fallen below the total for the corresponding week of 1919. For the week of December 18 the loading was 796,858 cars. The summary of the report follows:

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO, FOR WEEK ENDED SATURDAY, DECEMBER 25, 1920

Districts	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Misc. L. C. L.	Miscellaneous	Total revenue freight loaded			Received from connections		
										This year	Corresponding year	Corresponding year	This year	Corresponding year	Corresponding year
Eastern	1920	4,609	2,386	46,064	1,446	5,525	1,026	38,297	52,410	151,763	167,094	140,235	202,174	218,629	203,715
Allegheeny	1920	2,351	2,807	54,565	6,311	3,062	3,254	31,173	44,928	108,341	144,245	133,260	112,133	112,890	143,205
Pocahontas	1920	81	93	17,255	336	1,404	118	2,092	4,398	25,777	22,327	15,973	15,095	16,408	17,015
Southern	1920	2,504	1,696	23,793	710	13,142	1,658	30,166	23,705	99,374	106,618	72,265	61,631	73,858	55,720
Northwestern	1920	8,659	5,156	7,848	1,328	8,252	1,105	20,894	17,889	71,131	87,337	77,463	40,313	52,505	58,613
Central Western	1920	8,047	6,741	22,603	316	2,767	1,908	23,499	26,868	92,749	103,095	74,935	65,049	49,275	49,275
Southwestern	1920	2,896	935	5,150	509	5,162	448	12,797	22,123	50,050	51,168	35,844	39,638	49,275	35,059
Total all roads	1920	29,147	19,814	177,308	10,956	39,314	9,497	158,918	194,321	639,275	684,784	549,975	514,363	588,644	637,578
	1919	33,202	27,762	165,876	8,836	41,920	9,326	131,423	266,439	796,858	806,734	796,116	587,099	614,178	683,649
	1918	37,109	30,903	203,228	15,643	53,971	27,195	195,571	281,542	872,612	789,286	837,806	605,876	589,350	657,578
	1918	33,922	29,844	205,985	14,338	50,154	31,445	173,959	258,027	797,673	735,287	604,966	611,793	641,479	641,479
Increase compared	1919	4,055	7,948	11,432	2,120	2,606	171	27,495	72,118	45,509	89,300	74,281	48,239	48,239	48,239
Increase compared	1918	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Increase compared	1918	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

L. C. L. merchandise loading figures for 1920 and 1919 are not comparable as some roads are not able to separate their L. C. L. freight and miscellaneous of 1919. Add merchandise and miscellaneous columns to get a fair comparison.

December 18	35,505	30,470	223,153	12,750	48,626	14,127	186,997	245,230	796,858	806,734	796,116	587,099	576,770	672,533
December 11	36,820	31,799	230,396	13,904	51,194	17,673	193,143	259,968	834,897	761,940	820,202	614,178	596,785	683,649
December 4	37,109	30,903	203,228	15,643	53,971	27,195	195,571	281,542	872,612	789,286	837,806	605,876	589,350	657,578
November 27	33,922	29,844	205,985	14,338	50,154	31,445	173,959	258,027	797,673	735,287	604,966	611,793	641,479	641,479

official staff, in most instances, are apparently capable men, all of them having come up through the ranks. The employees are made up entirely of Mexicans, there being only two or three Americans in railroad service on the entire

The number of surplus cars continues to increase. For the week of December 23 the total was 127,723, while there were scattering shortages, particularly in the coal fields, of 9,056 cars.



Great Eastern Continental Express

English Railway Developments During 1920

Freight and Passenger Rates Increased—The Minister of Transport Outlines the Future Policy

By Robert E. Thayer
European Editor of the *Railway Age*

LONDON, England, December 10, 1920.

THE YEAR 1920 will stand as the second year of a period of the greatest moment in English railway history. It may logically be compared to the year 1919 for American railways. It has been a period of study and investigation looking forward to a future railway policy which bids fair to upset and wholly revolutionize all English railway traditions. It has been a "Ministry of Transport" year rather than a "railway" year. By that is meant that practically all of the developments that have occurred during the year have emanated from the Ministry of Transport rather than from the railways. This demarcation between the Ministry of Transport and the railways is made advisedly, for, unlike the United States Railroad Administration, the Ministry of Transport has held itself aloof from the direct control of railway operation. It has confined its activities more particularly to a study of the broader phases of the subject and the initiation of general policies while the railway managements have operated the roads.

The development during 1920 may be summed up briefly as follows: The Ministry of Transport has been busy formulating a plan for the future of the railways; it has increased

both passenger and freight rates; it has inaugurated a system of statistical reports which are published regularly in four-weekly periods; and it has appointed committees to investigate

electrification problems, standardization, automatic train control, complete revision of the rate structure, railway agreements made during the period of government control, etc. According to opinions of a large number of people, it has been making a strong endeavor to establish the Ministry of Transport as a permanent institution in the English government. On the other hand the railways have been carrying on, improving and reconstructing their plant as best they might to bring it back to pre-war conditions. There has been no real development along the lines of capital expenditures because of the uncertainty of the future, the railways naturally holding all new developments in abeyance until a definite railway policy is evolved by the government.

The year has shown an improvement in general railway conditions in the matter of permanent way, rolling stock and improved freight and passenger carrying capacity, for which the railways themselves are primarily responsible. Sir Eric Geddes, minister of

THE ENGLISH railways have handled more freight and passengers during 1920 than ever before.

The Ministry of Transport has outlined proposals for the future control of the railways which must shortly receive consideration in Parliament. It includes a grouping of the roads, employee representation on the boards, rate fixing machinery, and other provisions which tend toward nationalization, although during the past year the nation rejected railway nationalization.

transport, recently said in Parliament that in spite of the depleted resources and various dislocations due to the war, vastly greater freight and passenger traffic has been carried than ever before in the history of the English railways. There was considerable congestion in freight traffic at the beginning of the year, but this has greatly improved, until now the congestion is not bad enough to warrant wholesale criticism in the press, as at the beginning of the year.

Discussion of Future Problems

By far the most interesting development during the year has been the discussion of the future railway policy to be adopted by the government. The Ministry of Transport published not long ago a brief report outlining proposals as to the future organization of transport undertakings in Great Britain. This has been taken as defining the policy the government is to follow in its presentation of a final transport bill to the English Parliament within the next few weeks. The proposal is: to group the roads; to provide for each group a board of management, in which the representatives of labor shall participate; to prescribe rates with a provision for government participation of profits above a certain net return on those rates; to provide a method of handling all rate questions; to provide a method of handling wages and working conditions, and to increase further the powers of the state in relation to the railways.

Grouping—It is proposed to group the railways into seven distinct groups. The method suggested in this instance is geographic rather than economic, there being a Southern, Western, Northwestern, Eastern, Northeastern, London, and Scottish group. It is proposed that all the railways included in each of these sections of the country shall be amalgamated under one group management. Since this report has been issued there has been a severe criticism of the geographic arrangement. It would entirely eliminate all competition except possibly along the boundaries of the groups. By placing all the Scottish railways in one group it is claimed they would be bankrupt under the rates and labor conditions prevailing at this time. With wages standardized, the wage bill of the Scottish railways has been increased in much greater proportion to the increase in revenue to be derived from the increase in freight and passenger rates than the English roads. The Scottish railways claim that they could not live under such conditions. Furthermore, the public, particularly the shippers, is not ready to eliminate competition entirely.

Substitute proposals have, therefore, been brought forward from various sources based upon economic considerations, and which serve to retain a competition which it is quite agreed must exist if railway transportation is to progress. In these counter proposals a north and south grouping has been suggested, amalgamating certain of the Scottish lines with certain of the English lines so that there would at least be two competitive groups running from the south of England to the north of Scotland.

Management—The Ministry's proposals outline a board of management for each of the above-mentioned groups, to consist of 21 members, of which the shareholders should be in the majority and the rest divided, one-third being administrative officers of the group, and two-thirds representatives of the workmen. The railway stockholders have evinced much opposition to this proposal, claiming that employee representation on management councils is one thing, but on a directors' board entirely different. This point will be strongly contested when the final bill is presented to Parliament.

Finance—The Ministry's proposal in regard to finances is that rates and fares shall be fixed at such a level as, with sufficient and economical management, will, in the opinion of a prescribed authority, enable railway companies to earn a net revenue substantially equivalent, on some pre-war basis, to the combined net revenue of all the companies absorbed

in the group. Further, it is stated that in case the pre-war return of the railways in the new groups is exceeded the state should participate in such surplus revenues, which should be used for the purpose of assisting the backward districts in developing their transportation system, to developing small railways, and for other appropriate purposes in connection with transportation.

Rate Fixing Machinery—It is generally admitted that the basis on which the existing railway rates and charges are fixed is quite unsatisfactory and that it does not meet present conditions. The Ministry is now reviewing the situation and plans are in progress for bringing the whole rate question up-to-date. In the contemplated legislation the Ministry proposes to establish a body similar to the present Rates Advisory Committee, to consider all rate questions. The Ministry does not propose to include any guaranteed financial assistance to the railways in the future but proposes to regulate the railways' income through this rate-making body. In case the railways should not accept any decision of the rate-making body, it is proposed to grant them the right of appeal to a judicial tribunal.

Wages and Working Conditions.—In this preliminary report the Ministry states that it is the intention to continue the arrangement now in effect for dealing with railway wages and conditions, namely, that two boards shall be established, the Central Wages Board, consisting of equal numbers of managers and men, and the National Wages Board, consisting of four managers, four representatives of the men and four representatives from the users of the railways, with an impartial chairman. The latter board is to act as a board of last resort. In the case of a request for an advance in wages of the railwaymen during May of the past year, the National Wages Board was called into action and served its purpose admirably.

Powers of the State.—The Ministry outlined certain state powers which should be included in the final railway bill which may be classified as follows:

- (a) The protection of the public.
- (b) The economical working of the railway systems of the country.
- (c) Safeguarding national interests.

Under the first heading the state would be given power to require adequate service and facilities and minor extensions wherever it was deemed necessary. However, the group affected by such demands would be given the right to appeal to a prescribed tribunal in case such demands would seriously interfere with its finances. Likewise it is planned to give the state, under the same right of appeal, power to require alterations, improvements, and additions necessary for public safety.

Under the second heading it is planned to give the state the power to impose standards, granting the right of appeal to the companies. The state also would have the right to require co-operative operation, common use of rolling stock and facilities, pooling of traffic and receipts where competition caused waste, and the common use of repair and manufacturing facilities. Furthermore, it is claimed under this heading that the government should have the full power to prescribe the form of accounts and to require compilation of such statistics and returns as are deemed necessary.

Criticism of the Ministry's Plans

Under the third item, the railways would be required to submit for approval to the government their proposals involving capital expenditures and their plans for raising the capital required, with further power to require adequate reserves for depreciation and renewals before dividends are declared. This also would be subject to a right of appeal by the railway companies.

The above outline of what the Ministry proposes the gov-

ernment should do was published during the summer. Needless to say it has been given the closest and most careful consideration, not only by the railways, but by the industrial interests. The railways, through the Railway Companies' Association, have but just published their criticism of the proposed plans. An abstract giving the general trend of this criticism, which is addressed to the Minister of Transport, is given below:

The railways feel that if the government is to insist upon grouping the railways the principal considerations should be the securing of financial equilibrium within each group. The plan outlined by the Ministry they believe will not achieve this object and they submit an alternative scheme of five groups in contrast to the Ministry's seven groups. The railway companies approve of the Western, Southern and the London groups, as defined by the Ministry, but suggest dividing the Scottish group so that the Caledonian, Glasgow & South Western and the Highland would be included in the government's proposed North-Western group, and that the North British (Scotland) and the Great North of Scotland should be included in a single group with the Ministry's Eastern and North Eastern groups. This gives two competitive groups from London to the North of Scotland. The companies believe that economy will result from a suitable scheme of grouping but not to the extent contemplated by the Ministry. They believe the amalgamation of capital in these groups should be optional and not compulsory; that the "worked lines" should be acquired by the working companies or the groups of companies either on a perpetual lease or by purchase, and that there necessarily would have to be a rearrangement as to joint lines now operated by railroads which would come in the different groups.

The railways will strenuously oppose any suggestion that "workers elected by the workers" shall be appointed to the boards, believing that it is wrong in principle, that it would greatly disrupt discipline and furthermore that it is entirely wrong for the government to insist on any such plan which would interfere with the right of the shareholders to choose their own directors while it, the government, refuses to accept any financial responsibility. The railways quite agree, however, that advantage is to be obtained by some association of the workers with consideration of operating problems, but these should be in the nature of committees to meet under the chairmanship of a director to consider and make recommendations to the board.

In commenting on the Ministry's proposals under the head of finance and rate fixing machinery, the railways call attention to the ambiguity of the government's proposal of fixing rates and fares so that the net revenue substantially equivalent to some prewar basis is to be earned, stating that if the rate of return on capital is not to exceed the prewar rate it would be impossible, on any reasonable terms, to procure additional capital, but if it is proposed to consider net revenue on railway investments in the same relation to other industrial investments as in prewar days it would be a different matter. The railways dispute the ground upon which the state could claim participation in any surplus revenue earned by the railways and protest further that the state is not justified in claiming participation in surplus profits when it will accept no responsibility in respect to loss of revenue due to circumstances over which the railways have no control.

Furthermore, as the railways believe that any bill the Ministry may choose to place before the Parliament cannot become a law at the earliest until June or July, 1921, and that so many serious problems will arise as a result of it, they advocate that grouping should not be compulsory before the beginning of the year 1924. In the meantime the railways propose that the government should continue the present financial agreement and guarantee to the railways the 1913 net receipts. As regards rates the railways strongly object to the Minister of Transport having the right to refuse an advance in rates, and claim that the object in view can be secured if the Minister is to have the right to appear before the "rate-fixing tribunal" proposed by the government, for the purpose of challenging the careful and economical management of the railways seeking the increase in rates.

As regards wages and working conditions, the railways

oppose the Minister's proposal to continue the Central Wages Board and the National Wages Board with the powers they now hold, as it takes from the railways the power of dealing with their own men and for setting up their own machinery for settling disputes. It would also tend to establish as a permanent arrangement the standardization of wages and conditions of service without taking into consideration the different conditions that apply to different parts of the country, which in the opinion of the railways is wrong in principle and uneconomic in practice. In lieu of the Ministry's proposal, the railways suggest the system of Conciliation Scheme Boards which were first established in 1907.

In criticizing the Ministry's proposals regarding the powers of the state, the railways say they will oppose to the utmost any such conditions as enumerated by the Ministry. For the state to have power to require adequate service and facilities and minor extensions, the railways say, would be entirely inconsistent with the principle of private management and the responsibility for capital expenditure. For the state to impose standards is likewise incompatible with lack of responsibility for expenditure on the part of the state. Furthermore, by grouping the railways, standardization will tend automatically to take care of itself. As regards the form of accounts, the railways believe that if the government desires anything different from that already compiled for the shareholders of the railways, the cost of preparing such information should be charged to the state. Regarding state approval of capital expenditures, the railroads feel that this would take away from the boards the control of finance and they strongly object to this proposal. They agree, however, that the state should have the right to demand information regarding depreciation and renewal funds in order to assist the rate-fixing tribunal in establishing adequate rates.

The Shippers' Viewpoint

The industrial interests also have had something to say regarding the Ministry's plans. The Association of British Chambers of Commerce and the Federation of British Industries have been the leaders in this criticism. The Association of British Chambers of Commerce has adopted and forwarded to the Minister of Transport a report drawn up by a special committee appointed by the association to consider the proposals. As an indication of how the British industries feel a brief abstract of this report is given below:

While the committee welcomed the statement that the Minister of Transport and the government are opposed to nationalization of the railways, it regards the proposals outlined by the Minister as possessing many of the defects of nationalization without the responsibilities of the state which would attach to actual nationalization. It believes that the future powers in relation to railways should be vested in a body not liable to be influenced by political considerations. It advocates replacing the functions of the Ministry of Transport by a joint railway authority on which all interests might be represented.

As regards the grouping scheme, the committee believes that it will result in increased charges for both passenger and freight owing to the entire elimination of competition in any particular district, and while it agrees to the beneficial effect of grouping, such grouping should not be allowed to result in the elimination of competition.

The committee is opposed to the joint management committee as outlined, believing that these boards should be elected by the owners of the railways in the ordinary way. The committee does not question, however, but what representatives of the workers could work to good advantage on advisory committees in regard to the efficient and economical working of the railways, such committees being subordinate to the joint management committees.

It is believed that difficulty would be encountered in raising capital if the spending of such capital came under the jurisdiction of a board not made up entirely of men directly responsible to the providers of that capital. The committee states that the railways should be left to work out their own salvation in raising capital, sufficient opportunity being given to them to earn profits which will produce a satisfactory return to the investing public, and it deprecates any scheme of government loans for the capital requirements of the companies.

By placing the development of railways under the control

of the government, as outlined above, the committee believes that it would probably lead to the use of political pressure, which purely on economic grounds would not be justified.

In commenting on the manner in which the Ministry proposes to handle wages and working conditions, the committee calls attention to the fact that economic conditions of the country must determine the wages and conditions of employment of all workmen, and any permanent machinery which may be provided must not be for the purpose of attempting to circumvent the operation of economic law. It believes that the National Wages Board as now constituted should be regarded as only a temporary expedient to meet an emergency.

As regards the future powers of the state, the committee believes that the prewar control exercised by Parliament through the Board of Trade amply protected the public and that economical working of the railway systems might well be left to the companies of the groups themselves. Likewise standardization should be considered and provided for by the groups.

Labor Promises "Big Fight"

Labor has not been standing passively by while industry expressed its views on the Ministry's proposed joint management scheme. Within the past few weeks J. H. Thomas, the real leader of the railwaymen, made a strong statement in which a "big fight" is promised should the government not grant labor representation in railway management. Labor has, in the plans issued by the Ministry, a strong ground to stand on.

It will thus be seen that while the past year has had its interesting features, the new year will possibly far surpass it in interest and excitement. To prepare the public for the final introduction of a plan for the future organization of the railways, the Ministry of Transport has been doing a rather extended amount of propaganda work. The daily newspapers have been used to a great extent and as this article is being written a series of unsigned articles entitled "The Future of British Railways" is being published in one of the principal morning papers, the context of which leaves no question of a doubt as to its coming directly from the Ministry of Transport. Throughout the year the Ministry has not neglected many opportunities for free advertising.

The railway owners, on the other hand, have held aloof from following in its steps. The atmosphere at present is far from being pleasant and the railway owners, and also the railway managements, are not nearly so enthusiastic about the Ministry of Transport as they were when the ministry was formed 18 months ago.

Financial Standing of the Railways

From the time the government took over the railways, five days after the beginning of the war, and up to the end of 1918, there was a profit shown to the government in receipts over expenditures after all dividend guarantees had been paid, but during that time there had been gradually accumulating a bill for deferred maintenance under the various agreements made between the government and the railways. During the past two years some attempts have been made to write this off the books. In 1919 a total of £60,000,000 was provided to meet the demands of these agreements, and for the year 1920-21 the budget called for £22,000,000 for arrears on maintenance and renewal of works and for interest on capital expenditures. This, however, does not represent the full amount that must be paid by the government to the railways, for, under the agreements, the government must turn the roads back to their owners with the same amount of material, or its equivalent in cash under present-day prices, in accordance with the inventory that was taken at the time the government first took over the roads. A committee is now working on this complicated problem, and, while no definite statement has been made, it is estimated that a large amount of money is involved.

The report recently issued by the Ministry of Transport shows how the railway budget has changed, considering a

full normal year under present conditions, in comparison with the pre-war year of 1913. This comparison is shown in Table I, and it will be noted that the expenditure has increased 236 per cent. According to these figures, the sources of revenue bear practically the same proportion to each other for both periods, but it will be noted that there is a vast difference in the proportions on the expenditure side. Labor, in 1913, represented 34.8 per cent of the total railway expenditure. For a full normal year, under present conditions, labor's proportion is 51.5 per cent, an increase

TABLE I—A COMPARISON OF THE RECEIPTS AND EXPENDITURES ON BRITISH RAILWAYS FOR A FULL NORMAL YEAR UNDER PRESENT CONDITIONS AND THE YEAR 1913

	Receipts		Under existing conditions	
	1913			
	Amount in Pounds Sterling	Percent- age of total	Amount in Pounds Sterling	Percent- age of total
Passengers	44,000,000	32.6	105,000,000	33.0
Parcels and freight.....	78,000,000	57.7	188,000,000	59.2
Other sources	13,000,000	9.7	25,000,000	7.8
Total	135,000,000	100.0	318,000,000	100.0
	Expenditure		Under existing conditions	
	1913			
	Amount in Pounds Sterling	Percent- age of total	Amount in Pounds Sterling	Percent- age of total
Labor	47,000,000	34.8	164,000,000	51.5
Coal stores and materials.....	33,000,000	24.5	92,000,000	29.0
Sundries	8,000,000	5.9	14,000,000	4.4
Total working expense.....	88,000,000	65.2	270,000,000	84.9
Interest on capital.....	47,000,000	34.8	48,000,000	15.1
Total	135,000,000	100.0	318,000,000	100.0

Note—The figures for the year 1913 are actual (approximately), but those shown as "Under Existing Conditions" are necessarily estimated. The sum total, £318,000,000, is that sum which must be obtained to avoid a loss which would fall upon the taxpayer.

of 48 per cent over its proportion in 1913. Likewise, attention should be called to the large decrease in interest on capital.

In anticipation of returning the roads to their private owners next August, when the term of the Ministry of Transport expires under the Transport Act, the Ministry has resorted to a unique arrangement in an endeavor to turn back the roads with all deficits wiped out. It so increased passenger and freight rates during the past year, as not only to cover operating expenses up to August 15, 1921, but also to absorb all previous deficits, the intention being that by that time the Rates Advisory Committee would have had sufficient time to formulate a new system of rates which would provide sufficient revenue to meet the current expenses and provide an adequate return on capital invested. The Ministry's estimates have been quite upset, due to the recent coal strike, which resulted, according to the Minister of Transport, in an estimated loss of £8,000,000, and which will have to be absorbed by the government, inasmuch as the rates are not sufficient to cover this added loss.

What the real financial condition of the roads will be when the government turns them back (if it does) it is impossible to predict at the present moment, as much will depend upon the legislation that is passed by Parliament. But what the British public thinks of the railways as an investment, and the confidence it has in the government to return them to the owners on a sound financial basis, is reflected to some extent in the present prices of railway stocks. Table II is shown comparing the high and low values of certain railway securities in 1913, with the average value of the same securities on December 6, 1920. A casual glance at this table will show that the 1920 value is more than 50 per cent under the high quotation in 1913, and, furthermore, the investing public has less confidence in the Scotch companies than in the English companies.

Passenger and Freight Rates Increased

During the past year there have been two increases in freight rates and one in passenger fares. The freight rates were increased, for the first time since the beginning of the war, on January 15, 1920, an average of 50 per cent being applied to existing rates on all classes of minerals and merchandise with the exception of manures, basic slag and lime for agricultural uses. This was applied to cover an estimated annual deficit of £50,000,000. This increase included also an increase in rates on parcels and freight carried by passenger train.

On further investigation it was found that the additional revenue derived from this increase of rates was not sufficient to offset the heavy deficits which were constantly increasing. On August 16, 1920, a general increase of 16 2/3 per cent on the then existing passenger fares was made which, to-

crease of passenger fares, believed that it was feasible to grant some excursion rates, regardless of the fact that passenger traveling throughout Great Britain had increased materially over 1913 at the ordinary fares. In response to the suggestion of the committee third class excursions were inaugurated over the week-ends on certain lines during the summer months, in which the round trip was made for the price of a single fare. These reduced fares were restricted to special excursion trains. More recently third-class excursion fares were granted over the Christmas holidays. These excursion fares were permitted on regular trains but were granted only on trips of 100 miles or more at round-trip fares, equivalent to one and one-third times the one-way fare. The Ministry of Transport gave as the reason for restricting these excursion fares to trips of 100 miles or more, that the shorter trips would be made anyway, and a concession was given on the longer trips in an endeavor to induce travel.

Reference was made in the preceding paragraph to the increase in passenger traffic over 1913. Figures presented by Sir Herbert Walker, general manager of the London & South Western, to the Rates Advisory Committee, showed that 1,066,000,000 passengers traveled on the controlled railways at ordinary fares in 1919, as against 818,000,000 traveling at ordinary and excursion fares in 1913; passengers traveling at workmen's fares increased from 255,000,000 in 1913, to 411,900,000 in 1919, and the number of season tickets increased during the same period from 569,310 to 901,082.

At the beginning of the year when freight congestion was very bad, an attempt was made to relieve the situation by increasing the demurrage rates. Before this increase was put into effect, the demurrage rates were the same for each day the cars were held out of service. The new rates doubled the old rates for the first two days and trebled the old rates for each subsequent day. It was expected that this would relieve the situation, but the records of the following months showed that it did not have as great an effect as desired. The following table gives an indication of the results obtained, the percentage shown being the percentage decrease in the number of cars held in demurrage as compared with December, 1919, the month before the increase in demurrage rates went into effect:

January	27 per cent decrease	June	21 per cent decrease
February	39 per cent decrease	July	26 per cent decrease
March	37 per cent decrease	August	17 per cent decrease
April	34 per cent decrease	September	24 per cent decrease
May	29 per cent decrease		

One reason why the railways did not benefit to a greater extent on the increased demurrage rates is because of the fact that about one-half of all the freight cars in Great Britain are not railway owned cars. Before the Transportation Act of 1919 went into effect the Minister of Transport strongly advocated the railways taking over these privately owned freight cars, but because of the great opposition raised by the industries owning them, nothing has been done as yet in this respect.

Labor Conditions

The labor conditions were mild in 1920 as compared to 1918. There were a few isolated strikes, barely worth mentioning, which were promptly settled. The reason for the lack of any large amount of disturbance is that railway labor was receiving the benefits of the settlement of the 1919 strike, and the machinery in the form of wage committees set up as a result of the 1919 strike.

In two particular cases there were grave threatenings of disorder. One was in the early summer when the men presented their demand for a blanket increase of £1 a week, and again in October, when a sympathetic strike was threatened to assist the miners in obtaining their demands. In the first case the trouble was overcome by a thorough investi-

TABLE II—COMPARISON OF HIGH AND LOW VALUE OF RAILWAY STOCKS IN 1913 WITH THE AVERAGE VALUE ON DECEMBER 6, 1920, OF SOME OF THE PRINCIPAL BRITISH RAILWAYS

	1913	1920	Percentage decrease*
Caledonian—			
Ordinary stock	79½ — 70	36¼	54
Deferred converted	21¾ — 17¼	7¾	64
Preferred converted	59¼ — 53½	28¾	51.5
Glasgow & South Western—			
Deferred ordinary	44½ — 40½	21½	51.5
Great Central—			
Deferred ordinary	17¼ — 14½	5½	68
Preferred ordinary	39½ — 31½	10½	73.5
Great Eastern	63½ — 44½	30	53
Great Northern—			
Deferred	57¼ — 49½	28¾	50
Preferred	88¾ — 79¼	44½	50
Great Western	119 — 112	7¼	37.5
Lancashire & Yorkshire	91½ — 82¾	53	42
London, Brighton & So. Coast	95 — 86¾	44½	53
London & North Western	136¾ — 125¾	75¾	45
London & South Western	39¾ — 33½	20¾	48
Midland—			
Deferred	77½ — 70	48	38
Preferred	60¾ — 56¾	33	45
North British	32¾ — 26¾	12	63.5
North Eastern	124 — 116½	78½	37

* The 1920 value is compared with the high value in 1913. Note: The average decline in all of the above is 5¼ per cent, and for the three Scottish companies alone is 56.9 per cent.

gether with a 50 per cent increase in passenger fares applied on January 1, 1917, brought the total increase up to 75 per cent of the pre-war rates. On September 1, last, another increase in freight rates was made, bringing the total increase in freight rates up to approximately 100 per cent of pre-war rates. As has been stated, these increases were made, not only to cover current expenses, but to wipe out any deficit that might apply on August 15, 1921, when the term of the present Ministry of Transport will terminate.

These increases in both freight rates and passenger fares are intended only as a makeshift, and the Rates Advisory Committee, which was appointed by the Ministry of Transport, has since been making a thorough investigation of the entire rate problem for the purpose of establishing an absolutely new rate structure. The existing rates in effect on the British railways represent a gradual development from a rate basis established years ago, and it has been thought advisable to go over the whole matter with the idea of removing all anomalies and establishing an absolutely new set of rates to meet the present changed conditions in the commercial life of the country. The Rates Advisory Committee has been holding hearings, calling as witnesses representatives from both the railway and commercial interests. Its report will probably be made during 1921, at a time before the roads are returned to their owners.

The present passenger fares vary anywhere from 5.4 cents to 6.45 cents per mile for first-class passengers, and from 3.11 cents to 3.58 cents for third-class passengers, the transition from pence to cents being based on 1d equals 2 cents. Statistics are not available to show the average revenue received per ton-mile for the latest increase in freight rates.

The Rates Advisory Committee, in its report on the in-

gation of the railwaymen's claims by the National Wages Board, which is made up of 13 members, four of which represent the railways, four the railwaymen, four the users of the railways, and an independent chairman. In the second case the sympathetic strike was headed off by the good judgment of the union leaders, although for a time it appeared that the extremists had control. Had not a settlement been reached with the miners at the time it was, there undoubtedly would have been a railway strike.

The railwaymen at the beginning of the year succeeded in getting the wages in the different grades standardized throughout the country. As an indication of how the standard rates are applied, the following figures, showing the standard rates in shillings per week of freight handlers, or "goods porters," as they are called, are given:

Location	Pre-War Rates	Jan. 1920 Rates	Minimum Rates
London	20s. to 24s.	61s.	47s.
Other large towns	20s. to 26s.	60s.	46s.
Small towns	20s.	57s.	40s.

Note.—The January, 1920, rates give the weekly wages of these men at that time with the stipulated increased cost of living adjustment. The minimum rates show the limit to which the weekly wage of these men can fall regardless of the cost of living.

It may be said in passing that this standardization in wages has presented a serious problem for the Scottish railways, where traffic is very much smaller than on the strictly English roads.

The hearings before the National Wages Board on the demand of the railwaymen for the blanket increase of £1 per week applied to all members of the union with the exception of the shopmen, whose claims were handled in the Industrial Court. This new demand was not based on the cost of living, and was considered by the railwaymen wholly apart from settlement of their wages as a result of the September, 1919, strike. Their claim for the £1 a week increase was based on a comparison with wages paid in other industries. The hearing lasted for a little less than a month, in May and June. The award granted varied from four to seven shillings on the part of the enginemen in contrast to the twenty shillings, or £1, demanded, and from 2½ shillings, to 7½ shillings for the railway workers of other grades. The smallness of the award as compared to the demand, speaks well for the work of the National Wages Board.

During the past year there has been an interesting development of the "eight-hour day." It seems that the railwaymen have been seeking to fill in their spare time outside of their prescribed eight hours' work on the railway by seeking outside jobs. The matter came to such a pass that C. T.

some of them were filling in their spare time as musicians, painters, etc.

Mr. Cramp says: "It will be apparent that this union (National Union of Railwaymen) did not fight for and obtain the eight-hour day for railwaymen in order that they should find spare time employment and so prevent other men from obtaining a living."

J. H. Thomas, member of Parliament and secretary of the National Union of Railwaymen, in a talk before the International Transport Federation, recently convened in London, predicts a "big fight" in the next few months over a new stand that the railwaymen are going to make. He said: "We have fought for hours and wages, and we have succeeded in reducing our hours and increasing our wages, but we still believe that the workers' part in life ought not to be that of hewers of wood and drawers of water. We believe that we can contribute something to efficient railway management." Mr. Thomas referred to the bill which will shortly be put forward in Parliament on the future railway policy. He gives warning that the railwaymen will fight hard for participation in any board formed for the control of the railways in the final scheme adopted. In this he has received encouragement from the Minister of Transport through a published outline of what the government believes is a solution of the railway problem, in which it is stated that:

The Board of Management should, in the opinion of the government, be composed of representatives—

- of the shareholders, who should form a majority on the board, and of whom a proportion should hold large trading interests;
- of employees, of whom one-third might be leading administrative officials of the group, to be co-opted by the rest of the board, and two-thirds members elected from and by the workers on the railway.

With encouragement of this sort coming from the Minister of Transport, there is not much likelihood of the railwaymen allowing such an opportunity to pass without a fight, irrespective of how unpalatable such an arrangement might be to the real owners of the railways.

Statistics

One of the first things the Minister of Transport did after assuming office was to set to work towards establishing a uniform method for the compilation of statistics for the various roads throughout the country. The first of these was published in February, containing statistical information for the four weeks ending February 1. These all applied to

TABLE III—FREIGHT STATISTICS PUBLISHED BY THE MINISTRY IN FOUR-WEEKLY PERIODS

	Ending Feb. 1, 1920	Ending Feb. 29, 1920	Ending March 28, 1920	Ending April 25, 1920	Ending May 23, 1920	Ending June 20, 1920	Ending July 18, 1920	Ending Aug. 15, 1920	Ending Sept. 12, 1920
Net ton miles—revenue freight (millions)	1,487	1,511	1,546	1,391	1,523	1,430	1,507	1,348	1,439
Average length of haul (miles)	56.60	56.99	58.04	57.98	58.03	58.30	58.60	58.56	58.31
Gross freight train receipts per ton-mile (pence)	1,286	1,618	1,653	1,715	1,57	1,657	1,581	1,706	1,848
Gross freight train receipts (less cost of collection and delivery) (pence)	1,164	1,485	1,529	1,576	1,441	1,517	1,441	1,553	1,709
Average train load (tons)	134	134,800	135,94	132,69	135,66	132,84	134,56	130,33	134,32
Net ton-miles per engine hour	410.02	412.37	423.54	423.78	437.09	438.69	445.47	429.89	436.82
Percentage loaded car miles	71.38	71.09	70.89	70.85	70.52	70.38	69.77	69.11	70.47
Average freight car load (tons)	5.51	5.46	5.48	5.44	5.50	5.40	5.47	5.41	5.38
Cars per train	34.03	34.58	35	34.48	35.01	34.95	35.23	34.91	35.48
Average time per day cars in transit (hours)	1.45	1.51	1.49	1.28	1.39	1.28	1.34	1.22	1.36

Note—A "ton" is equal to 2,240 lb. A "pence" is equal to approximately 2 cents.

Cramp, president of the National Union of Railwaymen, found it necessary to address a letter to the members of the union calling attention to the fact that the Agricultural Laborers' Union and the British Gardeners' Association had filed complaints with the N. U. R. to the effect that the railwaymen, after finishing their railway duties, were encroaching upon their fields of activities with detrimental effect to the men in those lines of occupation. Nor were the railwaymen restricting their field to agricultural employment;

freight. Beginning with the first of July a modified table of passenger statistics was included in the report.

These statistics do not include any information regarding the expenses of the railways. They deal primarily with the amount of freight handled under various classified items used in the rate schedule; classified information on engine hours and engine miles; average length of haul; receipts classified under the principal commodities and per ton-mile; average train load, train hours, train miles, and train miles per train

and engine hour; average car load; car miles loaded and empty; car miles per engine hour; car miles per car; average time cars are in transit, switching, etc., and the number of cars per train.

The publication of these statistics has been an absolutely new departure in British railway history and their presentation has not been attended with any great amount of enthusiasm on the part of the railways themselves, which claim that the clerical effort involved to produce them has added about £1,000,000 to railway expenditure. Some of the more important statistics included in these reports are shown in Table III by the four-weekly periods. It will be noted that for the four weeks ending September 12, during which period the last freight rate increase was put into effect, the receipts

TABLE IV—PASSENGER STATISTICS FOR JULY AND AUGUST

	Receipts					
	Number Passenger journeys		Gross (pounds)		Per pass. journey (pence)	
	August	July	August	July	August	July
1st Class..	2,899,747	3,604,047	803,406	936,229	66.49	62.35
2d Class..	585,409	613,395	95,791	96,318	39.27	37.69
3d Class..	143,959,629	148,222,034	9,225,814	9,181,901	15.38	14.87
Total ..	147,444,785	152,439,476	10,125,011	10,214,448	16.48	16.08

per ton-mile showed some increase. There has been a gradual increase in the net tons per engine hour, but as regards the other important items, but little improvement has been shown.

Table IV contains passenger statistics for the months of July and August, which are those that have thus far been made public.

Conclusions

Within the next few months it is anticipated that English railway problems will be at least defined by law if not completely settled. The past year has been a year of probation; the nation has rejected nationalization as such but the government seems to have chosen a policy with nationalistic tendencies. If the proposals submitted by the Minister of Transport are approved by Parliament, Great Britain will have added to its official family another department which will materially add to the overhead of government administration. The disposition of the English public at the present time is very much opposed to any additional government expenditure, and with this disposition so readily expressed as it has been recently, both in Parliament and out, it is extremely difficult to predict just what the nature of the final outcome will be.

Section 10 of Clayton Law Effective

WASHINGTON, D. C.

SECTION 10 of the Clayton act, which became a law on October 15, 1914, but which has been rendered inoperative because of various extensions of the effective date, went into effect on January 1 because President Wilson vetoed a bill passed by Congress to amend Section 501 of the transportation act by extending the effective date of Section 10 of the Clayton act for another year.

A substitute for Section 10 of the Clayton act designed to accomplish the same purpose but in a workable way, drafted by Alfred P. Thorn, general counsel of the Association of Railway Executives, has been introduced in Congress by Senator Frelinghuysen and Representative Esch, and it has been planned to hold hearings on the bill. The action of the President in vetoing the extension will probably hasten action on the substitute. Section 10 provides that carriers shall not have dealings in securities, supplies or other articles of commerce or make contracts for construction and maintenance to the amount of more than \$50,000 in the

aggregate in any one year, with another corporation, firm, partnership or association when the common carrier shall have upon its board of directors or as its president, manager or as its purchasing or selling officer or agent in the particular transaction, any person who is at the same time a director, manager or selling officer of, or who has any substantial interest in, such other corporation, firm, partnership or association, unless such dealings shall be with the bidder whose bid is the most favorable, to be ascertained by competitive bidding under regulations to be prescribed by rule or otherwise by the Interstate Commerce Commission. The Interstate Commerce Commission has prescribed regulations in accordance with the law, which have been suspended from time to time, but which went into effect when the law was made effective by the President's veto of the amendment to Section 501 of Transportation Act.

The Interstate Commerce Commission had submitted a report to the President by which the majority of the members of the Commission approved the extension but four members did not.

The President in his veto message pointed out that the Clayton anti-trust act was responsive to recommendations which he had made to Congress and that one of his recommendations in particular was reflected in Section 10. Continuing, the President said in part:

"The act became law on October 15, 1914, and it was provided that Section 10 should not become effective until two years after that date, in order that the carriers and others affected might be able to adjust their affairs so that no inconvenience or confusion might result from the enforcement of its provisions. Further extensions of time, amounting in all to more than four years and two months have since been made. These were in part due to the intervention of federal control, but 10 months have now elapsed since the resumption of private operation. In all, over six years have elapsed since this enactment was put upon the statute book, so that all interests concerned have had long and ample notice of the obligations it imposes.

"The Interstate Commerce Commission has adopted rules responsive to the requirements of Section 10. In deferring the effective date of Section 10, the Congress has excepted corporations organized after January 12, 1918, and as to such corporations the commission's rules are now in effect. Therefore, it appears that the necessary preliminary steps have long since been taken to put Section 10 into effect, and the practical question now to be decided is whether the partial application of those rules shall be continued until January 1, 1922, or whether their application shall now become general, thus bringing under them all common carriers engaged in commerce, and at last giving full effect to this important feature of the act of October 15, 1914.

"The grounds upon which further extension of time is asked, in addition to the six years and more that have already elapsed, have been stated as follows:

That the carrying into effect of the existing provisions of Section 10 will result in needless expenditures on the part of carriers in many instances; that some of its provisions are unworkable, and that the changed status of the carriers and the enactment of the transportation act require a revision of Section 10 in order to make it consistent with provisions of the transportation act.

"When it is considered that the Congress is now in session and can readily adopt suitable amendments if they shall be found to be necessary, such reasons for further delay appear to me to be inadequate. The soundness of the principle embodied in Section 10 appears to be generally admitted. The wholesome effects which its application was intended to produce should no longer be withheld from the public and from the common carriers immediately concerned, for whose protection it was particularly designed."



Repairing a Railroad in Northern France

Present Condition of the French Railways

Huge Deficits Have Accrued and Labor Troubles, Including the 8-Hour Day, Have Greatly Retarded Reconstruction

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THE PRESENT MILEAGE of the French railways is in round numbers about 26,500 miles. This is divided into seven systems, five of which, the Paris-Orleans, the Paris, Lyons & Mediterranean, the Nord, the Est and the Midi, are operated by private companies under state concessions which expire between 1950 and 1960, at which time these railways, under the terms of the concessions, will revert back to the state. The other two systems are known as the State system, founded in 1878 and extended in 1908 by the purchase of the Ouest railway which has a mileage of about 6,000 miles, and, since the end of the war, the Alsace-Lorraine system which is also worked by the State.

The war put a severe strain on the French railways which I have tried to define in my work "Les Chemins de Fer Pendant et Depuis la Guerre" (Railways During and Since the War).^{*} At the outbreak of the war the financial position of the railways was not bad. The privately operated companies had on an average a surplus while the state operated roads had a large deficit. From both a physical and moral standpoint

the railways were in a satisfactory condition, but the war has accentuated more than ever before the principal defects in the French railway system. The roads all converge on

Paris, they are not properly equipped to handle cross country traffic and are too independent, physically of one another. However, it is to be said that the war found the railways in a good state of repair and with a well trained working force in which the "esprit de corps," was excellent and, as history has proved, they were a powerful aid to the country in winning the war.

Effect of the War on Finances

The war necessarily has had a very bad effect on the financial position of the French railroads. The operating expenses increased in a much larger proportion than the receipts. The operating expenses in 1919 were 461,902,000 fr. (\$92,500,000),[†] or 225 per cent greater than in 1913.

This increase was due partly to the increased expenditures for wages but chiefly to the increased cost of coal. This

THE TOTAL DEFICIT for all the French railways for 1920 will be about \$900,000,000, the operating ratio during the year being in the neighborhood of 125 per cent.

The total number of employees has increased from 355,900 in January, 1914, to about 500,000; the amount of money paid out in wages meanwhile has increased 327 per cent.

The greater part of the railways destroyed in northern France have been reconstructed and are now in operation.

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[†]Throughout this article francs are converted into dollars at five francs to the dollar, the normal rate of exchange.

item alone increased ten times because of the high price of foreign coal, which is used in much greater quantities than French coal. During this same period the receipts, in spite of the 25 per cent increase in rates made at the beginning of 1918 and extended in 1920 to 70 and 80 per cent for passenger and to 140 per cent for freight, increased only 89 per cent, or 302,000,000 fr. (\$60,400,000). The operating ratio increased from an average of 57 per cent in 1913 to 103 per cent in 1919. At the same time the burdens of company capital and loans increased. Taken together it is not to be wondered that the financial situation is deplorable.

The three principal privately operated lines—the Paris, Lyons & Mediterranean, the Est and the Nord—had surpluses in 1913 amounting to 8,000,000 fr. (\$1,600,000), 7,308,000 fr. (\$1,460,000) and 7,000,000 fr. (\$1,400,000) respectively, but since 1914 each of these roads has had a deficit and the deficits of the other railroads have increased. The total deficit for all of the railroads was 2,500,000,000 fr. (\$500,000,000) at the end of the last financial year and it is anticipated that the deficit for the present year will almost approach that sum, making a total deficit of 4,500,000,000 fr. (\$900,000,000). For the year 1920 it is anticipated that the operating ratio will be about 125 per cent.

In order to pay the shareholders of the railways the minimum guaranteed dividends, the Est, the Paris-Orleans, and the Midi have had recourse to advances from the state. The Nord and the Paris, Lyons & Mediterranean, which lost since 1915 the benefit of the state guarantee, have been authorized to borrow money in order to meet these dividends. This privilege, however, expires with the present financial year.

Effect of the Eight-Hour Day on Finances

To these serious effects of the war has been added the effect of the eight-hour day. This has had a disastrous influence on the financial situation of the railroads as is indicated by the tremendous increase in the deficit for 1920 and has so affected the output of the employees that it is no exaggeration to say that it has been crushing.

The law establishing the eight-hour day was made effective April 23, 1919, and the railroads were forced to put it into application immediately. This reform came at a time when the railroads had hardly recovered from the shortage in men caused by the war and when they were trying to develop their resources to cope with the continually increasing traffic. It was necessary to increase the number of employees out of all proportion to the actual work to be done. Compared with 1914, there was an increase in the number of employees varying from 25 to 32 per cent for station employees, from 30 to 37 per cent for trainmen, and the increase exceeded 40 per cent for engineers and firemen. The total number of employees was increased from 355,900 on January 1, 1914, to 391,400 in 1919, and, at present time there are about 500,000 employees. Naturally a large number of inexperienced men had to be employed. The wages paid to about 355,000 employees in 1913 was 766,800,000 fr. (\$153,360,000) as compared to 3,276,000,000 fr. (\$655,200,000) paid to about 500,000 employees in 1920, or an increase in wages of 327 per cent for an increase in working force of about 41 per cent.

The output of the workmen has considerably diminished in spite of the increase in the number of men employed. On one of the railroads where the number of locomotive engineers had been increased by 40 per cent because of the eight-hour day, the daily average run has fallen from about 67 miles in 1913, to about 40 miles at the beginning of 1920. Likewise in the shops the hourly output, on account of the application of the eight-hour day and the suppression of piece work, fell to 50 per cent below what it was before in spite of the increase in the number of men employed.

This loss has been partly compensated for by the suppres-

sion of certain privileges and by the introduction of new methods of working which are beginning to have their effect. In brief, the eight-hour day has been responsible for a reduction in the number of available freight cars and has considerably retarded the return of the transportation system to its normal state. It has resulted in the increase in the number of losses, delays and damages, and has upset all the plans taken to put the equipment back into good condition.

Condition of Equipment

Since the war the French railways have suffered more from the lack of experienced help than from the lack of the physical plant. The real transportation crisis has been caused by an insufficient number of available locomotives and the delay in repairing them, together with a lack of experienced engineers and firemen. Before the war the number of locomotives out of service for repairs was about 9.8 per cent of the total number. This increased to 20.5 per cent on August 1, 1919, and reached 22.4 per cent on January 1, 1920.

The increase in the number of freight cars out of service for repairs was even greater. Before the war the percentage of bad orders was 3.7 per cent and this item increased to 15.7 per cent on August 1, 1919, and to 18.6 per cent on January 1, 1920. At the present time it requires about double the number of men to keep the same number of locomotives in working order as it did in 1914, and as the number of large engines has materially increased since that time a greater amount of labor per engine is now required. For a given number of workmen the number of repaired units has considerably decreased.

In an endeavor to overcome these conditions the railways are seeking to re-establish the premium or piece work system and are anxious to improve the equipment of the shops by means of labor saving machines. Plans have also been started towards a certain amount of standardization. Four companies, the State, the Midi, the Paris-Orleans, and the Paris, Lyons & Mediterranean, to which was added later the Alsace Lorraine Railroad, formed at the beginning of 1919, an organization called "L'Office Central d'Etudes du Materiel de Chemins de Fer" for this purpose. This organization is divided into four departments, one in charge of tests, one for locomotive design, a third for car design, and the fourth to handle railway electrification.

This committee has already drawn up plans for certain types of standard locomotives. It has made a study of standard designs for freight cars of special types, such as tank cars, steel cars, etc., and has made tests of refrigerator cars for the transportation of fish. After a very thorough investigation of railway electrification this committee has recommended the adoption of 1,500 volts d. c. as a standard.

To improve the car supply the railways offer premiums to the shippers for the prompt release of the cars; they have initiated a sort of priority scheme, and have restricted the passenger service, all of which has notably improved the situation. Freight car repairs have been contracted out to private companies, which has had the effect of bringing the freight car supply almost back to normal. The locomotive situation, however, will not be brought back to its normal basis for another year.

The companies have also established a car service bureau to better control the distribution of cars.

Present and Future Developments

Since the war the railways in the north of France have done a large amount of reconstruction work in the devastated territory. It was necessary to rebuild a large part of the lines on the Nord and Est railways which had been destroyed. At present, in less than 20 months, 1,353 miles out of the

1,467 miles destroyed have been placed in operation and the transportation system in the devastated area is practically back to normal. This in itself is quite remarkable when the difficulties above enumerated are considered.

The problem of railway electrification has also become a question of great importance. A law was passed in 1919 regulating the use of hydraulic power and in this act various sites for the development of hydro-electric plants were conceded to the Paris-Orleans. Since that time a law has been passed for the development of hydro-electric plants on the Rhone river. Plans have been laid for the electrification of nearly 6,000 miles of line, distributed as follows: Paris-Orleans 3,250 miles, the Midi 2,125 miles, and the Paris, Lyons & Mediterranean, 1,525 miles. It is anticipated that this electrification program will entail an expenditure of several billion francs and will effect a saving of 1,500,000 tons of coal a year in addition to improving the traffic density along the lines affected.

During the year there have been developments in the use of fuel oil called "Mazout" for firing locomotives. The Nord, the Paris, Lyons & Mediterranean, the Est, and the Paris-Orleans, have formed, together with the principal shipping companies and several large manufacturers, a company called "Les Consommateurs de Petrole," in order to ensure a sufficient supply of this oil.

Labor Problems

Since the war the railways have endeavored to improve labor conditions by entering into new agreements with the workmen, the provisions of which have a double object:

1. Utilizing the brains and experience of the working staff by giving them every opportunity for putting before their superiors any proposals they may have for improving the service.

2. Safeguarding their interests by guarantees for promotion, increases in salary, strict observance of discipline, with the opportunity for the men to see that the regulations regarding these matters are properly carried out.

For this purpose the workmen elect delegates to three committees. One committee represents the men at local points, the second committee confers with the general manager and a third committee confers with the presidents of the roads. The presidential committee consists of 24 members, 7 from the transportation department, 7 representing the mechanical department, 7 representatives from the engineering department, and 3 representatives from other departments.

The general manager's committee confers with the general manager every three months and the presidential committee confers with the president every six months. These committees will also sit on any inquiry board which is called to give its opinion on questions of discipline. Labor also has representation on committees formed to consider employees' pensions and for the inspection of the co-operative stores. The workmen are thus able to participate in a very practical way in the management of the railways.

Wages have also been standardized so that all employees of the larger railways belonging to the same class of service will be paid alike. Likewise length of service and yearly bonuses have been established.

During the past year there have been two strikes which have put to test the agreements outlined above. The first strike occurred in February but only lasted four days. The second occurred during the month of May and was of a serious character. This lasted 28 days.

The May strike was a revolutionary movement for which elaborate provisions had been made and which was supported by foreign agencies. It was the outcome of a campaign that had been carried on for many years in the Railwaymen's Federation, which at that time included more than half of the railway workmen. This strike was met by a resolute government, a large number of faithful workmen and

by the strong arm of public opinion. In combating the strike the railways reduced the services, put into effect the 10-hour day and employed 9,470 volunteers which were drawn from large schools, colleges, former employees and "Unions Civiques" which were spontaneously formed by the citizens of France.

Despite the strong fight put up against the strike it had a serious effect on the railways and the life of the community for which the agitators are entirely responsible. It has been estimated that the loss suffered by the railways on account of the strike amounted to 140,000,000 fr. (\$28,000,000), and it required from two to five months to recover from the effects of it. However, this strike, so serious in results, showed what public opinion can do when it is supported by a good organization. The strike failed—at its height it involved 40 per cent of the working forces of four railways and 60 per cent of the engineers and firemen—because it met with the hostility of all classes of society.

There is now a much better feeling among the workmen. They are taking a new interest in their work for they are now paid in proportion to the present cost of living, they are guaranteed by the arrangements outlined above a certain amount of participation in the management of their lines, they are sure of finding new privileges on account of this representation, and they will participate by yearly bonuses in the financial results of the railways. The Railwaymen's Federation which started the strike has retired disorganized and it now includes scarcely one-fifth of the entire railway working force.

The French railroads have almost completely regained their physical and moral equilibrium, the transport crisis has been almost overcome, and peace reigns amongst the working forces. The new statute which the companies have drawn up with the government and which Parliament is now discussing will soon open the way to a new future and will put the railways in a position to take an important part in the work of economic reconstruction. After helping to win the war the French railway companies are getting ready to help the country to win the peace.

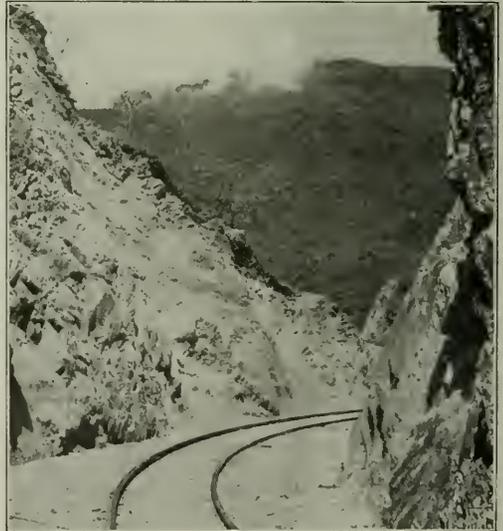


Photo by Keystone View Company, Meadville, Pa.

On the La Guaira & Caracas Railroad of Venezuela

Short Line Association Increases Activities

Experiences Under Federal Control Forced These Roads to Develop a Strong Organization

THE SHORT LINE railroads of the country have been well represented in connection with the principal developments of the year which affected the railroads generally by the American Short Line Railroad Association, which has greatly expanded its activities. Since its last annual meeting 83 railroads have been added to the list of members, so that the total number at the date of a recent report was 440 and new applications are coming in every week.

The short line railroads were given an increased solidarity and the scope of the work of the association was greatly enlarged by the experiences of these roads during federal control. The results of those experiences led the association to take an active part in the work of framing the Transportation Act so as to safeguard their interests upon the return of the railroads to private management and it was found that the short lines, representing local interests, possessed a remarkably strong influence upon members of Congress. The officers of the association have also been remarkably successful in impressing all concerned with the equity and justice of their claims and as a result of their assiduous efforts many provisions of the act were written with a view to their interests.

The trunk line railroads have also been led to accord a greater recognition to the interests of the short lines than ever before. President Bird M. Robinson of the short line association has been made an active member of the standing committee of the Association of Railway Executives and representatives of the short line association are accorded membership on special committees with whose activities they are concerned.

Getting a law passed is sometimes less important than getting it interpreted and applied in the way to accomplish the results intended and the officers of the short line association have found it necessary to keep very busy in this direction throughout the year.

The expansion of the association's organization to handle the increase in its work was authorized at the annual meeting in April and has proceeded as rapidly as circumstances would permit. A law department, a traffic department and a labor department have now been organized and plans for a purchasing department and an equipment trust corporation are under way. The association is also doing a very large amount of ordinary detail work from day to day before the Interstate Commerce Commission, the Railroad Administration and other government departments.

The particular sections of the Transportation Act of interest to the short lines were those authorizing the Interstate Commerce Commission to fix divisions of through rates, because the short lines generally have never been able to effect satisfactory agreements on this subject with their trunk line connections and those providing for a reimbursement of their losses during the period of federal control. Many of the short lines also expected to be able to take advantage of the opportunity to procure loans from the \$300,000,000 revolving fund, but as the law has been interpreted the fund has been of little practical use to them because of the requirements as to security. The question of readjustment of divisions is naturally one that will take time to work out to insure justice to all concerned.

The short lines have been particularly disappointed by the interpretation placed on Section 204 of the act, which was supposed to have been drawn in such a way as to provide for the reimbursement of short lines that were relinquished

from federal control for losses as compared with their income during the test period, but which the Interstate Commerce Commission has interpreted to apply only to roads which sustained an actual deficit for the period during which they operated their own property after the relinquishment. The short lines have also had the same experience as the trunk lines in having payments certified by the Interstate Commerce Commission under this section and under the guaranty section, 209, held up by the Treasury.

Another of the problems of the short lines arose from the increase in the per diem rate after March 1 from 60 cents to 90 cents, and the discontinuance by some roads of the two day free-time allowance, which seriously affected some of the short lines that did not accept the government guaranty. With the co-operation of the Association of Railway Executives the short line association secured a decision from the Interstate Commerce Commission authorizing the continuance of the former rate and free-time allowance for the guaranty period.

The executive board of the American Short Line Railroad Association recently reported the following as a list of the subjects which have been settled or are receiving the assiduous attention of the organization.

1. Settlement of the per diem question.
2. Establishing of the right of short-line railroads to participate in the rate increase in case Ex Parte 74.
3. Defense of short-line railroads before the United States Labor Board.
4. Participation in cases now pending which involve the application of the rule of divisions.
5. Preparation and prosecution of individual applications for the establishment of through routes in accordance with provisions of the Transportation Act of 1920.
6. The preparation and prosecution of individual applications for increased divisions in accordance with the Transportation Act of 1920.
7. Assistance to individual short-line railroads in the matter of valuation now being conducted by the Bureau of Valuation of the Interstate Commerce Commission.
8. Creation of a plan through which short-line railroads may procure loans from the government with which to purchase equipment.
9. Advice and assistance to individual roads in effecting settlements with the director general.
10. Plan for effecting agreements with trunk line railroads for increased divisions through the creation of regional committees in the three classification territories.

Under the head of work to be done the board listed the following:

1. Amend the Transportation Act of 1920 at the coming session of Congress in the following particulars:
 - (a) Broaden terms of Section 210 so the short-line railroads may borrow from revolving fund, which, in most cases, is now impossible.
 - (b) Amend Section 204 so that short-line roads whose earning power was reduced in the guarantee period as compared with the test period may be reimbursed.
 - (c) Amend Section 209 so all roads may procure funds due them under government guarantee without having to wait for the final check of federal auditors, as now required.
2. Maintain close and watchful contact with the Interstate Commerce Commission in the formation of plans for the consolidation of all railroads; and represent short-line rail-

roads before the commission in the adoption of any such plans and the putting of same into execution.

3. Prepare and present to Congress legislation which will assure speedy and fair settlement of claims of short-line railroads against the director general.

4. Oppose legislation which proposes to make changes in the Transportation Act of 1920 which are inimical to the interests of short-line railroads.

5. Protect and further the interests of short-line railroads by pressing for a readjustment of all divisions of freight rates so that each road shall receive a fair return; that is to say, its fair proportion of the revenue produced by the general rate structure.

6. Protect the interests of short-line railroads in the final valuation the commission is required to make as the basis for a fair return to each railroad.

7. Defend the interests of short-line railroads in the further adjustment of railway mail pay.

8. Defend the interests of short-line railroads in the matter of taxation both as to the interpretation of laws now in effect and proposed changes in such laws.

The labor department of the association is under the direction of James Berlingett, assistant to the president, at Chicago, but Mr. Berlingett has recently been given a leave of absence on account of ill health and F. C. Reilly, traffic manager for the western district, is temporarily in charge. This office has given particular attention to the representation of the short lines before the Railroad Labor Board.

The traffic department is under the direction of L. S. Cass, vice-president, and includes three traffic managers, Mr. Reilly for the western district and R. A. Belding for the Official Classification Territory and J. A. Streyer for Southern Classification Territory, with office at Washington; also a tariff bureau at Washington under the direction of I. T. Hanson, assistant to the vice-president. The traffic department will render assistance in negotiations for increased divisions. The legal department is represented by Ben B. Cain, general counsel, and S. S. Ashbaugh, special counsel, at Washington.

The association has organized the Consolidated Railway Equipment Corporation under the laws of Delaware to finance the purchase of new equipment, with the assistance of a government loan, under a plan which is to be announced shortly.

Norfolk & Western Labor Dispute

HEARINGS in the controversy between the Norfolk & Western and its conductors and trainmen were opened before the Railroad Labor Board at Chicago on January 3. The case was assigned to Bureau No. 3 of the Board, consisting of W. L. Park, chairman, H. T. Hunt, A. O. Wharton, Horace Baker and J. J. Forrester.

It will be recalled that differences between the Norfolk & Western and its trainmen and conductors first arose early in 1919, when they failed to agree on requests for certain changes in the organization's contracts with the road. Because of the unsettled conditions prevailing at that time, the demands were not considered immediately. However, later in the year negotiations were started between the employees and the carrier, ending in November when it was seen that agreement was impossible. It was decided then to submit the matter to the Board, but meanwhile both the trainmen and conductors had taken strike votes. This led the Board to request the executive officers of the conductors' and trainmen's organizations to appear before the Board to show whether or not they had violated the law in ordering this vote. An executive session of the Board was held on December 16 at which this testimony was taken; however, no formal action was subsequently taken by the Board other

than to issue a warning to carriers and brotherhoods, and the case properly came before it on January 3.

When the requests and contentions of the two organizations were assembled it was found that in several instances these requests could be conveniently considered together; accordingly the first point of difference taken up by the Board was that of changing the home terminal from Columbus, Ohio, to Portsmouth. This move was opposed by the employees, represented by Val Fitzpatrick, vice-president of the Brotherhood of Railroad Trainmen, and W. C. Turner, vice-president of the Order of Railway Conductors, on the ground that it would result in loss to the employees who had purchased homes in Columbus and little material benefit to the company. The carriers represented by W. J. Jenks, general manager, and Charles P. Neill, both of whom contended that the change was merely a "paper change" made to reduce the payment of terminal overtime.

The next point of difference considered by the Board was the request of the organizations for a local freight rate for mine run service. The employee's representatives contended that this service should be paid local freight rates for the reason that the men engaged in it cannot make mileage and are required to do switching service between terminals and are not accorded the same treatment in this respect as are the employees of other railroads in the same territory. The representatives of the carrier contended that the employees' request was simply a request for a rate higher than that established by the Board's Decision No. 2.

The next point taken up by the Board was that of the rates of pay for branch line service on the Norfolk & Western. The controversy between the carrier and its employees was based entirely on the manner in which certain wage rulings of the Railroad Administration had been applied and the testimony presented to the Board dealt entirely with the technical aspects of this application.

The preceding three points of difference were common to both of the organizations involved and were therefore considered together. The remaining points of difference taken up at the first day's session were between the Brotherhood of Railroad Trainmen and the carrier and included the employees' request that the rate for "baggage handling express" be incorporated in the trainmen's schedule, a disagreement over the revision of the "called and not used" rule to conform to Supplement 25 to General Order No. 27, and the employees, request for a new discipline rule. The carriers' contention in the first case was that inasmuch as there are no employees handling baggage on their line, the incorporation of the rule in their schedule with the trainmen is needless. In the discussion of the second case, it became evident that the differences between the railroad and its employees revolved about a minor technicality and this led Chairman Park to state that "it seems to illustrate to me, as one member of the Board, the advisability of carriers and employees getting together before they have these formal hearings and perhaps throw out of the window a lot of this, or agree to many things, and certainly agree to a joint statement of facts and to get down to things that you just absolutely cannot agree to." In the discussion following it developed that the representatives of the carrier and its employees agreed on the principles of the controversy, leaving only minor technical points to be adjusted. Practically the same conditions prevailed in discussing the establishment of a new discipline rule, it being found that the differences between the men and the carrier were of a minor character and could easily be adjusted by conference.

A real point of difference between the carrier and its yard employees, however, was indicated early in the Board's opening session when L. C. Going, attorney for the Association of Colored Railway Trainmen, requested permission of the Board to be heard.

Statistical Section

Railway Revenues and Expenses for the Year 1920

Receiverships and Foreclosure Sales During 1920

Locomotive Orders Show Increase in 1920

Increase in Passenger Car Orders Continues

Purchases of Freight Cars Increase in 1920

Railway Lines Abandoned During the Year 1920

New Construction Conspicuous by Its Absence

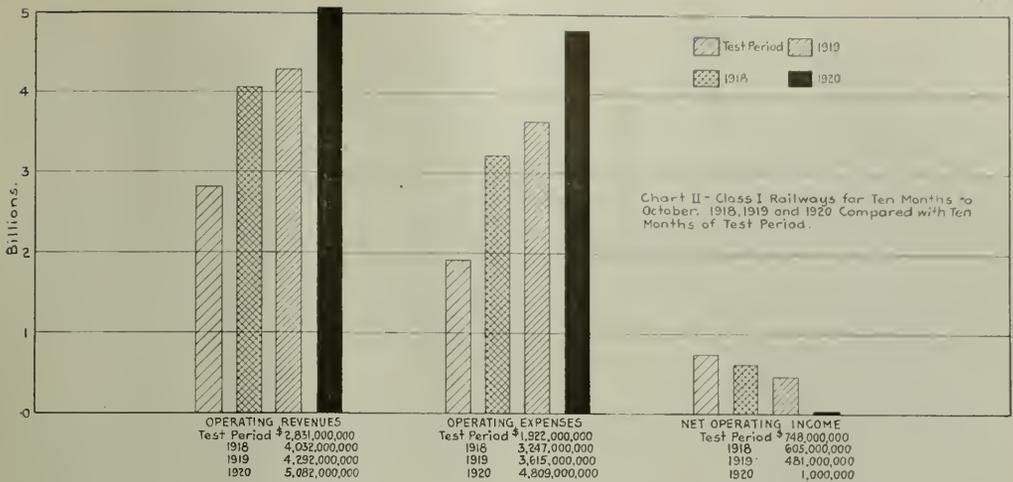
Signal and Interlocking Work Reaches Low Mark

Railway Supply Exports Showed Marked Decline





EDGAR E. CLARK
Chairman of the Interstate Commerce Commission



Railway Revenues and Expenses in the Year 1920

Smallest Net Operating Income in Any Year Since the I. C. C.
Made Its First Report in 1888

By Julius H. Parmelee

FOR THE THIRD TIME in succession the man who attempts an annual review of railway statistics finds his task difficult. The year 1918 saw federal control inaugurated, with many fundamental though temporary changes in accounting and statistics; saw in May the first general increase in railway wages ever granted; saw in June a marked increase in freight and passenger rates; was face to face throughout with a kaleidoscopic series of changes in rates, wages, prices, and operating conditions that made a statistical review of the year most difficult. Toward the close of the year there was a decided slump in traffic, which continued well into 1919.

The year 1919 not only inherited this disturbing condition from 1918, but added a number of changes on its own account. Wages and prices pursued an almost steadily rising trend, while two things had a marked effect on operations toward the close of the year, namely, the coal strike of November-December, and the near approach of the termination of federal control. The exact date of the return of the railways to their owners was not known until the last of December, yet for months before the end of the year it was regarded as certain that the date of return would not be much later than the first of January, as announced in the President's message to Congress.

The year 1920 opened, therefore, with but one certainty in the railway situation, which was the definite knowledge inherited from 1919 that on March first federal control would terminate. Virtually every other factor in the situation spelled uncertainty a year ago—what the future of the railways would be, what legislation would be enacted, how the wage and labor situation would evolve, what traffic would be offered and at what rates the railways would handle it. Finally, there was the vital question whether railway managements would find it possible to set their houses speedily in order and prove to the American public that its verdict against a continuation of government control of transportation was wise. The year 1920, as the railways looked out upon it twelve months ago, was fraught with potent possibilities and dangers.

Today, one year later, the period has clearly stamped itself as the most important single year of any in American railway

history, not only because the railways have returned to their owners under a new public policy of regulation, but also because that policy, with its endless ramifications, will profoundly affect future railway history to the end of time. The Transportation Act became effective with the return of the railways on March first; then came the six-month period

THE STATISTICAL record of the railways of this country for the past year is one of superlatives. It includes among other things:

The greatest traffic in the history of railways.

The greatest operating revenues.

The greatest operating expenses.

The greatest wage aggregate.

The greatest taxes.

The smallest net operating income recorded in more than 30 years.

of readjustment of wages and rates, during which the government wisely continued its financial support; finally, the railway companies on September first launched out under their own power, to meet whatever calm or storm might be ahead. Add to this the operating crisis through which the railways passed as a result of the April strikes, and their successful campaign through the summer and fall to put the crisis behind them, and the story of the year is complete in a few sentences.

This is not the place to recount the railway history of the year 1920, interesting though it is at every point. The reason for reviewing the past three years in a few brief paragraphs is merely to set up the background against which the statistical record of the year may be seen in bolder relief.

Summarized, the statistical record of 1920 is one of superlatives. It includes:

- The greatest traffic in railway history,
- The greatest operating revenues,
- The greatest operating expenses,
- The greatest wage aggregate,
- The greatest taxes, and
- The smallest net operating income in more than 50 years.

Traffic

Railways of the United States in the calendar year 1916 broke all records of freight traffic. The total traffic of railways of Class I in that year was 396 billion net ton-miles (including revenue and non-revenue freight). This record was shattered in 1917, with 430 billion, and again in 1918, with 440 billion. There was a recession in 1919 to 395 billion ton-miles, but the year 1920 again broke the record, with approximately 448 billion, which was 8 billions above the greatest previous record, and 13 billions greater than the average of the two war years 1917 and 1918. The fact that in four of the past five years the American railways have surpassed all their previous efforts in the handling of freight evidences their service to the American people during recent war-time and post-war periods.

The monthly freight statistics for 1920 present an interesting story. Stated in billions of ton-miles, it is as follows, November and December being partially estimated:

Months of 1920	Net ton-miles (billions)	Months of 1920	Net ton-miles (billions)
January	34.8	August	42.7
February	32.8	September	41.0
March	38.0	October	42.6
April	28.5	November	36.5
May	37.9	December	35.0
June	38.2		
July	40.4		448.4

This short table speaks eloquently of the successful effort made by the railways during the summer and fall months of 1920 to clear up traffic congestion and meet the unprecedented demands upon their facilities. Prior to 1920, the largest freight traffic recorded for any one month was 40.8 billions of ton-miles, which was in the war-time month of August, 1918. This record was surpassed, it will be noted, in the three months of August, September and October, 1920, with July only a short distance behind. Even the months of November and December, which in normal years show seasonal declines, and in 1920 might well have been affected by the decline in general business conditions, held up their average remarkably well.

As to passenger traffic, railway travel has been growing at a rapid pace, the years from 1915 to 1920 showing steadily maintained increases. In 1917, 1918 and 1919, the normal passenger traffic was augmented by heavy movements of troops. The year 1919 showed the heaviest passenger traffic on record, railways of Class I handling 46.4 billion passengers one mile in that year. This was 4 billion passenger miles greater than in 1918, 7 billions greater than in 1917, and 8 billions greater than in 1916. In spite of the record-breaking figures for 1919, the results for 1920 seem at the

present writing to have equalled the 1919 record. Returns for passenger miles are not reported or compiled so promptly as net ton-miles, but for the first nine months there was an increase of 1.4 per cent over 1919, and while the passenger traffic fell off somewhat after the increase in rates on August 26, indications are that the total for the year was as high as the total for 1919. Whatever the final results may show, it is certain that the freight and passenger traffic combined was greater in 1920 than in any previous year.

The traffic results for 1920 have been emphasized, not only because they represent a record-breaking performance, but more particularly because they prove that the efficiency developed by the railways in 1920, in the way of increased car mileage per day, increased loading per car, and the like, was attained while carrying the heaviest traffic ever handled, and with no greater plant or facilities than before the United States entered the war.

Revenues

Total operating revenues of Class I railways in 1920 approximated \$6,230,000,000, the greatest revenue aggregate on record. This was \$1,046,000,000 greater than the revenues of 1919, which represented the largest aggregate up to that time. The increase for 1920 was the result, of course, of the increased rates in effect part of the year and the increased traffic. At the time the new rates went into effect, on August 26, it was estimated that they would produce \$1,500,000,000 a year in revenues, but actual results for the months of September to November do not indicate that as yet such an amount is being realized. Whether it will be fully realized in 1921 will depend upon a number of factors undeterminable at the present time, such as the effect of recent orders of the Commission raising intrastate rates to the interstate level, the trend of traffic and adjustments that probably will be made in local and other specific rates.

In 1918 the revenues of all the railways for the first time surpassed five billions of dollars; in 1920 they were greater than six billions.

Of the \$6,230,000,000 of revenues for 1920, \$4,291,000,000 represented freight revenue, \$1,317,000,000 was passenger revenue, and the balance of \$622,000,000 was revenue from mail, express and miscellaneous operations. As compared with 1919, there was an increase of \$734,000,000, or 20.6 per cent, in freight revenue; an increase of \$139,000,000, or 11.8 per cent, in passenger revenue, and an increase in other revenue of \$173,000,000, or 38.5 per cent. Total revenues increased 20.2 per cent.

The picture of operating revenues by months portrays the cumulative effect of the increased rates and traffic after July.

1920. Month	Total Operating revenues Class I railways (millions)	1920. Month	Total Operating revenues Class I railways (millions)
January	\$501	August	\$555
February	425	September	616
March	461	October	642
April	402	November	575
May	456	December	575
June	494		
July	528	Total	\$6,230

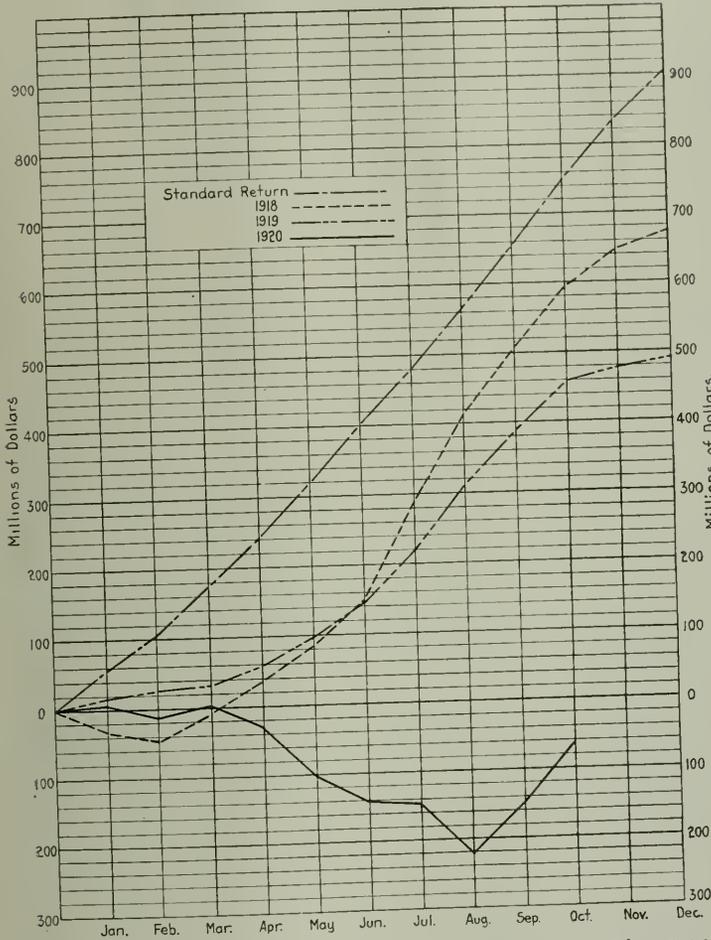
In the table November and December figures are partially estimated. The total for January was out of proportion with the months next succeeding, because it included some \$50,000,000 of back mail pay.

Expenses

Total operating expenses in 1920 approximated \$5,750,000,000 for Class I railways. Like the revenues, this was a record amount, being greater than in 1919 by \$1,330,000,000. Part of the increased expense of operation grew out of the increase in wages granted by the Railroad Labor Board as of May 1, which (for the eight months from May 1 to December 31) added some \$400,000,000 to the railway

payroll; part was due to the increased cost of fuel, which the Interstate Commerce Commission has reported, during the first nine months of the year, at seventy-four cents a ton more than during the same period of 1919, which would account for about \$80,000,000 of additional annual expense; part was due to the higher cost of other materials and supplies, and to the greater amounts of material and fuel utilized.

1920 Month	Total Operating expenses Class I railways (millions)	1920 Month	Total Operating expenses Class I railways (millions)
January	\$415	August	\$679
February	422	September	511
March	404	October	527
April	441	November	473
May	478	December	473
June	512	Total	\$5,750



It is important to refer to the text in studying this diagram and to note that the reported revenues and expenses for several months have been adjusted to include or exclude certain items that did or did not belong to these months.

Chart 1—Net Operating Income Calculated by Months. 1918, 1919 and 1920 Compared with Standard Return. Class I Railways

Maintenance of way expenses amounted to \$1,034,000,000, maintenance of equipment expenses \$1,573,000,000, and transportation expenses \$2,851,000,000. The increase in maintenance of way was \$256,000,000, or 32.9 per cent; maintenance of equipment increased \$340,000,000, or 27.6 per cent; transportation expense increased \$658,000,000, or 30.0 per cent. The total operating expenses increased 30.1 per cent.

The operating expenses by months were as follows, November and December being estimated:

The aggregates for May and June are smaller, while those for July and August are greater, than would have been the case had not the wage increase been made retroactive to May 1. Certain amounts of back pay chargeable to May and June were actually charged to July and August, thus throwing the totals for all four months out of line with other months of the same year and with corresponding months of preceding years.

Wages

Statistics showing the total railway payroll in 1920 are not at hand as this is written, but it seems likely that the wages of the employees of Class I railways aggregated some \$3,260,000,000. This estimate is computed by adding to the 1919 payroll of \$2,830,000,000, two-thirds of the annual increase in wages granted by the Railroad Labor Board, the increase having been in effect during eight of the twelve months. The payroll for 1920 may have been greater than the figure indicated, because there were some minor increases in January and February for which no allowance is made, and because the eight months of the increased wage scale included the months of the year when maintenance work was heaviest. But assuming \$3,260,000,000 as approximately correct, wages in 1920 represented 56.7 per cent of total operating expenses. That is, 56.7 cents out of every dollar of expenditure went to labor. Compared with total revenues, labor in 1920 received 52.4 cents out of every dollar of revenue, compared with 45.1 cents in 1914.

The general increase in railway wages which the Labor Board put into effect on May 1, 1920, was the greatest single increase ever granted by any tribunal to any group of workers in the history of the United States, or, for that matter, in the history of the world. The amount of the increase, reduced to an annual basis, was \$617,000,000, and with collateral increases to certain small groups of employees to whom the award did not apply, made imperative as a result of raising the general level of railway wages, will prove to be no less than \$625,000,000, or about 22 per cent on the scale of wages in effect before the award was made. It is a commentary on the quick way in which the American people have accustomed themselves to think in billions that the announcement of this increase aroused hardly a ripple of pub-

fic comment. By reason of this increase, railway wages are now at the highest point ever reached, the average annual earnings per employee being greater than \$1,800.

Taxes

Railway taxes in 1920, as reported by roads of Class I, amounted to about \$275,000,000. This does not include \$6,000,000 of war taxes not reported in the federal accounts of January and February. The taxes of \$199,000,000 reported for 1919 did not include about \$36,000,000 of war taxes. Placing the two years on a comparative basis by adding the excluded war taxes, the total for 1920 becomes \$281,000,000, compared with \$235,000,000 in 1919, an increase of \$46,000,000, or nearly 20 per cent. These taxes for 1920 represent the largest amount paid in any one year.

Net Operating Income

We come now to the most astonishing feature of the railway income account in 1920, which is that the net operating income was the smallest for any year since the Interstate Commerce Commission made its first summary of railway revenues and expenses in 1888. For the first ten months of 1920, to November first, railways of Class I earned practically nothing over expenses, taxes, equipment and joint-facility rentals, and this in the face of the fact that the revenues in January included some \$50,000,000 of back mail pay that was earned in prior years, and that \$6,000,000 of war taxes for January and February were not deducted. This result is so astonishing that it may be well to compare the same ten-month period over the past four years:

Year	Net operating income (ten months ended October 31)	Year	Net operating income (ten months ended October 31)
1920	\$1,078,000	1918	\$605,179,000
1919	481,083,000	1917	833,543,000

The steady decline from \$833,000,000 in the first ten months of 1917 to slightly over \$1,000,000 in 1920 in great measure explains the necessity for the increased rates made effective last August.

For the year 1920 as a whole, I estimate the net operating income of railways of Class I at approximately \$150,000,000, virtually all of which was earned in November and December. Add to this the \$100,000,000 of deficit to be made up by the Railroad Administration for the operations of January and February, and the \$650,000,000 of deficit incurred during the six-month guaranty period and payable from the U. S. Treasury, and the total net receipts of the railways for the year become approximately \$900,000,000, or about the amount of their standard return. This is a return of five per cent on the valuation that may be assigned to the property of railways of Class I, on the basis of the tentative valuation made by the Commission in its rate decision, and falls \$180,000,000 short of a return of six per cent for the year.

The cumulative monthly trend of net operating income is set out in Chart I, which covers the test period, the years 1918 and 1919, and the first ten months of 1920. In this chart the reported revenues and expenses of the several months have been adjusted to include or exclude items that did or did not belong to those months. For example, the back pay charged to certain months of 1918 and 1920 has been transferred to the months to which really chargeable; the back mail pay credited to January, 1920, has been distributed over the months of 1918 and 1919; the war taxes and corporate expenses of the federal control period have been brought into the accounts, wherever they were not already charged. While the results cannot in the nature of things be exact to the last dollar, the chart does compare the monthly results of 1918 to 1920 with what may be considered the normal experience of the test period, thereby eliminating the distorted relationships that exist in some of the accounts as actually reported. The chart does not cor-

respond to the figures already given for 1920 and earlier periods, but is presented with the thought of furnishing a picture of the trend of net income since the government took charge, on a basis fairly comparable with normal conditions.

Estimated Income Account—1920

Summarizing the revenues, expenses and taxes of Class I railways, as set out in preceding paragraphs, their estimated income account for 1920 was as follows:

	Railways of Class I, 1920
Total operating revenues	\$6,230,000,000
Total operating expenses	5,750,000,000
Net operating revenue	\$480,000,000
Taxes	275,000,000
Uncollectible revenue	1,000,000
Equipment and joint facility, rentals—Dr.	54,000,000
Net operating income	\$150,000,000

	1920	1919
Total revenues (the dollar)	100.0	100.0
Labor	52.4	54.4
Fuel for locomotives	9.0	9.0
Loss and damage	4.0	3.5
Other expenses, materials, etc.	26.9	18.6
Taxes	4.4	4.5
Equipment, etc., rentals	0.9	1.1
Net operating income	2.4	8.9
Add government guarantee	12.0	7.4
Total net receipts	14.4	16.3

Following the income account in the same way through fixed charges, rentals for leased road, other additions and deductions, we find that 5.9 cents out of every dollar of railway revenue in 1920 remained for dividends, betterments and surplus. This compares with 6.9 cents in 1919, 9.3 cents in 1918, 14.8 cents in 1917, and 18.0 cents in 1916.

The chart at the head of this article emphasizes this narrowing margin in a different way. It shows the total revenues, total expenses, and net operating income of the first ten months of 1920, compared with the same months of 1919, 1918, and the test period. The outstanding feature of the chart, of course, is the steadily rising revenues on the left and the steadily lessening net income on the right, falling so low in 1920 as to be scarcely discernible.

Looking Forward

Turning to the future, where the chief interest lies, the picture is less depressing. The railways have set their minds on no further increases in rates, if it is humanly possible to avoid them, and are making every effort to so reduce expenses and increase operating efficiency as to raise net operating income to a six per cent basis in 1921. While it is impossible to predict the trend of earnings this coming year, yet a glance at the results the year 1920 would have shown, had the increased rates and wages been in effect the whole year, may give a line on the possibilities of the future.

Had the year 1920 been on the same wage and rate level throughout, the results would have been something like these:

	Adjusted results for 1920
Total operating revenues	\$7,300,000,000
Total operating expenses	5,950,000,000
Taxes, etc.	360,000,000
Net operating income	990,000,000
Rate of return on valuation	5.3

In summary, we are closing the book on a remarkable year, both because the whole railway industry moved forward into a new era, and because records were shattered in almost every respect. The period of experimentation with the new conditions is by no means over, and there are still many uncertainties in the year that lies ahead, chief among which is the uncertainty as to earnings adequate to sustain and improve railway credit. In spite of this uncertainty, railway managements are facing the future with hope, a spirit of co-operation, and full recognition of their duty to serve the public.

Receiverships and Foreclosure Sales During 1920

Denver & Rio Grande Situation Most Interesting Feature at Present Time

THE DEVELOPMENTS of the year 1920, insofar as railway receiverships and foreclosures are concerned, have not been great. The number of roads in the hands of receivers and the mileage concerned at the close of this year will be found to approximate closely the totals given in the *Railway Age's* annual review number of last year. The list of roads in the hands of receivers shows but few changes in roads as between the two years and no important ones.

There has been one road, however, which has attracted no

of the stockholders to intervene in the foreclosure proceedings. A new company has been formed to take over the operation of the road; it was incorporated in November under the name of the Denver & Rio Grande Western. The Denver & Rio Grande receivership and reorganization are of special interest from two points of view. One is in the fact that the new owners of the road are the owners of the Western Pacific, a road built by the Denver & Rio Grande as an extension to the Pacific coast, wherein we have a case of a sub-

RAILROADS IN THE HANDS OF RECEIVERS

Name of road	Mileage	Date of receivership	Bonds of old company	Stock of old company	Total old company securities
Altoona Northern	16	Aug. 8, 1919	\$370,000	\$675,000	\$1,045,000
Birmingham & Southern	48	July 26, 1920	747,600	700,000	1,447,600
Birmingham, Columbus & St. Andrews	38	Dec. 25, 1908	250,000	4,000,000*	4,250,000
Cape Girardeau Northern	104	April 14, 1914	1,500,000	110,000	1,610,000
Caro Northern	17	May 27, 1913	59,289,000	18,267,900	77,556,900
Chicago & Eastern	247	July 31, 1914	4,236,000	4,000,000	8,236,000
Colorado Midland†	338	July —, 1918	9,532,000	10,000,000	19,532,000
Colorado Springs & Cripple Creek District	74	June 11, 1919	2,634,000	2,634,000	4,634,000
Creston, Winneset & Des Moines	21	June 25, 1914	200,000	98,600	298,600
Dansville & Mt. Morris	15	June 7, 1894	150,000	50,000	200,000
Denver & Rio Grande	2,585	Jan. 26, 1918	120,757,000	87,775,670	208,532,670
Denver & Salt Lake	255	Aug. 16, 1917	12,171,516	1,000,000	12,755,031
Eastern Kentucky	36	March 31, 1919	—	3,455,900	3,455,900
Eagle Mere	10	Dec. 22, 1920	72,000	49,000	121,000
Ft. Smith & Western	254	Oct. 9, 1915	6,240,000	5,000,000	11,240,000
Georgia & Florida	403	March 27, 1915	3,852,000	8,750,000	17,602,000
Gulf, Florida & Alabama	157	May 9, 1917	4,446,000	4,410,000	8,856,000
Hawkinsville Florida Southern	95	July 17, 1920	586,900	100,000	686,900
Helena, Parkin & Northern	15	July 3, 1919	65,000	100,000	165,000
Houston & Brazos Valley	30	Oct. 27, 1915	420,000	24,000	444,000
International & Great Northern	1,160	Aug. 10, 1914	27,073,000	4,822,000	31,895,000
Kansas City, Nexion & Orient	272	April 16, 1917	31,000,000	20,000,000	51,000,000
Kansas City Northwestern	171	Feb. 23, 1917	—	1,400,000	1,400,000
Louisiana & North West	121	Aug. 23, 1913	2,250,000	2,200,000	4,550,000
Macon & Birmingham	365	Feb. 1, 1908	500,000	500,000	1,000,000
Manatee & North Eastern	262	Dec. 24, 1918	1,172,000	2,000,000	3,172,000
Marshall & East Texas	92	Jan. 25, 1917	1,180,000	200,000	1,380,000
Memphis, Dallas & Gulf	130	Sept. 10, 1920	2,052,000	2,052,000	4,104,000
Missouri & North Arkansas	137	March —, 1912	10,309,000	8,649,000	18,649,000
Missouri, Kansas & Texas Lines	1,739	Sept. 27, 1915	142,993,500	76,283,257	219,276,757
Morgantown & Wheeling	27	July —, 1916	500,000	345,800	845,800
Northwestern Terminal	3	Jan. 21, 1920	2,217,000	3,000,000	5,217,000
Ocala Southern	69	June 30, 1918	416,000	68,000	484,000
Oklahoma Valley	54	Jan. 21, 1918	—	250,000	250,000
Orangeburg Railway	17	June 19, 1916	100,000	100,000	200,000
Paris & Mt. Pleasant	51	Feb. 26, 1920	600,000	75,000	675,000
Pine Bluff & Northern	8	Feb. 9, 1916	43,000	1,000,000	1,043,000
Pittsburgh & Susquehanna	8	Jan. 15, 1919	400,000	500,000	900,000
Pittsburg, Shawmut & Northern	210	Aug. 1, 1905	14,655,600	15,000,000	29,655,600
Rock Island Southern	56	March 18, 1920	2,764,750	2,944,800	5,709,550
Rome & Northern	23	Feb. 28, 1911	135,000	1,000,000	1,135,000
Roswell Railroad	42	Oct. 9, 1915	187,000	75,000	262,000
St. Louis, El Reno & Western	10	April —, 1920	135,000	1,000,000	1,135,000
Salina Northern	81	July 27, 1917	1,500,600	1,143,300	2,643,900
San Antonio, Ivalde & Gulf	317	Aug. 14, 1914	4,413,000	4,693,000	9,106,000
Sharpville Railroad	18	Jan. 21, 1897	—	350,000	350,000
Southwestern Railway	90	Nov. 11, 1917	354,000	35,000	389,000
Tennessee, Alabama & Georgia	36	Dec. —, 1920	—	3,100,000	3,100,000
Tennessee Central	293	Jan. 1, 1913	12,220,900	7,265,450	19,486,350
Texas & Pacific	093	May 27, 1916	60,061,017	38,755,110	98,816,127
Texas & Western	93	Jan. 14, 1917	300,000	300,000	600,000
Timpon & Henderson	34	Nov. —, 1919	—	250,000	250,000
Toledo, Peoria & Western	248	July 9, 1916	4,895,000	4,075,000	8,970,000
Toledo, St. Louis & Western	42	Oct. 22, 1914	17,293,257	19,947,600	37,240,857
Trinity & Brazos Valley	369	June 16, 1914	8,760,000	304,000	9,064,000
Valdosta, Moultrie & Western	42	Nov. 5, 1920	—	350,000	350,000
Wabash, Chester & Western	66	July 15, 1914	600,000	1,250,000	1,850,000
Waipaca—Green Bay	10	Sept. 10, 1917	69,000	10,000	130,400
West Virginia Midland	45	May 21, 1920	600,000	1,000,000	1,600,000
Wichita Falls & Northwestern	329	May 31, 1917	6,537,000	2,000,000	8,537,000
Williamsport & North Branch	46	Jan. 8, 1917	545,000	1,324,662	1,869,662
	15,401		\$91,934,140	\$375,302,364	\$967,236,504

*Sold at foreclosure October 14, 1919, and reorganized in November, 1919, under name of Gtlf, Pensacola & Northern. Sale not yet confirmed by court so property has not been turned over to new company. †Cretatio's suspended. ‡Authorized.

small amount of interest among students of railway finance during 1920. Reference is made to the Denver & Rio Grande. This road has been in the hands of receivers since January, 1918. It was sold at foreclosure on November 20, 1920, but court confirmation of the sale has been withheld pending a decision from the Court of Appeals on the right

of the stockholders to acquire possession of its parent road. The other point of interest is the proposal on the part of the owners of the Western Pacific in reorganizing the Denver & Rio Grande to eliminate the common stockholders of the property.

Construction of the Western Pacific was started in 1904

and operation was begun in July, 1911. The Denver & Rio Grande guaranteed the interest on \$50,000,000 first mortgage 5 per cent bonds of the Western Pacific and it assisted in its construction also by taking \$25,000,000 second mortgage bonds and \$26,800,000 in promissory notes and other claims. It owned \$62,500,000 of the stock of the Western Pacific.

Denver & Rio Grande is its eastern connection. This naturally is a most important factor, because the Western Pacific has not the branch lines and facilities generally to enable it to make the most of its main line from San Francisco to Salt Lake City without this connection to the east from the latter point over the Denver & Rio Grande. It is competing with carriers stronger than itself, such as the Southern Pacific, Union Pacific and Atchison, Topeka & Santa Fe, which have developed their territory by means of feeders and all of which have through lines of their own to the east. The

RECEIVERSHIPS ESTABLISHED IN 1920

Name of road	Mileage	Funded debt outstanding	Capital stock outstanding
Birmingham & Southeastern.....	48	\$747,600	\$700,000
Eagles Mere.....	10	72,000	49,000
Hawkinsville & Florida Southern.....	93	566,000	100,000
Memphis, Dallas & Gulf.....	130	2,052,000	2,052,000
Northwestern Terminal.....	3	2,217,000	3,000,000
Paris & Mt. Pleasant.....	51	600,000	75,000
Rock Island Southern.....	56	2,764,750	2,944,800
Roswell Railroad.....	10	135,000	75,000
Tennessee, Alabama & Georgia.....	96	.....	3,100,000
Valdosta, Moultrie & Western.....	42	.....	350,000
Totals.....	541	\$9,174,350	\$12,445,800

The Western Pacific failed to earn the interest on its first mortgage bonds. The Denver & Rio Grande was unable to make good its guarantee, with the result that in March, 1915, the Western Pacific went into the hands of receivers. It was reorganized in December of that year and one of the terms of the reorganization was that the holders of the defaulted bonds should transfer to the new company their claims against the Denver & Rio Grande. The Equitable Trust Company of New York, trustee for the bonds, with the co-operation of the new company (owning about 95 per

FORECLOSURE SALES IN 1920

Name of road	Mileage	Funded debt outstanding	Capital stock outstanding
Arkansas & Louisiana Midland.....	163	\$200,000	\$1,000,000
Evanville & Indianapolis.....	138	2,500,000	2,000,000
Gould Southwestern.....	18	.....	51,000
Hawkinsville & Western.....	23	.....	.....
Newport & Sherman's Valley.....	28	200,000	165,100
Pacific & Eastern.....	33	300,000	500,000
Tennessee & North Carolina.....	37	454,000	306,100
Totals.....	380	\$3,654,000	\$4,022,200

whole question has been further complicated by the fact that the new owners of the Denver & Rio Grande (that is provided the sale on November 20 is confirmed) expect to have to spend some \$12,000,000 at once to put that property in proper shape to handle its present traffic.

SUMMARY OF RECEIVERSHIPS FOR 45 YEARS

Year	No. of roads	Miles	Bonds and stocks
1876.....	42	6,662	\$467,000,000
1877.....	38	3,637	220,294,000
1878.....	27	2,320	92,385,000
1879.....	12	1,102	39,367,000
1880.....	13	885	140,265,000
1881.....	5	110	3,742,000
1882.....	12	912	39,074,000
1883.....	11	1,990	108,470,000
1884.....	37	11,038	714,755,000
1885.....	44	8,836	385,460,000
1886.....	13	1,799	70,346,000
1887.....	9	1,046	90,318,000
1888.....	22	3,270	186,814,000
1889.....	22	3,203	99,664,000
1890.....	26	2,963	105,007,000
1891.....	26	2,159	84,479,000
1892.....	36	10,508	357,692,000
1893.....	74	23,440	1,781,046,000
1894.....	38	7,025	395,791,000
1895.....	31	4,089	369,075,000
1896.....	34	5,441	275,597,000
1897.....	37	5,337	92,909,000
1898.....	38	2,069	138,701,000
1899.....	10	1,019	52,285,000
1900.....	16	1,165	78,234,000
1901.....	4	73	1,627,000
1902.....	5	229	5,833,000
1903.....	9	229	18,823,000
1904.....	8	744	36,069,000
1905.....	10	6	176,321,000
1906.....	6	204	55,045,000
1907.....	7	317	13,585,000
1908.....	24	8,009	596,359,000
1909.....	5	2,609	78,095,000
1910.....	7	735	51,427,500
1911.....	9	856	210,606,882
1912.....	13	3,784	182,112,497
1913.....	17	9,020	477,780,820
1914.....	22	4,222	199,571,446
1915.....	12	20,143	1,070,808,628
1916.....	9	4,439	208,159,689
1917.....	19	2,486	61,169,962
1918.....	8	3,519	242,090,800
1919.....	7	244	11,886,779
1920.....	10	541	21,620,150

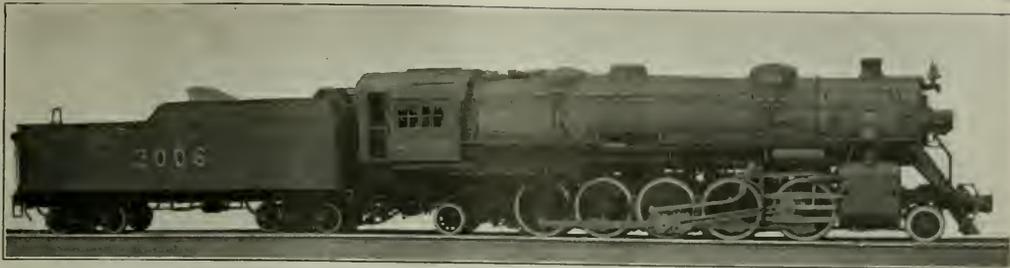
SUMMARY OF FORECLOSURE SALES IN 45 YEARS.

Year	No. of roads	Miles	Bonds and stocks
1876.....	30	3,840	\$217,848,000
1877.....	34	3,875	198,984,000
1878.....	48	3,906	311,631,000
1879.....	65	4,909	243,288,000
1880.....	31	3,775	263,882,000
1881.....	29	2,617	137,223,000
1882.....	16	867	65,426,000
1883.....	18	1,354	47,100,000
1884.....	15	710	23,504,000
1885.....	22	3,156	278,394,000
1886.....	45	7,687	374,109,000
1887.....	31	5,478	328,181,000
1888.....	19	1,596	64,555,000
1889.....	25	2,350	137,315,000
1890.....	29	3,825	182,495,000
1891.....	21	3,223	169,069,000
1892.....	28	1,922	95,898,000
1893.....	25	3,153	179,524,000
1894.....	42	5,643	318,999,000
1895.....	52	12,831	761,791,000
1896.....	58	13,730	1,150,377,000
1897.....	42	6,915	517,630,000
1898.....	47	6,054	629,910,000
1899.....	32	4,294	267,534,000
1900.....	24	3,477	190,374,000
1901.....	17	1,139	85,808,000
1902.....	20	693	39,788,000
1903.....	13	555	15,885,000
1904.....	13	524	28,266,000
1905.....	6	679	20,307,000
1906.....	8	262	10,400,000
1907.....	6	114	13,777,000
1908.....	3	138	2,547,000
1909.....	12	2,629	250,033,000
1910.....	17	1,100	93,660,109
1911.....	17	1,386	40,741,543
1912.....	12	661	25,910,990
1913.....	6	1,159	86,163,850
1914.....	9	4,470	81,439,500
1915.....	9	3,914	285,258,782
1916.....	26	8,355	703,444,855
1917.....	20	10,963	557,846,348
1918.....	11	763	24,776,187
1919.....	8	459	15,479,587
1920.....	7	380	7,676,200

cent of the defaulted bonds), then pressed suit against the Denver & Rio Grande and in May, 1917, a decision was handed down by the district court in favor of the Equitable Trust Company and awarding it the sum of \$32,272,274. This verdict was later affirmed by the Court of Appeals, and with accrued interest the total was brought up to approximately \$38,000,000. The final result was the receivership of the Denver & Rio Grande on January 26, 1918.

The Western Pacific's interest in the Denver & Rio Grande is contained not only in its judgment against that property on the defaulted bonds but also in the fact that the

The story of the receivership of the Denver & Rio Grande would be in the main a recital of the developments which have taken place in this Western Pacific matter. It is now proposed to reorganize the road under Western Pacific control as the Denver & Rio Grande Western, but the last step in the reorganization cannot be told until a decision is rendered as to the plea of the Denver & Rio Grande stockholders to have a part in the reorganization. The stockholders claim that the decision in the judgment in favor of the Western Pacific was incorrect and the confirmation of the sale of the Denver & Rio Grande on November 20 is withheld pending a decision on this question.



One of Twenty Santa Fe Type Locomotives Built by the American Locomotive Company for the Boston & Maine

Locomotive Orders Show Increase in 1920

Domestic Orders for Year Nine Times Total for Previous Year—
Still Far Below Average Annual Purchases

THE LOCOMOTIVES ORDERED by the Class 1 railroads in 1920 reached a total of 1,668—almost eight times the number ordered for all domestic service in 1919. The orders placed by other railroads in the United States amounted to 103 and by industrial concerns to 227, making a total of 1,998 for all domestic purchases—more than nine times the similar total for 1919.

The orders by Canadian roads and industries from builders either in Canada or the United States were 189 and the orders received by American builders from foreign coun-

tries amounted to 718, making a grand total for all orders of 2,905. In 1919 the total Canadian orders were 58 and the foreign orders 898. Thus it will be seen that there was a considerable increase in orders from every source except in the export trade. Here the 1920 total is 180 less than the 1919 figure. It will be noticed that the orders for the Class I roads have been compiled separately this year. Included with them are the figures for some of the more important terminal railways.

selfes, with some help from the government to be sure, during the period of readjustment attendant upon the return of the carriers to their owners when railway costs were nearing their peak and before adequate returns had been provided by a new rate structure. In view of these facts the showing for 1920 is not entirely unsatisfactory, although it is quite evident that nothing has been done during the past year to make up for deficiencies in the annual purchases of locomotives which have been accumulating since 1912.

It was pointed out in the last statistical number of the *Railway Age* that the foreign orders for 1919 made up more than 75 per cent of all orders placed. In 1920 conditions were quite different, because foreign orders have been small. This decrease in orders from abroad is disappointing; it can be traced to the premium on the dollar which has increased generally throughout the year in most countries and which makes it possible in some cases for foreign manufacturers to underbid our own; to the fact that foreign competitors have been able to increase their production and to direct their efforts once more to their old markets; and to the generally impoverished condition of the countries which most need to replenish the inadequate stock of locomotives on their rail-

tries amounted to 718, making a grand total for all orders of 2,905. In 1919 the total Canadian orders were 58 and the foreign orders 898. Thus it will be seen that there was a considerable increase in orders from every source except in the export trade. Here the 1920 total is 180 less than the 1919 figure. It will be noticed that the orders for the Class I roads have been compiled separately this year. Included with them are the figures for some of the more important terminal railways.

In last year's review of locomotive statistics (*Railway Age*, January 2, 1920, page 125) it was pointed out that the year 1919 set the low mark for locomotive orders as far back as records have been kept. In view of this fact, the 1920 orders can not be considered excessive, as may easily be seen by reference to Table II. The totals for 1916, 1917 and 1918 all exceed the figures for 1920. The totals for 1917 are as large again as the figures shown in the present compilation. During these years greatly increasing demands on the railways together with a steady upward movement of prices which looked as if it would continue indefinitely brought about an economic condition which generally increases buying in almost every field. Then, too, during the war period it was felt that something approaching an adequate number of locomotives had to be provided regardless of cost, and under the regime of the Railroad Administration government credit was available for such purposes.

The orders this year were financed by the railroads them-

TABLE I.—LOCOMOTIVE ORDERS OF 1920

For Class I Railroads	1,668
For Other American Railroads	103
For Domestic Industrials	227
Total Domestic	1,998
For Service in Canada	189
For Export to other Countries	718
Grand Total	2,905

TABLE II. ORDERS FOR LOCOMOTIVES SINCE 1901

Year	Domestic orders only		Loco- motives
	Loco- motives	Year	
1901	4,340	1908	1,182
1902	4,665	1909	3,350
1903	3,283	1910	3,787
1904	2,538	1911	2,850
1905	6,265	1912	4,515
1906	5,642	1913	3,467
1907	3,482	1914	1,265
Domestic and Foreign			
Year	Domestic	Foreign	Total
1915	1,612	850	2,462
1916	2,910	2,983	5,893
1917	2,704	3,438	6,142
1918	2,802	2,086	4,888
1919	272	898	1,170

ways. One of the most noteworthy orders from foreign countries which was placed in the United States during the year was from Roumania for 50 locomotives. This order was divided equally between the Baldwin Locomotive Works and the American Locomotive Company and payment for it was made in petroleum.

The number of locomotives built in the United States for domestic service during 1920 was 1,857 and for export 1,582, making a total of 3,439. In Canada the production was 165 for domestic use and 68 for export, making a total of 233

and a grand total of all production in the United States and Canada of 3,672. This figure represents an increase of 400 over the similar total, 3,272, for 1919. The total built in the United States for domestic service in 1920 is some 200

for locomotives exported that, due to the failure of two large locomotive builders to furnish figures showing the number built for export, the editors have had to content themselves with estimating the production of these builders from other sources, which, however, are believed to be sufficiently accurate for purposes of comparison.

If the locomotive orders for the preceding year give any data by which production for the following year may be estimated, we can safely assume that the output of locomotives in 1921 should exceed measurably the production for 1920. The fact confronts us always that American roads have for several years fallen far behind in their acquisition of new motive power and that sooner or later the deficiency must be made good. If there is to be an increase in locomotive production in 1921, then, it is a matter which should meet with the approval of all—the public and the railways themselves as well as the locomotive builders.

The locomotive orders which are listed in the accompanying tables are compiled from official sources. Some few omissions of small and unimportant orders doubtless occur. The data presented herewith were supplied by the railways, the industrial concerns and the manufacturers in reply to letters which we sent asking for the information. The lists were checked with the weekly reports in the Equipment and Supplies column of the *Railway Age* and amplified where necessary.

TABLE III. THE LOCOMOTIVES BUILT

	Domestic	Foreign	United States	Canada	Total
Domestic	1,857		1,857	165	2,022
Foreign		1,582	1,582	68	1,650
Total			3,439	233	3,672

Comparison with Previous Years		Year		Year		Total	
Year	Domestic	Foreign	Total	Year	Domestic	Foreign	Total
1896	866	309	1,176	1908*	1,886	456	2,342
1897	865	386	1,251	1909*	2,596	291	2,887
1898	1,321	554	1,875	1910*	4,441	314	4,755
1899	1,951	514	2,465	1911*	3,143	387	3,530
1900	2,648	505	3,153	1912*	2,708	1,367	4,075
1901	.....	3,384	1913†	4,561	771	5,332	
1902	.....	4,070	1914†	1,962	273	2,235	
1903	.....	5,152	1915†	1,250	835	2,085	
1904	.....	3,441	1916†	2,467	1,407	3,874	
1905†	4,896	595	5,491	1917†	2,585	2,861	5,446
1906†	6,232	720	6,952	1918†	3,668	2,807	6,475
1907†	6,564	798	7,362	1919†	2,162	1,110	3,272

*Includes Canadian output.

†Includes Canadian output and equipment built in railroad shops.

less than the domestic production in 1919, but the figures for the Canadian and export production combine to show a definite increase in the grand total.

It should be pointed out in connection with quoting figures

Locomotive Orders in 1920

Class I Roads

Purchaser	No.	Type	Cylinders	Weight	Super-heater	Brick arch	Valve gear	Mechanical stoker	Builder
Ann Arbor	2	0-8-0	22½ x 28	200,000	No	Yes	Walschaert	.....	American
Atchison, Topeka & Santa Fe	30	2-8-2	27 x 32	322,920	Yes	Yes	Walschaert	Duplex	Baldwin
	10	2-10-2	30 x 32	375,400	Yes	Yes	Walschaert	Duplex	Baldwin
	10	4-8-2	28 x 28	338,310	Yes	Yes	Walschaert	Duplex	Baldwin
Atlanta & West Point	2	4-8-2	27 x 28	316,000	Yes	Yes	Walschaert	.....	American
Atlantic Coast Line	25	4-6-2	25 x 28	277,000	Yes	Yes	Baker	.....	American
	5	0-6-0	21 x 28	163,600	No	Yes	Baker	.....	Baldwin
Baltimore & Ohio	50	2-8-2	26 x 32	300,000	Yes	Yes	Baker	Duplex	Baldwin
Bangor & Aroostook	6	2-8-0	23 x 30	212,000	Yes	Yes	Baker	.....	American
Boston & Albany	6	0-8-0	25 x 28	217,000	Yes	Yes	.....	.....	Lima
Boston & Maine	20	2-10-2	29 x 32	361,200	Yes	Yes	Walschaert	Duplex	American
Chicago & Alton	5	2-8-2	26 x 30	292,000	Yes	Yes	.....	.....	American
Chicago & North Western	7	4-8-2	27 x 28	316,000	Yes	Yes	Walschaert	.....	American
Central of Georgia	6	2-6-2	24-38 x 32	438,000	Yes	.....	.....	.....	American
Central of New Jersey	11	2-8-2	27 x 31	337,000	Yes	.....	.....	.....	American
Chesapeake & Ohio	20	2-6-2	21-35 x 32	441,000	Yes	Yes	Walschaert	Duplex	American
	5	0-10-0	27 x 28	292,000	Yes	Yes	Walschaert	.....	American
Chicago & Alton	20	4-6-2	25 x 28	260,000	Yes	Yes	Young	.....	American
Chicago & North Western	40	2-8-2	27 x 32	302,000	Yes	Yes	Young	.....	American
Chicago, Burlington & Quincy	15	2-10-2	30 x 27	367,830	Yes	Yes	Walschaert	Duplex	Baldwin
	16	2-8-2	27 x 32	277,000	Yes	Yes	Walschaert	.....	Baldwin
	15	0-6-0	21 x 28	163,500	No	Yes	Baker	.....	Baldwin
	5	2-8-2	28 x 32	318,700	Yes	Yes	.....	.....	Baldwin
Chicago Great Western	10	2-8-2	27 x 30	284,400	Yes	Yes	Baker	Duplex	Baldwin
Chicago, Milwaukee & St. Paul	100	2-8-2	26 x 30	287,600	Yes	Yes	Baker	.....	Baldwin
Chicago, Rock Island & Pacific	10	4-8-2	28 x 28	340,000	Yes	Yes	Baker	.....	American
	15	2-10-2	30 x 32	383,000	Yes	Yes	Baker	Duplex	American
Chicago, St. Paul, Minn. & Omaha	10	2-8-2	28 x 30	322,000	Yes	Yes	Baker	.....	American
	6	2-8-2	27 x 28	319,000	Yes	Yes	Walschaert	Duplex	American
	4	0-6-0	21 x 28	164,000	.....	.....	.....	.....	American
Cleveland, Cin., Chicago & St. Louis	10	0-8-0	25 x 28	217,000	Yes	Yes	.....	.....	Lima
	10	4-6-2	23½ x 26	282,000	Yes	Yes	.....	.....	American
	50	2-6-0	27 x 28	328,500	Yes	Yes	.....	.....	American
Delaware & Hudson	1	2-8-2	24-42 x 32	340,000	Yes	Yes	Young	.....	American
Delaware, Lackawanna & Western	6	4-6-2	25 x 28	302,000	Yes	Yes	Baker	.....	American
	10	2-8-2	28 x 30	321,000	Yes	Yes	Baker	Duplex	American
El Paso & Southwestern	10	2-8-2	29 x 30	319,000	Yes	Yes	Walschaert	Duplex	American
Florida East Coast	10	4-6-2	22 x 26	204,000	Yes	Yes	Walschaert	.....	American
	2	0-6-0	20 x 26	160,000	Yes	Yes	Walschaert	.....	American
Fort Smith & Western	1	2-8-2	22 x 28	206,990	Yes	Yes	.....	.....	Baldwin
Grand Trunk (Western)	25	0-6-0	22 x 26	174,000	Yes	Yes	Baker	.....	Lima
	1	4-6-2	25 x 28	302,000	.....	.....	.....	.....	Company shops
Great Northern	45	2-8-2	28 x 32	320,000	Yes	Yes	Walschaert	Duplex	Baldwin
Green Bay & Western	1	0-6-0	19 x 26	128,000	Yes	No	Walschaert	.....	American
Gulf Coast Lines	5	4-6-0	21½ x 26	191,000	Yes	.....	Walschaert	.....	American
Gulf, Mobile & Northern	5	4-6-0	21 x 26	265,800	Yes	No	Walschaert	.....	Baldwin
Illinois Central	50	2-10-2	30 x 32	380,000	Yes	Yes	Baker	Duplex	Lima
	25	4-6-2	26 x 28	278,000	Yes	Yes	Walschaert	.....	American
	50	2-10-2	30 x 32	380,000	Yes	Yes	Baker	Duplex	Baldwin
	25	4-6-2	25 x 28	216,000	Yes	Yes	.....	.....	Baldwin
Illinois Terminal	2	2-6-0	22 x 26	173,000	.....	.....	.....	.....	Baldwin
Indiana Harbor Belt	10	0-8-0	25 x 28	217,000	Yes	Yes	.....	.....	Lima
Lehigh Valley	5	2-8-2	27 x 30	325,000	Yes	Yes	Baker	Duplex	Baldwin
Los Angeles & Salt Lake	10	2-8-2	26 x 28	300,000	Yes	Yes	.....	.....	American
	4	0-6-0	21 x 26	.....	Yes	Yes	.....	.....	Baldwin
Midland Valley	2	2-8-2	22 x 28	200,500	Yes	Yes	.....	.....	Baldwin
Louisiana & Arkansas	2	4-6-0	22 x 28	190,500	Yes	.....	Walschaert	.....	Baldwin
	2	2-8-2	22 x 28	190,500	Yes	.....	Walschaert	.....	Baldwin
Louisville & Nashville	2	0-6-0	21 x 28	173,550	Yes	Yes	Walschaert	.....	Am. Ry. & Eq.
	15	2-8-2	26 x 30	292,000	Yes	Yes	Walschaert	Duplex	American
	6	0-8-0	23½ x 30	219,000	Yes	Yes	Walschaert	.....	Company shops
	6	0-8-0	22 x 28	235,400	Yes	Yes	Walschaert	.....	Company shops
	12	4-6-2	22 x 28	235,400	Yes	Yes	Walschaert	.....	Company shops
	16	2-8-2	28 x 30	324,000	Yes	Yes	Walschaert	Duplex	Company shops
	6	0-8-0	23½ x 30	219,000	Yes	Yes	Walschaert	.....	Company shops

Purchaser	No.	Type	Cylinders	Weight	Super-heater	Brick arch	Valve gear	Mechanical stoker	Builder
Maine Central	4	4-6-0	22 x 28	206,500	Yes	Yes	Baker	.....	American
Michigan Central	6	0-6-0	21 x 28	165,000	Yes	Yes	Walschaert	.....	American
	10	4-6-2	23 1/2 x 26	282,000	Yes	Yes	.....	.....	Lima
Minneapolis & St. Louis	15	2-8-2	24 x 30	328,000	Yes	Yes	.....	.....	American
	5	4-6-2	22 x 28	223,000	Yes	Yes	Baker	.....	American
Minneapolis, St. Paul & Sault Ste. Marie	25	2-8-2	28 x 30	294,000	Yes	Yes	Walschaert	.....	American
	10	0-6-0	27 x 30	151,000	Yes	Yes	Walschaert	.....	American
Missouri, Kansas & Texas	10	0-8-0	25 x 28	255,000	Yes	Yes	.....	.....	American
	10	0-8-0	25 x 28	220,000	Yes	No	Baker	.....	Lima
	10	4-6-2	25 x 28	272,000	Yes	No	Walschaert	.....	Lima
	20	2-8-2	27 x 30	315,000	Yes	No	Walschaert	.....	Lima
Missouri Pacific	5	0-6-0	21 x 28	165,000	Yes	.....	.....	.....	American
	25	2-8-2	27 x 32	325,000	Yes	.....	.....	.....	American
Missouri Pacific	15	0-6-0	21 x 28	165,000	Yes	.....	.....	.....	American
	3	4-8-2	27 x 30	345,000	Yes	.....	.....	.....	American
	5	4-6-2	26 x 26	265,000	Yes	.....	.....	.....	American
New York Central	50	0-8-0	25 x 28	217,000	Yes	Yes	.....	.....	American
	26	4-6-2	23 1/2 x 26	282,000	Yes	Yes	.....	.....	American
	3	0-8-0	26 x 28	468,000	Yes	Yes	.....	.....	American
New York, Chicago & St. Louis	10	2-6-2	21 1/4 x 32	364,000	Yes	Yes	.....	.....	American
New York, New Haven & Hartford	6	2-8-2	26 x 30	292,000	Yes	Yes	Walschaert	Duplex	American
	10	4-8-2	27 x 30	327,000	Yes	Yes	Southern	Duplex	American
	10	0-8-0	25 x 28	214,000	Yes	Yes	Baker	.....	American
Norfolk & Western	10	4-8-2	.....	.....	.....	.....	.....	.....	Company shops
Norfolk Southern	20	0-6-0	19 x 28	146,000	No	Yes	Baker	.....	Baldwin
	20	4-6-2	26 x 28	296,000	Yes	Yes	Walschaert	.....	American
	25	2-8-2	28 x 30	336,000	Yes	Yes	Walschaert	.....	American
	20	0-8-0	25 x 28	214,000	Yes	Yes	.....	.....	American
Northern Pacific	25	2-8-2	26 x 30	476,000	Yes	Yes	Walschaert	.....	American
	20	0-8-0	25 x 28	152,000	Yes	.....	.....	.....	American
Northern Pacific Terminal	6	2-8-2	26 x 30	476,000	Yes	Yes	Walschaert	.....	American
Pennsylvania	2	0-6-0	20 x 26	152,000	Yes	.....	.....	.....	American
	1	2-6-2	13 x 26	51,500	No	No	Richardson	.....	American
	1	0-4-0	9 x 14	24,900	No	No	.....	.....	Baldwin
Pere Marquette	12	4-6-2	23 x 28	240,000	Yes	Yes	Baker	.....	American
Philadelphia & Reading	5	4-6-2	25 x 28	273,600	Yes	No	Walschaert	.....	Company shops
	5	2-8-2	26 x 28	156,000	No	No	Walschaert	.....	Company shops
	25	2-8-2	25 x 32	279,390	Yes	No	Walschaert	Duplex	Company shops
Pittsburgh & Lake Erie	5	2-8-2	27 x 30	319,000	Yes	Yes	.....	.....	American
Pittsburgh & Shawmut	2	4-6-2	19 x 26	173,000	Yes	No	Walschaert	.....	American
Pittsburgh & West Virginia	6	2-8-2	25 x 32	238,000	Yes	.....	.....	.....	American
Portland Terminal	2	0-6-0	21 x 28	167,000	Yes	.....	.....	.....	American
Richmond, Fredericksburg & Potomac	2	4-6-0	26 x 28	285,000	Yes	Yes	Walschaert	.....	American
	2	0-6-0	21 x 28	172,000	Yes	Yes	Walschaert	.....	American
St. Louis Southwestern	1	2-8-0	25 x 30	241,000	Yes	Yes	.....	.....	Baldwin
	21	2-8-0	25 x 30	243,000	Yes	Yes	.....	.....	Baldwin
Southern Pacific	10	2-8-2	.....	.....	.....	.....	.....	.....	Company shops
	6	4-6-0	.....	.....	.....	.....	.....	.....	Company shops
	14	0-6-0	.....	.....	.....	.....	.....	.....	Company shops
	15	2-10-2	.....	.....	.....	.....	.....	.....	Company shops
	15	4-6-2	.....	.....	.....	.....	.....	.....	Baldwin
	10	0-6-0	.....	.....	.....	.....	.....	.....	Baldwin
	2	Electric	.....	120,000	.....	.....	.....	.....	Baldwin
Union	6	0-6-0	22 x 28	178,000	Yes	Yes	.....	.....	Westinghouse
Union Pacific	25	2-10-2	29 1/2 x 30	368,500	Yes	Yes	Walschaert	Duplex	Baldwin
	10	4-6-2	25 x 28	278,100	Yes	Yes	Walschaert	.....	Baldwin
Utah Terminal	19	2-8-0	26 x 32	494,500	Yes	Yes	Walschaert	Duplex	American
	16	2-8-2	26 x 28	294,000	Yes	Yes	Walschaert	Duplex	American
	30	0-6-0	21 x 26	156,000	Yes	Yes	Walschaert	.....	Lima
Utah	2	2-10-2	29 1/2 x 30	365,500	Yes	Yes	Walschaert	Duplex	Baldwin
Virginian	1	4-6-2	23 x 28	280,000	Yes	.....	Baker	.....	American
Western Maryland	20	2-8-0	27 x 32	296,000	Yes	Yes	Walschaert	Standard	Baldwin
	20	2-8-0	27 x 32	296,000	Yes	Yes	Walschaert	Standard	Baldwin
Western Pacific	5	2-8-2	27 x 32	320,000	Yes	Yes	Walschaert	Standard	American
	5	2-8-2	28 x 30	330,000	Yes	Yes	Walschaert	.....	American

Other Railroads

Abilene & Southern	1	4-6-0	18 x 24	126,000	Yes	Yes	Walschaert	.....	Baldwin
Akron, Canton & Youngstown	2	0-8-0	25 x 28	214,000	Yes	.....	.....	.....	American
Aurora, Elgin & Chicago	1	Electric	600 v. d. c.	100,000	.....	.....	.....	.....	General Electric
Bay Terminal	1	Electric	19 x 24	124,000	No	Yes	Baker	.....	Baldwin
Bamberger Electric	1	Electric	.....	82,540	.....	.....	.....	.....	Company shops
Bevier & Southern	1	2-6-0	20 x 26	137,000	.....	.....	.....	.....	Baldwin
Birmingham Southern	2	2-8-0	23 x 28	205,000	Yes	.....	.....	.....	American
Carro, Truman & Southern	1	Gesred	.....	94,000	.....	.....	.....	.....	Heister
California Western & Nav. Co.	1	2-6-2	18 x 24	140,000	Yes	No	Walschaert	.....	Baldwin
Cambridia & Indiana	2	2-8-0	23 x 32	238,500	Yes	Yes	Walschaert	.....	Baldwin
Charlotte Harbor & Northern	4	2-8-0	21 x 28	175,600	Yes	No	Walschaert	.....	Baldwin
Chicago Heights Terminal Transfer	1	0-6-0	22 x 26	160,900	.....	.....	.....	.....	Baldwin
Chicago, West Pullman & Southern	1	2-8-0	23 x 32	175,200	Yes	No	.....	.....	Baldwin
Cisco Southeastern	1	4-6-0	18 x 26	126,000	Yes	.....	.....	.....	Baldwin
Columbia & Nehalem River	1	2-6-2	18 x 24	130,600	No	Yes	Walschaert	.....	Baldwin
Columbia, Newberry & Laurens	1	2-8-0	21 x 26	161,000	Yes	Yes	Walschaert	.....	Baldwin
Corwall	1	4-6-0	20 x 28	162,000	.....	.....	.....	.....	American
Deering Southwestern	2	4-6-0	16 x 24	101,000	.....	.....	.....	.....	Baldwin
Delray Connecting	1	0-8-0	22 x 28	208,000	Yes	Yes	Walschaert	.....	American
Des Moines Union	3	0-6-0	21 x 26	138,700	.....	.....	.....	.....	Baldwin
East Broadway	1	2-8-2	20 x 24	161,000	.....	.....	.....	.....	Porter
East Jersey R.R. & Terminal	1	0-6-0	19 x 24	127,700	No	No	.....	.....	Baldwin
East Jordan & Southern	1	2-6-0	18 x 24	121,000	No	Yes	.....	.....	American
Escambia	1	3-6-0	18 x 24	100,000	No	No	Walschaert	.....	Baldwin
Eureka Nevada	1	0-8-0	14 x 18	68,000	No	Yes	Walschaert	.....	Baldwin
Fairport, Painesville & Eastern	1	0-6-0	22 x 26	156,000	Yes	Yes	.....	.....	Baldwin
Hagerstown & Frederick	1	Electric	.....	52,400	.....	.....	.....	.....	Company shops
Hetch Hetchy	1	2-6-2	18 x 24	127,000	Yes	.....	.....	.....	American
Interstate	1	2-8-0	20 x 32	223,600	Yes	.....	Southern	.....	Baldwin
Jacksonville Terminal	2	0-6-0	20 x 26	127,000	.....	.....	.....	.....	Baldwin
Jonesboro, Lake City & Eastern	2	2-8-0	19 x 24	134,000	Yes	.....	.....	.....	Baldwin
Kansas City, Kaw Valley & Western	2	Electric	.....	100,000	.....	.....	.....	.....	Bald. West'house
Kentucky & Indiana Terminal	1	2-8-0	24 x 28	209,900	Yes	.....	.....	.....	Baldwin
Lake Erie, Franklin & Clinton	1	4-4-0	19 x 24	128,000	.....	.....	.....	.....	Baldwin
Manufacturers' Junction	1	0-6-0	22 x 26	160,000	.....	.....	.....	.....	Baldwin
Minn. Northfield & So.	1	0-6-0	21 x 26	136,000	No	Yes	Walschaert	.....	Porter
Mississippi River & Bonne Terre	2	2-8-0	23 x 28	199,000	Yes	No	.....	.....	American
Monongahela Valley Traction	1	Electric	.....	100,000	.....	.....	.....	.....	Bald. West'house
Montana, Wyoming & Southern	1	2-8-0	21 x 28	175,000	Yes	Yes	.....	.....	Baldwin
Mount Hood	2	2-6-0	18 x 24	135,000	Yes	.....	.....	.....	Baldwin
Newburg & South Shore	2	0-6-0	22 x 28	178,000	Yes	Yes	Walschaert	.....	Baldwin
	2	0-8-0	24 x 30	231,700	Yes	Yes	Walschaert	.....	Baldwin
New Orleans Public Belt	3	0-6-0	19 x 24	130,600	Yes	Yes	.....	.....	Baldwin
New York Municipal	1	Electric	600 v. d. c.	100,000	No	.....	.....	.....	General Electric
Norfolk & Portsmouth Belt Line	2	2-8-0	21 x 28	169,000	Yes	.....	.....	.....	Baldwin

Purchaser	No.	Type	Cylinders	Weight	Super-heater	Brick arch	Valve gear	Mechanical stoker	Builder
Northeast Oklahoma	2	Electric	.....	100,000	.....	.....	.....	.....	Bald. - West'house
Northwestern Elevated	2	Electric	.....	100,000	.....	.....	.....	.....	Bald. - West'house
Norwood & St. Lawrence	1	2-6-0	19 x 24	123,400	.....	.....	.....	.....	Baldwin
Pittsburgh, Allegheny & McKee's Rocks	3	2-8-2	20 x 28	174,000	.....	.....	.....	.....	American
Portland, Astoria & Pacific	1	2-8-2	20 1/2 x 28	183,700	.....	Yes	.....	.....	Baldwin
Sewell Valley	1	2-8-0	18 x 22	121,000	.....	.....	.....	.....	American
Sierra Ry. of California	1	0-6-0	20 x 26	154,000	Yes	.....	.....	.....	Baldwin
South Buffalo	2	0-8-0	22 x 28	209,000	Yes	.....	.....	.....	Baldwin
South Shore	1	0-6-0	22 x 26	152,000	.....	.....	.....	.....	Baldwin
Sugarland Railway	1	4-6-0	18 x 26	126,000	.....	.....	.....	.....	American
Sumpter Valley	2	2-8-2	21 x 30	128,000	.....	.....	.....	.....	Baldwin
Texas, Oklahoma & Eastern	1	2-6-2	16 x 24	104,500	.....	Yes	.....	.....	American
Texas, Oklahoma & Eastern	1	4-6-0	20 x 26	168,000	Yes	Yes	Walschaert	.....	Baldwin
Texas, Oklahoma & Eastern	1	4-6-0	19 x 26	135,000	Yes	Yes	.....	.....	General Electric
Texas Southeastern	1	Electric	1,500' d. c.	120,000	.....	.....	Walschaert	.....	American
Tidewater Southern	1	0-6-0	21 x 26	142,000	Yes	Yes	.....	.....	American
Toledo Terminal	2	2-8-0	22 x 28	200,000	Yes	Yes	Walschaert	.....	Baldwin
Townville	1	2-6-0	13 x 20	60,000	.....	.....	.....	.....	American
Verde Tunnel & Smelter	2	2-6-6-2	23 1/2 x 37	448,000	Yes	Yes	Walschaert	.....	Baldwin
Wisconsin & Michigan	1	4-6-0	20 x 26	140,000	No	Yes	Walschaert	.....	Bald. - West'house
Washington & Old Dominion	1	Electric	.....	100,000	.....	.....	.....	.....	Baldwin
Virginia & Carolina Southern	1	4-6-0	18 x 26	126,000	.....	.....	.....	.....	Bald. - West'house
Youngstown & Sub.	1	Electric	.....	90,000	.....	.....	.....	.....	Baldwin

Industrials

Alaskan Engineering Comm.	1	4-6-0	14 x 20	77,600	.....	.....	.....	.....	Baldwin
Albert Hanson Lumber Co.	1	0-4-0	15 x 24	70,000	.....	.....	.....	.....	Baldwin
Alexander-Sullivan Lumber Co.	1	4-6-0	18 x 24	117,000	.....	.....	.....	.....	American
Allegheny River Mining Co.	2	0-6-0	19 x 26	173,000	Yes	.....	.....	.....	Baldwin
Allegheny Steel Co.	1	0-6-0	22 x 26	160,000	.....	.....	.....	.....	American
American Agricultural Chemical Co.	1	0-4-0	13 x 20	65,000	.....	.....	.....	.....	Baldwin
American Bridge Co.	1	0-4-0	11 x 16	44,600	.....	.....	.....	.....	American
American Locomotive Co.	1	0-6-0	21 x 28	168,000	Yes	.....	.....	.....	Baldwin
American Steel & Wire Co.	1	0-6-0	21 x 26	137,900	.....	.....	.....	.....	Baldwin
Anderson-Theobald Co.	1	0-6-0	16 x 24	85,000	.....	.....	.....	.....	Baldwin
Arkansas Land & Lumber Co.	1	2-6-2	16 x 24	120,500	.....	.....	.....	.....	Baldwin
Arkansas Short Leaf Lumber Co.	1	0-6-0	16 x 24	99,000	.....	Yes	.....	.....	American
Ashland Iron Mining Co.	1	0-4-0	16 x 24	99,000	.....	.....	.....	.....	American
Astoria Light, Heat & Power Co.	1	0-4-0-T	14 x 22	79,000	.....	.....	.....	.....	Baldwin
Atlantic Steel	1	0-4-0	14 x 22	77,500	.....	.....	.....	.....	Baldwin
Baldwin	6	0-4-0	10 x 16	37,000	.....	.....	.....	.....	Baldwin
Baldwin	1	2-6-2	13 x 22	76,400	.....	.....	.....	.....	Heisler
Barfield Lumber Co.	1	Geared	.....	94,000	.....	.....	.....	.....	American
Bee Tree Lumber Co.	2	0-4-0	14 x 22	79,000	.....	.....	.....	.....	Baldwin
Birmingham Slag Co.	1	0-6-0	17 x 24	88,000	.....	.....	.....	.....	Baldwin
Beech Bottom Power Co.	1	0-4-0	11 x 16	46,600	.....	.....	.....	.....	American
Board of State Harbor Com., San Francisco	1	0-6-0	20 x 24	146,000	.....	Yes	.....	.....	Baldwin
Bohlessen, H. G., Mfg. Co.	1	2-6-2	15 x 24	93,000	.....	.....	.....	.....	Baldwin
Brown, Geo. C., & Co.	1	Geared	.....	64,000	.....	.....	.....	.....	Baldwin
Brown, W. P., & Sons Lumber Co., Inc.	1	2-6-0	14 x 22	74,500	.....	.....	.....	.....	Baldwin
Buckwalter, J. R., Lumber Co., Inc.	1	2-6-2	16 x 24	101,000	.....	.....	.....	.....	American
Buffalo Slag Co.	2	0-4-0	16 x 24	99,000	.....	.....	.....	.....	Baldwin
Bureau of Water, Philadelphia	1	2-6-2	17 x 24	130,000	.....	Yes	.....	.....	Baldwin
Calestieu Long Leaf Lumber Co.	1	0-8-0	27 x 30	270,000	.....	.....	.....	.....	American
Cambria Steel Co.	2	2-6-0	13 x 20	57,000	.....	.....	.....	.....	Baldwin
Camp Mfg. Co.	2	.....	10 x 16	37,000	.....	.....	.....	.....	American
Carnegie Steel Co.	2	0-4-0	13 x 20	65,000	.....	.....	.....	.....	American
Casey Co., John F.	2	0-4-0	13 x 20	124,000	.....	.....	.....	.....	American
Central Leather Co.	1	2-8-0	18 x 24	106,000	.....	.....	.....	.....	Heisler
Charcoal Iron Co.	1	Geared	.....	94,000	.....	.....	.....	.....	American
Caplano Timber Co.	1	Geared	.....	80,000	.....	.....	.....	.....	Baldwin
Chehalis Mill Co.	3	0-6-0	21 x 26	157,000	.....	Yes	.....	.....	American
Chino Copper Co.	1	0-6-0	18 x 24	121,000	.....	.....	.....	.....	American
Colonial Steel Co.	1	0-4-2	14 x 22	84,000	.....	.....	.....	.....	Baldwin
Colorado Portland Cement Co.	2	.....	.....	180,700	.....	.....	.....	.....	American
Columbia Chemical Co.	2	2-6-0	23 x 26	180,700	.....	.....	.....	.....	Baldwin
Cornwall Ore Bank Co.	1	0-4-2	14 x 22	88,000	.....	.....	.....	.....	Baldwin
Coronet Phosphate Co.	1	4-6-0	19 x 26	139,900	.....	Yes	.....	.....	Baldwin
Crowell & Spencer Lumber Co., Ltd.	1	2-6-2	15 x 24	92,000	.....	.....	.....	.....	Heisler
Dawkins Lumber Co.	1	Geared	.....	106,000	.....	.....	.....	.....	Heisler
Dempsay Lumber Co.	1	Geared	.....	150,000	.....	.....	.....	.....	Heisler
Desha Lumber Co.	1	Geared	.....	80,000	.....	.....	.....	.....	American
Diamond Match Co.	1	Switch	.....	144,000	.....	.....	.....	.....	Baldwin
Donner Steel Co.	2	2-4-0	14 x 22	79,000	.....	.....	.....	.....	American
Eastman Kodak Co.	1	0-6-0	28 x 24	148,400	.....	.....	.....	.....	Baldwin
Eastern Steel Co.	1	0-4-0	16 x 24	99,000	.....	.....	.....	.....	Baldwin
Empire Steel & Iron Co.	1	2-8-2	20 1/2 x 28	175,500	.....	.....	.....	.....	American
English Lumber Co.	1	0-4-0-T	14 x 22	79,000	.....	.....	.....	.....	Baldwin
Frick, H. C., Coke Co.	1	2-6-2	16 x 24	107,800	.....	.....	.....	.....	Heisler
Frost Johnson Lumber Co.	2	Geared	.....	72,000	.....	.....	.....	.....	Baldwin
Gayoso Lumber Co.	2	0-6-0	22 x 26	160,000	.....	.....	.....	.....	Baldwin
Goodyear Tire & Rubber Co.	1	0-6-0	20 x 24	126,000	.....	.....	.....	.....	American
Gordon Mining Co.	1	0-4-0	11 x 16	39,000	.....	.....	.....	.....	American
Grace, W. R. & Co.	1	0-4-0	13 x 20	65,000	.....	.....	.....	.....	Heisler
Hartford Electric Light Co.	1	Geared	.....	44,000	.....	.....	.....	.....	Heisler
Holly Ridge Lumber Co.	1	Geared	.....	150,000	.....	.....	.....	.....	American
Independence Logging Co.	2	0-6-0	20 x 24	137,000	.....	Yes	.....	.....	American
Inland Steel Co.	1	0-4-0	14 x 22	79,000	.....	.....	.....	.....	Baldwin
Interstate Sand & Gravel Co.	2	0-4-0	12 x 18	53,000	.....	.....	.....	.....	Heisler
Johnson, G. W., Limestone Co.	1	0-6-0	22 x 26	160,000	.....	.....	.....	.....	Baldwin
Jones & Laughlin Steel Co.	1	Geared	.....	69,000	.....	.....	.....	.....	Baldwin
Jones, J. M., Lumber Co.	1	2-6-2	15 x 20	85,900	.....	.....	.....	.....	Heisler
Kentucky Lumber Co.	1	Geared	.....	72,000	.....	.....	.....	.....	American
Kelsey Wheel Co.	1	0-4-0	14 x 22	79,000	.....	.....	.....	.....	Baldwin
Kipawa Co.	1	0-6-0	18 x 24	120,000	.....	.....	.....	.....	American
Koppers Co.	2	0-4-0	14 x 22	79,000	.....	.....	.....	.....	American
Koppers Co.	2	0-4-0	16 x 24	99,000	.....	.....	.....	.....	American
Koppers Co.	2	0-6-0	19 x 26	121,000	.....	.....	.....	.....	American
Lake Superior Paper Co.	1	0-6-0	19 x 24	123,000	.....	.....	.....	.....	American
Lehigh Portland Cement Co.	2	0-4-0	10 x 16	38,000	.....	.....	.....	.....	American
Lehigh Portland Cement Co.	1	0-4-0	12 x 18	53,000	.....	.....	.....	.....	American
Lewis & Clark	1	0-4-0	13 x 20	66,000	.....	.....	.....	.....	Heisler
Lewis & Clark	1	Geared	.....	126,000	.....	.....	.....	.....	American
Lewis & Clark	1	0-4-0	14 x 22	79,000	.....	.....	.....	.....	Baldwin
Log Supply Co.	1	0-4-0	14 x 22	79,000	.....	.....	.....	.....	Baldwin
Long Bell Co.	1	2-6-0	18 x 24	112,000	.....	.....	.....	.....	Baldwin
Longville Lumber Co.	1	2-6-2	17 x 24	130,000	.....	Yes	.....	.....	American
Longville Lumber Co.	1	0-4-0	14 x 22	79,000	.....	.....	.....	.....	Baldwin
Mansfield Sheet & Tin Plate Co.	1	0-4-0	14 x 22	79,000	.....	.....	.....	.....	American

Purchaser	No.	Type	Cylinders	Weight	Super-heater	Brick arch	Valve gear	Mechanical stoker	Builder
Mengel Box Co.	2	2-4-2	14 x 22	73,000	..	..	..	..	Baldwin
Meredith Lumber Co.	1	2-4-2	14 x 22	73,000	..	..	..	..	Baldwin
Minnesota Steel Co.	1	2-6-2	15 x 24	92,000	..	..	..	..	Baldwin
Missabe Iron Co.	3	0-6-0	22 x 26	166,400	..	..	..	..	Baldwin
Mississippi State Insane Hospital	1	0-6-0	21 x 24	88,000	..	..	..	..	American
New Jersey Zinc Co.	1	2-6-2	21 x 26	146,000	..	..	..	..	Baldwin
Nickel Plate Gravel Co.	1	0-4-0	12 x 18	53,000	..	..	..	..	Baldwin
Nickey Bros.	1	Geared	..	44,000	..	..	..	..	American
North Steel Co.	1	0-4-0	16 x 24	65,000	..	..	..	..	Heisler
Norton Co.	1	0-6-0	19 x 24	123,000	..	..	..	..	Baldwin
Old Ben Coal Co.	2	0-4-0	16 x 24	99,000	..	..	..	..	American
Oil Well Supply Co.	1	0-4-0	14 x 22	79,000	..	..	..	..	American
Oregon Lumber Co.	3	2-8-2	20 x 28	174,000	..	..	..	..	American
Otis Steel Co.	1	0-6-0	22 x 26	160,000	..	..	..	..	Baldwin
	1	0-6-0	19 x 24	142,000	..	..	..	..	Lima
Pelican Bay Lumber Co.	1	2-6-2	19 x 26	146,000	Yes	..	..	..	American
Petosity Portland Cement Co.	1	0-4-0	14 x 22	79,000	..	..	..	..	American
Phipps Dodge Cement Co.	2	Switch	..	..	..	..	..	..	Porter
Pittsburgh Limestone Co.	1	0-6-0	10 x 16	39,000	..	..	..	..	American
Pittsburgh Plate Glass Co.	1	0-6-0	18 x 24	105,000	..	..	..	..	Baldwin
Pittsburgh Seamless Tube Co.	1	0-4-0	14 x 22	79,000	..	..	..	..	American
Poinsette Lumber & Mfg. Co.	1	Geared	..	94,000	..	..	..	..	Heisler
Prettyman, J. F., & Sons	1	2-6-2	14 x 22	88,400	..	..	..	..	Baldwin
Primrose Coal Producing Co.	1	0-4-0	14 x 22	79,000	..	..	..	..	American
Ransom & Benedict	1	Geared	..	94,000	..	..	..	..	Heisler
Railway Steel Spring Co.	1	0-6-0	17 x 24	118,000	..	..	..	..	American
Republic Iron & Steel Co.	1	0-4-0	13 x 20	60,000	..	..	..	..	American
Riverside Portland Cement Co.	1	0-6-0	18 x 24	128,000	..	..	..	..	American
Rodman Lumber Co.	1	2-6-0	16 x 24	98,800	..	..	..	..	American
Roebling's, J. A., Sons Co.	1	0-6-0	13 x 20	53,000	..	..	..	..	Baldwin
Robsonia Iron Co. Ltd.	1	0-6-0	19 x 26	160,000	..	..	..	..	Baldwin
Rogers-Brown Iron Co.	1	0-6-0	19 x 26	121,000	..	..	..	..	American
Roeper, J. L., Lumber Co.	1	2-8-0	19 x 24	126,300	..	..	..	..	Baldwin
St. Louis Coke Chemical Co.	1	0-6-0	13 x 24	99,000	..	..	..	..	American
Santee Timber Co.	1	2-6-2	13 x 22	72,800	..	..	..	..	American
Sartin Lumber Co.	1	2-6-2	12 x 18	62,000	..	..	..	..	Baldwin
Sawyer Goodman Co.	1	Geared	..	94,000	..	..	..	..	Heisler
Shenango Furnace Co.	2	0-6-0	22 x 26	160,000	..	..	..	..	Baldwin
Simmons Co.	1	0-4-0	18 x 24	104,000	..	..	..	..	American
Simpson Logging Co.	1	2-8-2	16 x 22	124,000	..	..	..	..	Baldwin
Singer Mfg. Co.	2	0-4-0	14 x 22	79,000	..	..	..	..	American
Solvay Process Co.	2	0-4-0	13 x 20	65,000	..	..	..	..	American
	2	0-8-0	22 x 28	248,000	Yes	..	..	..	American
	1	0-4-0	13 x 20	65,000	..	..	..	..	American
Standard Oil Co. of Indiana	5	2-8-2	26 x 30	292,000	Yes	..	..	..	American
Standard Oil Co. of Louisiana	1	0-6-0	19 x 24	123,000	..	..	..	..	Baldwin
Standard Oil Co. of New Jersey	1	0-6-0	19 x 24	103,300	..	..	..	..	Baldwin
Standard Oil Co. of New York	1	0-6-0	21 x 26	146,000	..	..	..	..	American
	1	0-4-0	16 x 24	99,000	..	..	..	..	American
	1	0-4-0	14 x 22	79,000	..	..	..	..	American
	1	0-4-0	16 x 24	99,000	..	..	..	..	American
Standard Slag Co.	1	0-6-0	..	..	..	..	..	..	Porter
Standard Tank Car Co.	1	0-6-0	..	..	..	..	..	..	American
Stark, Jas. E., & Co.	2	Geared	..	64,000	..	..	..	..	Heisler
Steel & Tube Co. of America	1	0-6-0	19 x 22	118,900	Yes	Yes	..	..	Baldwin
Stevensville-Deademora Oil Ry. (Tex.)	1	..	..	..	..	..	..	..	Bell
Stimson, J. V., Hardwood Co.	2	Geared	..	64,000	..	..	..	..	Bell
Sun Company	1	0-6-0	16 x 24	123,100	..	..	..	..	Heisler
Sun Shipbuilding Co.	1	0-4-0	16 x 24	103,000	..	..	..	..	Baldwin
Surry Lumber Co.	2	2-6-2	12 x 18	57,000	..	..	..	..	American
Tennessee Coal, Iron & R.R. Co.	4	0-6-0	22 x 26	167,000	Yes	..	..	..	American
Texas Pacific Coal & Oil Co.	1	0-4-0	16 x 24	99,000	..	..	..	..	American
Tonesta Valley Ry. Co.	1	Geared	..	80,000	..	..	..	..	American
Trumhull Steel Co.	1	0-6-0	22 x 26	160,000	..	..	..	..	Heisler
U. S. Ferro Alloys Corp.	1	0-4-0	14 x 22	79,000	..	..	..	..	Baldwin
Valley Camp Coal Co.	1	0-8-0	22 x 28	210,000	Yes	..	..	..	American
Virginia Anthracite Co.	2	0-6-0	23 x 28	65,000	..	..	..	..	Baldwin
Vredenburg Saw Mill Co.	1	2-8-0	19 x 24	134,400	..	..	..	..	Baldwin
Wagner Electric Mfg. Co.	1	0-4-0	14 x 22	79,000	..	..	..	..	American
Wasau Southern Lumber Co.	1	2-6-0	19 x 24	129,900	..	..	..	..	Baldwin
Weed Lumber Co.	1	2-6-0	17 x 24	123,000	..	..	..	..	Baldwin
Weller Construction Co.	1	0-4-0	..	..	..	..	..	..	Baldwin
Wesselhoef & Poor	2	2-4-2	9 x 14	35,000	..	..	..	..	Bell
	2	2-4-2	..	46,000	..	..	..	..	American
West Construction Co.	1	0-4-0	..	..	..	..	..	..	Baldwin
Westinghouse Electric & Mfg. Co.	1	0-6-0	19 x 24	119,000	..	..	..	..	Bell
West Penn Power Co.	1	0-4-0	16 x 24	99,000	..	..	..	..	American
White, A. C.	1	Geared	..	94,000	..	..	..	..	Heisler
Whitehead Bros. Co.	1	0-4-0	22 x 14	26,000	..	..	..	..	American
Wilcox, I. B., & Co.	1	Geared	..	64,000	..	..	..	..	Heisler
Wind River Lumber Co.	1	2-6-2	14 x 18	84,000	..	..	..	..	American
Winston-Deer Co.	2	0-6-0	21 x 26	138,700	..	..	..	..	Baldwin
	2	0-6-0	21 x 26	160,000	..	..	..	..	American
Wisconsin-Alabama Lumber Co.	1	Geared	..	170,000	..	..	..	..	Heisler
Wisconsin Logging & Timber Co.	1	2-8-2	19 x 24	177,400	..	..	..	..	Baldwin

Railroads and Other Companies in Canada

Algoma Eastern	2	2-8-0	23½ x 30	242,000	Yes	Yes	Walschaert	..	Montreal
Anglo-Newfoundland Dev. Co., Ltd.	1	4-6-0	17 x 22	91,000	..	..	..	..	Baldwin
	1	2-6-2	15 x 22	103,000	..	..	..	..	Baldwin
Canadian National Rys.	20	4-6-2	23½ x 28	260,000	Yes	Yes	Walschaert	..	Montreal
	10	4-6-2	24 x 28	275,000	Yes	Yes	Young	..	Montreal
	25	2-10-2	26x x32	320,000	Yes	Yes	Walschaert	..	Montreal
Canadian Pacific	15	0-6-0	21 x 26	154,000	Yes	Yes	Walschaert	..	Canadian
	3	2-8-2	25½ x 32	350,000	Yes	..	Walschaert	..	Montreal
Foundation Co.	2	2-10-2	..	..	..	..	..	..	shops
	1	0-4-0	16 x 24	99,000	..	..	..	..	Montreal
	1	2-6-0	16 x 24	85,000	..	..	..	..	Montreal
Grand Trunk	10	0-4-0	24 x 30	242,750	Yes	Yes	Young	..	Montreal
	10	0-6-0	22 x 26	..	..	..	..	..	shops
Grand Trunk Pacific	12	4-6-2	23½ x 28	260,000	Yes	Yes	Young	..	Montreal
	10	0-6-0	21 x 26	154,400	Yes	Yes	Walschaert	..	Canadian
	15	2-8-2	27 x 30	277,500	Yes	Yes	Walschaert	..	Canadian
Hydro Elec. Power Comm.	2	0-4-0	16 x 24	99,000	..	..	..	..	American
	2	0-4-0	16 x 24	99,000	..	..	..	..	American
Hydro-Electric Power Comm.	5	0-4-0	17 x 24	106,000	..	..	..	..	Baldwin
Pacific Great Eastern	3	2-8-2	22 x 28	210,100	..	..	Walschaert	..	Canadian
Reid-Newfoundland Co.	1	4-6-2	17 x 24	113,000	Yes	Yes	..	..	Baldwin
Roberval-Saguenay	1	4-6-0	19 x 24	134,000	..	..	..	..	Canadian
	1	4-6-0	19 x 24	134,000	..	..	..	..	Canadian
	1	4-6-0	19 x 24	134,000	..	..	..	..	Canadian
Temiskaming & Northern Ontario	2	0-8-0	23 x 28	203,000	Yes	Yes	..	..	Montreal
	4	2-8-2	25 x 30	258,000	Yes	Yes	Young	..	Canadian
	4	4-6-2	23 x 28	252,500	Yes	Yes	Young	..	Canadian

Export

Purchaser	No.	Type	Cylinders	Weight	Super-heater	Brick arch	Valve gear	Mechanical stoker	Builder
Amer. R. R. of Porto Rico.....	2	2-8-0	14 x 20	85,000	.....	.....	.....	.....	American
Armstrong-Fajardo Sugar So (P. R.).....	1	2-8-0	15 x 19	74,000	.....	.....	.....	.....	American
Banshu Ry. (Japan).....	1	2-6-2	.....	.....	.....	.....	.....	.....	Baldwin
Baturite Ry. (Brazil).....	1	2-8-0	15 x 18	.....	.....	.....	.....	.....	American
.....	2	4-6-0	.....	.....	.....	.....	.....	.....	American
Blanco Brothers (Cuba).....	1	0.4-0-T	14 x 22	29,000	.....	.....	.....	.....	American
Boos & Co (Trinidad).....	3	0.4-2-T	11 x 16	42,000	.....	.....	.....	.....	American
Burma Corp., Ltd.....	3	Electric	500 v.d.c.	75,000	.....	.....	.....	.....	Gen. Electric
Camao Quarry Co. (Cuba).....	1	.....	.....	.....	.....	.....	.....	.....	Vulcan
.....	1	2-8-0	.....	.....	.....	.....	.....	.....	Vulcan
Canton Hankow (China).....	8	2-8-0	.....	.....	.....	.....	.....	.....	Baldwin
.....	4	4-6-0	.....	.....	.....	.....	.....	.....	Baldwin
Carlos-Alfred-Isabela de Sagua (Cuba).....	4	4-6-0	.....	.....	.....	.....	.....	.....	Baldwin
Central Adela (Cuba).....	1	.....	.....	.....	.....	.....	.....	.....	American
Central Algodones (Cuba).....	1	2-8-0	18 x 24	124,000	.....	.....	.....	.....	American
Central Altamira (Cuba).....	2	.....	.....	.....	.....	.....	.....	.....	Baldwin
Central Andrica (Cuba).....	1	.....	.....	.....	.....	.....	.....	.....	Baldwin
Central Araujo (Cuba).....	1	.....	.....	.....	.....	.....	.....	.....	Baldwin
Central Australia (Cuba).....	1	.....	.....	.....	.....	.....	.....	.....	Baldwin
Central Bagnanos (Cuba).....	1	.....	.....	.....	.....	.....	.....	.....	Baldwin
Central Caracas (Cuba).....	1	.....	.....	.....	.....	.....	.....	.....	American
Central Caspedes (Cuba).....	1	.....	.....	.....	.....	.....	.....	.....	Baldwin
Central Colonos de Nueva Paz (Cuba).....	2	0-6-2	18 x 24	114,000	.....	.....	.....	.....	American
Central Corazon de Jesus (Cuba).....	1	2-8-0	18 x 24	124,000	Yes	.....	.....	.....	American
Central Cunaquea (Cuba).....	1	.....	.....	.....	.....	.....	.....	.....	Baldwin
Central Dominicano (Cuba).....	1	.....	.....	.....	.....	.....	.....	.....	Baldwin
Central Esperanza (Cuba).....	1	.....	.....	.....	.....	.....	.....	.....	Baldwin
Central Estrella (Cuba).....	1	.....	.....	.....	.....	.....	.....	.....	Baldwin
Central Galope (Cuba).....	2	.....	.....	.....	.....	.....	.....	.....	Baldwin
Central Jaragu (Cuba).....	6	.....	.....	.....	.....	.....	.....	.....	Baldwin
Central Josefa (Cuba).....	1	.....	.....	.....	.....	.....	.....	.....	Baldwin
Central La Francia (Cuba).....	2	.....	.....	.....	.....	.....	.....	.....	Baldwin
Central Lincoln (Cuba).....	1	.....	.....	.....	.....	.....	.....	.....	Baldwin
Central Nalasa (Cuba).....	1	.....	.....	.....	.....	.....	.....	.....	Baldwin
Central of Brazil.....	6	4-6-0	21½ x 26	174,000	Yes	.....	.....	.....	American
.....	6	4-6-0	16 x 20	82,000	.....	.....	.....	.....	American
.....	18	2-8-0	21½ x 26	170,000	Yes	.....	.....	.....	American
.....	10	2-8-0	17 x 20	93,000	Yes	.....	.....	.....	American
Central Oriente (Cuba).....	1	.....	.....	.....	.....	.....	.....	.....	American
Central Pilar (Cuba).....	1	.....	.....	.....	.....	.....	.....	.....	Baldwin
Central Portugaleta (Cuba).....	1	2-8-0	18 x 24	124,000	.....	.....	.....	.....	American
Central Progreso (Cuba).....	1	.....	.....	.....	.....	.....	.....	.....	Baldwin
Central Ramona (Cuba).....	1	.....	.....	.....	.....	.....	.....	.....	Baldwin
Central Reforma (Cuba).....	1	2-8-0	18 x 24	125,000	.....	.....	.....	.....	American
.....	1	2-6-2	14 x 22	93,000	.....	.....	.....	.....	American
Central Rosalia (Cuba).....	1	.....	.....	.....	.....	.....	.....	.....	Baldwin
Central San Aug. (Cuba).....	1	2-8-0	18 x 24	124,000	Yes	.....	.....	.....	American
Central San Christofal (Cuba).....	3	.....	.....	.....	.....	.....	.....	.....	Baldwin
Central Santa Amelia (Cuba).....	1	.....	.....	.....	.....	.....	.....	.....	Baldwin
Cent. St. Dominicas (San Dom.).....	3	.....	.....	.....	.....	.....	.....	.....	Bell
Central Santa Maria (Cuba).....	1	4-6-0	18 x 24	120,000	Yes	.....	.....	.....	American
Central Santo Tomas (Cuba).....	1	.....	.....	.....	.....	.....	.....	.....	Baldwin
Central Soña (Cuba).....	1	2-6-0	16 x 24	85,000	.....	.....	.....	.....	American
Central Zaza (Cuba).....	1	2-8-0	.....	.....	.....	.....	.....	.....	Baldwin
C. de f. de la Prov. de Santa Fe (Arg.).....	10	4-6-2	16 x 20	105,000	Yes	.....	.....	.....	American
Cia Trans. de Petrolea (Mex.).....	1	0.4-0	7 x 12	17,000	.....	.....	.....	.....	Baldwin
.....	1	4-6-0	9 x 16	36,000	.....	.....	.....	.....	Baldwin
Ciego de Avila (Cuba).....	1	.....	.....	.....	.....	.....	.....	.....	Baldwin
Cia Azucarera Seramaguacan (Cuba).....	1	2-6-0	18 x 24	114,000	.....	.....	.....	.....	American
Cordoba Central (Argentina).....	15	2-8-2	21½ x 24	165,000	Yes	.....	.....	.....	American
Cuban American Sugar Co.....	1	.....	.....	.....	.....	.....	.....	.....	Baldwin
Cuba Cane Sugar Corp.....	9	2-8-0	.....	.....	.....	.....	.....	.....	Baldwin
.....	2	.....	.....	.....	.....	.....	.....	.....	Baldwin
Cane Sugar Corp.....	3	2-8-0	19 x 26	135,000	.....	.....	.....	.....	American
Cuba R. R.....	10	4-6-0	21 x 26	174,000	Yes	Yes	Walschaert	.....	American
.....	2	2-8-0	19 x 26	137,000	Yes	Yes	Walschaert	.....	American
Cuban Central Railway.....	10	2-8-0	18 x 24	126,000	Yes	.....	.....	.....	American
Cuba Sugar Mills Corp.....	2	.....	.....	.....	.....	.....	.....	.....	Baldwin
E. d. F. C. Barboza (Brazil).....	4	4-6-2	19 x 26	131,000	Yes	.....	.....	.....	American
.....	1	4-6-0	13 x 18	60,000	.....	.....	.....	.....	American
E. d. F. Menas St. Jeronymo (Brazil).....	1	2-6-2-T	11 x 16	52,000	.....	.....	.....	.....	American
Egyptian State Rys.....	30	2-6-0	.....	.....	.....	.....	.....	.....	Baldwin
Ferrer Jose (Cuba).....	1	2-8-0	14 x 18	54,000	.....	.....	.....	.....	American
Forestry Bureau (Japan).....	4	0.4-2	.....	.....	.....	.....	.....	.....	Baldwin
Fuji Minobu (Japan).....	2	4-6-0	.....	.....	.....	.....	.....	.....	Baldwin
.....	1	2-6-0	.....	.....	.....	.....	.....	.....	Baldwin
Havana Central.....	28	2-8-0	20 x 26	163,000	Yes	.....	.....	.....	American
Haytian Amer. Corp.....	1	2-6-0	13 x 20	76,000	.....	.....	.....	.....	American
.....	1	0.4-0	11 x 16	35,000	.....	.....	.....	.....	American
Hudson, Robert (Africa).....	2	2-8-0	15-23½ x 20	87,000	.....	.....	.....	.....	American
Humberto Saboia (Brazil).....	2	2-8-0	15 x 20	74,000	.....	.....	.....	.....	American
.....	1	2-8-0	16 x 20	81,000	.....	.....	.....	.....	American
Imperial Japanese Navy.....	2	0.4-0	13 x 20	65,000	.....	.....	.....	.....	American
Imperial Taiwan Ry. (Formosa).....	7	2-8-0	20 x 24	131,000	Yes	.....	.....	.....	American
Insp. Fed. des Obres Contra as Siccias (Brazil).....	8	16 x 20	.....	80,000	.....	.....	.....	.....	American
.....	6	4-6-0	15 x 20	74,000	.....	.....	.....	.....	American
.....	6	0.4-0-T	9 x 14	29,000	.....	.....	.....	.....	American
Internatl Ry. Supply Co. (for Porto Rico).....	2	Switch	.....	.....	.....	.....	.....	.....	Baldwin
Jamaica Government.....	7	4-8-0	19 x 26	137,500	.....	Yes	.....	.....	Canadian
.....	7	2-8-0	19 x 26	148,300	Yes	Yes	.....	.....	Canadian
Joso Ry. (Japan).....	3	2-6-2	.....	.....	.....	.....	.....	.....	Baldwin
La Vega Sugar Co. (Cuba).....	1	2-8-0	18 x 24	124,000	.....	.....	.....	.....	American
Madrid, Zargossa & Alicante (Spain).....	15	4-6-2	23 x 26	187,000	Yes	.....	.....	.....	American
Manila.....	10	20 x 28	.....	185,000	Yes	.....	.....	.....	American
.....	10	2.10-2	20 x 28	190,000	Yes	.....	.....	.....	American
Manuel Gomez Mena (Cuba).....	1	2-8-0	19 x 26	137,000	Yes	.....	.....	.....	American
Marcelino Garcia (Cuba).....	1	2-8-0	18 x 24	126,000	Yes	.....	.....	.....	American
Mitsui & Co. (Far East).....	3	2-8-0	.....	.....	.....	.....	.....	.....	American
.....	4	4-6-2	.....	.....	.....	.....	.....	.....	American
.....	4	.....	.....	.....	.....	.....	.....	.....	American
Mogyana (Brazil).....	2	4-6-2	17½ x 20	118,000	.....	.....	.....	.....	Baldwin
Mysore Ry. (Ind.).....	5	2-6-4	.....	.....	.....	.....	.....	.....	Baldwin
National Rys. of Mexico.....	5	.....	.....	.....	.....	.....	.....	.....	Baldwin
Nordeste de Brazil.....	20	.....	.....	.....	.....	.....	.....	.....	Baldwin
Pampanga Sugar Develop. Co. (P. I.).....	11	0.4-0	.....	.....	.....	.....	.....	.....	Bell
Paris-Orleans (France).....	50	4-6-2	24½ x 25½	200,000	Yes	.....	.....	.....	American
Paulista Ry. (Brazil).....	6	.....	.....	.....	.....	.....	.....	.....	Baldwin
.....	2	Electric	.....	188,000	.....	.....	.....	.....	Bald - Westhouse
.....	2	Electric	.....	242,000	.....	.....	.....	.....	Bald - Westhouse
.....	4	Electric	3,000 v.d.c.	240,000	.....	.....	.....	.....	General Electric
.....	8	Electric	3,000 v.d.c.	200,000	.....	.....	.....	.....	General Electric

Export

Purchaser	No.	Type	Cylinders	Weight	Super-heater	Brick arch	Valve gear	Mechanical stoker	Builder
Perin & Marshall (for India).....	2	Switch	.....	.....	.....	.....	.....	.....	Baldwin
Quelimane Ry. (South Africa).....	1	2-6-0	13 x 18	53,000	.....	.....	.....	.....	American
Rhodesian.....	12	4-8-2	22 x 24	170,000	Yes	.....	.....	.....	American
Rio Grande do Sul (Brazil).....	20	2-8-2	16 x 22	110,000	Yes	.....	.....	.....	Baldwin
Roumanian Gov't Rys.....	25	2-8-0	21 x 28	167,000	Yes	.....	.....	.....	American
Sabana R. R. (Columbia).....	2	2-8-0	21 x 28	167,000	Yes	.....	.....	.....	American
Shantung Railway (China).....	2	2-8-0	21 x 26	160,000	Yes	.....	.....	.....	Baldwin
.....	3	4-6-0	20 x 26	180,000	Yes	.....	.....	.....	American
.....	1	4-6-2	20 x 26	180,000	Yes	.....	.....	.....	American
Soroceabana (Brazil).....	4	4-6-2	18 x 20	120,000	Yes	.....	.....	.....	American
So. Manchurian.....	12	4-6-2	.....	.....	.....	.....	.....	.....	American
Taiwan Denryoku Kaisha (China).....	4	0-8-0	.....	.....	.....	.....	.....	.....	Baldwin
Taiwan Seto Formosa Co.....	2	0-6-0	11 x 16	50,000	.....	.....	.....	.....	American
Takata & Co. (Japan).....	5	Electric	.....	42,000	.....	.....	.....	.....	Baldwin
Tientsin-Pukow (China).....	20	2-8-2	20 x 28	194,000	Yes	.....	.....	.....	Baldwin West-house
.....	12	4-6-2	22 x 26	215,000	Yes	.....	.....	.....	American
Tramway Cantareira (Brazil).....	1	2-6-0	13 x 18	57,000	.....	.....	.....	.....	American
Unidad Fruit Co. (Cuba).....	1	2-6-2	15 x 20	101,000	.....	.....	.....	.....	Baldwin
Union Miniere du H. Kantanga (Congo).....	4	2-8-0	.....	.....	.....	.....	.....	.....	American
United Fruit Co.....	1	0-8-0	.....	.....	.....	.....	.....	.....	Baldwin
.....	3	.....	.....	.....	.....	.....	.....	.....	Bell
.....	3	2-6-0	12 x 16	.....	.....	.....	.....	.....	Porter
.....	14	0-4-0	.....	.....	.....	.....	.....	.....	Bell
.....	2	0-4-4	.....	.....	.....	.....	.....	.....	Porter
.....	2	2-8-0	.....	.....	.....	.....	.....	.....	Bell
.....	2	2-8-0	.....	.....	.....	.....	.....	.....	Porter
United Rys. of Havana.....	28	2-8-0	.....	.....	.....	.....	.....	.....	Baldwin
.....	10	4-6-2	.....	.....	.....	.....	.....	.....	American
.....	8	Switch	.....	.....	.....	.....	.....	.....	Baldwin
U. S. War Dept (Panama).....	2	0-4-2-T	16 x 24	114,000	.....	.....	.....	.....	Baldwin
Vanadium Corp. of America (for Peru).....	2	.....	.....	.....	.....	.....	.....	.....	American
West India Sugar & Finance Corp. (Cuba).....	1	2-6-0	15 x 20	76,000	.....	.....	.....	.....	Davenport
Zayas-Abreu Com. Co.....	2	2-8-0	18 x 24	125,000	Yes	.....	.....	.....	American

Increase in Passenger Car Orders Continues

Orders Given Late in 1920 Promise Upward Movement of Production During This Year

THE TOTALS FOR ORDERS of passenger cars during the past year give proof of the upward trend which was noted in the statistical report on passenger car orders last year (*Railway Age*, January 2, 1920, page 133). A total of 1,115 cars was ordered by Class I roads during the year and 666 by other railroads and private car companies in the United States, including the Pullman Company. These

1919 figure. Export orders have dropped even more sharply. Export orders for 1920 were only 38, which is a rather poor showing in comparison with the total of 143 in 1919. Passenger car building has, however, been at a minimum the world over for some years, although eventually it

TABLE I. THE PASSENGER CAR ORDERS OF 1920

For Class I Railroads.....	1,115
Other Domestic (including Pullman Co.).....	666
Total Domestic.....	1,781
For Service in Canada.....	275
For Export to other Countries.....	38
Grand Total.....	2,094

figures added together give 1,781 as a total for the year's domestic orders, a figure which compares quite favorably with the orders in 1917 and 1918—as well as 1919. It will be noted that the statistics given this year separate the orders by Class I roads from the other domestic orders. By following this plan of separation hereafter a more accurate

TABLE II. ORDERS FOR PASSENGER CARS SINCE 1901

Year	Domestic orders only		Passenger cars
	Passenger cars	Passenger cars	
1901.....	2,879	1909.....	4,514
1902.....	3,459	1910.....	3,881
1903.....	2,310	1911.....	2,623
1904.....	2,213	1912.....	3,642
1905.....	3,289	1913.....	3,179
1906.....	3,402	1914.....	2,002
1907.....	1,791	1915.....	3,101
1908.....	1,319		
Year	Domestic and Foreign		
	Domestic	Foreign	Total
1916.....	2,544	109	2,653
1917.....	1,124	43	1,167
1918.....	131	26	157
1919.....	639	143	782

idea will be given of just what is being done by the more important railroads toward making up deficiencies accumulated for some years.

Canadian orders for the year were 275—72 less than the

TABLE III. PASSENGER CARS BUILT

	United States	Canada*	Total
Domestic.....	1,272	.....	.....
Foreign.....	168	.....	.....
	1,440	.....	.....

*Complete details Canadian production not received. Comparison with Previous Years

Year	Passenger		Total
	Domestic	Foreign	
1890.....	1,201	104	1,305
1900.....	1,515	121	1,636
1901.....	1,949	106	2,055
1902.....	.....	.....	1,948
1903.....	.....	.....	2,007
1904.....	.....	.....	2,144
1905*.....	.....	.....	2,551
1906*.....	.....	.....	3,167
1907.....	.....	.....	5,457
1908*.....	1,645	71	1,716
1909*.....	2,698	151	2,849
1910*.....	4,136	276	4,412
1911*.....	3,938	308	4,246
1912*.....	2,822	238	3,060

*Includes Canadian output. †Includes Canadian output and equipment built in company shops.

Year	United States		Canada		Total
	Domestic	Foreign	Domestic	Foreign	
1913.....	2,559	220	2,779	517	517
1914.....	3,310	56	3,366	325	325
1915.....	1,852	14	1,866	83	83
1916.....	1,732	70	1,802	37	37
1917.....	1,924	31	1,955	45	45
1918.....	1,480	92	1,572	1	1
1919.....	306	85	391	160	160

must increase greatly. The grand total of passenger car orders for domestic service and export in this country and in Canada was 2,094—1,312 more than the 1919 figure, an increase brought about entirely by greater orders from the roads and other buyers in the United States.

The production of passenger cars during 1920 in the

United States for domestic use was 1,272 (including cars for Pullman Company service) and for export 168. These figures show decided improvement over the similar figures, 306 and 85 respectively, for 1919. The cars built are described as: all steel, 1,240; steel underframe only, 171; wood, 21, and not specified, 8. This upward trend of production was predicted in the statistical review of the passenger car situation last year, in view of the increase in orders the latter part of 1919. Much the same situation

obtains at the beginning of 1921. Most of the larger orders for passenger equipment were placed relatively early in 1920. The car building companies started the year with orders for domestic service on hand and undelivered amounting to 407. The traffic congestion, the difficulty of securing raw material and related conditions prevented them from getting production under way with any great degree of speed. The orders on hand at the end of November had reached a total of 925.

Passenger Orders in 1920

Class I Roads

Purchaser	No.	Class	Construction	Weight	Wheels per truck	If electric lighting				Builder
						Lighting	Axle generator equipment	Batteries		
Alabama & Vicksburg	3	Coach	Steel	.....	6	Electric	Safety	Edison	.....	Am. Car & Fdy.
	3	Pass. & bagg.	Steel	.....	6	Electric	Safety	Edison	.....	Am. Car & Fdy.
	3	Baggage	Steel	.....	6	Electric	Safety	Edison	.....	Am. Car & Fdy.
Atlanta & West Point	3	Baggage	Steel	.....	6	Electric	Safety	Edison	.....	Am. Car & Fdy.
	3	Coach	Steel	.....	6	Electric	Safety	Edison	.....	Am. Car & Fdy.
Atlantic Coast Line	25	Coach	Steel	138,300	6	Electric	Stone-Franklin	Edison	.....	Pullman
Baltimore & Ohio	43	Express	St. and frame	42,500	4	.....	.....	.....	.....	Mt. Vernon
Bangor & Aroostook	1	Baggage	Steel	78,000	4	Electric	Safety	Edison	.....	Osgood-Bradley
Boston & Albany	15	Coach	Steel	127,000	6	Electric	.....	.....	.....	Standard Steel
	7	Baggage	Steel	.....	4	Electric	.....	.....	.....	Am. Car & Fdy.
	9	Coach	Steel	136,000	6	Electric	Safety	Edison	.....	Pullman
	4	Express	Steel	128,900	6	Electric	Safety	Edison	.....	Pullman
	4	Sleeper	Steel	148,000	6	Electric	Safety	Edison	.....	Pullman
Chicago & North Western	25	Coach	Steel	103,200	4	Gas	.....	.....	.....	Am. Car & Fdy.
	2	Postal	Steel	128,000	6	Gas	.....	.....	.....	Am. Car & Fdy.
	9	Coach	Steel	105,000	4	Gas	.....	.....	.....	Am. Car & Fdy.
	23	Baggage	Steel	121,300	6	Gas	.....	.....	.....	Am. Car & Fdy.
	3	Bagg. & mail	Steel	133,600	6	Gas	.....	.....	.....	Am. Car & Fdy.
Chicago, Rock Island & Pacific	30	Coach	Steel	.....	6	Electric	USL	USL	.....	Pullman
	5	Chair	Steel	.....	6	Electric	USL	USL	.....	Pullman
Clev. Cin., Chic. & St. Louis	20	Coach	Steel	.....	6	Electric	.....	.....	.....	Am. Car & Fdy.
	25	Baggage	Steel	.....	4	Electric	.....	.....	.....	Am. Car & Fdy.
	8	Pass. & bagg.	Steel	.....	6	Electric	.....	.....	.....	Pressed Steel
	2	Dining	Steel	.....	6	Electric	.....	.....	.....	Company Shops
Delaware, Lackawanna & West.	30	Coach	Steel	108,000	4	Electric	Gould	Gould	.....	Pullman
	6	Pass. & bagg.	Steel	110,000	4	Electric	Gould	Gould	.....	Pullman
	5	Express	Steel	104,000	4	Electric	Gould	Edison	.....	Pullman
	10	Milk	St. and frame	65,500	4	.....	.....	.....	.....	Am. Car & Fdy.
	42	Coach	Steel	93,000	4	Electric	Safety	Edison	.....	Standard Steel
	6	Pass. & bagg.	Steel	93,000	4	Electric	Safety	Edison	.....	Standard Steel
Florida East Coast	6	Baggage	Steel	.....	6	Electric	Safety	Edison	.....	Pullman
	2	Bagg. & mail	Steel	.....	6	Electric	Safety	Edison	.....	Pullman
Georgia	5	Coach	Steel	.....	6	Electric	Safety	Edison	.....	Am. Car & Fdy.
Grand Trunk (Western)	10	Horse	Steel frame	125,000	6	Electric	Safety	Safety	.....	Osgood-Bradley
Gulf Coast Lines	10	Coach	Steel	.....	4	Electric	Safety	Edison	.....	Pullman
	5	Baggage	Steel	.....	4	Electric	Safety	Edison	.....	Am. Car & Fdy.
Illinois Central	12	Compt. coach	Steel	.....	6	Electric	Safety	Edison	.....	Pullman
	18	Baggage	Steel	.....	6	Electric	Safety	Edison	.....	Pullman
	6	Dining	Steel	.....	6	Electric	Safety	Edison	.....	Pullman
	20	Suburban	Steel	.....	4	Electric	Safety	Edison	.....	Pullman
Long Island	50	Trailer	Steel	69,900	4	Electric	.....	.....	.....	Am. Car & Fdy.
	20	Mot. coach	Steel	107,200	4	Electric	.....	.....	.....	Am. Car & Fdy.
	30	Coach	Steel	.....	4	Electric	Gould	Gould	.....	Standard Steel
Los Angeles & Salt Lake	3	Baggage	Steel	.....	6	Electric	.....	Edison	.....	Pullman
	5	Chair	Steel	.....	6	Electric	Safety	.....	.....	Pullman
	5	Dining	Steel	136,200	6	Electric	.....	.....	.....	Pullman
Louisiana & Arkansas	5	Coach	Steel	135,000	6	Gas	.....	.....	.....	Am. Car & Fdy.
Louisville & Nashville	3	Baggage	Steel	.....	6	Electric	Safety	.....	.....	Am. Car & Fdy.
	3	Postal	Steel	128,000	6	Electric	Safety	Safety	.....	Am. Car & Fdy.
	10	Coach	Steel	138,000	6	Electric	Safety	Safety	.....	Am. Car & Fdy.
	15	Coach	Steel	138,000	6	Electric	Safety	Safety	.....	Am. Car & Fdy.
	3	Coach	Steel	138,000	6	Electric	Safety	Safety	.....	Am. Car & Fdy.
	4	Postal	Steel	128,000	6	Electric	Safety	Safety	.....	Am. Car & Fdy.
	4	Baggage	Steel	130,000	6	Electric	Safety	Safety	.....	Am. Car & Fdy.
	7	Dining	Steel	160,000	6	Electric	Safety	Safety	.....	Am. Car & Fdy.
Maine Central	7	Baggage	Steel	.....	6	Electric	Safety	Edison	.....	Osgood-Bradley
	2	Bagg. & mail	Steel	78,000	4	Electric	Safety	Edison	.....	Osgood-Bradley
	6	Baggage	Steel	122,000	6	Electric	Gould	Exide	.....	Am. Car & Fdy.
	6	Sleeping	Steel	144,000	6	Electric	Gould	Exide	.....	Am. Car & Fdy.
	3	Business	Steel	.....	6	Electric	Gould	Exide	.....	Am. Car & Fdy.
	3	Dining	Steel	.....	6	Electric	Gould	Exide	.....	Am. Car & Fdy.
Michigan Central	15	Coach	Steel	.....	6	Electric	.....	.....	.....	Standard Steel
	8	Baggage	Steel	.....	4	Electric	.....	.....	.....	Am. Car & Fdy.
	3	Pass. & bagg.	Steel	.....	6	Electric	.....	.....	.....	Pressed Steel
	2	Dining	Steel	.....	6	Electric	.....	.....	.....	Company shops
	8	Bagg. & mail	Steel	.....	4	Electric	.....	.....	.....	Company shops
	2	Postal	Steel	.....	4	Electric	.....	.....	.....	Company shops
Missouri, Kansas & Texas	4	Dining	Steel	.....	6	Electric	.....	.....	.....	Am. Car & Fdy.
Missouri Pacific Ry.	25	Baggage	Steel	.....	6	Electric	.....	.....	.....	Am. Car & Fdy.
	10	Coach	Steel	.....	6	Electric	Stone	Edison	.....	Am. Car & Fdy.
New York Central	50	Coach	Steel	.....	6	Electric	.....	.....	.....	Standard Steel
	35	Baggage	Steel	.....	4	Electric	.....	.....	.....	Am. Car & Fdy.
	30	Milk	St. and frame	.....	4	Electric	.....	.....	.....	Merchants Dispatch
	15	Mot. coach	Steel	.....	4	Electric	.....	.....	.....	Standard Steel
	8	Dining	Steel	.....	4	Electric	.....	.....	.....	Company shops
	10	Baggage	Steel	.....	4	Electric	.....	.....	.....	Company shops
	12	Baggage	Steel	110,000	4	Electric	.....	.....	.....	Standard Steel
	12	Coach	Steel	145,000	6	Electric	Safety	Willard	.....	Standard Steel
Pittsburgh & Lake Erie	5	Coach	Steel	.....	6	Electric	.....	.....	.....	Standard Steel
	5	Baggage	Steel	.....	4	Electric	.....	.....	.....	Am. Car & Fdy.
	1	Pass. & bagg.	Steel	.....	6	Electric	.....	.....	.....	Pressed Steel
Pittsburgh & Shawmut	2	Pass. & bagg.	Steel	130,000	6	Electric	Gould	USL	.....	Am. Car & Fdy.
	2	Coach	Steel	130,000	6	Electric	Gould	USL	.....	Am. Car & Fdy.
Southern Pacific	28	Coach	Steel	.....	4	Electric	.....	.....	.....	Pullman
	22	Baggage	Steel	.....	4	Gas	.....	.....	.....	Pullman
	3	Bagg. & mail	Steel	.....	6	Gas	.....	.....	.....	Pullman
	3	Bagg. & mail	Steel	.....	4	Gas	.....	.....	.....	Pullman
	26	Mot. coach	Steel	.....	6	Gas	.....	.....	.....	Pullman
	16	Trailer	.....	.....	..	.....	.....	.....	.....	Pullman

Purchaser	No.	Class	Construction	Weight	Wheels per truck	If electric lighting			Builder
						Lighting	Axle generator equipment	Batteries	
Toledo & Ohio Central	1	Bagg. & mail	Steel	.....	6	Electric	.....	.....	Company shops
Union Pacific	40	Chair	Steel	134,000	6	Gas & elec.	.....	.....	Pullman
	23	Baggage	Steel	110,500	6	Electric	.....	.....	Pullman
	2	Dining	Steel	160,000	6	Electric	USL	Edison	Pullman
Virginian	1	Club	Steel	.....	6	Electric	Stone-Franklin	Edison	Pullman
	4	Bagg. & mail	Steel	.....	6	Electric	Stone-Franklin	Edison	Pullman
	10	Coach	Steel	.....	6	Electric	Stone-Franklin	Edison	Pullman

*Not included in totals.

Other Domestic Purchasers, Including Pullman Company

Purchaser	No.	Class	Construction	Weight	Wheels per truck	If electric lighting			Builder
						Lighting	Axle generator equipment	Batteries	
Alger Sullivan Lhr. Co.	1	Coach	Wood	.....	4	Oil	.....	.....	Am. Car & Fdy.
Arms Palace Horse Car	25	Horse	St. and frame	144,000	4	.....	.....	.....	Pullman
Boston Elevated	65	Bodies for motor passenger cars	.....	.....	4	.....	.....	.....	Pressed Steel
Escambia	1	Coach	Wood	80,000	4	Oil	.....	.....	Am. Car & Fdy.
Ford, Henry	1	Private	Steel	.....	6	Electric	.....	.....	Pullman
Hassler, Inc., R. H.	4	Express	.....	.....	4	.....	.....	.....	Mt. Vernon
Hudson & Manhattan	25	Mot. coach	Steel	.....	4	Electric	.....	.....	Am. Car & Fdy.
Interstate R. R.	1	Coach	Wood	100,000	4	Electric	.....	.....	Am. Car & Fdy.
	1	Bagg. & mail	Wood	100,000	4	Oil	.....	.....	Am. Car & Fdy.
New York Consolidated	100	Mot. coach	Steel	73,000	4	Electric	.....	.....	Pressed Steel
Pullman Co.	60	Sleeping	Steel	.....	6	Electric	.....	.....	Company shops
San Francisco-Oakland Term.	18	Coach	Steel	45,000	4	Electric	.....	.....	Am. Car & Fdy.
	25	Coach	Steel	17,000	4	Electric	.....	.....	Company shops
	10	Coach	Steel frame	30,000	4	Electric	.....	.....	Company shops
Western Ry. of Alabama	4	Coach	Steel	.....	6	Electric	Safety	Edison	Am. Car & Fdy.
	3	Baggage	Steel	.....	6	Electric	Safety	Edison	Am. Car & Fdy.

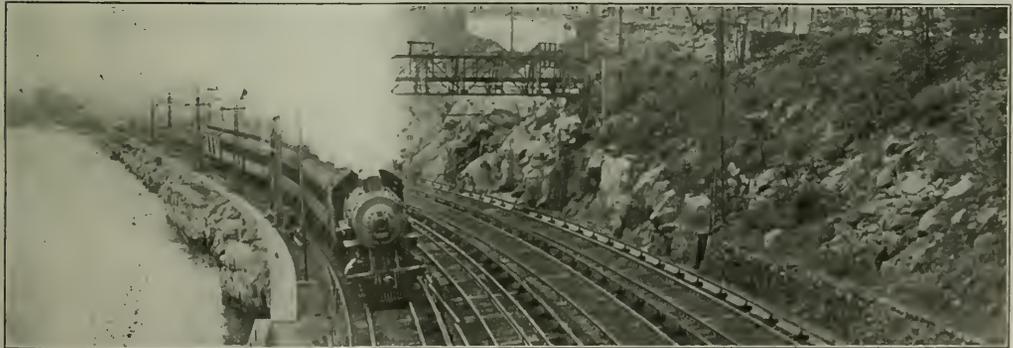
*Not included in totals.

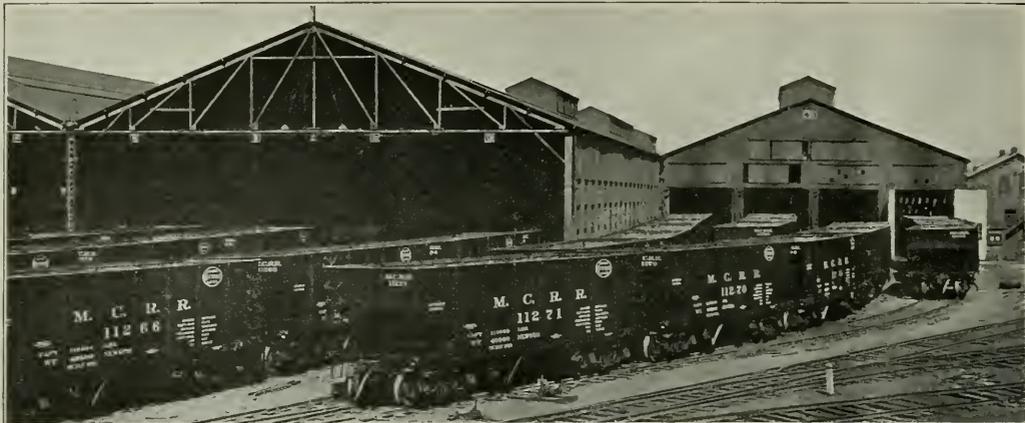
Railways and Other Companies in Canada

Purchaser	No.	Class	Construction	Weight	Wheels per truck	If electric lighting			Builder
						Lighting	Axle generator equipment	Batteries	
Canadian National	18	Sleeper	Steel	164,000	6	Electric	Stone-Franklin	Tonum	Can. Car & Fdy.
	12	Dining	Steel	168,000	6	Electric	Stone-Franklin	Tonum	Can. Car & Fdy.
	20	Baggage	Steel	128,000	6	Electric	Stone-Franklin	Tonum	Can. Car & Fdy.
	20	Exp. ref.	Steel	.....	4	.....	.....	.....	Natl. Steel
Grand Trunk	50	Baggage	Steel frame	98,000	4	Electric	.....	.....	Can. Car & Fdy.
	15	Exp. ref.	St. and frame	.....	4	.....	.....	.....	Can. Car & Fdy.
Canadian Pacific	56	Sleeping	Steel frame	168,000	6	Electric	Safety	Stone-Franklin	Can. Car & Fdy.
	13	Sleeping	Steel frame	170,000	6	Electric	Safety	Willard	Can. Car & Fdy.
	12	Dining	Steel frame	180,000	6	Electric	Safety	Stone-Franklin	Can. Car & Fdy.
	24	Baggage	Steel frame	150,000	6	Electric	Safety	Stone-Franklin	Can. Car & Fdy.
Grand Trunk Pacific	30	Exp. ref.	Steel	.....	4	.....	.....	.....	Natl. Steel
Pacific Great Eastern	3	1st class	Steel frame	90,000	4	.....	.....	.....	Pullman
Roberval-Saguenay	1	Coach	Steel	.....	4	Oil	.....	.....	Company shops
	1	Baggage	Steel	.....	4	Oil	.....	.....	Company shops

Export

Purchaser	No.	Class	Construction	Weight	Wheels per truck	If electric lighting			Builder
						Lighting	Axle generator equipment	Batteries	
Havana Central	8	Baggage	St. and frame	35,070	4	Electric	.....	.....	Osgood-Bradley
	10	Bagg. & mail	St. and frame	86,000	4	Electric	.....	.....	Osgood-Bradley
Panama Central	1	Observation	St. and frame	81,000	4	Oil	.....	.....	Company shops
	2	Parlor	St. and frame	81,000	4	Oil	.....	.....	Company shops
Various foreign purchasers	17	Orders not reported in detail	.....	.....	.....	.....	.....	.....	Am. Car & Fdy.





At the McKees Rocks Plant of the Fressed Steel Car Company

Purchases of Freight Cars Increase in 1920

Orders Placed After Return to Private Operation Make Totals
Almost Four Times Those for 1919

IN THE NUMBER of freight cars ordered during 1920 there has been, as was the case with the locomotives, a remarkable improvement over the 1919 showing. The orders by Class I roads were 51,250 cars, by other domestic roads 1,044 and by private car lines and industrials 31,913—making a total of 84,207 cars ordered in the United States for domestic

TABLE I—THE FREIGHT CAR ORDERS OF 1920

For Class I railroads.....	51,250
For other American railroads.....	1,044
For private car lines and industrials.....	31,913
Total domestic.....	84,207
For service in Canada.....	12,406
For export to other countries.....	9,056
Grand total.....	105,669

service. To this figure are added the total orders of 12,406 placed by Canadian roads and industries and 9,056 ordered by foreign buyers, which brings the total orders received in this country and Canada during the year up to 105,669. In 1919 the total domestic orders were 22,062—scarcely one-

TABLE II—ORDERS FOR FREIGHT CARS SINCE 1901

Year	Domestic orders		Freight cars
	Freight cars	Freight cars	
1901.....	193,439	1908.....	62,669
1902.....	195,248	1909.....	189,360
1903.....	108,936	1910.....	141,024
1904.....	136,561	1911.....	133,117
1905.....	341,315	1912.....	234,758
1906.....	310,315	1913.....	146,732
1907.....	151,711	1914.....	80,264
Domestic and foreign			
Year	Domestic	Foreign	Total
1915.....	109,792	18,222	128,014
1916.....	170,054	35,314	205,368
1917.....	79,367	53,191	132,558
1918.....	123,770	53,547	177,317
1919.....	25,899	3,994	29,893

fourth the 1920 total. Canadian orders of 3,837 for 1919 are scarcely a third of the purchases for 1920 and the export orders of 3,994 are less than one-half the total purchases for export during 1920.

As was pointed out in the review of the locomotive orders

for this year, the showing for freight car orders is not entirely unsatisfactory in view of the uncertain conditions which prevailed throughout the greater part of the period, even the close of which brought no conclusive proof that the rate structure provided by the Interstate Commerce Commission was going to provide adequate returns to the carriers. The fact remains, however, that the acquisitions of freight cars in 1920 were far from sufficient to make up the defi-

TABLE III—FREIGHT CARS BUILT

	United States	Canada*	Total
Domestic.....	60,955	.....	.....
Foreign.....	14,480	.....	.....
	75,435	.....	.....

*Complete details of Canadian production not received.

Comparison with Previous Years
Freight

Year	Domestic	Foreign	Total
1899.....	117,982	1,904	119,886
1900.....	113,070	2,561	115,631
1901.....	132,591	4,339	136,930
1902.....	161,747	2,800	162,599
1903.....	153,195	1,613	152,801
1904.....	60,955	1,995	60,806
1905.....	162,701	5,305	165,153
1906.....	236,451	7,219	240,503
1907.....	280,216	9,429	284,188
1908.....	75,344	1,211	76,555
1909.....	91,077	2,493	93,570
1910.....	176,374	4,571	180,945
1911.....	68,961	3,200	72,161
1912.....	148,357	4,072	152,429

*Includes Canadian output.

†Includes Canadian output and equipment built in company shops.

Year	United States			Canadian			Grand Total
	Domestic	Foreign	Total	Domestic	Foreign	Total	
1913.....	176,049	9,618	185,667	22,017	.....	22,017	207,684
1914.....	97,626	462	98,088	6,453	.....	6,453	104,451
1915.....	58,226	11,916	70,142	1,758	2,212	3,970	74,112
1916.....	111,516	17,905	129,421	.....	.....	.....	5,580
1917.....	115,705	23,938	139,643	3,658	8,100	11,758	151,401
1918.....	67,063	40,981	108,044	14,704	1,960	16,664	124,708
1919.....	94,981	61,783	156,764	6,391	30	6,421	163,185

encies in orders which have accumulated during the past eight years. The showing of freight car orders for 1920 does not even compare favorably with the totals for any recent year with the exception of 1914 and 1917. The domestic

orders in 1918 alone were for some 40,000 more than in 1920.

In the review of the statistics of freight car orders in 1919 (*Railway Age*, January 2, 1920, page 128) it was pointed out that by far the greater part of the orders for that year were from private car lines. It is pleasing to note in connection with the 1920 totals, that, although the orders from private car lines are practically twice the 1919 figures, the railway orders are nevertheless much larger than those from the private buyers.

The export orders for 1920 are more than twice the total for 1919, but far below the average for the preceding four years. This falling off may be explained in the same manner as was the decline in locomotive orders from abroad, i. e., the premium on the dollar in foreign countries, the return of foreign manufacturers into active competition and the generally impoverished condition of buyers throughout the world.

Freight car production in the United States during 1920 for domestic service was 60,955 and for export 14,480, making a total of 75,435 cars built in the United States during the year. The totals for 1915 only in recent years are lower than those for the past year. This decline in production is but the natural outcome of the few orders placed during 1919 and was predicted in the statistical review of freight car orders for 1919. The heavier orders during 1918 gave 1919 an excellent showing from the standpoint of production in spite of the fact that the orders during 1919 were much lower than usual.

The production for export in 1920—14,480—represents a decline of more than 75 per cent over the 1919 figures. It was pointed out in the statistical review for 1919 that the production for that year for export bore a large ratio to the total production and the domestic orders a small ratio to the total. This condition has not obtained during the year just past and indeed the small total for export may well occasion some concern. It is true that foreign buyers are not acquiring new equipment in anything like the quantities which they actually require, but it is also evident that manufacturers

abroad are once more directing their efforts toward regaining the markets lost to American concerns during the war and that the premium on the dollar gives them an opportunity in many cases to underbid American manufacturers.

In addition to the number of cars built and ordered during the year the *Railway Age* also asked the manufacturers for details regarding the type of cars built. The following details concerning the construction of cars built in the United States may be of interest. All-steel, 34,140; steel frames only, 6,537; steel underframes only, 22,862; steel center sills only, 635; all-wood, 2,451; not specified, 8,810.

If the orders for the preceding year are any measure of production for the following year, and it would seem that they are, the production in 1921 should greatly exceed the 1920 total. Orders in 1918 were comparatively high and production in 1919 was high. Few orders in 1919 resulted in low production totals for the past year. In like manner, then, orders having increased greatly in 1920, production in 1921 should show considerable advances. It is well to point out in this connection that the greater part of the orders for cars in 1920 were placed in the earlier part of the year but that conditions of transportation were such and raw material so difficult to secure that the manufacturing plants are only now getting up to anything like capacity production. The output of the car building companies has averaged only 3,000 cars a month for the greater part of the year. In October and November it reached 6,000.

The list of orders which follows is compiled from information furnished us by railroads, private car lines and car manufacturers. It was checked and amplified by comparison with the items appearing each week in the Equipment and Supplies column of the *Railway Age*. The railroads and manufacturers gave us their usual co-operation in supplying us with information concerning orders and production. We are especially indebted to Dr. W. F. M. Goss, president of the Railway Car Manufacturers' Association, for valuable assistance given us in securing reports from the members of that association.

Freight Car Orders in 1920

Purchaser	No.	Class	Class I Roads			Draft gear	Trucks	Roof	Builder
			Capacity	Construction	Weight				
Ann Arbor	200	Box	160,000	St. und'frame	46,000	Cardwell	Scullin	Hutchins	Haskell & Barker
Atchison, Topeka & Santa Fe	500	Gondola	100,000	Steel frame	42,000	Miner	.....	.....	Am. Car. & Fdy.
	1,250	Refrig.	80,000	St. und'frame	55,500	.....	.....	.....	Am. Car. & Fdy.
	1,250	Refrig.	80,000	St. und'frame	55,500	.....	.....	.....	Haskell & Barker
Atlantic Coast Line	506	Vent. Box	80,000	St. und'frame	47,000	Farlow	Bettendorf	.....	Std. Steel
	400	Hopper	100,000	Steel	43,500	Farlow	Bettendorf	.....	Std. Steel
Baltimore & Ohio	1,415	Hopper	100,000	Steel	39,000	Farlow	Arch bar	.....	Pressed Steel
	947	Box	80,000	St. und'frame	43,500	Farlow	Arch bar	.....	Mt. Vernon
	500	Refrig.	70,000	St. und'frame	55,000	Farlow	Arch bar	.....	Am. Car. & Fdy.
Boston & Maine	50	Caboose	.....	St. und'frame	42,000	Spring	.....	.....	Laconia
Carolina, Clinchfield & Ohio	10	Caboose	.....	Steel frame	38,000	Miner	Arch bar	.....	Std. Steel
Chesapeake & Ohio	1,000	Hop. bodies	115,000	Steel	.....	.....	.....	.....	Pressed Steel
	500	Gondola	200,000	Steel	66,000	Miner	Levis	.....	Pressed Steel
	500	Gondola	200,000	Steel	66,000	Miner	Lewis	.....	Std. Steel
Chicago & Alton	300	Gondola	80,000	Composite	42,000	Cardwell	Arch bar	.....	Gen. American
	344	Gondola	80,000	St. ctr. sills.	36,000	Cardwell	Arch bar	.....	Gen. American
Chicago & North Western	500	Ore	100,000	Steel	34,400	Cardwell	Cast steel	.....	Pullman
	250	Stock	80,000	St. und'frame	39,800	Cardwell	Cast steel	.....	Gen. American
	250	Stock	80,000	St. und'frame	37,700	Cardwell	Cast steel	.....	Gen. American
	50	Caboose	.....	St. und'frame	38,000	Cardwell	Cast steel	.....	Am. Car. & Fdy.
	250	Refrig.	80,000	St. und'frame	57,500	Cardwell	Cast steel	.....	Am. Car. & Fdy.
Chicago, Burlington & Quincy	500	Stock	60,000	St. ctr. sills	36,000	Farlow	Arch bar	.....	West. Steel
Chicago, Great Western	197	Hop. bodies	100,000	Steel	.....	.....	.....	.....	Pressed Steel
Chicago Junction	1	Box	60,000	Steel	36,200	Cardwell	Arch bar	.....	Company shops
	1	Box	60,000	Wood	35,400	Cardwell	Arch bar	.....	Company shops
Chicago, Milwaukee & St. Paul	2,000	Box	100,000	St. und'frame	46,100	Cardwell	Metal	.....	Bettendorf
Chicago, Rock Island & Pacific	50	Box	100,000	St. und'frame	46,200	Bradford	Murphy	.....	Bettendorf
Chic., St. Paul, Minn. & Omaha	10*	Caboose	60,000	St. und'frame	.....	Cardwell	Bettendorf	.....	Am. Car. & Fdy.
	125	Steel underframes for caboose cars	.....	.....	.....	.....	.....	.....	Bettendorf
	125	Stock	60,000	St. und'frame	37,400	Miner	Bettendorf	.....	Gen. American
Cleve., Cin., Chic. & St. Louis	200	Box	100,000	Steel	47,500	Friction	Cast steel	.....	Std. Steel
	500	Auto	100,000	Steel	47,800	Friction	Cast steel	.....	Haskell & Barker
	250	Hopper	110,000	Steel	41,200	Friction	Cast steel	.....	Std. Steel
	1,750	Hopper	110,000	Steel	41,200	Friction	Cast steel	.....	Am. Car. & Fdy.
	20	Stock	80,000	St. und'frame	39,500	Spring	Cast steel	.....	Haskell & Barker
	20	Caboose	.....	St. und'frame	.....	Spring	Cast steel	.....	Company shops
Delaware & Hudson	5	Box	60,000	St. und'frame	36,000	Miner	Arch bar	.....	Company shops
	6	Hopper	85,000	St. und'frame	36,900	Miner	Arch bar	.....	Company shops
Delaware, Lack. & Western	20	Caboose	60,000	Steel frame	43,200	Cardwell	.....	.....	Mt. Vernon
El Paso & Southwestern	75	Tank	10,000g.	Steel	.....	Cardwell	Andrews	.....	Gen. American
Erie	1,000	Gondola	100,000	Steel	43,700	Miner	.....	.....	Std. Steel
	1,000	Box	80,000	Steel frame	41,000	Miner	Arch bar	.....	Std. Steel
	70	Caboose	60,000	St. ctr. sills	37,800	Miner	Arch bar	.....	Company shops

	Purchaser	No.	Class	Capacity	Construction	Weight	Draft gear	Trucks	Roof	Builder
Florida East Coast		10	Caboose	60,000	St. and frame	.....	Miner	Cast steel	.....	Mt. Vernon
		500	Tank	100,000	Steel	.....	Miner	Cast steel	.....	Am. Car & Fdy.
		2,000	Vent. Box	80,000	St. and frame	.....	Friction	Cast steel	Hutchins	Std. Steel
Grand Trunk (Western)		2	Auto	80,000	Steel frame	.....	Miner	Arch bar	Hutchins	Am. Car & Fdy.
		2	Idler	80,000	.....	.....	.....	.....	.....	Company shops
Great Northern		500	Ore	140,000	Steel	40,400	Cardwell	.....	.....	Am. Car & Fdy.
		500	Ore	140,000	Steel	39,200	Cardwell	.....	.....	Haskell & Barker
Gulf Coast Lines		250	Gondola	80,000	Composite	.....	Friction	.....	.....	Mt. Vernon
		500	Box	80,000	Steel frame	.....	Friction	.....	.....	Am. Car & Fdy.
		50	Auto	80,000	St. and frame	.....	Friction	.....	.....	Am. Car & Fdy.
Illinois Central		1,000	Tank	100,000	Steel	.....	Friction	.....	.....	Std. Tank Car
		300	Refrig.	80,000	St. and frame	.....	Murray	.....	Murphy	Pullman
		200	Stock	80,000	Steel frame	40,000	Murray	.....	.....	Am. Car & Fdy.
		200	Flat	100,000	Steel	32,000	Murray	.....	.....	Bettendorf
Louisville & Nashville		1,500	Hopper	110,000	Steel	41,500	Miner	Cast steel	.....	Am. Car & Fdy.
		500	Hopper	110,000	Steel	41,500	Miner	Cast steel	.....	Mt. Vernon
Maine Central		10	Rack	60,000	St. and frame	38,000	Miner	Cast steel	.....	Am. Car & Fdy.
Michigan Central		1,000	Auto	100,000	Steel	47,700	Friction	Cast steel	.....	Metal
		500	Hopper	110,000	Steel	41,100	Friction	Cast steel	.....	Am. Car & Fdy.
		100	Stock	80,000	St. and frame	39,500	Spring	Cast steel	.....	Haskell & Barker
		100	Stock	80,000	St. and frame	42,300	Spring	Cast steel	.....	Haskell & Barker
		250	Refrig.	69,000	St. and frame	56,300	Friction	Cast steel	.....	Metal
		100	Caboose	.....	St. and frame	.....	Spring	Cast steel	.....	Wood
		35	Caboose	.....	St. and frame	.....	Spring	Cast steel	.....	Wood
Minneapolis & St. Louis		250	Gondola	100,000	St. and frame	41,100	Friction	Cast steel	.....	Company shops
Minn., St. Paul & S. S. Marie		250	Box	80,000	St. and frame	41,100	Cardwell	Cast steel	.....	Haskell & Barker
		250	Box	80,000	St. and frame	41,100	Miner	Cast steel	.....	Haskell & Barker
		300	Ore	100,000	Steel	33,500	Cardwell	Cast steel	.....	Haskell & Barker
Nashville, Chattanooga & St. L.		1,000	Hopper	110,000	Steel	40,000	Friction	Cast steel	.....	Pressed Steel
New York Central		1,000	Box	100,000	Steel	47,300	Friction	Cast steel	.....	Std. Steel
		250	Auto	100,000	Steel	.....	Friction	Cast steel	.....	Std. Steel
		750	Auto	100,000	Steel	47,700	Friction	Cast steel	.....	Metal
		1,500	Hopper	110,000	Steel	41,200	Friction	Cast steel	.....	Am. Car & Fdy.
		500	Stock	80,000	St. and frame	42,300	Spring	Cast steel	.....	Srd. Steel
		200	Stock	80,000	St. and frame	42,300	Spring	Cast steel	.....	Haskell & Barker
		100	Caboose	.....	St. and frame	.....	Spring	Cast steel	.....	Company shops
N. Y., New Haven & Hartford		39	Snow plow	.....	.....	.....	.....	.....	.....	Osgood-Bradley
New York Pacific		300	Convertible	100,000	Steel frame	51,200	Miner	Cast steel	.....	Am. Car & Fdy.
		90	Caboose	60,000	St. etr. sills	38,000	Miner	Cast steel	.....	Pac. Car & Fdy.
Pennsylvania		50	Caboose	.....	St. and frame	35,000	Friction	Cast steel	.....	Company shops
Philadelphia & Reading		20	Caboose	.....	St. and frame	24,000	Spring	Cast steel	.....	Company shops
Philadelphia & Lake Erie		1,500	Hopper	110,000	Steel	41,500	Friction	Cast steel	.....	Std. Steel
Pittsburgh & Shawmut		1	Scale test	.....	Steel	.....	Friction	Cast steel	.....	Am. Car & Fdy.
		6	Caboose	.....	Wood	.....	Friction	Cast steel	.....	Am. Car & Fdy.
Richmond, Fred. & Potomac		50	Hon. bodies	110,000	Steel	40,000	Farlow	Arch bar	.....	Pressed Steel
San Antonio & Aransas Pass		15	Tank	80,000	St. etr. sills	44,500	Miner	Arch bar	.....	Am. Car & Fdy.
Southern Pacific		2,000	Box	80,000	.....	.....	.....	.....	.....	Company shops
		1,000	Stock	80,000	.....	.....	.....	.....	.....	Company shops
		1,000	Flat	100,000	.....	.....	.....	.....	.....	Company shops
		65	Caboose	100,000	.....	.....	.....	.....	.....	Company shops
		250	Ballast	100,000	.....	.....	.....	.....	.....	Mt. Vernon
		500	Auto	100,000	.....	.....	.....	.....	.....	Std. Steel
Texas & Pacific		500	Box	100,000	Wood	.....	.....	.....	.....	Std. Steel
		50	Tank	100,000	Steel	45,000	Cardwell	Vulcan	.....	Am. Car & Fdy.
		200	Ballast	100,000	St. and frame	46,700	Cardwell	Vulcan	.....	Am. Car & Fdy.
Toledo, St. Louis & Western		100	Hopper	110,000	Steel	40,700	Westinghouse	.....	.....	Am. Car & Fdy.
Union Pacific		500	Gondola	100,000	Steel	42,810	Murray	Bettendorf	.....	Pullman
		500	Gondola	100,000	Steel	42,810	Murray	Bettendorf	.....	Pullman
		1,000	Gondola	100,000	Steel	42,810	Cardwell	Vulcan	.....	Ralston
		45	Caboose	.....	St. and frame	36,600	Cardwell	Vulcan	.....	Pac. Car & Fdy.
		24	Dump	80,000	Steel	51,900	Farlow	Arch bar	.....	Kilb. & Jacobs
Utah		45*	Steel underframes for cabooses	.....	.....	.....	.....	.....	.....	Bettendorf
Virginia		50	Caboose	60,000	St. and frame	36,900	Farlow	Cast steel	.....	Am. Car & Fdy.
		50	Coal	240,000	Steel	78,200	Cardwell	Levis	.....	Pressed Steel
Western Pacific		700	Coal	240,000	Steel	78,200	Westinghouse	Buckeye	.....	Pressed Steel
Wheeling & Lake Erie		500	Gondola	100,000	St. and frame	41,600	Farlow	Arch bar	.....	Pressed Steel
		500	Box	80,000	Steel frame	42,000	Cardwell	Bettendorf	.....	Pressed Steel
		500	Box	80,000	Steel frame	42,000	Cardwell	Bettendorf	.....	Am. Car & Fdy.
		1,500	Gondola	100,000	Steel	43,500	Cardwell	Bettendorf	.....	Hutchins
		500	Gondola	100,000	Steel	43,500	Cardwell	Bettendorf	.....	Hutchins

*Not included in totals.

Other United States Railroads

Alton & Southern		25	Hopper	100,000	Steel	.....	Friction	.....	.....	Mt. Vernon
Bangor Ry. & Elec. Co.		3	Box	50,000	Wood	.....	Spring	.....	.....	Am. Car & Fdy.
Batesville & So'western		40	Flat	60,000	Wood	28,000	Miner	Arch bar	.....	Company shops
		2	Ballast	60,000	Wood	31,000	.....	.....	.....	Company shops
Brimstone R. R. & Canal Co.		36	Hop. body	100,000	Steel	.....	.....	.....	.....	Pressed Steel
Charlotte Harbor & Northern		100	Cov. Hop.	100,000	Steel	44,000	Farlow	Arch bar	.....	Pressed Steel
Clarendon & Pittsford		40	Hopper	100,000	Steel	.....	Friction	.....	.....	Mt. Vernon
East Jersey		25	Log	100,000	Steel	45,000	Cardwell	Arch bar	.....	Am. Car & Fdy.
Escambia		25	Logging	60,000	Wood	28,000	.....	Arch bar	.....	Am. Car & Fdy.
Interstate R. R.		510	Steel	110,000	Steel	40,000	Farlow	Arch bar	.....	Pressed Steel
Piedmont & Northern		50	Flat	80,000	Composite	.....	.....	.....	.....	Am. Car & Fdy.
Puget Sound & Cascade		10	Flat	80,000	Steel frame	27,000	.....	.....	.....	Company shops
Riora, Tiera & Van Tw. Ry.		50	Flat	60,000	Steel frame	.....	Spring	.....	.....	Mt. Vernon
Salt Lake & Utah		10	Gen'l service	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Utah-Idaho Central		100	Box	80,000	Wood	.....	.....	.....	.....	Pressed Steel
		100	Gondola	100,000	Steel	.....	.....	.....	.....	Ralston

Private Car Lines and Industrials

Acar Mfg. Co.		18	Tank	10,300g.	.....	.....	.....	.....	.....	Penn. Tank Car
		22	Tank	10,000g.	.....	.....	.....	.....	.....	Penn. Tank Car
		50	Tank	8,000g.	.....	.....	.....	.....	.....	Penn. Tank Car
		35	Tank	10,000g.	.....	.....	.....	.....	.....	Am. Car & Fdy.
		65	Tank	8,000g.	.....	.....	.....	.....	.....	Am. Car & Fdy.
Actna Refining Co.		50	Tank	10,000g.	Steel	.....	.....	.....	.....	Std. Tank Car
Allegheny Pl. Glass Co.		10	Gondola	100,000	Steel	.....	.....	.....	.....	Pressed Steel
Aluminum Co. of America		25	Hopper	140,000	Steel	.....	.....	.....	.....	Pressed Steel
		100	Hopper	110,000	Steel	.....	.....	.....	.....	Pressed Steel
American Cyanamid Co.		10	Hopper	140,000	Steel	57,500	Cardwell	.....	.....	Gen. American
Amer. Steel & Wire Co.		250	Hopper	140,000	Steel	.....	.....	.....	.....	Pressed Steel
American Tar Prod. Co.		10	Tank	10,000g.	.....	.....	.....	.....	.....	Std. Tank Car
Anderson & Gustafson		50	Tank	100,000	Steel	46,100	Cardwell	Arch bar	.....	Std. Tank Car
Argent Lbr. Co.		10	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
Armour Car Lines		400*	Underframes for beef cars.	.....	.....	.....	.....	.....	.....	Bettendorf
Ashley Lbr. Co.		4	Logging	20,000	Wood	.....	.....	.....	.....	Kilby Car
Astoria Let. Ht. & Power Co.		4	Gondola	100,000	Steel	.....	.....	.....	.....	Pressed Steel

Purchaser	No.	Class	Capacity	Construction	Weight	Draft gear	Trucks	Roofs	Builder
Atkins & Co.	2	Box	60,000	Steel	.....	.....	.....	.....	Pressed Steel
Barnes Circus	1	Flat	80,000	Steel frame	.....	Friction	.....	.....	.....
Barratt Co.	50	Stock	80,000	Steel frame	.....	Friction	.....	.....	Mt. Vernon
Barr-Holiday Lbr. Co.	5	Logging	10,000g.	Steel	.....	Cardwell	.....	.....	Gen. American
Bayou Land & Lbr. Co.	10	Logging	40,000	Wood	.....	.....	.....	.....	Kilby Car
Be-Tree Lbr. Co.	5	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
Bertha Coal Co.	100	Hopper	140,000	Steel	.....	.....	.....	.....	Kilby Car
Bethlehem Steel Co.	1,000	Hopper	140,900	Steel	.....	.....	.....	.....	Ralston
Bighart Prod. & Ref. Co.	250	Tank	.....	.....	.....	.....	.....	.....	Cambria Steel
Black Warrior Lbr. Co.	6	Logging	30,000	Wood	.....	.....	.....	.....	Penn. Tank Car
Boone Fork Lbr. Co.	10	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
Briar Hill Steel Co.	54	Hopper	110,000	Steel	.....	.....	.....	.....	Pressed Steel
Brown & Sons Lbr. Co., W. P.	100	Hopper	140,000	Steel	.....	.....	.....	.....	Pressed Steel
Buckeye Steel Castings Co.	18	Hopper	110,000	Steel	.....	.....	.....	.....	Ralston
Byers & Co., A. M.	115	Hopper	140,000	Steel	.....	.....	.....	.....	Am. Car & Fdy.
Caddo Cent. Oil & Refin. Co.	400	Tank	80,000	Steel	40,500	Cardwell	Arch bar	.....	Std. Tank Car
Candler Lbr. Co.	10	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
Carnegie Steel Co.	500	Hopper	110,000	Steel	.....	.....	.....	.....	Std. Steel
Carrier Lbr. Co.	10	Logging	50,000	Wood	.....	.....	.....	.....	Kilby Car
Carson Petroleum Co.	8	Tank	10,000g.	Steel	.....	.....	.....	.....	Am. Car & Fdy.
Central Refining Co.	2	Tank	8,000g.	Steel	39,000	Bradford	Arch bar	.....	Am. Car & Fdy.
Central Timber Saw Mill Co.	12	Logging	40,000	Wood	.....	.....	.....	.....	Chic. Steel Car
Cheswick & Hiarm	25	Hopper	110,000	Steel	42,000	Cardwell	Arch bar	.....	Kilby Car
Chestnut & Smith Corp.	100	Hopper	8,000g.	Steel	.....	.....	.....	.....	Std. Steel
Clark Car Co.	250	Gondola	100,000	Steel	.....	.....	.....	.....	Gen. American
Clinchfield Carbocool Co.	10	Hopper	110,000	Steel	.....	.....	.....	.....	Cambria Steel
Clinchfield Port. Cement Co.	45	Hopper	110,000	Steel	.....	.....	.....	.....	Cambria Steel
Champlin Ref. Co.	100	Tank	8,000g.	Steel	.....	.....	.....	.....	Pressed Steel
Chickasaw Ref. Co.	100	Tank	8,000g.	Steel	.....	Cardwell	Arch bar	.....	Pressed Steel
Choate Oil Corp.	10	Tank	80,000	Steel	40,500	Cardwell	Scullin	.....	Penn. Tank Car
Clarkson Coal Mining Co.	500	Hopper	110,000	Steel	48,800	Cardwell	Buckeye	.....	Am. Car & Fdy.
Clements & Son.	10	Tank	10,000g.	Steel	.....	.....	.....	.....	Std. Tank Car
Columbia Steel & Sbiting Co.	50	Gondola	100,000	Steel	.....	.....	.....	.....	Haskell & Barker
Commerce Transport System.	50	Tank	100,000	Steel	.....	.....	.....	.....	Chic. Steel Car
Commercial Car Line.	25	Tank	100,000	Steel	.....	.....	.....	.....	Pressed Steel
Conly Car Co.	125	Tank	8,000g.	Steel	.....	.....	.....	.....	Am. Car & Fdy.
Consolidated Coal Co.	110	Hopper	110,000	Steel	.....	.....	.....	.....	Gen. American
Consolidated Portland Cement Co.	40	Hopper	60,000	Wood	.....	Bradford	Arch bar	.....	Penn. Tank Car
Contact Process	2*	Underframes for tank cars.		.....	.....	.....	.....	.....	Kilby Car
Coopers Creek Chemical Co.	9	Tank	100,000	Steel	47,400	Cardwell	Arch bar	.....	Bettendorf
Craig Oil Company	30	Tank	10,000g.	Steel	43,500	Cardwell	Arch bar	.....	Penn. Tank Car
Crescent Portland Cement Co.	5	Hopper	110,000	Steel	.....	.....	.....	.....	Am. Car & Fdy.
Crystal Car Line.	50	Tank	100,000	Steel	40,000	Cardwell	Arch bar	.....	Pressed Steel
Deal-Batchell Lbr. Co.	4	Logging	40,000	Wood	.....	.....	.....	.....	Gen. American
Detroit City Gas Co.	1	Hopper	110,000	Steel	.....	.....	.....	.....	Kilby Car
Detroit Edison Co.	6	Gondola	100,000	Steel	.....	.....	.....	.....	Pressed Steel
Diamond Alkali Co.	100	Hopper	140,000	Steel	.....	.....	.....	.....	Pressed Steel
Dickey, Clay Mfg. Co., W. S.	2	Tank	10,100g.	.....	.....	.....	.....	.....	Penn. Tank Car
Donner Steel Co.	250	Hopper	140,000	Steel	.....	.....	.....	.....	Std. Steel
Donner Union Coke Corp.	250	Gondola	140,000	Steel	.....	.....	.....	.....	Cambria
El Dorado Refining Co.	100	Tank	80,000	Steel	.....	Cardwell	Arch bar	.....	Pressed Steel
Electro Bleaching Gas Co.	5	Tank	.....	.....	.....	.....	.....	.....	Std. Tank Car
Elk Refining Co.	25	Tank	80,000	Steel	40,000	Friction	Arch bar	.....	Gen. American
Elliott Jones & Co., Inc.	111	Tank	100,000	Steel	45,000	National	.....	.....	Std. Tank Car
Emmenton Ref. Co.	11	Tank	80,000	Steel	.....	.....	.....	.....	Std. Tank Car
Fair Lbr. Co., D. L.	18	Logging	30,000	Wood	.....	.....	.....	.....	Am. Car & Fdy.
Faulkner Candy Co.	2	Box	80,000	Wood	.....	Friction	.....	.....	Kilby Car
Federal Shipbuilding Co.	20	Flat	100,000	Steel	.....	.....	.....	.....	Mt. Vernon
Finkbine Lumber Co.	20	Gondola	100,000	Steel	.....	.....	.....	.....	Std. Steel
Flint Lbr. Co.	10	Logging	80,000	Steel	.....	.....	.....	.....	Kilby Car
General Chemical	50	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
Federal Tank Car Line.	48	Tank	140,000	Steel	50,500	Cardwell	Arch bar	.....	Am. Car & Fdy.
Foco Oil Co.	5	Tank	8,000g.	Steel	60,500	Cardwell	.....	.....	Gen. American
Foreman-Blades Lbr. Co.	12	Tank	80,000	Steel	45,900	Cardwell	Cast steel	.....	Std. Tank Car
Franklin Quality Refin. Co.	20	Tank	100,000	Steel	45,500	Cardwell	Arch bar	.....	Am. Car & Fdy.
Frost-Sibley Lbr. Co.	1	Flat	50,000	.....	.....	.....	.....	.....	Std. Tank Car
Georgia Rosin & Pres. Co.	3	Tank	8,000g.	.....	.....	.....	.....	.....	Penn. Tank Car
(Nile) & Sons	28	Tank	100,000	Steel	.....	Cardwell	Arch bar	.....	Am. Car & Fdy.
Glen Nina Tank Line.	53	Tank	8,000g.	.....	.....	.....	.....	.....	Penn. Tank Car
Golden Saw Mill Co.	4	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
Goldsboro Lbr. Co.	20	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
Goss Thr. Co., II, O.	4	Logging	40,000	Wood	.....	.....	.....	.....	Kilby Car
Great American Ref. Co.	100	Tank	8,000g.	.....	.....	.....	.....	.....	Gen. American
Griffin, J. P.	3	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
Hamburg Lbr. Co.	6	Logging	20,000	Wood	.....	.....	.....	.....	Kilby Car
Hahm & Richards	30	Hopper	110,000	Steel	.....	.....	.....	.....	Pressed Steel
Hanna Co., M. A.	40	Hopper	110,000	Steel	.....	.....	.....	.....	Pressed Steel
Hassler & Co., R. H.	1	Box	.....	.....	.....	.....	.....	.....	Am. Car & Fdy.
Herf & Fredericks Chem. Co.	8	Tank	10,100g.	.....	.....	.....	.....	.....	Penn. Tank Car
Hobbs Circus	2	Flat	80,000	Steel frame	.....	Friction	.....	.....	Mt. Vernon
Holly-Ridge Lbr. Co.	10	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
Homer-Laughlin China Co.	20	Hopper	140,000	Steel	.....	.....	.....	.....	Kilby Car
Howell Lbr. Co.	3	Logging	30,000	Wood	.....	.....	.....	.....	Ralston
Humble Oil & Ref. Co.	50	Tank	10,000g.	Steel	.....	Cardwell	Arch bar	.....	Kilby Car
Ill. Oil Co. of Rock Island.	35	Tank	8,000g.	Steel	.....	Cardwell	Arch bar	.....	Gen. American
Imperial Refining Co.	50	Tank	80,000	Steel	40,000	Cardwell	Cast steel	.....	Chic. Steel Car
Indian Refining Co.	100	Tank	100,000	Steel	46,000	Cardwell	.....	.....	Std. Tank Car
Indian Refining Co.	150	Tank	100,000	Steel	45,000	Cardwell	Arch bar	.....	Am. Car & Fdy.
Indian Refining Co.	150	Tank	80,000	Steel	40,500	National	Buckeye	.....	Std. Tank Car
Indian Refining Co.	18	Tank	80,000	Steel	40,500	Cardwell	Buckeye	.....	Std. Tank Car
Indian Refining Co.	18	Tank	100,000	Steel	41,500	Bradford	Arch bar	.....	Chic. Steel Car
Indian Refining Co.	2	Tank	100,000	Steel	41,650	Bradford	Arch bar	.....	Chic. Steel Car
Inland Steel Co.	20	Gondola	140,000	Steel	.....	Friction	.....	.....	Bettendorf
International Harvester Co.	500	Hopper	110,000	Steel	.....	.....	.....	.....	Standard Steel
Internat'l Lead Co.	1	Box	80,000	Steel frame	.....	Friction	.....	.....	Mt. Vernon
Inter Ocean Ref. Co.	50	Tank	80,000	Steel	40,800	Cardwell	Arch bar	.....	Std. Tank Car
Interstate Pub. Service Co.	50	Tank	100,000	Steel	45,700	Cardwell	Arch bar	.....	Std. Tank Car
Invinible Oil Co.	75	Box	60,000	.....	.....	.....	.....	.....	Interstate
Invinible Oil Co.	25	Tank	8,000g.	Steel	.....	.....	.....	.....	Gen. American
Invinible Oil Co.	25	Tank	10,000g.	Steel	.....	.....	.....	.....	Gen. American

*Not included in totals.

Purchaser	No.	Class	Capacity	Construction	Weight	Draft gear	Trucks	Roofs	Builder
Ivor Stave & Tbr. Co.	6	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
Jackson Bros. Lbr. Co.	1	Logging	20,000	Wood	.....	.....	.....	.....	Kilby Car
Kelley Lbr. Co.	6	Logging	20,000	Wood	.....	.....	.....	.....	Kilby Car
Kendall Ref. Co.	6	Tank	8,050g.	Wood	.....	.....	.....	.....	Penn. Tank Car
Kuhn Lbr. Co., W. T.	3	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
Lames Hand	5	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
Levi Smith Ref. Co.	3	Tank	8,050g.	.....	.....	.....	.....	.....	Penn. Tank Car
Lidgerwood Mfg. Co.	88	Flat	100,000	Steel	.....	.....	.....	.....	Am. Car & Fdy.
Konsburg, A. V.	4	Tank	100,000	Steel	.....	.....	.....	.....	Standard Steel
Koppers Co.	100	Hopper	140,000	Steel	.....	.....	.....	.....	Standard Steel
	4	Hopper	140,000	Steel	.....	.....	.....	.....	Standard Steel
	900	Hopper	110,000	Steel	.....	.....	.....	.....	Standard Steel
	1	Flat	100,000	Steel	.....	.....	.....	.....	Standard Steel
Labelle Iron Works	50	Gondola	100,000	Steel	.....	.....	.....	.....	Pressed Steel
Lancaster Foundry Co.	2	Hopper	110,000	Steel	.....	.....	.....	.....	Pressed Steel
McKinney Steel Co.	400	Hopper	140,000	Steel	.....	.....	.....	.....	Standard Steel
	100	Hopper	140,000	Steel	.....	.....	.....	.....	Standard Steel
Magnetic Pigment Co.	1	Tank	100,000	.....	.....	.....	.....	.....	Penn. Tank Car
Magnolia Petroleum Co.	25	Tank	80,000	Steel	.....	.....	.....	.....	Am. Car & Fdy.
	100	Tank	80,000	Steel	.....	.....	.....	.....	Am. Car & Fdy.
	250	Tank	100,000	Steel	.....	.....	.....	.....	Am. Car & Fdy.
	3	Tank	8,050g.	.....	.....	.....	.....	.....	Penn. Tank Car
Marcus Ruth Jerome Co.	.....	.....	.....	.....	.....	.....	.....	.....	Bettendorf
Merchants Despatch Trans. Co.	250*	Underframes for refrigerator cars.	.....	.....	.....	.....	.....	.....	Pressed Steel
Moore & Co., E. M.	2	Gondola	100,000	Steel	.....	.....	.....	.....	Standard Steel
Mudge & Co.	240	Hopper	140,000	Steel	.....	.....	.....	.....	Kilby Car
Nacora Crate Co.	5	Logging	50,000	Wood	.....	.....	.....	.....	Penn. Tank Car
National Lamp Co.	8	Tank	8,050g.	St. and frame	.....	.....	.....	.....	Kan. C. Struct. St.
National Zinc Co.	1	Tank	62,000	St. and frame	65,000	Cardwell	Arch bar	.....	.....
New Jersey Zinc Co.	45	Hopper	110,000	Steel	.....	.....	.....	.....	Pressed Steel
	10	Gondola	100,000	Steel	.....	.....	.....	.....	Pressed Steel
Newport Rolling Mill Co.	1	Flat	200,000	Steel	.....	.....	.....	.....	Pressed Steel
New York Shipbuilding Co.	35	Gondola	100,000	Steel	.....	.....	.....	.....	Pressed Steel
Noble Oil & Gas Co.	200	Tank	8,000g.	Steel	.....	.....	.....	.....	F. A. H. Corp.
	100	Tank	8,000g.	Steel	.....	.....	.....	.....	Am. Car & Fdy.
	100	Tank	8,000g.	Steel	.....	.....	.....	.....	F. A. H. Corp.
	50	Tank	8,000g.	Steel	.....	.....	.....	.....	Am. Car & Fdy.
	50	Tank	10,000g.	Steel	.....	.....	.....	.....	Am. Car & Fdy.
North Carolina Lbr. Co.	14	Logging	40,000	Wood	.....	.....	.....	.....	Kilby Car
Northern Petroleum Co.	20	Tank	8,050g.	.....	.....	.....	.....	.....	Penn Tank Car
Nufer, Wm. L.	10	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
Nunn & Co., E. F.	2	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
	2	Logging	20,000	Wood	.....	.....	.....	.....	Magor
Oliver Iron Mining Co.	65	Dump	.....	.....	.....	.....	.....	.....	West. Whl. Sc.
	65	Dump	.....	.....	.....	.....	.....	.....	Pressed Steel
Otis Steel Co.	7	Gondola	100,000	Steel	.....	.....	.....	.....	Pressed Steel
	5	Hopper	110,000	Steel	.....	.....	.....	.....	Pressed Steel
Pacific Fruit Express	309	Refrig.	60,000	St. and frame	52,200	Cardwell	Vulecan	.....	Murphy
	200	Refrig.	60,000	St. and frame	52,400	Cardwell	Vulecan	.....	Murphy
	600	Refrig.	60,000	St. and frame	52,700	Cardwell	Vulecan	.....	Murphy
	300	Refrig.	60,000	St. and frame	53,700	Cardwell	Vulecan	.....	Murphy
	500	Refrig.	60,000	St. and frame	52,300	Cardwell	Vulecan	.....	Murphy
	1,000	Refrig.	60,000	St. and frame	52,100	Cardwell	Vulecan	.....	Murphy
	705	Refrig.	60,000	St. and frame	52,300	Cardwell	Vulecan	.....	Murphy
Pan Handle Refin. Co.	3,400*	Underframes for refrigerator cars.	.....	.....	.....	.....	.....	.....	Haskell & Barker
	50	Tank	8,000g.	Steel	40,000	Cardwell	Arch bar	.....	Bettendorf
	5	Tank	10,050g.	Steel	44,000	Cardwell	Arch bar	.....	Std. Tank Car
	5	Tank	8,000g.	Steel	.....	.....	.....	.....	Gen. American
	100	Tank	10,000g.	Steel	45,700	Cardwell	Arch bar	.....	Std. Tank Car
Parker Lbr. Wks., S. M.	3	Logging	20,000	Wood	.....	.....	.....	.....	Kilby Car
Pease, L. A.	50	Tank	8,050g.	.....	.....	.....	.....	.....	Penn. Tank Car
Peerless Transit	25	Tank	80,000	Steel	48,000	National	Arch bar	.....	Std. Tank Car
Penick & Ford Tank Line	50	Tank	80,000	Steel	46,000	Cardwell	Arch bar	.....	Am. Car & Fdy.
Penn-Jarratt Lbr. Co.	40	Tank	8,000g.	Steel	39,500	Cardwell	Arch bar	.....	Gen. American
Phelps-Dodge	2	Tank	.....	.....	.....	.....	.....	.....	Kilby Car
Pickands, Mather & Co.	412	Hopper	140,000	Steel	.....	.....	.....	.....	Gen. American
Pittsburgh Crucible Co.	25	Hopper	140,000	Steel	.....	.....	.....	.....	Cambria
	10	Gondola	100,000	Steel	.....	.....	.....	.....	Pressed Steel
Pittsburgh Plate Glass Co.	20	Hopper	140,000	Steel	.....	.....	.....	.....	Standard Steel
Planters Nut & Choc. Co.	4	Logging	20,000	Wood	.....	.....	.....	.....	Kilby Car
Poinsett Lbr. Co.	14	Logging	80,000	Steel	.....	Spring	.....	.....	Bettendorf
Priscilla Coal & Coke Co.	40	Hopper	110,000	Steel	.....	.....	.....	.....	Pressed Steel
Procter & Gamble Co.	5	Gondola	100,000	Steel	.....	.....	.....	.....	Ristort
Prudential Oil Corp.	100	Tank	80,000	Steel	40,800	Farlow	Arch bar	.....	Am. Car & Fdy.
Public Service Electric Co.	600	Hopper	110,000	Steel	.....	.....	.....	.....	Standard Steel
Pure Oil Co.	250	Tank	8,000g.	Steel	.....	Cardwell	Arch bar	.....	Am. Car & Fdy.
Rainey Wood Coke Co.	400	Hopper	140,000	Steel	.....	.....	.....	.....	Am. Car & Fdy.
Rajah Oil & Ref. Co.	2	Tank	8,050g.	.....	.....	.....	.....	.....	Penn. Tank Car
Rathborne Lbr. Co., J.	20	Logging	40,000	Wood	.....	.....	.....	.....	Kilby Car
Red River Refining Co.	50	Tank	10,000g.	All steel	40,000	Cardwell	Arch bar	.....	Gen. American
Reed Circus Co.	2	Flat	80,000	Steel frame	.....	Friktion	.....	.....	Mt. Vernon
Republic Iron & Steel Co.	160	Hopper	140,000	Steel	.....	.....	.....	.....	Pressed Steel
Roanoke R. R. & Lbr. Co.	12	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
Robinson & Co., D. P.	3	Hopper	40,000	.....	.....	.....	.....	.....	Magor
Robinson's Circus	6	Flat	80,000	Steel frame	.....	Friktion	.....	.....	Mt. Vernon
	4	Stock	80,000	Steel frame	.....	Friktion	.....	.....	Mt. Vernon
Robinson Clay Prod. Co.	2	Hopper	110,000	Steel	.....	.....	.....	.....	Pressed Steel
Rogers, Brown Iron Co.	4	Hopper	110,000	Steel	.....	.....	.....	.....	Pressed Steel
	6	Gondola	100,000	Steel	.....	.....	.....	.....	Pressed Steel
Roxana Petroleum Co.	125	Tank	80,000	Steel	41,000	Cardwell	Arch bar	.....	Std. Tank Car
	75	Tank	100,000	Steel	45,000	Cardwell	Arch bar	.....	Std. Tank Car
Sartin Mill Co.	4	Logging	40,000	Wood	.....	.....	.....	.....	Kilby Car
Schryver Lbr. Co., C.	6	Logging	20,000	Wood	.....	.....	.....	.....	Kilby Car
Sharon Steel Hoop Co.	8	Gondola	100,000	Steel	.....	.....	.....	.....	Pressed Steel
Simms Oil Co.	300	Tank	10,000g.	St. and frame	45,000	Cardwell	Arch bar	.....	Am. Car & Fdy.
	300	Tank	10,000g.	St. and frame	45,000	.....	.....	.....	Std. Tank Car
Sinclair Refining Co.	6	Hopper	110,000	Steel	.....	.....	.....	.....	Pressed Steel
	6	Gondola	100,000	Steel	.....	.....	.....	.....	Pressed Steel
	500	Tank	10,000g.	Steel	.....	.....	.....	.....	Am. Car & Fdy.
	300	Tank	10,000g.	Steel	.....	.....	.....	.....	Gen. American
	240	Tank	8,000g.	Steel	.....	.....	.....	.....	Gen. American
	10	Tank	8,000g.	Steel	.....	.....	.....	.....	Company shops
	8	Tank	8,050g.	.....	.....	.....	.....	.....	Gen. American
Sloan & Zoak	5	Coke	100,000	.....	.....	.....	.....	.....	Pressed Steel
Loss-Sheffield Steel & Iron Co.	25	Tank	8,050g.	.....	.....	.....	.....	.....	Penn. Tank Car
Snyder, T. E.	5	Logging	20,000	Wood	.....	.....	.....	.....	Kilby Car
South Atlantic Lbr. Co.	2	Logging	20,000	Wood	.....	.....	.....	.....	Penn. Tank Car
South Gem Coal Co.	25	Hopper	100,000	Steel	.....	Friktion	.....	.....	Mt. Vernon
Southern Extract	10	Tank	80,000	Steel	38,000	.....	.....	.....	Am. Car & Fdy.
Sparks Circus	4	Flat	80,000	Steel frame	.....	Friktion	.....	.....	Mt. Vernon
	5	Stock	80,000	Steel frame	.....	Spring	.....	.....	Mt. Vernon
Staley Mfg. Co., A. E.	60	Tank	8,050g.	.....	.....	.....	.....	.....	Penn. Tank Car
Standard Oil Co.	6	Gondola	100,000	Steel	.....	Friktion	.....	.....	Mt. Vernon
Standard Oil of Ind.	500	Gondola	100,000	Steel	.....	Friktion	.....	.....	Mt. Vernon
Standard Plate Glass Co.	4	Gondola	140,000	Steel	.....	.....	.....	.....	Gen. American
	.....	.....	.....	.....	.....	.....	.....	.....	Standard Steel

*Not included in totals.

Purchaser	No.	Class	Capacity	Construc- tion	Weight	Draft gear	Trucks	Roofs	Builder
Standard Tin Plate Co.	3	Gondola	100,000	Steel	.....	.....	.....	.....	Pressed Steel
Struthers Furnace Co.	20	Hopper	140,000	Steel	.....	.....	.....	.....	Pressed Steel
	60	Hopper	110,000	Steel	.....	.....	.....	.....	Pressed Steel
Surry Lbr. Co.	35	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
Taylor, Lowenstein & Co.	5	Tank	80,000	St. and frame	.....	Cardwell	Metal	.....	Am. Car & Fdy.
Tenn. Coal, Iron & R. R. Co.	30	Coke	100,000	Steel	.....	.....	.....	.....	Pressed Steel
Texas Co.	400	Tank	80,000	Steel	39,000	Cardwell	Arch bar	.....	Geo. American
	400	Tank	80,000	Steel	45,000	Cardwell	Arch bar	.....	Gen. American
	11	Tank	100,000	Steel	45,500	Cardwell	Arch bar	.....	Penn. Tank Car
	52	Tank	100,000	Steel	42,000	Cardwell	Arch bar	.....	Penn. Tank Car
	137	Tank	100,000	Steel	43,000	Cardwell	Arch bar	.....	Penn. Tank Car
	139	Tank	80,000	Steel	40,000	Cardwell	Arch bar	.....	Kilby Car
Thayer Mfg. Co.	3	Logging	30,000	Wood	.....	.....	.....	.....	.....
Tidal Gasoline Co.	25	Tank	10,000g.	Steel	.....	Cardwell	Arch bar	.....	Std. Tank Car
	60	Tank	10,000g.	Steel	.....	Cardwell	Arch bar	.....	Gen. American
	65	Tank	8,000g.	Steel	.....	Cardwell	Arch bar	.....	Gen. American
	115	Tank	10,000g.	Steel	.....	Cardwell	Arch bar	.....	Gen. American
Tidewater Oil Co.	100	Tank	.....	.....	.....	.....	.....	.....	Gen. American
Tyler & Co.	5	Logging	80,000	Steel	.....	Spring	.....	.....	Bettendorf
	1	Box	100,000	Steel	.....	Spring	.....	.....	Bettendorf
Union Coal & Coke	250	Gondola	140,000	Steel	.....	.....	.....	.....	Cambrria
Union Coal & Coke Co.	3	Hopper	140,000	Steel	.....	.....	.....	.....	Cambrria
U. S. Stores Co.	11	Box	80,000	Steel frame	.....	Friction	.....	.....	Cambrria
Union Tank Car Co.	1,000	Tank	100,000	Steel	.....	Cardwell	Side frame cast steel	.....	Gen. American
	2,000	Tank	100,000	Steel	.....	Cardwell	Side frame cast steel	.....	Gen. American
	250	Tank	80,000	Steel	.....	Cardwell	Side frame cast steel	.....	Std. Tank Car
	450	Tank	100,000	Steel	.....	Cardwell	Side frame cast steel	.....	Sid. Tank Car
	200	Tank	80,000	Steel	.....	Cardwell	Side frame cast steel	.....	Penn. Tank Car
United Alloy Steel Co.	15	Gondola	100,000	Steel	.....	.....	.....	.....	Penn. Tank Car
Universal Steel Co.	2	Gondola	100,000	Steel	.....	.....	.....	.....	Pressed Steel
Walsh, J. R.	3	Tank	110,000	Steel	.....	.....	.....	.....	Penn. Tank Car
Warner Co., W. H.	150	Hopper	80,000	Steel	.....	.....	.....	.....	Pressed Steel
Warner-Quinlan Co.	50	Tank	100,000	Steel	40,000	Cardwell	Arch bar	.....	Am. Car & Fdy.
Waverly Oil Wks.	14	Tank	.....	.....	.....	.....	.....	.....	Penn. Tank Car
Western Oil Corp.	25	Tank	8,000g.	.....	.....	.....	.....	.....	Gen. American
Westmoreland Coal Co.	150	Hopper	.....	Steel	.....	Friction	.....	.....	Pressed Steel
West Va. Pulp & Paper Co.	25	Hopper	140,000	Steel	.....	.....	.....	.....	Pressed Steel
Weirton Steel Co.	2	Flat	200,000	Steel	.....	Westinghouse	Arch bar	.....	Pressed Steel
	240	Hopper	140,000	Steel	.....	Westinghouse	.....	.....	Standard Steel
Westinghouse Elec. & Mfg. Co.	1	Flat	150,000	Steel	.....	.....	.....	.....	Standard Steel
Westinghouse Elec.	3	Pump	.....	.....	.....	.....	.....	.....	Federal Equip't
	2	Transformer	150,000	Steel	46,200	.....	Cast steel	.....	Atlas Steel Car
	1	Transformer	190,000	Steel	46,200	.....	Cast steel	.....	Atlas Steel Car
	1	Well	150,000	Steel	.....	.....	.....	.....	Atlas Steel Car
West Va. Thr. Co.	20	Logging	40,000	Wood	.....	.....	.....	.....	Kilby Car
Whitaker-Glossner Co.	50	Gondola	100,000	Steel	.....	.....	.....	.....	Pressed Steel
	140	Hopper	110,000	Steel	.....	.....	.....	.....	Pressed Steel
Whiteville Lbr. Co.	5	Logging	40,000	Wood	.....	.....	.....	.....	Kilby Car
Whiting, Wm. S.	20	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
Williams Lbr. Co.	35	Logging	40,000	Wood	.....	.....	.....	.....	Kilby Car
Wilson & Co.	35	Refrig.	60,000	Wood	.....	.....	.....	.....	Standard Steel
Wilson Cypress Co.	15	Logging	60,000	Wood	.....	.....	.....	.....	Kilby Car
Winyal Lbr. Co.	6	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
Young & Co., J. S.	4	Tank	8,050g.	.....	.....	.....	.....	.....	Penn. Tank Car
Youngstown Sheet & Tube Co.	500	Hopper	140,000	Steel	.....	.....	.....	.....	Cambrria
Various Purchers.	1,573	Orders not reported in detail	.....	.....	.....	.....	.....	.....	Am. Car & Fdy.
	739	Orders not reported in detail	.....	.....	.....	.....	.....	.....	Fac. Car & Fdy.
	2,104	Orders not reported in detail	.....	.....	.....	.....	.....	.....	Gen. American

*Not included in totals.

Railroads and Other Companies in Canada

Canadian National	350	Ballast	100,000	Wood	43,200	Murray	Arch bar	.....	Hart-Otis
	650	Gondola	100,000	St. and frame	43,700	Universal	Arch bar	.....	Eastern
	1,500	Box	80,000	Steel frame	39,300	Miner	Arch bar	.....	National
	1,000	Box	80,000	Steel frame	39,300	Miner	Arch bar	.....	Can. Car & Fdy.
	5	Snow Flow	.....	.....	.....	.....	.....	.....	Eastern
	500	Refrig.	80,000	Wood	53,500	Miner	Simplex	.....	Can. Car & Fdy.
	150	Stock	60,000	Wood	.....	Miner	Simplex	.....	Can. Car & Fdy.
	80	Caboose	60,000	Wood	39,300	Miner	Simplex	.....	Can. Car & Fdy.
	20	Caboose	60,000	Wood	39,300	Miner	Simplex	.....	Preston
Canadian Pacific	500	Box	120,000	Steel frame	47,500	Murray	Arch bar	.....	Murphy
	5	Flat	80,000	Steel	44,000	Miner	.....	.....	Company shops
	500	Refrig.	60,000	St. and frame	61,000	Cardwell	Arch bar	.....	Murphy
	500	Auto	80,000	Steel frame	47,400	Cardwell	.....	.....	Company shops
	3,000	Box	120,000	Steel frame	47,500	Murray	Arch bar	.....	Murphy
Dominion Iron & Steel Co.	10	Service	100,000	Steel	.....	Friction	.....	.....	National and Can.
	30	Flat	100,000	Steel	.....	Friction	.....	.....	Eastern
Imperial Oil Co.	75	Tank	5,400g.	Steel	.....	.....	.....	.....	Can. Car & Fdy.
	100	Tank	8,400g.	Steel	.....	.....	.....	.....	Can. Car & Fdy.
	125	Tank	8,400g.	Steel	.....	.....	.....	.....	Can. Car & Fdy.
Grand Trunk	1,600	Auto	80,000	Steel frame	45,700	Miner	Arch bar	Hutchins	Can. Car & Fdy.
	1,000	Flat	100,000	Steel frame	35,300	Miner	.....	.....	National
Grand Trunk Pacific	500	Gondola	100,000	St. and frame	43,700	Universal	Arch bar	.....	Eastern
	100	Refrig.	80,000	Wood	53,500	Miner	Arch bar	.....	Can. Car & Fdy.
	200	Stock	60,000	Wood	37,200	Miner	Simplex	.....	Can. Car & Fdy.
Pacific Great Eastern	3	Caboose	.....	Wood	.....	Miner	.....	.....	Can. Car & Fdy.
Roberval-Saguenay	2	Flat	40,000	Wood	25,000	.....	.....	.....	.....

Export

Argentine State Rys.	250	Box	60,000	Wood	.....	.....	.....	.....	Standard Steel
Baldwin Loco. Works (for Cuba)	15	Gondola	60,000	Wood	.....	.....	.....	.....	Standard Steel
Benzuella Ry.	20	Gondola	70,000	Steel	.....	.....	.....	.....	Am. Car & Fdy.
Bianco & Bro.	10	Flat	60,000	St. frame	.....	.....	.....	.....	Pressed Steel
Burma Corporation	50	Ore	40,000	Steel	.....	.....	.....	.....	Kilby Car
Central Algodones (Cuba)	20	Box	60,000	Steel	.....	.....	.....	.....	Pressed Steel
Central Camaguey (Cuba)	15	Cane	50,000	.....	.....	.....	.....	.....	Maxor
Central Macaguay (Cuba)	10	Cane	.....	.....	.....	.....	.....	.....	Maxor
Central Romelie (Cuba)	10	Cane	.....	.....	.....	.....	.....	.....	Kilby Car
Central Santa Catalina	50	Cane	60,000	Steel	.....	.....	.....	.....	Maxor
Central Santa Maria (Cuba)	50	Cane	.....	.....	.....	.....	.....	.....	Kilby Car
Central Sofia Oriente	12	Cane	60,000	Steel	.....	.....	.....	.....	Standard Steel
Chile Exploration Co.	35	Tank	.....	.....	.....	.....	.....	.....	Am. Car & Fdy.
Cintas, O. B. (Cuba)	10	Flat	.....	.....	.....	.....	.....	.....	Am. Car & Fdy.
Cuba Cane Sugar Corp.	150	Cane	.....	.....	.....	.....	.....	.....	Maxor
	25	Box	60,000	Steel Supr.	.....	.....	.....	.....	Pressed Steel

Purchaser	No.	Class	Capacity	Construction	Weight	Draft gear	Trucks	Roofs	Builder
Cuba Northern Ry.	10	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
	15	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
	350	Box	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
	2	Cane	80,000	Wood	.....	Friction	.....	.....	Am. Car & Fdy.
Cuba R. R.	500	Box	80,000	Composite	29,500	Cardwell	Arch bar	Hutchbins	Am. Car & Fdy.
	50	Tank	100,000	Steel	.....	Cardwell	Arch bar	.....	Am. Car & Fdy.
F. C. de Amaga (Columbia)	6	Flat	40,000	Wood	.....	.....	.....	.....	Standard Steel
	6	Box	40,000	Wood	.....	.....	.....	.....	Standard Steel
	6	Gondola	40,000	Wood	.....	.....	.....	.....	Standard Steel
	10	Stock	40,000	Wood	.....	.....	.....	.....	Standard Steel
Fox Bros. & Co. (for Cuba)	100	Cane	.....	.....	.....	.....	.....	.....	Am. Car & Fdy.
Grace & Co., W. R.	23	Tank	8,050g.	.....	.....	.....	.....	.....	Ben. Tank Car
Havana Central	75	Hopper	80,000	Steel	.....	.....	.....	.....	Standard Steel
	200	Flat	60,000	Wood	.....	.....	.....	.....	Standard Steel
	300	Box	80,000	Wood	.....	.....	.....	.....	Standard Steel
	50	Box	30,000	Wood	.....	.....	.....	.....	Standard Steel
	50	Flat	30,000	Steel	.....	.....	.....	.....	Standard Steel
	100	Flat	80,000	Steel	.....	.....	.....	.....	Standard Steel
	300	Box	60,000	St. frame	.....	.....	.....	.....	Am. Car & Fdy.
	300	Flat	50,000	Wood	.....	.....	.....	.....	Am. Car & Fdy.
Howard Co., C. B.	4	Logging	30,000	Wood	.....	.....	.....	.....	Kilby Car
	7	Logging	40,000	Wood	.....	.....	.....	.....	Kilby Car
International Ry. Supply Co.	7	Tank	6,000g.	.....	.....	.....	.....	.....	Am. Car & Fdy.
	130	Cane	24,000	.....	.....	.....	.....	.....	National
	100	Cane	50,000	.....	.....	.....	.....	.....	Gregg Co.
	25	Flat	40,000	.....	.....	.....	.....	.....	Gregg Co.
Katanga Ry.	30	Ballast	70,000	Steel	.....	.....	.....	.....	Pressed Steel
	20	Gondola	70,000	Steel	.....	.....	.....	.....	Pressed Steel
	25	Box	70,000	Steel	.....	.....	.....	.....	Pressed Steel
	10	Box	40,000	Steel	.....	.....	.....	.....	Pressed Steel
	5	Tank	.....	Steel	.....	.....	.....	.....	Pressed Steel
	12	Stock	60,000	Wood	.....	.....	.....	.....	Pressed Steel
Liberty Export & Import Co.	100	Cane	60,000	Steel	.....	.....	.....	.....	Standard Steel
Matazzaro Co. (Brazil)	4	Tank	6,575g.	Steel	.....	.....	.....	.....	Standard Steel
Middleton & Co.	10	Cane	.....	.....	.....	.....	.....	.....	Magor
Mogyano Ry. (Brazil)	20	Und frs & trucks	.....	Steel	.....	.....	.....	.....	Standard Steel
National Rys. of Mexico	100	Tank	12,000g.	.....	.....	.....	.....	.....	Am. Car & Fdy.
Netherlands Gov't	60	Gondola	.....	Steel	.....	.....	.....	.....	Standard Steel
Northwestern of Brazil	150	Box	40,000	Wood	.....	.....	.....	.....	Standard Steel
Oller, Antonio (Cuba)	15	Tank	6,600g.	.....	.....	.....	.....	.....	Am. Tank Car
Ollivier y Cia, J. (Mexico)	3	Tank	10,109g.	.....	.....	.....	.....	.....	Penn. Tank Car
So. African Rys.	60	Cane	.....	.....	.....	.....	.....	.....	Am. Car & Fdy.
Standard Products Corp.	20	Caboose	.....	Wood	.....	.....	.....	.....	Standard Steel
Suchi Timber Co.	10	Logging	60,000	.....	.....	.....	.....	.....	Kilby Car & Fdy.
Trinidad Gov't Lines	30	Cane	.....	.....	.....	.....	.....	.....	Magor
United Fruit Co.	25	Ballast	.....	.....	.....	.....	.....	.....	Koppel
	30	Ballast	.....	.....	.....	.....	.....	.....	Am. Car & Fdy.
	10	Flat	.....	.....	.....	.....	.....	.....	Magor
	36	Banana	.....	.....	.....	.....	.....	.....	Magor
	3	Tank	5,000g.	.....	.....	.....	.....	.....	Gen. American
	50	Flat	50,000	.....	.....	.....	.....	.....	Magor
	300	Cane	.....	.....	.....	.....	.....	.....	Magor
	150	Cane	60,000	Composite	.....	.....	.....	.....	Pressed Steel
	3	Tank	5,000g.	Steel	.....	.....	.....	.....	Gen. American
United Rys. of Havana	300	Box	60,000	.....	.....	.....	.....	.....	Am. Car & Fdy.
	300	Flat	50,000	.....	.....	.....	.....	.....	Am. Car & Fdy.
Vanadium Corp. (for Peru)	12	Dump	.....	.....	.....	.....	.....	.....	Western Whl. Sc.
West Ind. Fin. Corp.	250	Cane	40,000	.....	.....	.....	.....	.....	Magor
	45	Flat	.....	.....	.....	.....	.....	.....	Am. Car & Fdy.
	1	Tank	8,000g.	Steel	.....	.....	.....	.....	Gen. American
Various foreign purchasers	3,243	Orders not reported in detail.	Am. Car & Fdy.



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A Scene at East Chicago



An Abandoned Southern Line

Railway Lines Abandoned During the Year 1920

Operation Was Discontinued on a Mileage Greatly Exceeding the Amount Built in the Same Period

FOR THE YEAR 1920, 535 miles of main line railways were abandoned for operation in the United States and about 35 miles in Canada. To this amount should be added a total of 178 miles of main line track upon which operation was discontinued or suspended during the latter part of 1919, notice of which, however, was received too late to be included in the tabulated data for that year. This mileage in addition to that abandoned for the year 1920 brings up the total miles abandoned since the last annual compilation to 713 miles, some 24 miles greater than that for 1919, but what is more to the point, some 400 miles more than was constructed during the same period. In other words, the lines abandoned exceed the new construction in the ratio of over two to one.

Of the total mileage abandoned for operation, slightly over 239 miles were given up completely, the equipment sold and the lines taken up or junked. Of the remaining approximately 474 miles, operation was discontinued either permanently or temporarily and in many instances petitions have been made to dismantle the roads. The mileage abandoned in Canada was greater than that reported for 1919; all of it was abandoned permanently and the lines were taken up during 1920. An interesting sidelight on this is that about 90 per cent of the abandoned mileage was on the Great Northern lines through British Columbia.

In contrast to previous years none of the so-called short lines of from 75 to 100 miles or more in length were abandoned completely and junked, the largest one being the Ocean Shore. This road operated two lines, one 38 miles long between San Francisco, Calif., and Tunitas, and the other 15.5 miles long between Swanton, Calif., and Santa

Cruz, all of which was dismantled. Following that in size is the Denver, Boulder & Western operating lines from Boulder, Colo., to Eldora and from Sunset, Colo., to Ward, totaling 46 miles. Actual operation ceased on this road on August 6, 1919.

Among the lines upon which operation was discontinued but which have not been dismantled and are not very likely to be are the Illinois Southern with 136 miles of line and the Kansas City Northern with 170 miles. The first-named road has been recently resold to parties as yet unknown who expect to operate it in the near future—probably in 1921. The Kansas City Northwestern discontinued operation on November 1, 1919, because of the "shortage of coal and other financial difficulties" and it is not unlikely that under better business conditions and under the new rates operation may be resumed in the future. With the exception of these two roads, which are more temporary than permanent abandonments, a comparison of the lines discontinued or dismantled between the years 1919 and 1920 brings out an important difference.

Outside of a few roads the abandonments during the year 1919 covered practically the entire mileage of the lines listed while in 1920 the tabulation shows that in general the tendency of the year has been towards the abandonment of small sections or short extensions of existing lines, in many instances parts of Class 1 roads. In other words, during 1919, and for that matter previous years, the tendency of the country has been towards the wiping out of the smaller lines which proved to have been built in unprofitable locations or under uneconomic conditions. In contrast to this, 1920 indicates a movement towards the tightening up and the weeding out of

THE MILEAGE of the lines upon which operation was abandoned during 1920 greatly exceeds the number of miles of new track built.

The greater part of the mileage abandoned was in the middle and far west.

During the last four years operation has been discontinued on over 1,300 more miles of line than have been built.

Generally speaking, the mileage abandoned in 1920 covered unprofitable lines which never should have been built.

the unnecessary short sections or branches, etc., in order that operating expenses may be kept a minimum.

Another significant point may be noted if the tabulation is studied from a geographical standpoint, i. e., that the greater part of the mileage abandoned lies chiefly in the central west and west, that is, in the states bordering on or lying close to the Mississippi river, from the Gulf to the Lakes and from there west to the Pacific coast. The mileage abandoned in New England and the South Atlantic states was practically negligible—a distinct contrast to the results of 1919 when 255 miles were abandoned in the South Atlantic states and about 28 miles in New England out of a total of 689 miles, the balance of which was scattered generally throughout the country. This factor, in connection with the tendency shown by the marked decrease in the abandonments of entire roads, would seem to indicate that the railway mileage of the United States has about reached the point where future "deflation" will not be so marked or so extreme. This is borne out somewhat by the decrease in the mileage annually abandoned from 1917 to 1919 inclusive; while the figure for 1920 is slightly higher than that for 1919 the fact must not be overlooked that it includes such items as the Illinois Southern, upon which operation will undoubtedly be resumed in the future.

The year 1920 is the fourth one in which our records have shown the mileage abandoned to exceed the mileage of new lines built. Since 1917 there have been 4,032 miles abandoned as against about 2,700 miles of new construction placed in service. Thus there has been a decrease of approximately 1,332 miles in which are included about 225 miles of line abandoned temporarily in 1918 through consolidation under government control as a part of the policy of the Railroad Administration in co-ordinating parallel lines. Some of this mileage no doubt has since been placed in service. Even with that taken into account the figure is distinctive for it shows how markedly the mileage of the railways of the country has decreased, yet it cannot be taken in any sense as an indication of a surplus of mileage for the United States as a whole. It is rather, or at least it would seem to be, a realization of the uneconomic position of various short lines, branches and extensions, and if anything points toward a paving of the way for a more sound and substantial policy for future lines and extensions.

United States	Lines abandoned permanently and taken up. Miles	Lines abandoned and not taken up. Miles
ARKANSAS & LOUISIANA, MISSOURI— Rolf Junction, Ark., to Hamburg.....	.....	8.80*
*Application made to abandon line.		
ATCHISON, TOPEKA & SANTA FE—COAST LINES— Poland Junction, Ariz., to Poland.....	5.90	.....
BELLFONTE CENTRAL— Pine Grove Mills, Pa., to 1/2-mile west of Strubles Station.....	3.00	.....
CENTRAL OF GEORGIA— Lyerly, Ga., to Woodyard.....	4.02	.....
CHICAGO, MILWAUKEE & ST. PETERSBURG— Magenta, Wis., to Central Junction.....	11.15	.....
Coleman, Idaho, to Clagstone Junction.....	6.15	.....
CHICAGO, ROCK ISLAND & PACIFIC— Briark, Ark., to Hopefield.....	2.07	.....
Watonga, Okla., to Greenfield Junction.....	6.31	.....
DENVER, BOULDER & WESTERN— Boulder to Eldora, Colo.....	33.00	.....
Sunset to Ward, Colo.....	13.00	.....
GOVERNMENT RAILROAD IN ALASKA— Chena Junction, Alaska, to Chena.....	5.00	.....
ILLINOIS MIDLAND— Millington, Ill., to Newark.....	2.50	.....
ILLINOIS SOUTHERN— Salem, Ill., to Bismarck, Mo.....	139.65	.....
KENTWOOD & EASTERN— Miles post 24 to Kaneo, La.....	1.39	.....
LAKE CHARLES RAILWAY & NAVIGATION CO.— Edna, La., to Kinder.....	7.00	.....
LAWRENCEVILLE BRANCH— Lawrenceville, Ga., to Suwanee.....	10.00	.....
MENCKLER SOUTHERN— Sabine to Lumer, Cal.....	1.00	.....
MISSOURI SOUTHERN— Spur line at Dairyville, Mo.....	5.00	.....
NAME, CARSON & SOUTHERN— Morrison to Galloway, La.....	4.50	.....
NEWPORT & SHERMAN VALLEY— Newport, Pa., to Bloomfield Junction.....	8.00	.....

NORFOLK & WESTERN— Shenandoah Ore branch (Va.).....	1.00	.....
Pericoinkla branch (Va.).....	1.35	.....
Indian Creek branch (Va.).....	0.78	.....
NORTHERN DAKOTA— Edinburgh, N. Dak., to Concrete.....	20.00	.....
OCEAN SHORE RAILROAD— San Francisco, Calif., to Tunitas.....	38.00	.....
Swanton, Calif., to Santa Cruz.....	15.50	.....
ORANGEBURGH RAILWAY— North, S. C., to Orangeburgh.....	16.80	.....
OUACHITA VALLEY— Millville, Ark., to Artesian.....	28.00	.....
PATRO VALLEY CONSOLIDATED— Near Oudry to Bardin, Calif.....	1.33	.....
RIVIERA, BEACH & WESTERN— Riviera Beach, Tex., to Riviera.....	9.86	.....
SAN ANTONIO SOUTHERN— Macon, Tex., to Kirk.....	3.50	.....
SOUTHERN UTAH— Provo, Utah to Hiawatha.....	17.90	.....
SOUTH FLORIDA & GULF— Kendensville, Fla., to Bassenger.....	26.00	.....
SPOKANE & BRITISH COLUMBIA— Republic, Wash., to Danville.....	36.30	.....
UNITED VERDE & PACIFIC— Jerome Junction, Ariz., to Jerome.....	26.26	.....
WEST VIRGINIA MIDLAND— Long Run, W. Va., to Parkers.....	3.50	.....
WILLACOCHEE & DU PONT— Lex, Ga., to Willacoochee.....	12.00	.....
.....	239.61	295.91
Canada		
CANADIAN GOVERNMENT— Charlotte, Que., to Ste Rosalie.....	4.51	.....
GREAT NORTHERN— Vancouver, Victoria & Eastern.....	.....	.....
Weston, B. C., to Grandby Smelter.....	3.74	.....
Copper Junction to Phoenix.....	25.82	.....
.....	34.07	.....

Lines abandoned in 1919, but received too late for inclusion in report for that year

United States	Lines abandoned permanently and not taken up. Miles	Lines abandoned and not taken up. Miles
KANSAS CITY NORTHWESTERN.....	170.00
NEW BERLIN & WINFIELD.....	8.00
.....	178.00



Photo from Keystone View Co., Inc., N. Y.

A Landslide on the Central Railway of Peru



South End of the Cedar Hill Yards of the New Haven

New Construction Conspicuous by Its Absence

Low Record Established for New Mileage Built in 1920—Old Improvements Still Under Way

THE MILEAGE not only of new railway lines, but of additional second and other multiple main tracks built in the United States during the year 1920, took a tremendous though not altogether unexpected slump, reaching a low mark that will in all probability stand as the low record for a long time. During 1920 only 313.71 miles of first track were completed as compared to 685.98 miles in 1919, while the total completed mileages (first, second and other multiple main tracks) for the two years were 414.35 and 1,135.68, respectively; in 1920 it was therefore less than one-half of what in 1919 was considered a very low record for either new lines or completed mileages. The most important decrease, however, or at least the one having the most bearing upon the operating efficiency of the roads was that concerned with the construction of second, third and other main track. For second track this fell from 681.55 miles in 1918 and 405.32 in 1919 to but 90.87 for 1920. Only 1.89 miles of third track were built as compared with 76.95 in 1918 and 27.54 in 1919. The decrease in the construction of other main track was equally as marked.

In Canada there was some decrease in total mileage constructed as compared to the year 1919, but a considerable increase over that for the years 1917 and 1918. During 1920, 305.39 miles of new lines and 31.60 miles of second track were built, or a total of 336.99—but very little less than the mileage of new construction in the United States. While lower than the 442.46 miles of 1919, it indicates a resumption of the policy of expansion which the Canadian roads have been following in tapping and building up new sections of the country. Canada in many ways is yet an undeveloped country and as a result

railroad construction has since 1904 followed somewhat along the lines of the development in this country from 1895 to 1907—though, of course, on a smaller scale. Since 1913 construction of new lines both in the United States and Canada has fallen off rapidly, reaching its probable bottom for Canada in 1918. While the 1920 work is below the pre-war average, it does, in connection with that of 1919, mark the resumption of construction activities in Canada.

Of the mileage of new lines built in the United States during the year no one project has been of any great size. The largest single item is that of the Government Railway of Alaska, which completed 37 additional miles—practically the only item at all corresponding to the more or less pioneer work of the old days. Next in size was the mileage completed by the Cisco & North-eastern and the Ringling, Eastern & Gulf, with 28 and 26.6 miles, respectively, the total of the two—54.60 miles—comprising practically the entire mileage of new lines for the state of Texas.

Texas, with 54.90, and California, with 54.74 miles, were the only states with any outstanding new track, comparatively speaking, which is unlike the development of the year previous; in that year sections that showed increases were found to be coal, ore and oil territories. It is therefore not unlikely that the construction of new lines in these two states was a result of the development in the southwestern oil fields, the need for which outweighed other financial considerations, such as high building costs, etc.

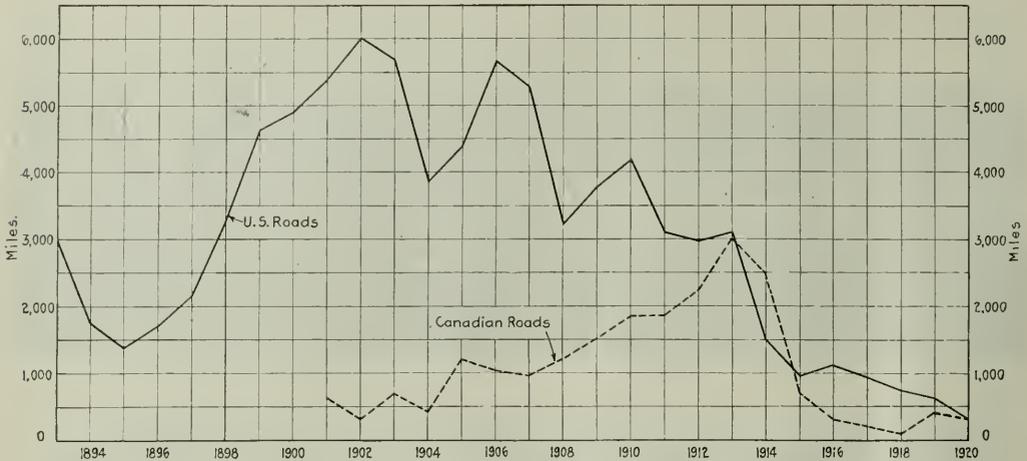
It is interesting to note, in comparing the construction of new lines in both the United States and Canada, the various items listed under "Other Important Work Under Construc-

MILEAGE of new lines in the United States is less than half of that for the previous year, creating a new and exceptionally low mark.

Multiple main track construction practically ceased entirely.

Canadian roads continue to build numerous branches though mileage is still below normal.

Renewal and continuation of unfinished development programs tendency of the year. Work is concerned chiefly with small projects to increase operating capacity.



Curves of Mileage Built in the United States and Canada Since 1893

tion." Few new lines of any size are being started or are now under way, these projects being confined chiefly to short extensions or branch lines in the United States, while in Canada there are numerous branch lines underway ranging from 25 up to 135 miles in length and located chiefly in the middle and far west.

While the construction of new lines in this country has been on a gradual decline since 1901, the most marked fall has been since 1913; undoubtedly this was largely due to

control, and with an administration unwilling to authorize any new work, yet practically sure of being returned to private ownership. This in connection with the hesitation and delay in ordering material or authorizing new work during the guarantee period after the return to private ownership and financial conditions caused almost a cessation of new work. Second and other multiple track fell to a total of but 100.64 miles, of which over 60 per cent was contained in the two states of Illinois and Ohio; this was

NEW TRACK BUILT IN 1920

UNITED STATES—	No. Cos.	MILES				Total
		First building track	Second track	Third track	Fourth or more track	
Alaska	1	37.00				37.00
Arizona	1	5.00				5.00
Arkansas	2	9.00				9.00
California	5	54.74				54.74
Colorado	1		1.10			1.10
Florida	2	12.20				12.20
Georgia	2	5.00				5.00
Illinois	1	2.00	36.54			38.54
Kansas	1	0.50				0.50
Kentucky	4	19.87		1.80		21.67
Louisiana	3	31.15				31.15
Maryland	1	2.72				2.72
Michigan	1		0.50			0.50
Mississippi	1	9.52				9.52
Missouri	2	0.86	11.85			12.71
New Jersey	2	1.97	2.24		1.74	5.95
New Mexico	1	9.00				9.00
New York	1	1.46	1.46			2.92
Ohio	1	1.35	27.24	0.09	5.99	34.67
Oklahoma	2	18.00				18.00
Oregon	4	8.60				8.60
Pennsylvania	4	6.12	0.39		0.15	6.66
Tennessee	1	2.50				2.50
Texas	3	54.90	1.70			56.60
Utah	1	3.60				3.60
Virginia	1	0.20				0.20
West Virginia	3	16.45	1.75			18.20
Wisconsin	1		6.10			6.10
Total	53	313.71	90.87	1.89	7.88	414.35
CANADA	7	305.39	31.60			336.99

NEW TRACK BUILT IN 1919

UNITED STATES—	No. Cos.	MILES				Total
		First building track	Second track	Third track	Fourth or more track	
Alabama	2	11.50	29.70			41.20
Arizona	4	32.40	3.13			35.53
Arkansas	1	2.00				2.00
California	2	69.29				69.29
Colorado	1		20.00			20.00
Delaware	1		8.00			8.00
Florida	1	17.60				17.60
Georgia	2	14.00	12.64			26.64
Idaho	1	4.00				4.00
Illinois	1	6.50	7.81			14.31
Indiana	1		9.00			9.00
Iowa	1		7.75			7.75
Kansas	2	35.34	48.97	5.64		89.95
Kentucky	4	48.94	30.55			79.49
Louisiana	1	.39				.39
Maine	1	.50				.50
Maryland	1	.75				.75
Mississippi	3	62.50				62.50
Nevada	1	2.26				2.26
New Jersey	2	2.62		21.90	13.40	37.92
North Carolina	1		41.00			41.00
Ohio	1	4.08			3.44	7.52
Oklahoma	4	91.60	7.05			98.65
Oregon	3	51.90				51.90
Pennsylvania	2	36.68	6.98			43.66
South Carolina	1		86.35			86.35
Tennessee	2	23.50	23.36			46.86
Texas	3	86.00	10.50			96.50
Utah	1	10.50	15.82			26.32
Virginia	1	42.00				42.00
West Virginia	2	24.00				24.00
Wyoming	1	4.38	44.46			48.84
Totals	54	685.98	405.32	27.54	16.84	1,135.68
CANADA	6	433.31	9.15			442.46

the world war, at least up to and including 1918. From the time when the Railroad Administration policies began to be put in action, the development tended more toward intensive development rather than extensive. As a result of this, second and other multiple track were built, even though new lines were not being constructed.

With the advent of the year 1920, the roads found themselves in an uncertain condition—still under government

built chiefly in short sections by the Illinois Central and the Cleveland, Cincinnati, Chicago & St. Louis. The maximum length of any one section of double track work was 13 miles.

In general, construction work has been limited to such facilities as were absolutely needed to conduct operation. Practically no new work of any magnitude was inaugurated with perhaps a few exceptions of which the Clarendon rail

and deep water terminal of the Lehigh Valley at the Port of New York is probably the largest. Considerable work involving heavy expenditures was underway or completed during 1920, but it consisted of large projects started before government control on which progress had been curtailed and on which the work was authorized to be continued or work which was started under federal control. Typical examples of this class include such projects as the New Haven terminal program covering Boston; Cedar Hill

As to bridges, little was done outside of making needed repairs and strengthening existing structures for the use of heavier power. Under new construction such structures as the Allegheny river bridge of the Baltimore & Ohio and the Harrisburg bridge of the Philadelphia & Reading. Grade separation has likewise suffered and outside of some carried over projects practically nothing has been done. Grade reductions, passenger terminal work, etc., have also suffered in much the same manner and with the exception of the St. Paul (Minn.) station, new passenger terminal work of any magnitude has been at a standstill, though such projects as the Indianapolis (Ind.) work still under way and the Union station improvements at Chicago, now in progress must be considered in passing.

As a whole, the work underway or completed during 1920, when considered from the viewpoint of the decreased value of the dollar during that period, has been the smallest for a great number of years and its effect so far as bringing about any immediate or future operating economies has been even less. With the passing of the war and its accompanying government control, the roads have been left in a sadly depleted condition. What the year 1921 will bring in the way of actual new construction is still an open question; the outcome and the corresponding volume of work will depend upon future financial considerations all hinging largely on the results of the new rates. There is no question but that there is a great need for a widespread and extensive program of construction, and since in all probability the rates will prove ample there should, and no doubt will be, a far larger construction program inaugurated during 1921 than the country has seen for the past three or four years.

MILES OF NEW LINE COMPLETED IN THE UNITED STATES SINCE 1894

1895.....	1,4-0	1908.....	3,214
1896.....	1,692	1909.....	4,748
1897.....	2,109	1910.....	4,122
1898.....	3,265	1911.....	3,066
1899.....	5,569	1912.....	2,997
1900.....	4,894	1913.....	3,011
1901.....	5,368	1914.....	1,532
1902.....	6,026	1915.....	935
1903.....	5,652	1916.....	1,098
1904.....	3,832	1917.....	979
1905.....	4,388	1918.....	721
1906.....	5,623	1919.....	686
1907.....	5,213	1920.....	314

and Providence, and the Chicago freight terminal of the Chicago & Alton.

The larger part of the work has, however, been restricted to the most needed improvements which would effect temporary increases in the facilities for handling the greatly increased traffic of the year rather than any extensive work designed to bring about future operating economies. This is indicated by the number of small improvements varying from \$100,000 to \$200,000 in cost and covering such work as additions to engine houses, yards, freight house extensions, etc.

Railroad Construction in the United States in 1920

Alton & Southern

First Track: Madison, Ill., to Illinois Traction Crossing, 2 miles.

Americus & Atlantic

First Track: Flint River, Ga., to Methvins, 3 miles.

Other Important Work Under Construction: Building from Methvins, Ga., to Americus, 11 miles, railway forces doing the work.

Arizona Eastern

First Track: Avondale, Ariz., to Litchfield, 5 miles.

Atchison, Topeka & Santa Fe

First Track: Oil Junction, Cal., to Landco, 2.82 miles.

Second Track: On Western lines.—At La Junta, Colo., 1.10 miles.

Other Important Work Under Construction: On Eastern lines.—Subway extension at Emporia, Kans., cost \$200,947, completed; bridge renewal between Akron, O., and Winfield, cost \$134,454, 25 per cent completed; viaduct at Argentine, Kans., cost \$188,241, 50 per cent completed; reinforced concrete dock, at Chicago, Ill., cost \$161,189, completed. On Western lines.—Machine shop at Albuquerque, N. M., cost \$1,409,557, 30 per cent completed. On Coast Lines.—Improvements to bridge 194-A on Albuquerque division, cost \$197,954, completed. On Panhandle, Santa Fe.—Addition to roundhouse, Amarillo, Tex., cost \$138,827, 10 per cent completed.

Atlantic Coast Line

Other Important Work Under Construction: Building from Goodno, Fla., to Imokalee, 26 miles, company's forces doing the work; yard improvements at South Rocky Mountain, N. C., cost \$114,000, 80 per cent completed.

Baltimore & Ohio

Other Important Work Under Construction: Renewal of roof at west end of Fairmount Park tunnel, Philadelphia, Pa., cost \$275,000, 50 per cent completed; purchase and remodeling office building Baltimore, Md., cost \$777,000, completed; revision of Locust Point branch and reconstruction of yard in connection with construction of an industrial plant, cost \$795,000, 40 per cent completed; installation of trimmers on coal pier, Curtis Bay, Md., cost \$138,000, completed; elimination of grade crossing at Claysville, Pa., cost \$153,000, completed; reconstruction of bridge over Allegheny river, Pittsburgh, Pa., cost \$2,110,000, 80 per cent completed; installation of 80 foot turntable, Allegheny, Pa., cost \$100,000, completed; relocation of main line and reconstruction of yard in connection with enlargement of an industrial plant at Girard, Ohio, cost \$336,000, 95 per cent completed; construction of concrete arch and filling of old bridge, Painesville, Ohio, cost \$102,000, completed; enlargement of engine house, South Chicago, Ill., cost \$176,300, completed.

Baltimore & Ohio Chicago Terminal

Other Important Work Under Construction: Track elevation 68th street and 39th street, Chicago, cost \$2,000,000, 25 per cent completed.

Baltimore & Ohio South Western

Other Important Work Under Construction: Reconstruction of bridge over Big Miami river, Lawrenceburg, Ind., cost \$1,980,000, 15 per cent completed.

Big Sandy & Kentucky River

First Track: From near Riceville, Ky., to Sublett, 8 miles.

Other Important Work Under Construction: Building from near Sublett, Ky., to the mouth of Laurel Fork of Oakley Creek in Magoffin county, 4 miles. Contractors: Howard Brothers, Sublett, Ky.

Boston & Albany

Other Important Work Under Construction: Renewal of bridge at Westfield, Mass., cost \$250,000, completed; reconstruction of drawbridge at Chelsea, Mass., cost \$800,000, completed.

California Southern

First Track: Blvthe, Cal., to Ripley, 8 miles.

Central New England

Other Important Work Under Construction: Coal and water station at Hopewell Junction, N. Y., cost \$112,650, 98 per cent completed.

Central of Georgia

Other Important Work Under Construction: Reinforcing concrete roundhouse at Columbus, Ga., cost \$506,000, 3 per cent completed; freight station at Macon, Ga., cost \$163,000, completed.

Central of New Jersey

Other Important Work Under Construction: Renewal of bridge 214, East Rahway, N. J., cost \$222,000, 25 per cent completed; bridge 217, Maurer, N. J., cost \$375,000, 7 per cent completed.

Chartiers Southern Railway

First Track: Crucible, Pa., to Nemaacolin, 5.35 miles.

Chesapeake & Ohio

First Track: Man to Gillert (W. Va.) line, 7.20 miles.

Second Track: Logan to Stollings, W. Va., 1.75 miles.

Third Track: Big Sandy Junction, Ky., to Russell, 1.80 miles.

Chicago & Alton

Second Track: Nilwood, Ill., to Biersd, 4.37 miles.

Other Important Work Under Construction: Freight terminal, Chicago, Ill., cost \$2,600,000, 50 per cent completed.

Chicago & North Western

Other Important Work Under Construction: Bridge construction at Maywood, Ill., cost \$140,000, completed; steel and concrete viaduct at Orleans St., Chicago, cost \$800,000, completed; additional storage bins at

Calumet Terminal elevator, South Chicago, cost \$800,000, completed; bridge construction at Lick, Ill., cost \$130,000, 75 per cent completed; passenger station facilities at Clinton, Iowa, cost \$260,000, completed; bridge construction at Mankato, Minn., cost \$125,000, completed.

Chicago, Burlington & Quincy

Second Track: Ayres, Ill., to Durley, 5.17 miles.

Other Important Work Under Construction: Elevation and realignment of main tracks, Aurora, Ill., cost \$5,000,000, 75 per cent completed; freight transfer facilities at Morton Park, Ill., cost \$238,000, completed; new engine terminal facilities, Galesburg, Ill., cost \$300,000, completed; new engine terminal at Pacific Junction, Iowa, cost \$100,000, completed; grain elevator at Murray, Mo., cost \$450,000, completed.

Chicago, Indianapolis & Louisville

Other Important Work Under Construction: Brick car repair shop, LaFayette, Ind., cost \$175,000, to be completed by March, 1921.

Chicago, Milwaukee & St. Paul

Other Important Work Under Construction: Extension to yard at Aberdeen, S. Dak., cost \$325,000, completed; new yard at Mitchell, S. Dak., cost \$175,000, completed; water supply and treating plants in South Dakota, cost \$300,000, 75 per cent completed.

Chicago, Rock Island & Pacific

Other Important Work Under Construction: Office building, Chicago, cost \$100,000, 75 per cent completed.

Chicago, St. Paul, Minneapolis & Omaha

Other Important Work Under Construction: Freight house facilities at Sioux Falls, S. Dak., cost \$111,396, 50 per cent completed.

Chicago Union Station

Other Important Work Under Construction: Station facilities, Chicago, Ill., from Roosevelt Road on the south to Canal and Kinzie street on the north, Canal street on the west to Chicago river on the east; work expected to be completed in 1923.

Cisco & Northeastern

First Track: Cisco, Tex., to Breckenridge, 28 miles.

Cleveland, Cincinnati, Chicago & St. Louis

Second Track: Lamb, Ohio, to Ansonia, 17 miles.

Other Important Work Under Construction: Yard extension at Mattoon, Ill., cost \$115,000, 55 per cent completed; new freight house at Muncie, Ind., cost \$135,000, 90 per cent completed; second track and relocation work, Augusta, Ind., to Whitestown, grading and bridges, completed, cost \$1,160,000, 60 per cent completed.

Cornwall Railroad

Other Important Work Under Construction: Locomotive erecting and machine shop at Lehanon, Pa., also boiler house, cost \$140,000; 40 per cent completed.

Delaware & Hudson

Other Important Work Under Construction: New third track, Schenectady, N. Y., to Richmondville Summit, 12.50 miles, including reduction of grade on north throughville, cost \$1,000,000, 70 per cent completed.

Delaware, Lackawanna & Western

Other Important Work Under Construction: Grade crossing elimination, Sanford's Crossing, Kearney, N. J., cost \$305,000, 85 per cent completed; engine terminal improvements, Port Morris, N. J., cost \$182,000, 70 per cent completed; engine terminal improvements at Seacaucus, N. J., cost \$179,000, 60 per cent completed; new powerhouse, Hoboken, N. J., cost \$139,000, 40 per cent completed; additions to passenger station, Scranton, Pa., cost \$195,367, 30 per cent completed; elimination of grade crossing, Elmhurst, Pa., cost \$112,178, completed; renewal of bridge at mile post 293.56, Avoca, N. Y., cost \$111,817, completed.

Donora Southern

Other Important Work Under Construction: New yard and additional trackage at Donora, Pa., joint operation with the Pennsylvania Railroad, cost \$130,000, 16 per cent completed. Work held up pending action of Pennsylvania Railroad.

East Erie Commercial Railroad

Other Important Work Under Construction: Grade separation at Water street in Westerville, Pa., cost \$235,000, 25 per cent completed.

Erie Railroad

Other Important Work Under Construction: Renewal of draw-bridge over Passaic river, Newark, N. J., cost \$600,000, 40 per cent completed; construction of fruit market and track facilities, Newark, N. J., cost \$122,000, completed.

Fernwood, Columbia & Gulf

First Track: Kokomo, Miss., to Foxworth, 9.52 miles.

Florida East Coast

Other Important Work Under Construction: Freight house at Miami, Fla., cost \$125,000, 50 per cent completed.

Fort Worth & Denver City

Second Track: At Wichita Falls, Tex., 1 mile.

Other Important Work Under Construction: Freight yard at Fort Worth, Tex., cost \$140,000, 20 per cent completed.

Fort Worth & Rio Grande

Other Important Work Under Construction: New terminal, including

new yard and mechanical facilities, at Dublin, Tex., cost \$250,000, track, 75 per cent completed, mechanical facilities, 25 per cent completed.

Government Railroad in Alaska

First Track: Mile post 238 to mile post 275, 37 miles.

Other Important Work Under Construction: Building from mile post 275 to mile post 358, 81 miles; reconstruction of bridges and trestles between Seward, and Anchorage, cost \$252,400, completed; 1,559 lineal ft. of snow sheds between Seward, and Anchorage, cost \$195,700, completed; raising track, etc., between Seward, and mile post 238, cost \$223,500, completed.

Grand Prairie Branch Railroad

First Track: In Arkansas, not specified, 1 mile.

Great Northern

Other Important Work Under Construction: Twelve mechanical coal chutes, 10 of which are at Spokane, Wash., cost \$306,410, 90 per cent completed; additional yard tracks at Hillyard, Wash., cost \$315,185, and at Allouez, Wis., cost \$115,000, both completed; open dock at Smith's Cove, Seattle, Wash., cost \$161,000, completed; rebuilding part of ore dock No. 3 and approach to ore dock No. 1 at Allouez, Wis., cost \$1,558,000, to be completed by May, 1921; machine shop extension at Whitefish, Mont., cost \$117,720, completed; car repair sheds at Williston, N. Dak., cost \$112,300, completed, and at Grand Forks, N. Dak., cost \$103,500, completed; bridge at Como and 10th avenue, Minneapolis, Minn., cost \$160,400, 2 per cent completed; filling in two bridges in North Dakota, one to cost \$131,940, and the other \$110,200, completed; lining tunnel 'on Billings line, cost \$109,650, completed.

Gulf, Colorado & Santa Fe

Other Important Work Under Construction: Reconstruction of causeway at Galveston, Tex., work started in 1917, cost \$307,839, 83 per cent completed.

Hocking Valley

Second Track: Meredith, Ohio, to Owens, 9 miles.

Other Important Work Under Construction: Scioto River Channel improvement includes two additional spans to each of two bridges at Columbus, Ohio, cost \$200,000, completed.

Illinois Central

Second Track: Clinton, Ill., to Heyworth, 8.40 miles; Amboy, Ill., to Sublett, 5.60 miles; Peotone, Ill., to Tucker, 13 miles.

Other Important Work Under Construction: Yard extension, Freeport, Ill., cost \$137,000, completed; new passenger and freight station at Centralia, Ill., cost \$298,870, completed; new bridge at Dixon, Ill., cost \$268,210, completed.

Indianapolis Union Railway

Other Important Work Under Construction: Elevation of train shed and tracks in Indianapolis, Ind., cost \$8,000,000, 80 per cent completed.

Kanawah, Glen Jean & Eastern

First Track: Mt. Hope, W. Va., to Lee, 1.25 miles.

Kansas & Oklahoma

First Track: At Liberal, Kan., 0.50 miles.

Other Important Work Under Construction: Building from Forgan, Okla., to Liberal, Kan., 25 miles, contractors: Strickland & Smedley, Forgan, Okla.

Kansas City Terminal

Other Important Work Under Construction: Holmes street viaduct, Kansas City, Mo., cost \$245,000, 56 per cent completed; Fifteenth street subway, Kansas City, Mo., cost \$447,000, 78 per cent completed; passenger station, Seventh street, Kansas City, Kan., cost \$145,000, 10 per cent completed.

Kentucky & Tennessee

First Track: In Kentucky, not specified, 1 mile.

Other Important Work Under Construction: Building in Kentucky from mile post 17.5 to mile post 27, 9.50 miles.

Lake Erie & Eastern

First Track: Brier Hill (Youngstown, O.) to M. Y. Tower, 1.35 miles.

Second Track: Brier Hill (Youngstown, O.) to M. Y. Tower, 1.24 miles. *Other Important Work Under Construction:* Raising South avenue bridge, changing streets, etc., Youngstown, O., cost \$400,000, completed.

Leesville, Slagle & Eastern

First Track: Slagle, La., to Leesville, 10.35 miles.

Lehigh Valley

First Track: In New Jersey at end of Raritan branch, 0.31 miles; from connection with main line at Bayonne, N. J., to end of branch 1.11 miles; at North Wilkes-Barre, Pa., 0.07 miles.

Other Important Work Under Construction: Construction of first unit of a new rail and deep water terminal, Jersey City, N. J., 25 per cent completed; new engine terminal at Ashmore, Pa., completed.

Live Oak Perry & Gulf

First Track: In Florida from mile post 65 to mile post 68½, 3.50 miles.

Other Important Work Under Construction: Building in Florida from mile post 68½ to mile post 72½, 4 miles. J. C. Donohov, Jacksonville, Fla., has contract for grading, and company's force will construct bridges and lay tracks.

Long Fork

First Track: From Clear Creek, Ky., to coal mine, 4 miles.

Other Important Work Under Construction: Building from Jack's Creek, Ky., to Coal Mine, 1.65 miles; contractors Blue River Elkhorn Fuel Company.

Louisville & Nashville

First Track: Hamdin, Ky., to Yellow Creek, 6.87 miles.

Other Important Work Under Construction: Mechanical coaling plant, Corbin, Ky., cost \$125,000, 50 per cent completed; yard and mechanical facilities, Loyal, Ky., cost \$600,000, 10 per cent completed; mechanical facilities, Hazard, Ky., cost \$480,000, 5 per cent completed.

Manufacturers Railway

First Track: At St. Louis, Mo., 0.36 miles.

Second Track: At St. Louis, Mo., 0.65 miles.

Michigan Central

Second Track: In Michigan from Detroit Belt Line, 0.50 miles.

Other Important Work Under Construction: Reconstructing bridge over River Rouge at Detroit, Mich., joint expense of Michigan Central and New York Central, cost \$500,000, 95 per cent completed; grade separation, Detroit, Mich., to River Rouge, joint expense Michigan Central, New York Central, Wabash, and Pere Marquette, cost \$1,500,000, 20 per cent completed.

Minckler Southern

First Track: Porterville Cal., to Ducor, 12.07 miles.

Minneapolis, St. Paul & Sault Ste. Marie

Second Track: At Neenah, Wis., 2.60 miles; at Waukesha, 3.10 miles; at Stevens Point, 0.40 miles.

Minnesota Transfer

Other Important Work Under Construction: Grade separation work at Minneapolis, Minn., cost \$100,000, 75 per cent completed.

Missouri Pacific

Other Important Work Under Construction: New terminal facilities at Gale, Ill., cost \$135,900, completed; raising main tracks over levees and drainage ditches, between Poplar Bluff, Mo., and Fisk, cost \$224,500, 60 per cent, completed; reconstruction and enlargement of passenger station at Little Rock, Ark., cost \$690,000, 80 per cent completed.

Mobile & Ohio

Other Important Work Under Construction: Freight house facilities at East St. Louis, Ill., cost \$150,000, 30 per cent completed.

Neame, Carson & Southern

First Track: Staples Junction, La., northwest 8.80 miles.

Newburgh & South Shore

Other Important Work Under Construction: At Cleveland, Ohio, car shop, cost \$265,000, 60 per cent completed.

New York Central

Other Important Work Under Construction: Freight office at Weehawken, N. J., cost \$200,000, 75 per cent completed; coaling pit, ash pit and sand house at Rensselaer, N. Y., cost \$365,000, 75 per cent completed; eliminating grade crossing, Brown street, Rochester, N. Y., cost \$60,000, 5 per cent completed; subway under tracks at Harbor Creek, Pa., cost \$110,000, 25 per cent completed; subway at Wesleyville, Pa., cost \$229,285, 35 per cent completed; subway at Erie, Pa., cost \$188,985, completed; viaduct and relocation of freight house at Youngstown, O., cost \$310,285, 85 per cent completed; cinder pit and yard tracks at Collinwood, O., cost \$100,000, 25 per cent completed; raising tracks and separation of grades, Elvira, O., cost \$354,595, 30 per cent completed; stock facilities and new track at Rockport, O., cost \$455,000, 70 per cent completed; raising tracks and constructing subway, Detroit, Mich., cost \$104,445, 5 per cent completed; renewal of River Rouge drawbridge, Detroit, Mich., cost \$270,500, 95 per cent completed.

New York, New Haven & Hartford

Other Important Work Under Construction: Extension to Cedar Hill (Conn.) shop, cost \$377,080, 34 per cent completed; transfer platform at Cedar Hill, cost \$470,300, completed; improvements at South Bay Coach yard, near South Boston (Mass.) passenger terminal, cost \$225,700, 30 per cent completed; additional tracks, bridge and culvert work, Kingston-Wickford, cost \$165,000, 16 per cent completed; westbound tracks from Bradford to Westerley, R. I., cost \$120,000, 75 per cent completed; pipe flume at power house, Cos Cob, Conn., cost \$100,000, 65 per cent completed; engine facilities and tracks at State Line, Mass., cost \$137,000, completed; extension of branch switch yard, Hartford, Conn., cost \$294,000, 21 per cent completed, work has been deferred.

New York, Westchester & Boston

First Track: New Rochelle, N. Y., to Chatsworth avenue, Larchmont, 1.46 miles.

Second Track: New Rochelle, N. Y., to Chatsworth avenue, Larchmont, 1.46 miles.

Norfolk & Western

First Track: In Virginia, from Lewis Creek, branch extension, 0.20 miles.

Other Important Work Under Construction: New 120-ton capacity dumper and electrification of piers 2 and 3 at Norfolk, Va., cost \$650,000, 30 per cent completed; trimming machine on pier 4, Norfolk, cost \$150,000, to be installed; additional yard tracks and rearrangement of tracks at Norfolk, cost \$210,000, 30 per cent completed; new water supply facilities at Roanoke, Va., cost \$223,000, 75 per cent completed; additional engine terminal facilities at Roanoke, Va., cost \$1,000,000, 75 per cent completed; tie-treating plant at Radford, Va., cost \$500,000, 50 per cent completed; additional yard tracks and engine facilities at Bristol, Va., cost \$1,300,000, 80 per cent completed; passing track extensions between Bluefield, W. Va., and Norton, east \$150,000, 75 per cent completed; cal branch, Pigeon Creek, Rockhouse Fork, from Lenore, W. Va., under construction 18 miles, cost \$2,000,000, 60 per cent completed; bridge to carry freight house spur from Pennsylvania tracks at Cleveland avenue, Columbus, Ohio, cost \$140,000, 90 per cent completed.

Northern Pacific

Other Important Work Under Construction: Grade separation at Minneapolis, Minn., cost \$350,000, 75 per cent completed; grade separation at Fargo, N. Dak., cost \$196,000, 90 per cent completed.

Oregon, California & Eastern

First Track: Between Klamath Falls, Ore., and Dairy, 1.50 miles.

Other Important Work Under Construction: Building from Dairy, Ore., to Sprague river, 20 miles, company's forces doing the work.

Oklahoma-Southwestern

First Track: Between Bristow, Okla., and Slick, 13 miles.

Other Important Work Under Construction: Building between Slick and Bristow, 37 miles; contractors, Ailhands & Davis Construction Company, Bristow, Okla., 20 per cent completed.

Oneida & Western

First Track: From Stockton, Tenn., northwest 2.50 miles.

Patapasco & Back River

First Track: At Sparrow's Point, Md., 2.72 miles.

Pennsylvania System

First Track: Eastern region.—Hegerman street branch, Philadelphia, Pa., 0.18 miles. On the P. B. & W.—At Chester, Pa., 0.39 miles.

Second Track: On the P. B. & W.—At Chester, Pa., 0.19 miles.

Third Track: Central region.—West of Alliance, Ohio, 0.09 miles.

Fourth Track: Central region.—West of Alliance, Ohio, 0.09 miles; Mazoni, Ohio, to Fairhope, 5.90 miles.

Other Important Work Under Construction: Central region.—Relocation of bridge over Clarion river at Parkers Landing, Pa., cost \$600,000, completed; classification yard at Dennison, Ohio, cost \$2,600,000, 42 per cent completed; engine house facilities, Mingo Junction, Ohio, cost \$1,503,000, 90 per cent completed; engine yard facilities, Mingo Junction, cost \$596,000, 98 per cent completed; classification and industrial yard at Mingo Junction, Ohio, cost \$6,000, 33 per cent completed; engine house and shop, Canton, Ohio, cost \$3,270,000, 95 per cent completed; new engine terminal and shop facilities, Scully yard, Pittsburgh, Pa., cost \$3,400,000, 65 per cent completed; additional tracks and yard facilities; Kinsman street yard, Cleveland, Ohio, cost \$244,500, completed; track elevation and grade crossing elimination, from Cedar avenue to Holton street, Cleveland, Ohio, cost \$2,780,000, to be completed in 1922; engine house improvements, Wellsville (Ohio) shop, cost \$1,250,000, completed; reconstructing bridge No. 122, Rochester, Pa., cost \$650,400, completed; West street engine terminal improvements, Ashabula, Ohio, cost \$181,455, completed; low grade freight line, Kenwood, Pa., to Rochester, cost \$4,325,000, 60 per cent completed; new main tracks, yard and engine terminal, Briar Hill to Girard, Ohio, cost \$6,200,000, 25 per cent completed; engine terminal facilities at Wheatland, Pa.; cost \$600,000, completed; relocation of double track line, Summitville, Ohio, to "K" tower, finished, cost \$2,500,000, 78 per cent completed; at Yellow Creek, Ohio, "Y" tracks and second track to Hammondsville, cost \$1,381,000, to be completed in 1921; new engine terminal facilities at Mahoningtown, Pa., cost \$2,268,000, 30 per cent completed. Southwestern region.—New erecting shop at Columbus, Ohio, cost \$450,000, 40 per cent completed; passenger engine terminal, Spruce street, Columbus, cost \$2,500,000, 56 per cent completed; extension of westward classification yard, Columbus, cost \$1,500,000, 90 per cent completed; extension of bridge No. 3 over Secoy river, Columbus, cost \$250,000, 90 per cent completed; engine terminal improvements, Richmond, Ind., cost \$1,500,000, completed; track elevation at Indianapolis, Ind., cost \$200,000, 90 per cent completed.

Pere Marquette

Other Important Work Under Construction: New engine terminal, yard, etc.; New Buffalo, Mich., cost \$750,000, 80 per cent completed; building new engine terminals, Saginaw, Mich., cost \$980,000, 50 per cent completed; new engine terminal, Plymouth, Mich., cost \$450,000, 60 per cent completed; Thornapple river bridge, McCords, Mich., cost \$150,000, 30 per cent completed.

Philadelphia & Reading

First Track: Between Belle Mead, N. J., and Manville, 0.55 miles; in Pennsylvania, not specified, 0.13 miles.

Second Track: Between Belle Mead, N. J., and Manville, 0.60 miles; in Pennsylvania, not specified, 0.20 miles.

Fourth Track: Between Glenmore, N. J., and Hopewell, 1.74 miles; in Pennsylvania, not specified, 0.15 miles.

Other Important Work Under Construction: New county bridge over tracks on line of Fayette street, Conshohocken, Pa., part of cost to be paid by the Philadelphia & Reading, work 40 per cent completed; replacing bridge No. 8 over Susquehanna river, west of Harrisburg, Pa., 22.5 per cent completed; replacing bridge No. 7 north of McAuley, Pa., 53 per cent completed; rebuilding bridge over Oley street, Reading, Pa., 80 per cent completed; elimination of bridges No. 2 and No. 3 north of Molino, Pa., and bridge No. 4 south of Millers, contract let but no physical work done to date; opening Tulip street, Philadelphia, Pa., under tracks of Richmond branch, between Somerset street and Lehigh avenue, 45.7 per cent completed; between Somerset street and Lehigh avenue, 38.5 per cent completed; coaling station and sand house Tulip street engine yard, Philadelphia, 56.5 per cent completed; rebuilding Columbia bridge over Schuylkill river, Schuylkill canal and Fairmont Park, Philadelphia, 80 per cent completed; ash pit, inspection pit, water supply and fire protection, Tulip street engine yard, Philadelphia, 24.5 per cent completed.

Pittsburgh & Lake Erie

Other Important Work Under Construction: Enlargement of yard at Hazelton, Ohio, cost \$175,000, completed.

Pittsburgh, Chartiers & Youghiogheny

Other Important Work Under Construction: Building from Van Emman, Pa., to Eighty-four, Pa., 8.36 miles.

Portland, Astoria & Pacific

First Track: Wilkesboro to Manning, Ore., 4 miles.

Other Important Work Under Construction: Building from Manning, Ore., to Keasey, 28 miles; contractors, Utah Construction Company, Portland, Ore.

Raritan River

Second Track: At South Amboy, N. J., 0.52 miles; Gillespie, N. J., to South River, 1.12 miles.

Ringling, Eastland & Gulf

First Track: Mangum, Tex., to Breckwalker, 26.60 miles.

Rio Grande & Southwestern

First Track: In New Mexico, not specified, 9 miles.

St. Louis, Kennett & South Eastern

First Track: In Missouri, between Kennett, Mo., and Deering, 0.50 miles.

Other Important Work Under Construction: Building extension from Kennett, Mo., 9 miles, cost \$175,000, 5 per cent completed.

St. Louis-San Francisco

Second Track: Eureka, Mo., to Pacific, 6.90 miles; Globe, Mo., to Monett, 4.30 miles.

Other Important Work Under Construction: Engine terminal facilities at Alton, Okla., cost \$102,626, 80 per cent completed; at Lawton, Okla., cost \$127,913, 10 per cent completed and at Monett, Mo., cost \$152,319, completed. On the St. Louis-San Francisco & Texas—Engine terminal facilities at Sherman, Tex., cost \$130,875, 80 per cent completed.

St. Louis Southwestern of Texas

Other Important Work Under Construction: Terminal facilities at Hodge, Tex., cost \$105,500, completed.

St. Paul Bridge & Terminal

Other Important Work Under Construction: New storage yard at South St. Paul, Minn., cost \$132,642, 30 per cent completed.

St. Paul Union Depot

Other Important Work Under Construction: New passenger station, St. Paul, Minn., cost \$11,000,000, 30 per cent completed.

Sewell Valley

Other Important Work Under Construction: Building from Rainelle Junction, W. Va., to Glencoe, 12 miles; contractors, Meadow River Lumber Co., Rainelle, W. Va.

Southern Pacific

First Tracks: From near Knights Landing, Cal., to Sheffield, 16.49 miles; Marchant, Cal., to Karnak, 2.75 miles. In Texas: Mile Post 2.8 to Mile Post 3.1, Dallas Belt (H. & T. C.), 0.30 miles.

Second Track: On the Galveston, Harrisburg & San Antonio. At El Paso, Tex., 0.70 miles.

Other Important Work Under Construction: New construction work to eliminate two tunnels between Marcell, Cal., and Cable, cost \$149,090, 25 per cent completed; engine house facilities, Mojave, Cal., cost \$140,304, completed; engine house facilities at Indio, Cal., cost \$101,305, completed. On Central Pacific: New steel foundry at Sacramento, Cal., cost \$126,328, completed. On the Southern Pacific lines in Texas and Louisiana—Additional tracks, Honston-Englewood yards, cost \$245,000, 50 per cent completed; renewing bridge span over Neches river, cost \$118,060, 10 per cent completed; renewing bridge span over Trinity river, cost \$101,241, 10 per cent completed.

Southern Railway & Navigation Company

First Track: In Louisiana, not specified, 12 miles.

Staten Island Rapid Transit

Other Important Work Under Construction: Reconstruction of thawing shed, Arlington, S. I., N. Y., cost \$342,000, completed.

Tampa Southern

First Track: In Florida, not specified, 8.70 miles.

Other Important Work Under Construction: Building from Seth, Fla., to Palmetto, 8.80 miles; contractors, E. G. Stoney, Sarasota, Fla.; H. E. Springstead, Palmetto, Fla.; John F. Lamh, Thomasville, Ga.

Terminal Railroad Association of St. Louis

Other Important Work Under Construction: Enlargement of shop, at Brooklyn, Ill., cost \$510,000, completed; reconstruction of highway deck of west approach of Eads Bridge, St. Louis, Mo., cost \$160,000, 55 per cent completed.

Texas City Terminal Company

Other Important Work Under Construction: Oil dock at Texas City, Tex., cost \$90,000, and dredging turning basin at Texas City, cost \$75,000, completed.

Texas, Oklahoma & Eastern

First Track: In Oklahoma, Mile Post 36 to Mile Post 41, 5 miles; from Oklahoma-Arkansas state line to DeQueen, Ark., 8 miles.

Toledo & Cincinnati

Other Important Work Under Construction: Construction of roadbed for second track in connection with relocation of main line by Miami Conservancy District Commission, North Dayton to Tippecanoe, Ohio, cost \$475,000, completed.

Union Pacific

Other Important Work Under Construction: Installing concrete lining and extending concrete portals at end of Hermosa tunnel (Old Sherman tunnel), Hermosa, Wyo., cost \$372,500, 34 per cent completed, work sus-

pending for winter; will be resumed in spring; additional yard tracks at Green River, Wyo., cost \$139,000, 84 per cent completed; lining 1,830 feet long of Sherman tunnel with concrete, Hermosa, Wyo., cost \$323,000, 35 per cent completed; concrete viaduct at Central avenue, Kansas city, Kan., cost \$203,380, completed. Union Pacific Coal Company spur, building from Lionok, Wyo., to about 1 mile west, 1.20 miles; contractor, Utah Construction Company, Ogden, Utah. Oregon Short Line building from Strachan to Phosphate Mine, Idaho, 7.54 miles; contractors, Utah Construction Company, Ogden, Utah. Oregon-Washington Railroad & Navigation Company. Engine division improvements; at Huntington, Ore., cost \$168,670, 95 per cent completed, and at Rieth, Ore., cost \$175,250, 75 per cent completed; terminal improvements at Alhina (Ore.) yards, cost \$168,022, 50 per cent completed.

Utah Railway

Other Important Work Under Construction: Machine shop at Provo, Utah, cost \$200,000, 30 per cent completed.

Utah Terminal

First Track: Utah Railway Junction, Utah, to coal mines in Spring Canyon, 3.60 miles.

Uvalde & Northern

Other Important Work Under Construction: Building from Uvalde, Tex., to Camp Wood, 40 miles; contractors: L. J. Smith Construction Company, Kansas City, Mo.; S. M. Bush, Uvalde, Tex.

Valley & Siletz

First Track: From Camp 1 to Valsetz, Ore., 2.10 miles.

Virginian

Other Important Work Under Construction: Virginian-Wyoming building from Mahen, W. Va., to Raleigh-Wyoming Coal Company's mine, 14.45 miles. Contractors, W. W. Boxley & Co., Roanoke, Va., and Porter Brothers, Norfolk.

Wabash Railroad

Other Important Work Under Construction: Reconstructing draw-bridge over Rouge river, Detroit, Mich., cost \$750,000, 12 per cent completed.

Western Maryland

Other Important Work Under Construction: Coal pier at Port Covington, Baltimore, Md., cost \$700,000, 78 per cent completed.

Western Pacific

First Track: In California from southwest of Hawley to a point west, 12.61 miles.

Wheeling & Lake Erie

Other Important Work Under Construction: Engine terminal, Canton, Ohio, and additions to Gambler's yards, cost \$573,380, 12 per cent completed; engine terminal at Jewett, Ohio, including additions to present yards, cost \$486,305, 15 per cent completed.

Willacochee & Du Pont

First Track: In Georgia, not specified, 2 miles.
Other Important Work Under Construction: Building from Shaws Still, Ga., to Du Pont, 19 miles. Contractors, C. M. Green, Willacochee, Ga.

Willamina & Grande Ronde

First Track: In Oregon, not specified, 1 mile.
Other Important Work Under Construction: Building from Willamina, Ore., to Bentley, 7.76 miles, company forces doing the work.

Winchester & Western

First Track: In West Virginia, not specified, 8 miles.

Railroad Construction in Canada in 1920**Canadian National Railways**

First Track: In Nova Scotia from Halifax Ocean Terminals Railway to Halifax & South Western Railway near Fairview, 0.68 miles. In New Brunswick, from St. John's to Newcastle (Moncton Cut off) 3.86 miles. In Quebec, from Charlotte to Ste. Rosalie, 4.70 miles. In Saskatchewan, from Alaska southeasterly, 2.60 miles; between Melfort and Humbolt, 32.40 miles; from Swift Current extension, 6.70 miles; on Jackfish branch, 10 miles. In Alberta, between Hanna and Medicine Hat, 10 miles; from Munson, 3 miles; from Oliver branch, 23.10 miles; from Onaway branch, 18.10 miles; from Red Deer spur, 6.40 miles. In Manitoba, from Thundershill extension, 8.30 miles. In British Columbia from Koksitah river to Siwash Rips Cowichan river, Vancouver Island, 19.30 miles.
Second Track: In Nova Scotia, from Springhill to Maccan, 9.13 miles; from Truro to Belmont, 7.69 miles. In Quebec, from Bagot to Ste. Rosalie, 10.94 miles. In Alberta, between Manson and Wayne, 0.84 miles; from Munson, 3 miles.

Other Important Work Under Construction: Engine terminal facilities at Fairview, N. S., cost \$824,000, 10 per cent completed; new bridge and track realignment, at Tantramar river, Amherst, N. S., cost \$550,000, 50 per cent completed; yard and terminal facilities at Moncton, N. B., cost \$1,175,000, 9 per cent completed; yard improvements at St. John's, N. B., cost \$255,500, 73 per cent completed; revision of grade and alignment, McGivney Junction to Fredericton, N. B., cost \$264,000, 50 per cent completed; new terminal facilities at Chaudiere Junction, Que., cost \$340,000, 20 per cent completed; new station at Lewis, Que., cost \$130,000, completed; yard and facilities at Dartmouth, N. S., cost \$200,000, completed; Rosebud river bridge, Drumheller (Alberta) subdivision, cost \$117,000, 93 per cent completed; Red Deer (Alberta) river bridge, mile post 59.3, contract let to the Dominion Bridge Company, cost \$250,000, work just started; South Saskatchewan river bridge improvements at mile post 159.8, Duck Lake sub-division, contract let to

the Dominion Bridge Company, cost \$340,000, work just started; building from Siwash Rips Cowichan river to Alberni, V. I., 74.40 miles, work being done by Canadian Northern Pacific forces; building from Kamloops, B. C., to Kelowna and from Vernon to Lumby, 133 miles, contractors, John W. Stewart & Company, Vancouver, B. C.; survey under way from Cowichan river to East Coast, Vancouver Island, 14 miles; engine terminal facilities at Victoria, B. C., cost \$170,000, 80 per cent completed.

Canadian Pacific

First Track: Russell, Manitoba, northerly, 6.50 miles; Lanigan, Saskatchewan, northeasterly, 50 miles; Moose Jaw, Saskatchewan, southwest (Consul East) 1.5 miles; from Leader, Saskatchewan, 26 miles; Langdon, Alberta, north (Acme-Express), 18.50 miles.

Other Important Work Under Construction: Work is now under way, building from Russell, Manitoba, northerly, 5.8 miles; from Moose Jaw, Saskatchewan (Consul East), 58.50 miles; Wynmark-Archive line, 25 miles; Bassano, easterly (Milden-Express) 59 miles; Rosetown, Saskatchewan, southeast, 43.20 miles; Leader, 9.20 miles, in Saskatchewan, 14.80 miles, in Alberta; Langdon, Alberta, north 18.80 miles; Weyburn-Stirling, Alberta (Altawan West), 18.90 miles.

Canada & Gulf Terminal

First Track: In the Province of Quebec, not specified, 2.50 miles.

Esquimalt & Nanaimo Railway

Other Important Work Under Construction: Building from Alberni, Vancouver Island, to Great Central Lake, 10 miles. Contractors: Foundation Company of British Columbia, Ltd., Vancouver, B. C.

Grand Trunk

Other Important Work Under Construction: Western Lines—Additional team-tracks and freight house extension and land for site for new yard at Pontiac, Mich., cost \$250,000; new passenger and freight station at St. John, Mich., cost \$106,000, completed.

Kettle Valley

First Track: From Princeton, B. C., to Loffer mountain mine, 7.25 miles.

Other Important Work Under Construction: Building from South Penticton, B. C., to Dog Lake, 2.40 miles, contractors, P. J. Salons, Penticton, B. C.

Pacific Great Eastern

First Track: In British Columbia, not specified, 37 miles.

Other Important Work Under Construction: In British Columbia building from present end of track at mile post 331 to mile post 427 on the Grand Trunk Pacific; contractors, Northeastern Construction Company, Vancouver, B. C.

Quebec Central

Other Important Work Under Construction: Building from Scotts, County Beauce, Quebec, to Diamond Junction, St. Jean Chrysostome, County Levis, 19.33 miles; contractors, J. T. & J. F. Davis, Quebec, Canada.

Reid Newfoundland Company

First Track: Branch line to Argenteia, N. F., 3.50 miles.

Other Important Work Under Construction: Wharf and terminal buildings at Port-aux-Basques, N. F., 70 per cent completed.

Roberval-Saguenay Railroad

First Track: At Port Alfred, Que., 2 miles and at Portage des Roches, 0.50 mile.

Other Important Work Under Construction: Harbor wharves cost \$750,000.

Railroad Construction in Mexico in 1920

National Railways of Mexico

First Track: Between Durango, Mex., to the port of Mazatlan, 21.13 miles; between Cuatro Ciénegas and Sierra Mojada, state of Coahuila, 39.77 miles.

Other Important Work Under Construction: Building from Durango, state of Durango, to the port of Mazatlan, on the Pacific coast, 250 miles, about 87 miles from Durango has been completed, contractors, E. E. Shaw, Durango; Building from Cuatro Ciénegas to Sierra Mojada, state of Coahuila, 99.42 miles, track has been completed on about 76 miles, work is being done by company's forces; building between Allende and Las Vacas, state of Coahuila, 75.80 miles, work is being done by company's forces; building from Empalme Purisima on the Durango-Mazatlan line to Las Animas, 31 miles, of which 19 miles have been completed, contractor, E. C. Rosas, Durango; building new station in Durango to cost \$250,000, masonry and concrete work completed; grade reduction under way from Saltillo to Carneros, 34 miles; building new passenger station at Saltillo, nearing completion.

FEEDING THE COMMUTER ON KEY SYSTEM BOATS.—The San Francisco-Oakland Terminal (Key System), served meals to 62,273 passengers on its ferry boats during May, 1920, according to C. D. Bennetts, superintendent of the service department, who recently discussed the growth of the company's restaurant business before the Pacific Railway Club. Mr. Bennetts said that lunch counter facilities were provided on the boats first put into service by the Key System in 1903, and that after a short trial at leasing them to outsiders, which proved unsatisfactory, the company organized its own commissary department. As additional steamers were built, they were also equipped with restaurants, which have been enlarged and re-equipped at frequent intervals to take care of the growing number of patrons who must be served in the twenty minutes that the boats are en route. This need for quick service has led to specialization in a few popular dishes, such as coffee, soup, hash and pie. The food is prepared by Chinese cooks in the company's kitchen in the Ferry Building, San Francisco, and is kept hot on the boat by steam tables. Revenue from the restaurant totaled \$19,197.50 in May, and Mr. Bennetts estimated that during that month 5 per cent of the Key System's passengers were served.



Photo by Ewing Galloway, N. Y.

Michigan Central Yards at Detroit

Signal and Interlocking Work Reaches Low Mark

Reports Indicate That Construction Activities
Were Lighter Than During Any Period
Since 1905



A TOTAL of 523.5 miles of road in the United States and Canada was equipped with block signals during the past year. Some of this mileage represents new construction, a portion represents reconstruction, and a part consists of manual block changed to automatic block. Twenty-five roads built new interlocking plants or made changes in existing ones, affecting a total of 86 plants. It is hard to arrive at any definite conclusion as to the number of new interlocking plants installed during this period because a large number of the railroads failed to include in their reports sufficient information to show whether or not the work completed represented new facilities. Where automatic signaling was in use previously, the changes were due largely to replacing one type of signals with another, or on account of additional main tracks.

Comparing the figures for 1920 with those for 1919, published in the January 2, 1920, issue of the *Railway Age*, it is readily seen that a decided drop has occurred in construction work of this character, as the total block signal mileage completed in the United States and Canada during year 1919 was 2,071, as compared to 523.5 miles of road in 1920, or only about 25 per cent of that of the preceding year. Of this 523.5 miles, 515.2 represents the amount completed during the year on roads in the United States. Deducting 1.7 miles manual blocking from the total, leaves 513.5 miles of road upon which automatic block signals were installed during the year. Comparing this mileage with that reported by the Interstate Commerce Commission as of January 1, 1920, and which is recorded in the table showing block signals installed in the United States since January 1, 1907, there appears to have been 466 miles less automatic block signaling completed during 1920 than in 1919. In each and every year shown in that table the

mileage of automatic block signals installed was more than double that reported for the year now closed.

Under Construction.—In comparing the total mileage of block signals under construction in the United States and Canada on December 31, 1920, and that under construction on the same date in 1919, it is seen that there is now a decrease of 64.2 miles. The total mileage under construction

on December 31, 1920, consists of automatic block signals in the United States, no Canadian roads having reported any work in progress. While no statements have been made indicating that the automatic block is to replace manual block, all, or a large part of this work in progress is of this character. No road reports any manual block signals under construction.

Proposed Work.—The outlook for proposed new work for 1921 is very indefinite at present, as a large number of roads have not yet decided on their budgets. In making a comparison of the block signal mileage proposed for next year with that proposed one year ago, it is seen that there is an increase over that of a year ago of 78.7 miles of road. The proposed new work reported includes a total of 398.7 miles of auto-

matic block signals in the United States, and 43 miles in Canada.

Interlocking.—A decided slump has occurred in the number of interlocking plants built or rebuilt during the year. In 1919 a total of 153 were built or rebuilt in the United States, and four in Canada, as compared to 45 this year, two of which are in Canada. Likewise the number of plants under construction in the United States on December 31, 1919, was 46, and 3 in Canada, as compared to 19 this year, one of which is in Canada. A total of 39 plants was proposed a year ago, 3 being in Canada, in comparison with a total of 22 for the coming year, all of which are in the United States.

ONLY 515 MILES of road in the United States were equipped with block signals during the past year; there are 206 miles under construction and 442 miles are known to be proposed for 1921.

Forty-five interlocking plants were completed; 19 are under construction and 22 are proposed for the coming year. These are the smallest construction figures reported for many years.

Statistics of telegraph line construction are given this year for the first time.

An Outline of the Work

The figures so far available, together with the data covering work now under construction and in respect to plans for 1921, are shown in the accompanying tables. The data will be found in the tables under nine heads, as follows:

- A—Automatic Block Signaling Completed in 1920.
- B—Automatic Block Signaling Under Construction.
- C—Automatic Block Signaling Proposed for 1921.
- D—Manual Block Signaling Completed in 1920.
- E—Manual Block Signaling Under Construction (None).
- F—Manual Block Signaling Proposed for 1921 (None).
- G—Interlocking Completed in 1920.
- H—Interlocking Under Construction.
- I—Interlocking Proposed for 1921.

From the reports received, the largest mileage of automatic signals installed on a single road was on the Chicago, Burlington & Quincy, which put in service 144.3 miles of single track and 9.3 miles of double track, using 359 signals.

NEW BLOCK SIGNALS COMPLETED IN 1920

	Automatic (Table A)				Manual (Table B)				Both total miles
	S. T.	D. T.	Total miles	Total miles	S. T.	D. T.	Total miles	Total miles	
United States	378.9	134.6	513.5	1.7	1.7	3.4	515	8.3	
Canada	6.3	2.0	8.3	...	...	...	...	...

NEW BLOCK SIGNALS UNDER CONSTRUCTION DEC. 31, 1920

	Automatic (Table B)				Manual (Table E)				Both total miles
	S. T.	D. T.	Total miles	Total miles	S. T.	D. T.	Total miles	Total miles	
United States	148.9	56.9	205.8	...	...	...	205.8	...
Canada	...	...	...	...	...	...	...	...

NEW BLOCK SIGNALS PROPOSED FOR 1921

	Automatic (Table C)				Manual (Table F)				Both total miles
	S. T.	D. T.	Total miles	Total miles	S. T.	D. T.	Total miles	Total miles	
United States	361.0	37.7	398.7	...	...	...	398.7	43.0
Canada	43.0	...	43.0	...	...	...	...	...

INTERLOCKING PLANTS—TABLE G

	No. of plants	Number of levers	
		Mechanical	Electric*
Completed in 1920	43	517	295
United States	...	...	...
Canada	2	19	...
UNDER CONSTRUCTION DEC. 31, 1920—TABLE H	...	...	...
United States	18	131	283
Canada	1	13	...

PROPOSED FOR 1921—TABLE I

	No. of plants	Number of levers	
		Mechanical	Electric*
United States	22	153	232
Canada	...	...	...
Total United States	83	800	810
Total Canada	3	32	...
Grand total	86	832	810

*Including Push-button (non-interlocking) machines.

TOTAL CONSTRUCTION—TWELVE YEARS Miles of road

Year	Automatic Block	Manual Block	Total
1908	1,387.6	517.6	870.0
1909	2,047.1	4,162.2	6,209.3
1910	3,473.8	2,037.3	5,511.1
1911	2,623.4	2,517.2	5,140.6
1912	1,883.9	5,656.2	7,540.1
1913	4,350.5	1,563.4	5,913.9
1914	3,030.7	6,511.5	9,542.2
1915	1,113.1	1,112.0	2,225.1
1916	1,843.5	196.9	2,040.4
1917	2,242.2	1,214.9	3,457.1
1918	1,794.9	1,398.4	3,193.3
1919	979.4	1,007.1	1,986.5

The next largest installations were made on the Missouri, Kansas & Texas and on the Northern Pacific, each installing 83 miles of single track signals, the first road using 151 signals, two of which were the color light type, and the latter using 150. Signals installed on other roads consisted mostly in the protection of short stretches of track; on additional new multiple tracks or for station protection purposes. In Canada, three short stretches of single track automatic block signals, totaling 6.3 miles, were put in service on the Canadian Pacific, Western lines, mostly for station protection,

while the Grand Trunk installed 2.0 miles for the same purpose.

But ten roads report automatic block signals under construction, the greatest mileage reported being by the Chicago, Burlington & Quincy, which has 71 miles of single track signaling under construction. The Chesapeake & Ohio has under construction, 40 miles of single track, A. P. B. color light automatic signals, while the Baltimore & Ohio has 21.6 miles of double track signaling, and the Illinois Central has 19.7 miles of single track signaling under construction.

Of the work proposed for 1921, out of eight roads reporting such work, the Chicago, Milwaukee & St. Paul contemplates the construction of 122 miles of single track signaling, using 220 motor semaphore signals removed from the electrified zone, while the Missouri, Kansas & Texas is also planning on 168.5 miles of single track automatics, using a total of 282 signals.

The reports from the various roads on proposed block signaling are rather incomplete, inasmuch as most of the roads have not yet prepared their programs or had their budgets approved for the 1921 work.

The only manual block signaling reported as installed during 1920, consisted of 1.7 miles of single track, of which 0.98 mile replaced automatic block. No signaling of this character was under construction on December 31, 1920, nor did any roads report any such work contemplated.

Automatic Train Control

The use of automatic train control as an adjunct to automatic block signals has been reported as completed during 1920 on the Chicago, Rock Island & Pacific, between Blue Island, Ill., and Joliet, a distance of 25 miles. It is installed on double track in connection with automatic block signals already in service, and is of the intermittent electrical contact type. An installation of automatic train control is under construction on the Chesapeake & Ohio, between Charlottesville, Va., and Staunton, a distance of 40 miles. Low voltage color light signals with approach lighting is also being installed in connection with the train control. The automatic train control under construction is an extension of the system already in use between Gordonsville, Va., and Charlottesville.

Interlocking

Twenty-five roads report interlocking plants as completed during the past year, and Table G gives this list in detail. This table, however, should be taken more as an exhibit of the work done than as showing the precise amount of the increase of interlocking apparatus in use in the country, some of the figures representing only reconstruction or enlargements. Some duplications necessarily occur, as a joint plant may be reported by two or more roads. The same remarks apply also to Tables H and I.

One striking feature indicating the small amount of work done during the past year, under construction or contemplated, aside from the small number of entries in the tables, is the small size of the plants installed, those predominating being of the mechanical type. An analysis of the plants shows that the largest electric plant completed during the year is one of 64 working levers at Barbourville, W. Va., on the Chesapeake & Ohio, while the next largest is one with 40 working levers at Pittsburgh, Pa., on the Pennsylvania. The third largest plant of this type had 33 working levers, and was installed at Weston, N. J., on the Philadelphia & Reading, while the fourth largest consisted of 29 working levers at Newark, N. J., on the Lehigh Valley.

One 20-push-button electro-pneumatic machine was reported as completed during the year at the Russell, Ky., yards of the Chesapeake & Ohio.

Five electro-mechanical plants were reported as completed, one plant on the Philadelphia & Reading having 32 me-

TABLE A—AUTOMATIC BLOCK SIGNALS INSTALLED IN 1920

Name of road	Miles of road		From	To	No. of signals	Type of signals	Control System	Remarks
	S.T.	D.T.						
A. T. & S. F.	13.7		Winfield J.	Ark. City	19	Union "S"	Neutral track and line	
	12.3		Ark. City	Newkirk, Okl.	16	Union "S"	Neutral track and line	
	3.1		Bakersf'd, Cal.	Oil Junc.	16	Union "S"	Neutral track and line	
A. T. & S. F. (Coast Lines)	3.1		Bakersfield, Cal.	Jastro	7	U.S. & S.Co. 3-pos. U.Q.	Polarized line	
B. & O.	13.2		Goehring, Pa.	Gallery Jct.	40	J. S. & S. Co. "T 2"		
B. & O.	12.7		Grenwich, O.	Willard, W. Va.	20	General		
B. & M.	1.2		Westminster, Mass.	S. Ashburham	7	Union style B	Overlap	
Can. Pac. Lines West.	2.7		Minnitaki, Ont.		1	Union "T 2"	Neutral track	On one track of 3-track line.
	2.4		Austin, Minn.		1	Union "T 2"	Neutral track	Station protection.
C. & A.	2.4		M. P. 124.7	M. P. 127.1	2	General "2 A"	Neutral track and line	
C. B. & Q.	67.4		Savannah, Ill.	Flag Center	146	General "2 A"		
	9.3		Flag Center, Ill.	Steward Jct.	25	Federal		
	16.1		Oxford, Neb.	Arapahoe	31	Federal	A. P. B.	60 deg. L. Q. 10 volt.
	60.8		Lafayette, Neb.	Bradshaw	157	Federal	A. P. B.	60 deg. L. Q. 10 volt.
C. R. I. & P.	3.0		Faribault, Minn.	Medford	5	Electric	Neutral line	60 deg. L. Q. 10 volt.
E. J. & E.	0.5		Joliet, Ill.		2	General		Two-pos. U. Q. motor sema.
Grand Trunk	15.0		Bates, Me.	Oxford	18	General "4 A"	A. P. B.	
	2.0		Port Hope, Ont.		2	Federal	"4 A"	Normal clear.
Lehigh Valley	1.6		Laurel Jct., Pa.	Delano	2	Federal	Line	Station protection.
	2.1		Falling Springs, Pa.	Weldon	6	General	Line	
L. A. & S. L.	2.5		Smelter, Utah	Garfield	4	3-pos. U. O.	A. P. B.	Addition for pas'g track.
L. & N.	13.0		Maplewood, Tenn.	Brentwood	26	3-pos. U. O.	A. C. polar. track	A. C. signals.
M. K. & T.	6.0		M. P. 16	Devol	16	3-pos. U. O.	Overlap	Normal clear.
	6.5		Mahan, Okla.	Riversand	14	3-pos. U. O.	Overlap	Normal clear.
	65.5		Wybark, Okla.	McAlester	116	3-pos. U. O.	Overlap	Normal clear.
	2.3		Coler, Okla.	Red River	3	3-pos. U. O.	Overlap	Normal clear.
	2.4		San Antonio, Tex.		2	Color-light	Overlap	Normal clear.
Mo. Pac.	1.6		Boonville, Mo.		2	3-pos. U. O.	Overlap	
	0.8		Monroe Jct., La.		1	3-pos. U. O.		
	1.0		Bald Knob, Ark.		1	2-pos. U. O.		
	0.3		West Side Jct., Neb.		2	2-pos. U. O.		
	1.3		Dupo, Ill.		2	2-pos. U. O.		
N. Y. N. H. & H.	1.0		Valley Jct., Ill.		2	2-pos. U. O.		
	1.6		Warren, R. I.	Barrington River	3	"B"	Polarized	
	1.0		Providence		8	"B"	Polarized	
Nor. Pac.	83.0		Terry, Mont.	Forsyth	150	General "2 A"	A. P. B.	Base of mast. 10-v. mech. d. c.
Pacific Electric	0.5				4	Color light	A. C.	
Penn. System:								
Southwestern Region	4.5		Clymers, Ind.	Logansport	10	Union Style B		Normal clear.
Central Region	14.3		Alliance, O.	Clinton	26	Union Style B, U. Q.		D. C.
Pere Marquette	26.0		Grand Ledge	Edinlake	34	Union	Polarized line	Overlaps.
	1.0		Wyoming	G. Ramsd.	8	Union	Polarized line	
P. & R.	7.5		Belle Meade, N. J.	Manville	40	Union 3-pos. U. Q.	Normal danger	Four track, A. C. replacing D. C. disk signals.
	1.2		Manville, N. J.	Bound Brook Jct.	5	Union 3-pos. U. Q.	Normal danger	A. C. system replacing D. C. disk signals.
Southern	8.5		Huffmans, Tenn.	Mountain Jct.	15	General "2 A"		Direct current
	3.2		Vance, Ala.	Dowdie	6	General "2 A"		Direct current
Sou. Pac.	3.2		Hornbrook, Cal.	Gregory, Ore.	6	Union		
Total	385.2	136.6			1,047			

chanical and 35 electric working levers being revised. The largest electro-mechanical plant installed was on the Jacksonville, Fla., terminal, and this consisted of 27 mechanical and 13 electric working levers. A small electro-mechanical plant of 7 working levers, and provided with position light signals, was installed by the Pennsylvania on a drawbridge.

The largest mechanical plant installed was on the Missouri Pacific at Sedalia, Mo., and had 36 working levers, while the largest one revised was on the P. & R. at Belle Meade, N. J., with 46 working levers. Other plants ranged in size from the smallest up to the size given above. Some were of the cabin door lock type, others had time locks; still others had electric locks, while still others had power-operated distant signals as adjuncts.

The largest electric interlocking plant under construction on December 31, 1920, was at Richmond, Ind., on the Pennsylvania System, and consists of 44 working levers; the next

in size being one of 29 working levers at Myerstown, Pa. on the P. & R.

The New York, New Haven & Hartford has under construction two electro-pneumatic push button plants for hump yards at Providence, R. I., and New Haven, Conn., each having 60 push buttons.

The largest electro-mechanical plant under construction as of the above date is one of 43 working levers at Mountain Lake Park on the Baltimore & Ohio, while the Chesapeake & Ohio is building one having 20 mechanical and 18 electric working levers at Kenova, W. Va.

The largest mechanical plant under construction is one of 29 working levers at Madison, Ill., on the Toledo, St. Louis & Western.

Of those proposed for 1921, the largest electric plant is one of 49 working levers to be located at Carlton, Minn., on the Great Northern; the next largest being one of 33 working

TABLE B—AUTOMATIC BLOCK SIGNALS UNDER CONSTRUCTION, DECEMBER 31, 1920

Name of road	Miles of road		From	To	No. of signals	Type of signals	Control System	Remarks
	S.T.	D.T.						
A. T. & S. F.	11.5		Plymouth	Strong City	13	Union "4"	Neutral track and line	
B. & O.	21.6		Callery, Pa.	Willow Gr., W. Va.	43	Union T 2		
Ches. & Ohio	40.0		Charl'ville	Staunton	87	Color light 3-pos.	A. P. B.	Am. Train Control Co.'s A. C. automatic train control apparatus included in this installation.
C. & N. W.	1.6		Belt Line Jct., Wis.	Hurley Jct.	8	General 2 A. U. Q.	A. P. B.	
C. B. & Q.	38.5		Steward Jct., Ill.	Aurora	93	Federal	A. P. B.	60 deg. L. Q. 10 volts.
Illinois Central	32.5		Bradshaw, Neb.	Grand Island	75	Federal	A. P. B.	60 deg. L. Q. 10 volts.
	19.7		Isley, Ky.	Princeton	36	Hall "L" 3-pos. U. Q.	A. P. B.	
N. Y. N. H. & H.	1.1		N. Haven		6	Light ("2A" (4))	Line	To shorten block sections.
P. & R.	5.5		Myerstown, Pa.	Lebanon	18	Union 3-pos. U. Q.	Normal danger	A. C. Four track.
Sou. Pac.	6.3		Hornbrook, Cal.	Gregory, Ore.	22	Union		On electric lines; A. C.
	10.3		Pordland, Ore.	Beaverton	22	Color-light		
Virginian	17.2		M. P. 359.3	M. P. 376.5	34	Union "SP" 3-pos. U. Q.	Alternating current	
Total	148.9	56.9			457			

TABLE C—AUTOMATIC BLOCK SIGNALS—PROPOSED NEW CONSTRUCTION, 1921

Name of road	Miles of road		From	To	No. of signals	Type of signals	Control System	Remarks
	S.T.	D.T.						
Can. Pac. Lines West	21.0	.....	Leaneoh, B. C.	Golden	32	.....	A. P. B.	.....
C. M. & St. P.	122.0	.....	Glazier, B. C.	Albert Canyon	39	.....	A. P. B.	.....
C. T. H. & S. E.	.....	.....	Terre Haute, Ind.	.....	2	.....	.....	Bottom-mast. Removed from electric zone.
E. P. & S. W.	50.0	.....	{ Winkle, N. M.	{ Guadalupe	.....	.....	.....	Shortening blocks
(Grand Trunk	13.5	.....	Oxford, Me.	Danville Jct.	22	.....	A. P. B.	.....
M. K. & T.	37.0	.....	McAlester, Okla.	Stringtown	61	U. O. 3-pos.	.....	Normal clear, overlap
	99.0	.....	Labette, Kan.	Wybark, Okla.	161	U. O. 3-pos.	.....	Normal clear, overlap
	14.5	.....	Denison, Tex.	Bells	25	U. O. 3-pos.	.....	Normal clear, overlap
No. Ohio Trac. & Lgt.	7.0	.....	Pinkshoro, Tex.	Whitesboro	35	U. O. 3-pos.	.....	Normal clear, overlap
Union Pacific	37.7	.....	Akron, O.	Springfield Lake	10	Union Semaphore	.....	Alternating current
		.....	Leroy, Wyo.	Wahsatch, Utah	134	Union Style B 2-pos.	.....	Two-arm home and distant signals.
Total	404.0	37.7			741			

TABLE D—MANUAL BLOCK SIGNALING INSTALLED IN 1920

Name of road	Miles of road		From	To	No. of signals	Type of signals	Control System	Remarks
	S.T.	D.T.						
Mo. Pac.	1.7	.....	Edgewater Jct., Kan.	High Line Con.	7	2-pos. U. O.	.....	0.98 mi. automatic block replaced by manual block.

levers on the Buffalo, Rochester & Pittsburgh at Falls Creek, Pa.

No electro-pneumatic plants are reported as contemplated next year. Three electro-mechanical plants are proposed for

TABLE G—INTERLOCKING PLANTS COMPLETED IN 1920

Name of road	Location	Layout	Working levers ¹	
A. T. & S. F.	Turner, Kan.	Yard	17 ²³	
	Morris, Kan.	.....	13 ²⁵
	Hackney, Kan.	E. D. T.	17 ²¹	
	Chillico, Okla.	.....	31 ²⁵
	Hutchinson, Kan.	Cross'g, M. P. Ry.	30 ²⁵	
	Hutchinson, Kan.	Cross'g, C. R. I. & P.	30 ²⁵	
A. C. L.	Tampa, Fla.	Drawbridge	8	
Jacksonville Term'l.	Jacksonville, Fla.	Crossing	40 ²	
Bessemer & L. E. Canadian Pacific	Culmerville, Pa.	Ganuntlet	4	
Lines West	Russell, Man.	Crossing	13	
Ches. & Ohio	Barboursville, W. Va.	Junction	E 64 ²⁵	
	Russell, Ky.	Term	13 ¹⁰	
	Russell, Ky.	Yard ⁹	.....
	Prince, W. Va.	Junction	17 ¹¹	
	Anrota, Ill.	Junction ⁸	.....
Chi. B. & O.	Johannott, Ill.	Crossing	12 ⁴	
Chi. R. I. & P.	Denver, Colo.	Crossing	2	
C. T. H. & S. E.	Fernie, B. C.	Crossing	6 ⁵	
Col. & So.	Bemis, Tenn.	Crossing	29 ⁸	
Great Northern	Bemis, Tenn.	Crossing	29	
Illinois Central	Springfield	Crossing	8 ¹³	
Ill. Traction	Newark, N. J.	Junction	E 29 ²⁵	
Lehigh Valley	Spanish Fork, Utah	Crossing	17	
L. A. & S. Lake	Columbia River, Tenn.	Ganuntlet	4 ⁶	
M. & N.	Easton, Tenn.	Crossing	7 ⁹	
	Mobile, Ala.	Drawbridge	5 ¹⁰	
	Leeds, Mo.	Crossing	46 ¹⁸	
	Falls City, Nebr.	Crossing	23 ¹²	
	Sedalia, Mo.	Crossing	36 ¹³	
N. Y. N. H. & H.	New Haven	Term.	E 11 ³³	
Pennsylvania	Eastern Region	Darby Creek, Pa.	Drawbridge	E 7 ⁴
	Central Region	Pittsburgh, Pa.	Junction	E 40
Phila. & R.	Glenmoore, N. J.	Crossovers	E 16 ⁴	
	Belle Mead, N. J.	Crossing	46 ¹⁸	
	Weston, N. J.	Junction	E 33	
	Manville Crossing, N. J.	Crossing	67 ¹⁰	
	Bound Brook Jct., N. J.	Junction	40 ²⁰	
Southern	New River, Tenn.	Junction	E 15 ¹⁸	
	Robbins, Tenn.	Junction	E 21 ¹⁵	
	Ten Mile, S. C.	Crossing	4	
Toronto H. & B.	Hamilton, Ont.	Crossing	4	
Union Pacific	Leeds, Mo.	Crossing	24	
	Norfolk, Nebr.	Crossing	9	
	O. S. L.	Montana Jct., Idaho	Junction	E 21 ⁷
Virginian	Tidewater Junction, Va.	Crossing	E 6 ¹⁷	

- ¹⁷ Addition to existing machine
- ¹⁸ Revision.
- ¹⁹ Revision of electro-mechanical plant; 32 mechanical, and 35 electric levers.
- ²⁰ Revision.
- ²¹ Approach, indication and section locking.
- ²² Approach, indication and section locking, and low voltage switch movements.
- ²³ Approach, indication and section locking, and polarized relay control.
- ²⁴ Frequency selective traffic locking.
- ²⁵ Mechanical levers 6, electric 7.
- ²⁶ Pushbutton machine, electro pneumatic, 20 buttons.
- ²⁷ Mechanical levers 9, electric 8, voltage switch movements.
- ²⁸ Cabin-door lock.
- ²⁹ Style T, union; enlargement.

construction on the Chesapeake & Ohio, the largest one to have 20 working levers.

The largest mechanical plant proposed is one of 26 working levers on the P. & R. at Schuylkill Haven, Pa. This plant is to be equipped with approach and route locking;

TABLE H—INTERLOCKING PLANTS NOW UNDER CONSTRUCTION

Name of road	Location	Layout	Working levers ¹
A. C. L.	Allenhurst, Ga.	Crossing	6 ⁵
A. T. & S. F.	New Kirk, Okla.	Yard	E 15 ⁴
B. & O.	Mountain Lake Park	Junction	43 ³
B. & M.	So. Lawrence, Mass.	Yard	24
Can. Pacific	Watson, Sask.	Crossing	13
Ches. & Ohio	Big Sandy, W. Va.	Junction	20 ⁸
	Kenova, W. Va.	Junction	38 ⁷
C. & N. W.	Hurley, Wis.	Junction	8
Kan. City So.	De Queen, Ark.	Crossing	12
L. & N.	Mayton, Tenn.	Junction	40 ¹
	Brentwood, Tenn.	Junction	4 ¹
N. Y. N. H. & H.	Providence	Terminal ²⁸	.....
	New Haven	Hunn Yard ²⁹	.....
	New Haven	C. Hill Yard	12
Pacific Elec.	Wise, Cal.	Crossing	10 ²⁰
Pennsylvania	S. W. Region	Richmond, Ind.	Yard
	Phila. & R.	Frederick, Pa.	Crossovers
Tol. St. L. & W.	Madison, Ill.	Crossing	29
Union Pac.	O. S. L.	Salt Lake City	Terminal
			E 4 ⁹

- ¹ Electric levers indicated by E. Total is 156 mechanical and 163 electric.
- ² Door locked.
- ³ Electro-mechanical.
- ⁴ Temporary plant.
- ⁵ Complete electric route and detector locking; position-light dwarf signals.
- ⁶ Addition to existing machine.
- ⁷ Approach, indication and section locking.
- ⁸ Mechanical levers 10, electric 10; frequency selective traffic locking.
- ⁹ Mechanical levers 20, electric 13; frequency selective locking.
- ¹⁰ Pushbutton mechanism electro-pneumatic, 60 buttons.
- ¹¹ Pushbutton, 60 buttons, also certain switches electrically and mechanically locked for control of movements to repair tracks.
- ¹² A. C. track circuits; time locks on steam road.

¹ All levers are mechanical, except in items indicated by E, which are electric. The totals are 546 mechanical, and 260 electric.

² Electro-mechanical machine; 27 mechanical levers and 13 electric.

³ Mechanical plant moved to new elevation.

⁴ Electric distant signals.

⁵ With time locks.

⁶ Electric time clocks.

⁷ Mechanical derails; electrically controlled signals. Semi-automatic signals on L. A. & St. L. with approach locking. Hayes derails on transverse line, operated from switch stand and controlled by electric lock.

⁸ A. C. signals and track circuits.

⁹ A. C. signals and track circuits.

¹⁰ Rebuilt.

¹¹ Electric signals; approach and detector locking.

¹² Rebuilt; approach and detector locking.

¹³ Electric signals; approach and detector locking.

¹⁴ Electro-mechanical; position-light signals.

¹⁵ Advance and detector locking.

¹⁶ Mechanical levers; low voltage electric machine for switches at far end of adjacent tunnel. Advance and detector locking.

the next largest proposed is on the Texas & Pacific at Ranger, Tex., and it is to consist of 24 working levers.

The General Outlook

The general outlook a year ago indicated that signal construction work would show some signs of picking up before now, but instead less work was completed than in any year

since 1908. This results from the conditions which have affected the railroads during the past four years and it is because of the readjustment taking place now in the railroad field that the outlook as to next year's budgets is so uncertain. The principal reason for this uncertainty is the inability of the railroads to get money at reasonable rates. This has been further complicated by the action of the govern-

ment that it is difficult to judge what the coming year may have in store in the way of prices for the raw materials, and this will affect the quotations which can be made on signal materials. Labor conditions are by no means stable as a readjustment is taking place in this field as well as in other fields. As a consequence the tendency is to follow a hand to mouth policy until conditions approach a more nearly normal stage.

TABLE I—NEW INTERLOCKING PROPOSED FOR 1921

Name of road	Location	Layout	Working levers ¹
B. & O.	Deshler, O.	Crossing	
	Defiance, O.	Crossing	
	Postoria, O.	Crossing	
B. R. & P.	Falls Creek, Pa.	Crossing & Junct.	E 33
Ches. & Ohio	Hinton, W. Va.	Terminal	20 ²
	Hilldale, W. Va.	Crossovers	20 ²
C. Ind. & I.	MacDougal, W. Va.	Crossing	17 ²
	Rochdale, Ind.	Crossovers	55 ²
	Ladoga, Ind.	Crossing	17 ²
Col. & So.	Denver, Colo.	Crossings	
Del. & Hudson	Schoharie Junct., N. Y.	Junction	E 28
Erie	Newark, N. J.	Drawbridge	E 11
Great Northern	Carlton, Minn.	Crossing	
M. K. & Texas	Oklahoma City, Okla.	Crossing	18 ²
Phila. & R.	Schuylkill Haven, Pa.	Crossovers	26 ²
Southern	Blyee, Tenn.	Drawbridge	F 6 ²
	Epes, Miss.	Drawbridge	F 6 ²
Texas & P.	Ranger, Tex.	Crossing	24
	Cisco, Tex.	Crossing	24
Union Pacific	Aspen, Wyo.	End double track	E 20 ²
	Altamont, Wyo.	Yards and tunnel	E 23 ²
Western Pacific	San Jose, Cal.	Crossings	E 39 ²
			385

¹ Electric levers indicated by E. Total, 153 mechanical levers and 232 electric.

² Electric signals.

³ Electric signals.

⁴ Approach, route and detector locking.

⁵ Electric distant signals.

⁶ Approach and route locking.

⁷ Check locking between Aspen and Altamont towers.

⁸ Includes three plants.

⁹ Mechanical levers 9, electric 11; frequency selective traffic locking.

¹⁰ Mechanical levers 15, electric 5.

¹¹ Mechanical levers 3, electric 2.

ment in holding up the amounts due the railroads for the time they were under government control.

The high cost of material and all kinds of labor are also directly affecting the future programs. The material market is further complicated by the fact that the basic materials have fluctuated so radically in cost during the past year

Railroad Telegraph and Telephone Construction

IN INAUGURATING A SURVEY of the activities in the railroad telegraph and telephone field covering the past year, the *Railway Age* sent out a questionnaire to 198 roads asking for certain data. It is impossible to draw conclusions as to the relative amount of work as compared with that done in other years as this is the first time that an attempt has been made to collect such data. However, basing conclusions on conditions known to have existed in other departments, it would appear safe to assume that the construction work in this department was below normal, although it will require the collection of data for several years before an accurate analysis of this field can be made.

Work Completed

Thirty-seven out of the 198 roads reported telegraph and telephone construction work completed during 1920. Out of a total of 2,645 miles of long distance telephone conversation circuits, the two largest installations were made by the Pennsylvania System on which 1,014.9 miles was completed in the central region, and the New York, New Haven & Hartford, which completed 600 miles. The Virginian installed 340 miles. The Missouri, Kansas & Texas completed 266 miles of long distance phantom telephone circuits. A total of 820 miles of No. 8 gage iron wire was installed by all roads as compared with 69 miles of No. 9 and 409 miles of No.

6, while 10 miles of No. 8 gage and 430 miles of No. 10 gage copper were installed as compared with 5,421 miles of other gage copper wire.

A total of 15 metallic train despatching circuits were installed while 31 long distance physical telephone and 11 phantom circuits were completed. One road, the Union Pacific, reports the completion of three telegraph circuits for printing telegraph. Sixty-seven way station offices were opened, 50 of which were on the Atchison, Topeka & Santa Fe.

But little overhead or underground cable work was done during the year, a total of 29.3 miles of overhead and 14.8 miles of underground cable being installed. Out of a total of 53 miles of railroad pole line constructed, the Pennsylvania System, central region, installed 34 miles and the Louisville & Nashville 12 miles.

Work Under Construction

Eighteen roads of the 198 reported work as under construction on December 31, 1920. There were 674 miles of long distance telephone conversation circuits reported under construction, of which 341 miles were on the Northern Pacific and 295 on the Pennsylvania System, central region. A total of 577 miles of No. 8 iron is under construction as compared with a mileage of 84 No. 9 gage and 417 No. 6 gage, while

Developments of the Past Year

A review of the conditions during the past year indicates that greater attention has been given to automatic train control than ever before, with the prospects that more installations of this character will be made during the coming year. Railway men in general also have shown a keener appreciation of the value of automatic signaling with reference to its use in effecting economies in train operation. In this connection attention has been directed to the elimination of train orders by making the greatest use of the signal system. Electric lighting of signals has advanced quite rapidly, this advance being helped by the possibility of eliminating lampmen, whose wages have been materially increased. Further replacement of gravity battery with caustic soda cells has also taken place as this helps reduce maintenance costs. The track circuit has received marked attention, with the result that low resistance bonds have been developed on a commercial basis so that they may be welded to the rails. This not only effects economy but also increases the safety of the track circuits.

Future developments of signaling will continue along the lines of saving freight train hours and stoppages to trains, in that means will be provided for the handling of the trains by signal indication and remote switches will be placed under the control of the leverman and operated from the nearest interlocking or nearest station. Light signals will be used more than they have been in the past, as each year shows an increasing use of this type of signal. Automatic train control will receive a large share of attention and the tendencies in this connection will be along lines of improvements and standardization as to its use and interchangeability on different roads.

179 miles No. 8 gage copper is being erected on the Union Pacific and 254 miles No. 10 gage on the central region of the Pennsylvania System as compared with 760 miles of other gage copper on all roads reporting.

A total of 13 metallic train despatching circuits are under construction, 12 being in the central region of the Pennsylvania, while a total of 11 physical and 6 phantom circuits is being put in by the various roads. Of the total of 18.3 miles of overhead cable going in, the Great Northern is installing 12.3 miles and the New York, New Haven & Hartford 5 miles. Out of a total of 6.2 miles of underground cable being put in, the N. Y., N. H. & H. is installing 4 miles. Of the 36 miles of railroad pole line under construction, 24.5 miles are being built on the Pennsylvania System, central region. This system is also installing 14 simplex circuits, one composite, seven physical and five phantom circuits. The Union Pacific has three printer circuits under construction.

Work Contemplated

Twenty-six roads report work contemplated in 1921. A mileage of 7,139 long distance telephone conversation circuits is under consideration on these roads, the quoted mileage being 4,935 on the Pennsylvania System. Of a total of all iron wire to be installed, 760 miles of No. 8 gage, 230 miles of No. 9 gage and 235 miles of No. 6 is contemplated, while 2,324 miles of No. 8 gage copper, 479 miles of No. 10 gage and 9,665 of other gages are to be put in.

A total of 17 metallic train despatching circuits having a mileage of 2,098 is expected to be built during the coming year. Forty-six physical and 19 phantom circuits are in contemplation for this year, while the Gulf & Ship Island expects to install 306 miles of grounded telephone circuits and other roads 122 miles of metallic yard circuits. The construction of 53 miles of railroad pole line is at present under consideration and considerable cable work is contemplated, there being a total of 62 miles of overhead cable and 58 miles of underground cable to be installed. The N. Y., N. H. & H. contemplates the installation of 10 printer circuits and the Union Pacific one; and the Pennsylvania contemplates putting in eight duplex circuits. The Denver & Rio Grande has 210 road miles (2 wires) metallic telephone despatching circuits awaiting authority for installation on the Third division narrow gage line between Salida, Colo., and Grand Junction. The reconstruction of the pole line on this section by the Western Union Telegraph Company is also under contemplation.

The Attitude of Investors Toward Railroad Securities

(Continued from page 56)

considerably lower than has been the case for many months net earnings will not touch favorable levels. In the meantime, however, it is expected that the carriers will make material decreases in their expenses. They have already decreased their working forces. The decreased costs of supplies will have their effect and this is especially true of fuel which has dropped considerably and is expected to drop much further. The general result will be that when business does pick up again, as it is hoped it will in the late spring or early summer, the carriers should be able to show net earnings on a better scale than the September or October results indicated.

In the first 10 months of 1920 the carriers financed, exclusive of the proceeds granted them from the revolving fund, about \$338,304,000, including refunding issues. Their needs for refunding for 1921 are estimated at \$446,000,000.

For additions and betterments the amounts needed in 1921 are variously estimated, although the authorities seem to agree that something like \$1,000,000,000 will be required. The question that arises, of course, is as to the possibilities of the carriers being able to finance these large amounts. It is the general opinion that the recession in the stock and bond market has ended and that from now on conditions should be much easier. It seems unlikely, however, that conditions will improve sufficiently in 1921 to permit of very much financing through stock issues.

Conditions as to bonds seem much better. It is thought that there will be a gradual reduction in interest rates in the course of the year. We can apparently expect also a more receptive bond market, in which case railway issues should be in what amounts practically to a preferred position as compared with industrial issues, and possibly even with government bonds. We have mentioned the increasing popularity of railroad bonds and there can be no doubt that this popularity and increased confidence in railway shares will show its effect in railway financing. The popularity of short term equipment trust issues has already been commented upon; it might be added that the plan of equipment financing worked out by the National Railway Service Corporation should prove of material assistance.

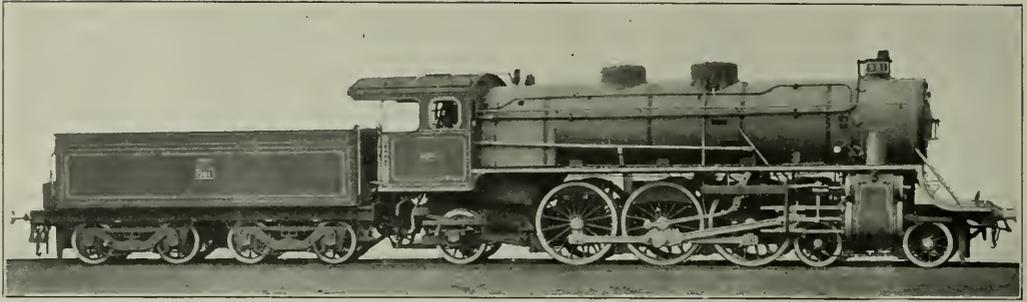
There is a certain drawback in the fact that so much financing will have to be in the form of funded debt and comparatively little in stock. This, in the minds of some, is encouraged by the strong guarantees given railway funded debt in the Transportation Act and in the manner in which the Interstate Commerce Commission has used the \$300,000,000 revolving fund for assisting the carriers in meeting their maturing indebtedness. No one could say that the commission has it in mind to protect bondholders as against stockholders. It happens to be the situation nevertheless and the remedy, it is feared, will not be in sight in satisfactory degree during 1921.

This brings us to the question of the progress that will probably be made as to consolidations during the coming few months. The commission is now engaged in working out the suggestions it is required to make under the terms of the Transportation Act.

The law says:

The commission shall as soon as practicable prepare and adopt a plan for the consolidation of the railway properties of the continental United States into a limited number of systems. In the division of such railways into such systems under such plan, competition shall be preserved as fully as possible and wherever practicable the existing routes and channels of trade and commerce shall be maintained. Subject to the foregoing requirements, the several systems shall be so arranged that the cost of transportation as between competitive systems and as related to the values of the properties through which the service is rendered shall be the same so far as practicable, so that these systems can employ uniform rates in the movement of competitive traffic and under efficient management earn substantially the same rate of return upon the value of their respective railway properties.

Bearing in mind that these consolidations are voluntary and that the act also withdraws handicaps to consolidations that carriers may have desired to work out in the past, it is very evident that from this point of view 1921 should prove a most interesting year. It is likely that if the commission makes sufficient progress the roads suggested for consolidation will see a speculative movement in their stocks that will be something of an exception from the past few years. The excitement that has already been evidenced in the cases of the large crop of rumors of consolidation proves that conclusively. While speculative movements in stocks are never desirable, it is nevertheless true that they do serve to increase popularity in the stocks concerned and related issues. Observers have sufficient confidence in the Interstate Commerce Commission to believe that the situation will be kept from getting out of hand.



One of the Locomotives Shipped to Spain by the American Locomotive Company in 1920

Railway Supply Exports Show Marked Decline

Adverse Conditions of Exchange and Credit Bring About a Temporary Lull in the Export Showings

THE EXPORTS of railway materials during the first ten months of 1920 fell short enough of the totals for the year 1919 to make it safe to predict that the exports for the whole year, the figures for which are not as yet available, will show a considerable decline from the 1919 totals, except in the case of steam and electric locomotives, where an increase will probably be shown. Taking freight cars as a case in point, it will be noted that the exports for 1919 were 27,317, valued at \$57,473,824, while the figures for the first ten months in 1920 give these totals as 18,932 and \$32,831,303. The year 1919 was a banner year for exports of railway materials, however, and the figures for that year are the only annual totals which exceed the exports of freight cars for the first ten months only in 1920. Much the same situation obtains as regards the other articles of export, i.e., the 1920 shipments, generally speaking, were less than those of 1919, but greater than those of any previous year.

It had been hoped in this country that the heavy export trade which American equipment manufacturers enjoyed in 1919 could be made permanent. Several conditions have arisen during the past year, however, which make the immediate fulfillment of this hope at least somewhat doubtful. The larger part of the shipments in 1919 were the results of orders placed in 1918 or in the early part of 1919. At that time the equipment manufacturers in other countries were either devoting a large part of their production to war materials or had not yet placed their plants on a peace time basis to an extent where they could handle the orders of their own countries, and it was practically impossible for them to make immediate foreign deliveries. Under such circumstances American manufacturers were practically without competition and sold their wares in almost every country where a market existed.

Conditions have changed somewhat during the past year. Manufacturers in foreign countries were able during 1919 and 1920 to resume production in increasing quantities. At first their factories were so disorganized that their costs of production were very high and American concerns could in most cases underbid their quotations. The situation for them in this regard has, however, steadily improved with the gradual return of pre-war efficiency. On the side of the foreign manufacturers and working in their behalf is the heavy premium on the American dollar which is practically world-wide and in many countries so high that purchases in

America are all but prohibitive. Under such circumstances our equipment builders have found it increasingly difficult to compete in prices with foreign manufacturers. The result is that fewer orders have been placed in this country and more are going to foreign concerns.

Another factor which has gone a long way in retarding purchases of railway materials in most countries is the impoverished condition of the greater part of the world as a result of heavy expenditures during the war. Most foreign roads have been in the position in which some of our own have found themselves—in actual need of great quantities of equipment but unable to finance the purchase of it.

The prospects for an early return to heavy exports of railway materials like those of 1919 do not appear as bright as might be wished. In the first place, the credit of the purchasers of this material must be restored so that they can make more purchases. Secondly, the rate of exchange must change so that foreign firms will not find it easy to underbid American manufacturers on account of it. Finally, the labor and raw material which go into the finished product must cost the American manufacturer no more than they do his foreign competitor. Labor costs per unit manufactured can be equalized in two ways: (1) by the same wage scale in America as in Europe or (2) by increased efficiency of American labor to the point where the labor cost per unit is the same as in Europe.

It does not seem at present that the buying power of foreign railways will greatly increase in the near future, nor is there any indication of an early return of the exchange rate to par. The securing of a reasonable cost of manufacture lies largely with the American manufacturers and their employees.

The *Railway Age* publishes each month the exports of railway materials as compiled by the Division of Foreign and Domestic Commerce. These interesting figures give an accurate account of materials shipped month by month with the value and destination. For purposes of comparison these reports have been summarized here.

Steam Locomotive Exports

The totals of exports of steam locomotives for each of the ten months to October have been compiled in Table I. It will be observed that from January 1 to October 31, 1920, 1,426 steam locomotives valued at \$45,227,046 were shipped.

By comparing these figures with those for other years, it will be noted that the exports of steam locomotives for 10 months in 1920 have exceeded in value, and approach in number, the totals for any previous year. From this it may be deduced that 1920, with two more months yet to be reported, bids fair to exceed the previous years in the number of locomotives

and December will be large enough to off-set them. The freight car situation affords even less hope of equaling even the 1919 figures. During the first ten months of the year 18,932 cars valued at \$32,831,303 were shipped. These figures fall far below the 1919 totals. Cuba was the destination of a large share of this equipment.

Table III gives the exports of car wheels and axles. The only figures which give a proper basis for comparison with these figures are those for 1918 and 1919, because the totals shown for other years are for car wheels only. It will be seen that the total for the first ten months has already exceeded the exports for 1918, but that there is little likelihood that the great value of these exports in 1919 will be reached.

Track Materials

The exports of railway track materials are shown in Table IV. Here the decline in shipments from 1919 has been great enough to be little short of remarkable. In point of quantity

TABLE I—EXPORTS OF STEAM LOCOMOTIVES

Month	Number	Value
January	146	\$4,189,214
February	132	4,580,074
March	125	3,672,579
April	157	4,449,736
May	152	5,906,046
June	163	4,248,348
July	134	4,742,306
August	125	5,424,588
September	154	4,105,405
October	138	3,494,750
Total for ten months of 1920	1,426	\$45,227,046

Comparison with Previous Years (Entire 12 Months)

Fiscal Year—	Number	Value
1914	383	\$3,692,225
1915	238	2,115,866
1916	799	12,665,877
1917	1,442	18,243,248
1918	1,457	35,889,632
Calendar Year—		
1918	1,062	27,064,042
1919	959	30,275,728

exported. It may be well to note here that the increase in value is due not alone to increased prices, but also to the increasing size and power of the locomotives which are being ordered each year from abroad.

Exports of Cars

In the case of cars the showing for 1920 is not so promising. The figures for the first ten months as shown in Table

TABLE II—EXPORTS OF CARS FOR STEAM RAILWAYS

Month	Passenger		Freight and other	
	No.	Value	No.	Value
January	16	\$205,811	1,724	\$3,032,309
February	6	83,365	1,986	3,574,366
March	8	103,474	1,649	2,489,551
April	17	232,224	2,761	5,382,961
May	14	110,798	1,884	3,789,237
June	2	25,851	945	1,031,798
July	1	45,000	2,575	4,825,290
August	—	—	2,643	4,181,391
September	3	5,900	1,838	3,061,817
October	22	73,500	927	1,462,603
Total for 10 months, 1920	89	\$885,923	18,932	\$32,831,303

Comparison with Previous Years (Entire 12 Months)

Fiscal Year—	No.	Value	No.	Value
1914	—	\$2,018,853	—	\$5,390,705
1915	—	509,024	—	1,198,806
1916	—	820,518	—	23,298,759
1917	—	1,217,199	—	26,769,793
1918	75	228,698	10,303	18,821,936
Calendar Year—				
1918	98	883,607	8,050	11,522,608
1919	104	1,606,540	27,317	57,473,824

II give a total of 89 passenger cars exported valued at \$885,923. These figures are somewhat under the total for the year 1919 and it is doubtful if the exports for November

TABLE III—EXPORTS OF CAR WHEELS AND AXLES

Month	No.	Value	Month	Value
January	\$652,251	July	\$1,476,881	
February	1,217,199	August	469,413	
March	789,265	September	543,753	
April	593,394	October	—	
May	756,027	Total 10 mos. 1920	\$7,690,481	
June	346,100			

Comparison with Previous Years (Entire 12 Months)

(Car Wheels Only Prior to 1918)

Fiscal year	No.	Value
1914	49,360	\$414,371
1915	20,985	183,290
1916	59,950	741,542
1917	88,381	2,385,973
1918	—	5,220,704
Calendar year		
1918	—	6,889,084
1919	—	11,843,758

TABLE IV—EXPORTS OF RAILWAY TRACK MATERIAL

Month	Spikes		Steel rails		Switches, frogs, splice bars, etc.	Dollars
	Pounds	Dollars	Tons	Dollars		
January	1,653,569	61,372	44,449	2,602,916	237,178	2,840,148
February	2,787,036	117,130	31,241	1,724,970	411,538	2,136,508
March	4,014,009	163,337	51,763	2,940,117	557,189	3,497,306
April	3,913,937	178,925	46,564	2,713,080	726,403	3,439,483
May	3,072,767	137,087	58,397	3,434,893	582,278	3,997,171
June	3,651,759	165,649	49,620	3,080,619	556,959	3,637,578
July	2,845,462	123,574	51,869	3,329,530	735,726	4,065,258
August	2,699,131	114,213	56,160	3,661,174	566,710	4,227,884
September	1,874,136	85,297	31,170	2,008,609	366,724	2,375,333
October	3,534,645	142,611	53,266	3,426,671	689,785	4,116,456
Total for 10 months, 1920	30,046,451	1,289,195	474,599	28,922,669	5,430,490	34,353,159

Comparison with Previous Years (Entire 12 Months)

Fiscal Year—	Pounds	Dollars	Tons	Dollars	Switches, frogs, splice bars, etc.	Dollars
1914	19,564,618	346,034	338,613	10,259,109	2,534,148	12,793,257
1915	12,289,203	203,663	159,587	4,537,978	2,407,490	7,045,468
1916	59,145,818	1,398,514	537,918	17,631,756	5,261,944	22,893,700
1917	42,809,961	1,502,430	594,389	25,405,469	9,108,617	34,514,086
1918	34,832,142	1,722,922	430,347	22,817,400	6,266,369	29,083,769
Calendar Year—						
1918	22,330,104	1,229,083	453,537	26,402,864	5,882,860	32,285,724
1919	55,487,231	2,896,073	652,443	38,986,855	9,280,725	48,267,580

the figures in all cases give the shipments for the first ten months of 1920 at little more than half those for 1919. Spikes weighing 30,046,451 pounds and valued at \$1,289,195; steel rails weighing 474,599 tons valued at \$28,922,669; and miscellaneous material valued at \$5,430,490 complete the totals for the ten months. While the showing is very unfavorable when compared with the peak year, 1919, the indications are that the full year 1920 will give totals as great, and in most cases greater, than any other year for exports of this material. The weight and value of shipments of spikes and rails have in the ten months exceeded the figures for any other year excepting 1919. Cuba and Japan were the destinations of large consignments of track material.

Table V shows the exports of electric locomotives which during 1920 will probably equal the 1919 figure in point of

TABLE V—EXPORTS OF ELECTRIC LOCOMOTIVES

Fiscal year	No.	Dollars
1914	48	\$437,452
1915	43	324,478
1916	62	452,324
1917	73	563,550
1918	39	161,453
Calendar year		
1918	67	183,200
1919	48	835,978
1920 (first 10 mos.)	60	861,580

number and possibly that of the banner year for export of electric locomotives, 1917, when 73 were shipped. In point of value the shipments for the first ten months of 1920 have already exceeded those of any previous year.

General News Department

The New York Section of the Signal Division of the American Railroad Association will hold its next meeting on Thursday evening, January 20, at the Hotel McAlpin, Sixth avenue and 34th street, New York City. Louis F. Vieillard, electrical inspector, Long Island Railroad, will present a paper on A. C. track circuits. Men on steam roads using A. C. track circuits are particularly invited to attend and to relate their experience with A. C. compared with D. C. track circuits.

A station, properly equipped, and attended by an agent, must be maintained, in Canada, at every place where the average railroad earnings have been not less than \$15,000 a year. This is in accordance with general order No. 54 of the Railway Commission. The commission has received an application, on behalf of the railroads, for an order amending No. 54 so as to make the limit \$25,000, of which \$4,000 must be on inward traffic. The application is made on the ground that the cost of maintenance of agency stations has more than doubled; and that the rule, if not changed, will require the maintenance of stations at points where there is but a small volume of business.

Wood Preservers' and Tie Producers' Associations Meet in San Francisco

The American Wood Preservers' Association will hold its seventeenth annual convention at the St. Francis Hotel, San Francisco, Cal., on January 25, 26 and 27. The National Association of Railroad Tie Producers will hold its third annual convention at the same hotel on January 27 and 28. The programs for these two conventions have been completed and are published in abstract below.

In view of the increasing use of western timber throughout the central and eastern states, members of these associations are taking advantage of the opportunity to make first-hand study of lumber conditions in those areas. Special cars will leave Chicago on January 15, with connecting cars from St. Louis and Kansas City, arriving at Seattle, January 19, where four days will be spent in studying the timber resources and methods of producing lumber in the northwest. The party will arrive at San Francisco Tuesday morning, January 25, prior to the opening of the Wood Preservers' convention.

WOOD PRESERVERS' PROGRAM

Tuesday Morning.

Opening business.

Tuesday Afternoon.

Report of Committee on Preservatives.

Paper on Creosol, by R. G. Smith.

Report of Committee on Utilization and Service.

Report of Committee on Track.

Paper on Selection and Treatment of Douglas Fir Ties, by A. C. Pestel.

Report of Committee on Flooring and Paving.

Wednesday Morning.

Report of Committee on Treatment.

Report of Committees on Fir Ties and Blocks.

Paper on Treated Lumber in Insulating Roofs of Moist Factories, by F. J. Hoxie.

Paper on History of Wood Pipe and Some Data on Its Use, by E. F. Bartells.

Wednesday Afternoon.

Paper on Experiments with Butt Treated Poles in California, by P. R. Hicks.

Paper on Perforated Butt Treated Poles, by W. M. Leavitt.

Paper on Wood Preservation as a Conservative Policy, by Walter Buebler.

Paper on Description of Process Used to Treat Pole Butts in Place, by E. F. Hartman.

Thursday Morning.

Report of Committees on Pressure and Non-Pressure Treatment of Poles.

TIE PRODUCERS' PROGRAM

Thursday Afternoon.

Convention opens at 1:30 p. m.

Address by Edmund W. Blake, president.

Report of Committee on Specifications, dealing principally with the specifications and inspection rules proposed by the Tie Committee of the American Railway Engineering Association for adoption by that association. These specifications will be discussed with reference to yellow pine ties by R. E. McKee, The Long-Bell Lumber Company; white and red oak ties by Walter Poleman, The Western Tie & Timber Company; redwood ties by H. M. Cochran, The Union Lumber Company; Douglas fir ties by R. L. France, The Southern Pacific; ties manufactured from Rocky Mountain timber by B. Coldren, The Hallack & Howard Lumber Company, and ties manufactured from cedar and northern hardwoods, by Benjamin Finch, of Finch Brothers.

Friday Morning.

Reports on tie production from the 11 tie producing districts of the association.

The Relation Between the Tie Producers, Treating Plants and the Railroads, by R. A. Calvin, The Kettle River Company.

The Various Factors Entering into the Cost of Delivered Cross Ties, Both to Producing and Non-Producing Roads, by Howard Andrews.

The Nashville Tie Company.

The Function and Necessity of the Small Mill in Tie Production, by J. S. McCladry, The Bohemia Lumber Company.

Friday Afternoon.

The Use of Mechanical Power in the Production of Cross Ties, by R. J. Withrell, of L. D. Leach & Co.

The Timber Resources of the United States with Special Reference to the Pacific Coast, by C. L. Hill, in charge of office of Forest Products, California district, U. S. Forest Service.

The Tie Supply of the Future, by John Foley, forester, Pennsylvania Railroad.

The Effect of Increased Costs of Cross Tie Renewals upon Permissible First Cost of Ties in the Track, by R. H. Howard, chief engineer maintenance of way, Wabash Railway.

The Economics of Railroad Tie Purchasing, by E. E. Pershall, T. J. Moss Tie Company.

Open discussion standardized specifications and inspection and action upon them by the association.

On Saturday a special train will carry the members of the two associations and their guests into the redwood forest near Santa Cruz, Cal.

Central Railway Club

The next meeting of the club will be held on Thursday evening, January 13, at Hotel Iroquois, Buffalo, N. Y. There will be an exhibition of moving pictures showing the manufacturing methods of the Eddystone plant of the Baldwin Locomotive Works, with an explanatory address by A. H. Ehle, general sales manager. Officers for the new year will be installed.

Program of the Annual Meeting of the A. S. C. E.

The following is a summary of the meetings and excursions planned for the 68th Annual Meeting of the American Society of Civil Engineers to be held at the headquarters of the society at 33 West Thirty-ninth street, New York, on January 19 and 20, 1921:

Wednesday, January 19.

10 a. m.—Business meeting.

1.15 p. m.—Luncheon.

2:30 p. m.—For the benefit of the society's guests, as well as for its members in case the business meeting does not continue through the afternoon, arrangements have been made whereby those who desire may have the choice of visiting any or all of the following places of interest:

- (1) Experimental laboratories, Western Electric Company.
 - (2) Surveying and Engineering Instrument Factories of Keuffel & Esser Company, Hoboken.
 - (3) Fox Film Corporation Motion Picture Studios and Laboratories.
 - (4) New buildings under construction for Fletcher's Castoria Company and Western Electric Company.
 - (5) Long Distance Telephone Exchange, American Telephone and Telegraph Company.
- 9 p. m.—President's reception, followed by dancing.

Thursday, January 20.

- 9:45 a. m.—Excursion to Long Island City.
- 1 p. m.—Luncheon, Metropolitan Life Insurance Company Building (Manhattan).
- 2:30 p. m.—Address by President, Metropolitan Life Insurance Company.
- 3-4:30 p. m.—Inspection of "Human Engineering" Work and the buildings of the Metropolitan Life Insurance Company.
- 8:30 p. m.—Address and informal smoker.

Meetings and Conventions

The following list gives names of secretaries, dates of next or regular meetings and places of meetings:

- AIR BRAKE ASSOCIATION.—F. M. Nellis, Room 3014, 163 Broadway, New York City. Exhibit by Air Brake Appliance Association.
- AIR BRAKE APPLIANCE ASSOCIATION.—Fred W. Venton, 836 So. Michigan Ave., Chicago. Meeting with Air Brake Association.
- AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—E. A. Pontius, Supervisor of Demurrage and Storage, C. & N. W. Ry., Chicago.
- AMERICAN ASSOCIATION OF DRIVING CAR SUPERINTENDENTS.—S. W. Derr, Philadelphia and Delaware, Philadelphia, Pa.
- AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, Illinois Central, Chicago. Next meeting June 20, 1921.
- AMERICAN ASSOCIATION OF GENERAL BAGGAGE AGENTS.—E. L. Duncan, C. & N. W. Ry., Chicago, Chicago, Chicago.
- AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.
- AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—J. Rothschild, Room 400, Union Station, St. Louis, Mo. Next convention, August 24-26, 1921, Kansas City, Mo.
- AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Burritt, 8 W. 40th St., New York.
- AMERICAN RAILROAD MASTER TINNERS', COPPERSMITHS' AND PIPE FITTERS' ASSOCIATION.—C. Berchardt, 202 North Hamlin Ave., Chicago, Ill.
- AMERICAN RAILWAY ASSOCIATION.—J. E. Fairbanks, 75 Church St., New York.
- Telephone and Telegraph Section.—E. H. Fritch, 431 South Dearborn St., Chicago.
 - Division 1, Operating (including former activities of Association of Railway Telegraph Superintendents).—W. J. Frupp (chairman), General Manager, N. Y. C. R. R., New York; H. Hulst (chairman), Manager of Telegraphs, Grand Trunk. Exhibit by Railway Telegraph and Telephone Appliance Association.
 - Division 2, Transportation (including former activities of Association of Transportation and Car Accounting Officers).—E. J. Pearson (chairman), President, N. Y. N. H. & H. R. R., New Haven, Conn.
 - Division 3, Traffic.—Robert C. Wright (chairman), General Traffic Manager, P. R. R., Philadelphia, Pa.
 - Division 4, Engineering.—E. H. Fritch, 431 South Dearborn St., Chicago. Next annual meeting, March 15-17, 1921, Chicago.
 - Construction and Maintenance Section.—E. H. Fritch, secretary.
 - Electrical Section.—George Gibbs (chairman), Chief Engineer of Electric Traction, Long Island Railroad, New York.
 - Signal Section.—H. S. Balliet, 75 Church St., New York. Exhibit by Signal Appliance Association.
 - Division 5, Mechanical (including former activities of Master Car Builders' and Master Mechanics' Association).—V. R. Hawthorne, 431 South Dearborn St., Chicago. Next convention June 15-22. Atlantic City, N. J. Exhibit by Railway Supply Manufacturers' Association.
 - Equipment Painting Section.—V. R. Hawthorne, secretary.
 - Division 6, Purchases and Stores (including former activities of Railway Storekeepers' Association).—J. P. Murphy, General Storekeeper, N. Y. C. R. R., New York.
 - Ohio. Second annual meeting, June 20-22, 1921, Atlantic City, N. J.
 - Division 7, Freight Claims (including former activities of the Freight Claim Association).—Lewys Pilcher, 431 South Dearborn St., Chicago.
 - Division 8, Perishable Freight.—E. F. McPike (chairman), 431 South Dearborn St., Chicago.
- AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Litchy, C. & N. W. Ry., 319 W. Waller Ave., Austin Station, Chicago. Next convention in New York City. Exhibit by Bridge and Building Supply Men's Association.
- AMERICAN RAILWAY ENGINEERING ASSOCIATION.—(Works in co-operation with the American Railroad Association, Section II.)—E. H. Fritch, 431 South Dearborn St., Chicago. Next annual meeting, March 15-17, 1921, Chicago. Exhibit by National Railway Appliance Association.
- AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—(See American Railway Association, Division 5.)
- AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—R. D. Fletcher, 1145 East Marquette Road, Chicago. Exhibit by Supply Association of American Railway Tool Foremen's Association.
- AMERICAN SHORT LINE RAILROAD ASSOCIATION.—T. F. Whittelsey, Union Trust Bldg., Washington, D. C.
- AMERICAN SOCIETY FOR TEST MATERIALS.—C. L. Warwick, University of Pennsylvania, Philadelphia, Pa.
- AMERICAN SOCIETY OF CIVIL ENGINEERS.—Col. H. S. Crocker (acting secretary), Engineering Societies Building, 33 W. 39th St., New York. Annual meeting, January 19-20, 1921, 33 W. 39th St., New York. Regular meetings, 1st and 3d Wednesday in month, except July and August, 33 W. 39th St., New York.
- AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 49th St., New York.
- AMERICAN STEEL TREATERS' SOCIETY.—W. H. Eisenman, 154 East Erie St., Chicago.
- AMERICAN TRAIN DISPATCHERS' ASSOCIATION.—C. L. Darling, Northern Pacific Ry., Spokane, Wash. Next convention, June 20, 1921, Kansas City, Mo.
- AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Mt. Royal Sta., Baltimore, Md. Next annual meeting, January 23-27, 1921, San Francisco.
- ASSOCIATION OF RAILWAY CLAIM AGENTS.—Willis H. Failing, C. R. R. of N. J., Jersey City, N. J. Next meeting at St. Louis, Mo.
- ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago. Exhibit by Railway Electrical Supply Manufacturers' Association.
- ASSOCIATION OF RAILWAY EXECUTIVES.—Thomas De Witt Cuyler (chairman), 492 Broadway, New York, N. Y.
- ASSOCIATION OF RAILWAY SUPPLY MEN.—C. L. Mellor, 212 W. Illinois St., Chicago. Meeting with International Railway General Foremen's Association.

- ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—(See American Railway Association, Division 1.)
- ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—(See American Railway Association, Division 2.)
- BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—A. J. Filkins, Paul Dickinson Company, Chicago. Meeting with convention of American Railway Bridge and Building Association.
- CANADIAN RAILWAY CLUB.—A. Booth, 131 Charbon St., Montreal, Que. Next meeting, December 14.
- CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 626 North Pine Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, New Morrison Hotel, Chicago.
- CAR FOREMEN'S ASSOCIATION OF ST. LOUIS.—Thomas B. Konecne, Federal Reserve Bank Bldg., St. Louis, Mo. Meetings first Tuesday in month at the American Hotel Annex, St. Louis, Mo.
- CENTRAL RAILWAY CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 2d Thursday in November and 2d Friday in January, March, May and September, Hotel Statler, Buffalo, N. Y.
- CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S ASSOCIATION.—J. C. Keene, General Car Inspector, Wabash R. R., Decatur, Ill.
- CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S SUPPLY MEN'S ASSOCIATION.—W. P. Elliott, Terminal R. R. Ass'n of St. L., East St. Louis, Mo.
- CINCINNATI RAILWAY CLUB.—H. Boulet, 101 Carew Bldg., Cincinnati, Ohio.
- EASTERN RAILROAD ASSOCIATION.—D. G. Stuart, Washington, D. C.
- FREIGHT CLAIM ASSOCIATION.—(See American Railway Association, Division 7.)
- GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 321 Grand Central Sta., Chicago. Regular meetings, Wednesday preceding 3d Friday in month, Room 856, Insurance Exchange Bldg., Chicago.
- INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—W. J. Mayer, Michigan Central R. R., Detroit, Mich.
- INTERNATIONAL RAILROAD MASTER CARBONERS' ASSOCIATION.—J. G. Crawford, 702 E. 51st St., Chicago. Next annual meeting, May, 1921, Hotel Sherman, Chicago.
- INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 1061 W. Washington Ave., Winona, Minn. Exhibit by Association of Railway Supply Men.
- MAINTENANCE OF WAY MASTER PAINTERS' ASSOCIATION.—E. E. Martin, Union Pacific R. R., Room No. 19, Union Pacific Bldg., Kansas City.
- Next convention, October 4-6, 1921, Buffalo, N. Y.
- MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York. Next convention, May 23-26, 1921, Planters' Hotel, St. Louis, Mo.
- MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—(See American Railway Association, Division 5, Equipment Painting Section.)
- MASTER CAR BUILDERS' ASSOCIATION.—(See American Railway Association, Division 5.)
- NATIONAL ASSOCIATION OF RAILROAD TIE PRODUCERS.—E. E. Pershall, T. J. Moss Tie Company, 720 Security Bldg., St. Louis, Mo. Next annual convention, January 27-28, 1921, San Francisco.
- NATIONAL ASSOCIATION OF RAILWAY AND UTILITIES COMMISSIONERS.—James B. Walker, 49 Lafayette St., New York.
- NATIONAL FOREIGN TRADE COUNCIL.—O. K. Davis, 1 Hanover Square, New York.
- NATIONAL RAILWAY APPLIANCES ASSOCIATION.—C. W. Kelly, Kelly-Derby Co., Peoples Gas Bldg., Chicago. Meeting with American Railway Engineering Association.
- NEW ENGLAND RAILWAY ASSOCIATION.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, excepting months of June, July, August and September.
- NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 3d Friday in month, except June, July and August, 29 W. 30th St., New York.
- PACIFIC RAILWAY CLUB.—W. S. Wollner, 64 Pine St., San Francisco, Cal. Regular meetings, 2d Thursday in month, alternately in San Francisco and Oakland.
- RAILWAY ACCOUNTING OFFICERS' ASSOCIATION.—E. R. Woodson. Next annual meeting, June 8, 1921, Hotel Traymore, Atlantic City, N. J.
- RAILWAY BOILERMAKERS' ASSOCIATION.—Frank W. Dixon, 600 Liberty Bldg., Broad and Chestnut Sts., Philadelphia, Pa.
- RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, 515 Grandview Ave., Pittsburgh, Pa. Regular meetings, 4th Thursday in month, except June, July and August, Athletic Club, Harrisburg, Pa.
- RAILWAY DEVELOPMENT ASSOCIATION.—D. C. Welly, Missouri Pacific R. R., Little Rock, Ark.
- RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, Central Electric Co., Chicago. Annual meeting with Association of Railway Electrical Engineers.
- RAILWAY EQUIPMENT MANUFACTURERS' ASSOCIATION.—D. L. Eubank, Galena Signal Oil Company, Richmond, Va. Meeting with Traveling Engineers' Association.
- RAILWAY FIRE PROTECTION ASSOCIATION.—R. R. Hackett, Baltimore & Ohio R. R., Baltimore, Md.
- RAILWAY REAL ESTATE ASSOCIATION.—R. II. Morrison, C. & O. Ry., Richmond, Va.
- RAILWAY SIGNAL ASSOCIATION.—(See American Railway Association, Division 4, Signal Section.)
- RAILWAY TOOL FOREMEN'S ASSOCIATION.—(See American Railway Association, Division 6.)
- RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 1841 Oliver Bldg., Pittsburgh, Pa. Meeting with American Railway Association, Division 5.
- RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, Waterbury Battery Co., 30 Church St., New York.
- ROADMASTERS AND MAINTENANCE OF WAY ASSOCIATION.—F. I. McAndrews, C. & N. W. Ry., Sterling, Ill. Next annual convention, September 20-22, 1921, Chicago. Exhibit by Track Supply Association.
- ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August.
- SIGNAL APPLIANCE ASSOCIATION.—F. W. Teal, Teal, Schrodter, Headlight & Generator Co., New York City. Meeting with American Railway Association, Signal Section.
- SOCIETY OF RAILWAY FINANCIAL OFFICERS.—L. W. Cox, 1217 Commercial Trust Bldg., Philadelphia, Pa.
- SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, P. O. Box 1205, Atlanta, Ga. Regular meetings, 3d Thursday in January, March, May, July, September and November, Piedmont Hotel, Atlanta.
- SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, Western Ry. of Ala., Atlanta, Ga.
- SUPPLY ASSOCIATION OF RAILWAY TOOL FOREMEN'S ASSOCIATION.—C. N. Thulin, Duff Manufacturing Company, 935 Peoples Gas Bldg., Chicago.
- TRACK SUPPLY ASSOCIATION.—W. C. K'dd, Ramapo Iron Works, Hillburn, N. Y. Meets with Roadmasters and Maintenance of Way Association.
- TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. R. R., Buffalo, N. Y. Exhibit by Railway Equipment Manufacturers' Association.

Traffic News

The Gulf Coast Lines announce that, beginning February 1, a sleeping car will be run regularly between Houston, Texas, and Tampico, Mexico, via Brownsville and Matamoros.

The Supreme Court of New York, at Kingston, has authorized the reopening of the case in which the Court of Appeals recently decided that the New York Central must carry way passengers between Albany and Buffalo at the rate of 2 cents a mile, notwithstanding the order of the Interstate Commerce Commission prescribing a higher rate.

The Interstate Commerce Commission has vacated and set aside as of December 31 its Service Order No. 1 issued on May 20, which authorized and directed railroads to route freight regardless of the routing instructions of shippers or of connecting lines, to relieve congestion, and also its Service Order No. 13 issued on August 24, authorizing carriers to unload cars of grain at Galveston. The emergency which caused the issuance of these orders has been measurably relieved.

The Southern Pacific announces that the Sunset Route via New Orleans has been reopened for through passenger travel on the basis of fares applying over other routes, to and from the eastern and northern territory served by the Sunset Route for 37 years prior to the closing of the New Orleans gateway in October, 1919, by the Railroad Administration. This means that from Chicago, Louisville, Cincinnati and points east thereof, to all points in California, the fares are now as low through New Orleans as those over the other lines.

The Traffic and Transportation Association, of Pittsburgh, Pa., held its election of officers on December 10. S. R. Hosmer, of the Jones & Laughlin Steel Company, was elected president; H. A. Dietz, of the Delaware & Hudson, vice-president; George E. Gree, of the Union Pacific, treasurer; R. F. Heil, of the Guth Refining Company, recording secretary; F. E. Wolfe, of the Atchison, Topeka & Santa Fe, financial secretary; and H. L. Geyer, of the Carnegie Steel Company, custodian. H. A. Cochran, of the A. M. Byers Company, was elected chairman of the executive committee; E. A. Hynes, of the Chicago & Alton; W. H. Spilker, of the Pittsburgh Terminal Warehouse & Transfer Company; A. C. Schweitzer, of the Tonnage Steel Company, and H. A. Dietz are the other members.

Coal Production

Production of soft coal decreased during the week ended December 25, not only because of the Christmas holiday but also because of a smaller rate of output per working day. The total production is estimated at 9,725,000 net tons. Cumulative production for the calendar year to December 25, amounted to 547,264,000 net tons. If the rate of production be continued during the five remaining days of the year, the total output will be 556,000,000 tons. Production during the first 303 working days of the year was over 1,000,000 tons greater than that for 1917, but 25,000,000 tons less than that for 1918, although 97,000,000 tons greater than that for 1919.

Equipment and Supplies

Locomotives

THE FLORIDA EAST COAST is asking for prices on 5 switching and 10 Pacific type locomotives.

THE INTERNATIONAL & GREAT NORTHERN is inquiring for 4 Mikado and 4 switching locomotives.

Freight Cars

THE JERRY MUGIVAN CIRCUS interests, Peru, Ind., are inquiring for 20 flat cars of 30-ton capacity.

THE SOUTH AFRICAN RAILWAYS are inquiring through their London, Eng., office for 200 gondola cars.

THE UNITED FRUIT COMPANY, Pier 9, North river, New York, is inquiring for 40 box cars and 40 flat cars of 16 tons capacity.

MITSUI & Co., 65 Broadway, New York, has ordered from the Kilbourne & Jacobs Manufacturing Co., 50 air dump cars for the Japanese Government, to be used in Formosa.

Passenger Cars

THE FLORIDA EAST COAST is asking for prices on 6 passenger cars.

THE DEPARTMENT OF CITY TRANSIT, Philadelphia, Pa., William S. Twining, director, is asking for bids until January 25, for from 50 to 100 steel passenger car bodies for steel passenger cars, for elevated and subway service and for from 54 to 104 motor trucks.

Iron and Steel

THE SOUTHERN RAILWAY has ordered 5,000 tons of rails from the United States Steel Corporation.

THE BALTIMORE & OHIO has ordered 15,000 tons of rails from the United States Steel Corporation.

THE ATCHISON, TOPEKA & SANTA FE has ordered 40,000 tons of rails from the United States Steel Corporation.

THE CHICAGO UNION STATION COMPANY has ordered 700 tons of structural steel from the Bethlehem Steel Company for use in the construction of the Van Buren street viaduct, Chicago.

THE NEW YORK, CHICAGO & ST. LOUIS has placed an order for 3,000 tons of open-hearth rails, for 1921 delivery, with the Carnegie Steel Company, increasing its order from this producer to 9,000 tons.

Miscellaneous

MITSUI & Co., 65 Broadway, New York, has ordered 3,200 couplers from the National Malleable Castings Company, to be used on the Japanese Government railways.

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Supply Trade News

Emanuel Woodings has been elected vice-president of the Verona Tool Works, Pittsburgh, Pa. Mr. Woodings has been connected with the company 33 years.

A. G. Shaver, chief engineer of the **Regan Safety Devices Company, Inc.**, Chicago, has been in England and has made a tour of the Continent, making a study of train control conditions there.

The Du Pont Fabrikoid Company, Inc., Wilmington, Del., announces that its entire business has been sold to E. I. Du Pont De Nemours & Co., Inc., also of Wilmington, and is now operated as the Fabrikoid division of that company.

Howard H. Marsh, for nearly eight years district manager of the *Railway Age* and the other publications of the Simmons-Boardman Publishing Company at Cleveland, Ohio, has

resigned to become president of the **Victory Equipment Company**, with office at 444 Maison Blanche Annex, New Orleans, La. As head of the Victory Equipment Company, he will handle the following accounts: McMyler-Interstate Company, Cleveland, locomotive cranes, pile drivers and material handling equipment; Ball Engine Company, Erie, Pa., steam shovels and railroad ditchers; Schaefer Equipment Company, Pittsburgh, Pa., truck lever connections, brake levers, brake rod jaws and stake

pockets; and Equipment Manufacturing Company, Cleveland, trucks and trailers. His education, business experience and wide acquaintance fit Mr. Marsh for his new undertaking. He is still a young man, having graduated at the University of Vermont in 1903, with the degree of B. S. in civil engineering. That same year he entered the employ of Engineering News (now Engineering News-Record) as assistant to the western manager, and stayed there until 1907, when he was appointed western representative of Engineering & Contracting, with headquarters in Chicago. He left the latter place to go to Cleveland as district manager of the Simmons-Boardman Publishing Company. Mr. Marsh's removal to New Orleans is due to his desire to be near his family, as it was necessary for Mrs. Marsh to take up her residence in the southwest in order that her health might be restored. In addition to his other work, Mr. Marsh will represent the Simmons-Boardman Publishing Company in the southwestern territory.

W. H. Darrah, sales representative for the **Upson Nut Company**, and the **Bourne-Fuller Company**, of Cleveland, Ohio, and Chicago, is now connected with the **Michigan Bolt & Nut Works of Detroit, Mich.**, as sales representative in the Chicago territory.

George S. Bigelow, formerly manager of the railway department of the **Railway Varnish Company**, is now in charge of the railway department of the **Mountain Varnish & Color Works, Inc.**, of Toledo, Ohio, with offices in the Railway Exchange Building, Chicago.

John B. Zymour, formerly with the **National Lock Washer Company**, Newark, N. J., has been appointed manager of the sales department of the **Verona Tool Works**, Pittsburgh, Pa.,

with headquarters at Chicago, succeeding **Howard C. Mull**, who has resigned to go to another company, as noted in the *Railway Age* of December 31.

William S. Boyce, for a number of years connected with **The Rail Joint Company**, New York, has been appointed western manager of sales for the **Lundie Engineering Corporation** with headquarters at 30 North La Salle street, Chicago, Ill.

Harry B. Stafford, who has opened an office as consulting industrial labor administrator in the **Hudson Terminal**, 30 Church street, New York, as noted in these columns last week, was formerly for some three years major in the Construction Division of the United States Army, instead of manager, as incorrectly stated.

F. Lavis will resume his independent practice as consulting engineer at 120 Broadway, New York City, specializing in transportation developments and especially in those relating to foreign countries. He has been retained by the **American International Corporation**, New York, with which he has been associated since its inception.

John S. Lemley, for five years general sales agent of the **G. F. Cottor Supply Company**, Houston, Tex., and later associated with **William D. Jenkins**, dealer in railway supplies, St. Louis, Mo., has been appointed sales representative for southeastern territory for **Harry Vissering & Co.**, the **Okadee Company**, Chicago, and the **Charles R. Long, Jr., Company**, Chicago, effective January 1.

Lima Locomotive Works Changes

Lewis A. Larsen, assistant to the president of the **Lima Locomotive Works, Inc.**, has been elected vice-president and **Waldo H. Marshall** has been elected a director.

Mr. Marshall was formerly president of the **American Locomotive Company** and later resigned to go with **J. P. Morgan & Co.**

Mr. Larsen was born at **Ridgeway, Ia.**, in 1875. He received his early education in the public schools of **Ridgeway** and **Decorah, Ia.**, and **Upper Iowa University**, **Northwestern University** and **St. Paul College of Law**. In **November, 1897**, he entered the service of the **Chicago Great Western** as clerk to the master mechanic. He held successively the position of chief clerk to the

superintendent of motive power and chief clerk to the assistant general manager. In 1904 he resigned to accept the position of chief clerk to the superintendent of motive power of the **Northern Pacific** at **St. Paul**. In **November, 1906**, he became associated with **W. H. S. Wright**, railway supplies, representing the **Railway Steel Spring Company**, the **Pittsburgh Forge & Iron Company** and other companies, and in 1907 entered the service of the **American Locomotive Company**. In 1909 he was appointed assistant to the vice-president in charge of manufacturing, and **July, 1917**, was appointed assistant controller. For several years previous to 1917 Mr. Larsen was a special lecturer in the **Alexander Hamilton Institute**, **New York**. He has also contributed a number of papers to the railroad magazines. In **December, 1917**, he was appointed assistant to the president of the **Lima Locomotive Works**.

R. F. Eissler, has been appointed assistant to the vice-president of the **Chicago Pneumatic Tool Company**, **New**



H. H. Marsh



L. A. Larsen

York, with headquarters in the company's new office building at 6 East Forty-fourth street, New York. **W. C. Straub**, formerly district manager of the New Orleans branch, has been appointed district manager of the Pittsburgh branch to succeed Mr. Eissler, and **Ross Wyeth**, formerly attached to the Pittsburgh branch, has been appointed district manager of the New Orleans branch to succeed Mr. Straub.

On January 1, the general offices of the **Stone Franklin Company** were removed from 18 East Forty-first street, New York, to 6400 Plymouth avenue, St. Louis, Mo. This change brings the office in close connection with its manufacturing plant. In addition to its general offices in St. Louis, the Stone Franklin Company will also maintain a New York office at 30 Church street, in charge of president **Ralph G. Coburn** and vice-president **C. E. Walker**. **H. D. Rohman**, at present chief engineer of the company, has been appointed vice-president, with office at St. Louis, in addition to his present duties. He will have jurisdiction over sales in the west.

The **B. F. Goodrich Rubber Company**, Akron, Ohio, on December 31, 1920, celebrated its golden anniversary. The company was incorporated December 31, 1870, by Dr. Benjamin Franklin Goodrich. In a golden anniversary greeting to employees and customers, President B. G. Work said in part: "We feel a thrill of pride as we look back over the years and realize the part we have played in the development of the rubber industry." The Goodrich company commemorated the golden anniversary by publishing an attractive 48-page book called the Golden Year of Goodrich, telling of the romance of the rubber industry, its history, and of what great importance it has been in the progress and development of the world. The book was written by Wilbur D. Nesbit and illustrated by W. T. Benda, the Polish-American painter.

Obituary

WILLIAM ROBINSON

Dr. William Robinson, inventor of the closed track circuit, the distinctive essential element in the automatic block signal system used on all the important railroads of the United States, died at the Muncie Sanitarium, in Brooklyn, N. Y., on Sunday, January 2, at the age of 80. He was born at Cole Island, County Tyrone, Ireland. He was unmarried and had lived in Brooklyn 76 years. He was an inventor in many fields and is credited with an electric welding process and the coaster brake for bicycles. He was a fellow of the American Institute of Electrical Engineers and an honorary member of the Signal Division of the American Railroad Association.

Dr. Robinson's experiments with track circuits began more than fifty years ago. He installed a section, open circuit, on the Philadelphia & Erie, now a part of the Pennsylvania, at Kinzua, Pa., in 1870, one of the co-operating railroad officers being the late Theodore N. Ely, afterward chief of motive power of the Pennsylvania Railroad. The closed circuit, which is the chief element in Robinson's fame, was tried on the same road in 1871, and a patent applied for. He took out patents on other features of automatic signaling, but in a list of electric signal patents published by the Union Switch and Signal Company in 1894, Robinson's name appears only once, namely, November 7, 1882, patent number 267,259. Like all other patentees of important inventions, he had to fight long years in the courts for his rights.

In 1876 Robinson went to Boston and his first extensive experiments were made on the Boston & Lowell, the Boston & Providence, and the Old Colony. In 1878 he formed the Union Electric Signal Company, which about two years later was bought by George Westinghouse and became the Union Switch & Signal Company.

To Robinson, inventor of the closed track circuit, and Professor Joseph Henry (1799-1878), inventor of the electromagnet, the world is indebted for one of the most wonderful elements in modern high-speed railroading, the automatic block signal. All of the automatic signals of American railroads depend on these two features.

Railway Financial News

ATCHISON, TOPEKA & SANTA FE.—This company has declared the regular quarterly dividend of 1½ per cent on its common stock, payable March 1 to stock of record January 28.

BALTIMORE & OHIO.—The Interstate Commerce Commission has authorized this company to nominally issue \$7,586,000 of refunding and general mortgage bonds to be held in its treasury and to issue and pledge \$362,000 of its Pittsburgh & Lake Erie and West Virginia System refunding 4 per cent gold bonds as additional collateral security for the refunding and general mortgage bonds; also to issue and pledge \$1,000 of its Pittsburgh Junction and Middle Division first mortgage bonds as additional collateral security for its Pittsburgh, Lake Erie & West Virginia bonds. Authority was also granted to various subsidiary companies to issue and deliver their bonds to the Baltimore & Ohio Company's nominees in payment for additions, improvements and betterments. Authority was also granted to issue conditional sale purchase notes for the conditional purchase of equipment under the terms of the contract entered into with the National Railway Service Corporation, to assume liability as guarantor in respect of an application of the service corporation to the United States for a loan on account of the equipment, and to pledge \$3,250,000 of its refunding and general mortgage bonds as security in part for the performance of obligations under the equipment trust.

BOSTON & MAINE.—This company has been authorized by the Interstate Commerce Commission to issue \$609,000 of mortgage bonds dated January 1, 1921, at 7 per cent, to be sold or exchanged for the retirement of bonds of subsidiary companies.

BUFFALO, ROCHESTER & PITTSBURGH.—The Interstate Commerce Commission has approved a loan of \$1,000,000 to this company to aid the company in meeting its maturing indebtedness in a total principal amount of \$1,987,000. The company itself is required to finance \$987,000 to meet the loan of the government.

CAROLINA, CLINCHFIELD & OHIO.—The Interstate Commerce Commission has authorized this company to issue \$5,000,000 of 15-year 6 per cent cumulative income debentures dated July 1, 1920, and payable July 1, 1935, the proceeds of which are to be applied to the payment or discharge of outstanding short term notes and expenses and other current indebtedness.

CENTRAL OF GEORGIA.—This company has applied to the Interstate Commerce Commission for authority to issue \$650,000 of equipment trust certificates at 7 per cent, representing 55 to 60 per cent of the cost of equipment proposed to be acquired at the cost of \$1,066,123. The certificates are to be sold to bankers on a 7½ per cent basis and the balance of the purchase price the company expects to obtain in part from a loan of \$237,912 from the United States Government.

CHICAGO & ALTON.—This company has decided not to accept the government's compensation offer of \$3,178,314, which represents the road's standard return. The directors asked for \$4,592,500 and hold that compensation based simply on standard returns is not sufficient. An appeal will be made to the Court of Claims.

CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA.—This company has applied to the Interstate Commerce Commission for authority to issue a promissory note for \$1,000,000 to the Chicago & North Western in renewal of an existing note and to repledge as collateral \$1,200,000 of its debenture gold bonds maturing 1930.

CINCINNATI, NEW ORLEANS & TEXAS PACIFIC.—This company has been authorized by the Interstate Commerce Commission to assume as lessee of the Cincinnati Southern the obligation of paying as additional rental the interest on \$3,500,000 of 5 per cent gold bonds of the City of Cincinnati and of paying annually 1 per cent to provide a sinking fund.

FREDERICKSBURG & NORTHERN.—This company has applied to the Interstate Commerce Commission for a loan of \$20,000 from the

government for three years to be used in the purchase of a second-hand locomotive. The company says in its application that the lone engine now possessed is 39 years old and will not last any longer.

ILLINOIS SOUTHERN.—This road, which ceased operations under a court order in December, 1919, has been purchased by W. F. Carter, an attorney of St. Louis Mo. The road extends from Salem, Ill., to Bismarck, Mo., about 140 miles.

MICHIGAN CENTRAL.—The Interstate Commerce Commission has authorized this company to issue 15 six per cent promissory notes, each for \$262,000, to the New York Central for a loan aggregating \$3,930,000, the proceeds to be used by applicant in procurement of new equipment, and for additions and betterments to existing equipment; to issue one 10-year six per cent promissory note for \$613,000, to the New York Central, the proceeds to be used for additions and betterments to applicant's ways and structures; and to issue \$507,000 of six per cent refunding and improvement mortgage bonds, series B, maturing July 1, 1935, and to pledge same with the New York Central as security for the note for \$613,000.

In connection with the approval of this application, the commission said:

"While no request for a hearing has been made by any state authority answers containing representations on behalf of the states of Ohio, and Michigan, have been filed by the public utilities commissions thereof, in which dismissal of the application is asked, on the grounds: (1) that as the applicant is a railroad corporation organized and existing under the laws of the state of Michigan, we have no jurisdiction; (2) that the issue of securities by the applicant does not involve a federal question; and (3) that the applicant, not being a federal corporation or creature of the federal government, is not answerable to the federal government in any degree so far as its security issues are concerned. The answer on behalf of Michigan also asserts that said state is financially interested in the issue of securities by the applicant, for the reason that upon such issue being authorized by it, a statutory fee becomes payable to the state of Michigan before the issue or sale of the securities takes place.

"No objection to the granting of the application has been offered by the railroad, public service or utilities commissions, or other authorities of the states of Indiana, Illinois, or New York.

"It is well settled that common carriers by railroad engaged in interstate commerce, although organized and existing as state corporations, are nevertheless subject to our jurisdiction. Paragraph 7 of section 20a provides that a carrier may, under our authority, issue securities and assume obligations or liabilities in accordance with the provisions of said section 20a without securing other approval.

"Paragraph 2 of said section 20a provides that it shall be unlawful for a carrier by railroad to issue securities, even though permitted by the authority creating it, unless and until, and then only to the extent that, we authorize such issue. Any security for the issue of which our authority is required, is void if issued without such authority having been first obtained. Upon consideration of the answers of the public utilities commissions of Ohio and Michigan, we are of opinion that we have jurisdiction."

NEW YORK CENTRAL.—The Interstate Commerce Commission has authorized this company to issue \$6,494,000 of refunding and improvement mortgage bonds and to pledge them with the Secretary of the Treasury as security for a loan; also to assume obligations and liabilities in respect to \$6,420,000 of 6 per cent equipment trust certificates and to pledge them with the Secretary of the Treasury; also to assume obligations and liabilities as endorser and guarantor for promissory notes to be issued by its subsidiaries to the amount of \$18,299,000, also to be pledged with the Secretary of the Treasury as security for a loan. The commission had previously approved the making of two loans to the New York Central and its subsidiaries aggregating \$26,775,000.

NEW YORK CENTRAL.—The Interstate Commerce Commission has granted authority to various subsidiaries of the New York Central to issue their promissory notes to New York Central, the proceeds to be used for additions and betterments to roadway and structures, and to equipment.

PEORIA & PEKIN UNION.—This company has applied to the Interstate Commerce Commission for a loan of \$1,861,000 to retire bonds maturing on February 1, which the holders have declined to extend.

TENNESSEE CENTRAL.—This company has applied to the Interstate Commerce Commission for a loan of \$3,000,000 for the purchase of locomotives, cars, rail and other track material and to pay outstanding obligations. The company proposes to purchase six Mikado locomotives at a cost of \$270,000 and 300 coal cars at \$3,000 each.

Railway Officers

Executive

Charles Hicks, general manager of the Tennessee, Alabama & Georgia, with headquarters at Chattanooga, Tenn., has been appointed receiver on application made by counsel of the company.

S. Ennes, general manager of the Eastern lines of the Baltimore & Ohio, with headquarters at Baltimore, Md., has been appointed vice-president and general manager of the Wheeling & Lake Erie, with headquarters at Cleveland, Ohio, effective January 1. He succeeds **H. W. McMaster**, who has been granted a temporary leave of absence on account of illness and has been relieved of his duties as general manager but will continue as vice-president.

Financial, Legal and Accounting

A. J. Maxwell, assistant auditor on the Atchison, Topeka & Santa Fe, Coast Lines, with headquarters at Los Angeles, Cal., has been appointed auditor of the subsidiary oil companies of the Santa Fe in California, effective December 15. **C. W. Sowle**, assistant auditor of disbursements, succeeds Mr. Maxwell.

Edward G. Smith, assistant treasurer of the Union Pacific, has been appointed treasurer, succeeding **F. V. S. Crosby**, deceased. Mr. Smith was born at Buffalo, N. Y., May 11, 1886. He was graduated from the Buffalo Central High School in 1902 and entered the service of the New York Central in 1903 in the office of the division engineer. In 1905 he was transferred to New York City as a clerk in the office of the engineer maintenance of way. In 1907 he left the New York Central to become a clerk in the treasurer's office of the Union Pacific. While working in this capacity Mr. Smith studied law in the New York Law School and received the degree of LL. B. in 1909 from that institution. The following year he received the degree of LL. M. from New York University and was admitted to the New York bar. Mr. Smith remained with the Union Pacific as cashier until December, 1917, when he resigned to enter the building business. In 1919 he again entered the service of the Union Pacific, this time as assistant treasurer, and served in that capacity until the time of his recent promotion.

Operating

J. D. Haydon, superintendent of the Atlanta division of the Louisville & Nashville, with headquarters at Etowah, Tenn., has been transferred to the Eastern division at Ravenna, Ky., succeeding **M. Seargeant**. Mr. Seargeant succeeds Mr. Haydon as superintendent of the Atlanta division.

Andrew Dutton, trainmaster on the Chicago, Milwaukee & St. Paul, with headquarters at Des Moines, Ia., has been transferred to Dubuque, Ia., effective January 1, succeeding **R. L. Blakesley**, who has been assigned to other duties. The position of trainmaster at Des Moines has been abolished.

A. O. Veitch, trainmaster on the Idaho division of the Chicago, Milwaukee & St. Paul, with headquarters at Spokane, Wash., has been promoted to superintendent of the Olympic division, with headquarters at Port Angeles, Wash., effective December 22, succeeding **W. H. Molchior**, deceased.

Allan Pollok has been appointed manager of dining cars, hotels and restaurants of the Southern Pacific, with headquarters at San Francisco, Cal., effective January 1, succeeding **S. M. Estabrook**, who has been appointed assistant manager of dining cars, hotels and restaurants, with the same headquarters.

W. F. Thiehoff, who has been promoted to general manager of the Chicago, Burlington & Quincy, Lines West of

the Missouri River, with headquarters at Omaha, Neb., succeeding G. W. Holdrege, who has retired, effective January 1, was born on June 25, 1866, at Hunnewell, Mo. He entered railway service in 1883 as a section hand on the Chicago, Burlington & Quincy, and became a telegraph operator in 1885. From 1887, to May, 1889, he served as a freight brakeman, becoming a freight and passenger conductor on the latter date. After 16 years' service in this capacity, Mr. Thiehoff was promoted to trainmaster on the St. Joseph division, a position which he held until March 1, 1906, when he was transferred to the Brookfield division. He was promoted to assistant superintendent in 1907, and in July, 1908, he became superintendent of the Ottumwa division. He was transferred to the Beardstown division in February, 1911, and after service for 4 years in that position and as superintendent of the La Crosse division, he was promoted to general superintendent of the Nebraska district, with headquarters at Lincoln, Neb. At the time of his recent promotion, Mr. Thiehoff was serving as assistant general manager of the Lines West of the Missouri River, a position to which he had been promoted in July, 1916.

R. C. White, assistant chief engineer of maintenance of the Missouri Pacific, has been appointed general superintendent of the Eastern District with headquarters at St. Louis, succeeding **C. B. Wildman**. Mr. Wildman has been transferred to a similar position on the Western District with headquarters at Kansas City, succeeding **A. H. Webb**, who has been appointed superintendent of the Wichita division with headquarters at Wichita, Kan. Mr. Webb succeeds **J. E. Snedeker**, who has been appointed assistant superintendent of the same division. **W. C. Bevington**, superintendent of the Joplin division with headquarters at Nevada, Mo., who has been on a leave of absence because of illness, has again assumed his duties and acting superintendent **M. J. Crotty** has been appointed superintendent of the Central division with headquarters at Van Buren, Ark. **D. H. Robinson** has been appointed assistant superintendent of the Eastern division with headquarters at Sedalia, Mo., succeeding **G. B. Howden**, who has been appointed trainmaster of the Northern Kansas division with headquarters at Concordia, Kan. **J. C. Gerety**, trainmaster of the Colorado division with headquarters at Hoisington, Kan., has been transferred to a similar position on the Northern Kansas division with headquarters at Concordia, Kan. **J. C. Gerety** has been succeeded at Hoisington by **D. P. Gerety**, who was formerly trainmaster at Wichita, Kan. **S. E. Ridlon**, who was trainmaster on the Northern Kansas division at Concordia, Kan., has been transferred to a similar position on the Missouri division with headquarters at Poplar Bluff, Mo. **D. W. Hickey**, assistant superintendent of the Colorado division, will hereafter have direct charge of the Horace district (including Horace yard) and general jurisdiction over the entire division. These appointments were effective January 1.

Traffic

R. H. Morris has been appointed general western freight agent on the Southern with headquarters at Chicago.

E. L. Mountfort has been appointed assistant traffic manager on the Gulf, Mobile & Northern, with headquarters at Chicago.

G. E. Littlefair has been appointed general agent of the Fort Worth & Rio Grande, with headquarters at Dallas, Tex., succeeding **C. A. Forrest**, who has been transferred.

Charles D. Semple has been appointed commercial agent on the St. Louis-San Francisco, with headquarters at San Francisco, Cal., and **W. L. Evans** has been appointed district passenger agent with the same headquarters.

W. F. Van Bergen, auditor of passenger accounts of the Chicago & North Western, with headquarters at Chicago, has retired after 55 years of continuous service with the North Western. **J. O. Clifford**, auditor of freight accounts, with headquarters at Chicago, has been transferred, succeeding Mr. Van Bergen. **E. J. Bloodgood**, auditor of freight overcharge claims, succeeds Mr. Clifford. **J. S. Fox**, assistant

auditor of freight accounts, succeeds Mr. Bloodgood. **G. W. Nelson** has been appointed assistant auditor of freight accounts, succeeding Mr. Fox. The appointments and changes are effective January 1.

C. M. Davis, a member of the Southern Freight Rate Committee, Atlanta, Ga., at one time general freight agent of the Atlantic Coast Line, has been appointed assistant freight traffic manager of that company with headquarters at Wilmington, N. C., effective January 1.

Mechanical

A. Peers, division master mechanic on the Canadian Pacific, with headquarters at Moose Jaw, Sask., has been appointed master mechanic with the same headquarters, succeeding **W. J. Renix**, effective January 1.

E. A. Murray, master mechanic of the Chesapeake & Ohio with headquarters at Clifton Forge, Va., has been promoted to shop superintendent at Huntington, W. Va., effective January 1, succeeding **H. M. Brown**, resigned. **C. B. Hitch** succeeds Mr. Murray as master mechanic at Clifton Forge.

R. A. Pyne, superintendent of the motive power and car department of the Canadian Pacific, Eastern Lines, with headquarters at Montreal, Que., has been transferred to Winnipeg, Man., succeeding **C. H. Temple**, whose appointment as chief of motive power and rolling stock, with headquarters at Montreal, was announced in the *Railway Age* of December 31 (page 1184). **A. Sturrock**, master mechanic of the British Columbia district, with headquarters at Vancouver, B. C., has been promoted to assistant superintendent of motive power, with headquarters at Winnipeg, Man. The appointments and changes are effective January 1.

Engineering, Maintenance of Way and Signaling

G. W. Boschke has been appointed assistant chief engineer of the Southern Pacific, Lines West of Ogden, El Paso and Portland, with headquarters at San Francisco, effective January 1.

Paul Lebenbaum has been appointed assistant electrical engineer on the Southern Pacific, with headquarters at San Francisco, Cal., succeeding **F. E. Geibel**, who has resigned, effective January 1.

S. Morrison, acting district engineer on the Canadian National, Western Lines, with headquarters at Vancouver, B. C., has been appointed assistant engineer maintenance of way, with the same headquarters, effective January 1, with jurisdiction over all lines west of Edmonton, Alta., and including Vancouver Island lines. The position of district engineer, Pacific district, has been abolished.

Obituary

W. H. Molchior, superintendent of the Olympic division of the Chicago, Milwaukee & St. Paul, with headquarters at Port Angeles, Wash., died of cancer at Seattle, Wash., on December 18, after a long illness.

Eugene H. Coapman, who was recently given a leave of absence as vice-president of the Southern, on account of illness, died on January 5 at his home in Washington, D. C. Mr. Coapman was born August 11, 1865, and had been in railway service since 1880. He began as messenger boy on the Chicago, Milwaukee & St. Paul and was later operator, train dispatcher, chief train dispatcher and superintendent of telegraph on various roads. On March 1, 1901, he became trainmaster on the Atchison, Topeka & Santa Fe. He went to the Southern in 1902 as superintendent of the Danville division. In 1905 he was promoted to assistant general superintendent of the Eastern district, in 1906 to general superintendent of the same district, in 1907 to manager of the same district, and in January, 1908, to manager of the entire system. In 1910 he was appointed general manager and in October, 1910, also vice-president. During federal control Mr. Coapman was federal manager of the Southern.

EDITORIAL

Railway Age

EDITORIAL

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The Coal Trade Journal says that the operators are incensed at the action of the railroads in rejecting coal, and claims the roads "are seeking to avoid living up to their obligations." For several years the railroads have paid prices that are all out of reason but when, on top of these exorbitant prices, they have been forced to accept some of the worst coal that ever came out of a mine, the railroads have felt that this was adding insult to injury. When the Boston & Maine was recently compelled to reject 400 cars of this near-coal the shippers in Cleveland thought that the railroad was taking advantage of a technicality to save some money on a falling market. But when they employed a consulting engineer to report the facts, they discovered that some of the rejected coal was unfit for any use whatever. Now that the tide has turned and the railroads are no longer obliged to accept the poor coal that has been forced down their throats at outrageous prices, the coal trade is talking about a "square deal." This sounds like "kamerad."

Adding Insult to Injury

The officers and employees of each railroad ought to consider themselves members of a "Conservation Commission," to conserve, not particularly water power, or national forests, or even locomotive fuel or other railroad property; but railroad men. This is the suggestion of J. T. Loree, general manager of the

A "Committee of the Whole" on Conservation

Delaware & Hudson, in a recent circular to his subordinates. This is his interpretation of the duty to seek "safety first," an idea which usually is formulated in somewhat different language. The desideratum is to inculcate the importance of co-operation. To warn a careless man not to step on rusty nails, or to refrain from adjusting drawbars with his foot, sometimes proves an embarrassing duty; there is a temptation to shirk it. But if a thousand fellow-employees are known to be in the same movement, and the co-operation is manifest, such duties are not so embarrassing. Mr. Loree does not make the mistake of expecting too much from co-operation per se; he reminds his men that "the results will depend on the personal energy, punch, or pep . . . which causes a man to exceed the letter of the law."

A dollar saved is a dollar earned and it is pretty generally believed that this is the only kind of a dollar the railroads are going to earn during the ensuing interval of business stagnation. Fortunately it is not difficult to discover ways in which the railroads can save money and the fuel bill appears to be

A Dollar Saved Is a Dollar Earned

one of the most vulnerable items to attack. There is no question but what the railroads are going to save fuel; a reduction in traffic will enable them to lay aside the small, uneconomical locomotives and to use the best power they have to the best advantage. The lessened demand for coal will certainly result in the delivery of a better grade to the railroads and the scarcity of good jobs will surely tend to make each employee more inclined to conserve the company's

resources. These factors have so important a bearing on the situation that a reduction in fuel consumption per ton mile or car mile is bound to result whether or not the railroads increase their efforts toward fuel conservation. It is important, therefore, that the railroads should not be misled in the belief that they are making any real progress in this direction just because the figures indicate a fine showing in comparison with the previous year, or even the year before. The railroads must not simply be sure that they are making a fuel saving; they must be sure that they are saving all the fuel that can be saved under existing conditions.

Efficiency and economy, the watchwords for 1921, are subscribed to by every loyal railroad worker. Railroad shop managements at the present time are laboring under the necessity of increasing production to the highest point consistent with quality and decreasing costs. High production, good

A Call for Efficient Shop Operation

workmanship and low unit costs mean efficient shop operation which will help tide the railroads over a business depression and minimize its serious effects. There are three prominent factors in efficient shop operation; namely, machinery, men and methods. It would be difficult, if not impossible, to say which factor is most important since the elimination or impairment of any one of them will seriously reduce shop output. It is proposed in subsequent issues of the *Railway Age* to develop in a series of editorials ways and means of increasing the productive capacity of shops and lowering unit costs consistent with good quality of work. The railroads have been confronted with a labor shortage almost continuously for the past five years. Conditions have changed so rapidly that the managements of overworked shops have found it difficult to "get by." One emergency has followed another in rapid succession and expedients have been adopted to meet them. Under such chaotic conditions there has been little opportunity for formulating or carrying out a constructive program of building up the shop organization. The fact that little improvement has been made in the condition of locomotives or cars since the roads were returned to their owners is evidence that the shops have little reserve capacity if they are not actually inadequate for present needs. This is an opportune time for each road to take stock of the situation in its repair plants, to analyze the tendencies of the past few years and to set out on the right track if the present policies are not giving results.

Some of the railways are giving out statements showing the percentage of their passenger trains which make their runs "on time." The Pennsylvania states that in the first ten days of December it operated 42,568 passenger trains on its entire system of 12,000 miles. Of this number 85 per cent arrived at

Reduce the Number of Late Passenger Trains

destination on time, while, including those that started late, 93 per cent made their schedule time over the railroad. On the eastern region 90 per cent of all passenger trains arrived on time, and 95.7 per cent made their runs on schedule time.

The Chicago Great Western shows that in the four weeks ending November 26 of a total of 1,246 trains operated, 1,180, or 94.7 per cent, were on time. A larger number of railroads ought to give out statistics of this kind regarding the performance of their passenger trains. They would show the public that the number of trains late is smaller than many believe, and at the same time serve as a stimulus to the officers and employees to get trains over the road "as advertised." Among the principal causes of delays to passenger trains are locomotive failures. The eastern region of the Pennsylvania has given out information regarding delays due to this cause. There were 521 passenger train detentions on the eastern region in October which were caused by locomotive failures. This was 83 less than in the previous month, and 364 less than the number occurring in October, 1919. The total time lost by passenger trains owing to locomotive failures was reduced from 19,664 minutes in October, 1919, to 11,083 minutes in October, 1920. We think that most persons who have traveled much recently have the impression that there have been occurring on the railways an extraordinary number of delays to passenger trains due to locomotive failures, and it is gratifying to note that some special attention is being given to this matter. There is no feature of passenger service that annoys a larger number of people, or annoys them more, than late trains. Delays to passenger trains have been among the principal shortcomings of railway service in this country, and no reasonable effort should be spared to reduce the number of them.

One of the most promising developments in transportation facilities during 1920 was the consideration given to locomotive terminals. This is not so remarkable for what has actually been consummated in the form of completed locomotive terminals as in the terminal development that is under way and that

Locomotive Terminal Development

which is contemplated. Of even greater importance perhaps is the change in sentiment toward terminal development due to a growing appreciation of the importance of the locomotive terminal as an operating factor. Locomotive terminals have until recently been woefully neglected on a majority of railroads. Year after year these railroads have added to the weight of locomotives and to the complexity of this equipment without making any corresponding improvements in the terminal equipment until the limit of terminal endurance has literally been reached and the new power must go begging for want of adequate maintenance between shoppings. It is the lack of suitable terminal facilities that has in many instances retarded the application of efficiency and capacity increasing devices which necessitate any additional maintenance. Moreover, the railroads are waking up to the fact that any reduction in terminal delays is actually equivalent to increasing the power available for service. Also that if locomotives can be kept in service for longer periods between shoppings by means of frequent adequate terminal repairs, this is likewise equivalent to increasing the available power. Obviously, the railroads should get the utmost service out of the locomotives they have before adding to their equipment and when it is observed that locomotives still average more than 50 per cent of their time at terminals and that only 75 per cent of all locomotives are now in a serviceable condition it must be apparent that there is tremendous need for better locomotive terminal and shop facilities. The most notable locomotive terminal development work ever undertaken by any railroad is still under way on the Pennsylvania Railroad. Several units were placed in service during the year and other units are nearing completion. The Michigan Central established a new locomotive terminal at

Niles, and this is only one of many new and interesting projects of a similar character usually involving an entirely new lay-out and a change in engine districts. It is safe to predict that no single feature of the transportation machine will undergo greater relative development within the next ten years than the locomotive terminal.

Misrepresentation, with a Purpose

THE MACHINISTS' UNION, through a paid propagandist, has recently filled the daily papers with charges that the railroads are manipulating public funds in a campaign to drive the railroad unions out of business. At the same time, a petition has been filed with the Interstate Commerce Commission in which the statement is made that the railroads have wasted half a billion dollars in contracts for locomotive repairs and a quarter of a billion on freight car repairs. The motives which the petition ascribes to the railroad managers in causing this enormous waste are, first, to make profitable the operation of equipment companies controlled by the same financial interests which control the railroads, and, second, to disrupt railroad labor organizations. No statistics are given to substantiate the charges made in the petition, but it is probable that the construction contracts to which it refers are the same as those recently mentioned in the House by Representative Huddleston of Alabama. Mr. Huddleston, who has consistently advocated the adoption of the Plumb plan, filled several pages of the Congressional Record with comparative figures to prove that the cost of repair work in the builder's works was four times as much as it would cost the road to do similar work in its own shops. The figures serve only to prove the truth of the old saying that figures don't lie but liars will figure. The data presented is not convincing to anyone familiar with conditions in railroad and contract shops because railroad cost figures are not representative.

Manufacturers find it absolutely necessary to compute the costs of doing work, including every factor of expense. The railroads compile their figures of operating expenses according to the Interstate Commerce Commission's classification, and many items which are properly chargeable to locomotive or car repairs are allocated to maintenance of way expense as, for instance, the maintenance of shop buildings. Furthermore, there is no adequate provision for depreciation of buildings or machinery nor for overhead expenses. The cost of repairs in railroad shops as ordinarily given includes only direct labor and material costs with a small handling charge added and are not comparable with cost data obtained from manufacturers. If the expense of making repairs in the builder's plants and in railroad shops were computed on the same basis, it is doubtful whether the railroad shops could show a saving on similar operations.

The petition filed by the Machinists' Union states that the general public interest is involved in the proposed investigation, but the underlying reason that has led the organization to make these absurd charges is found in the concluding section of the petition, which suggests that no railroad company be permitted to enter into contracts for repair work by outside companies unless given a permit by the Interstate Commerce Commission. It is further proposed that, as a condition to securing such a permit, the railroad companies must show that they are unable to do the work or that they cannot do it at as low cost as it can be done by outside companies, and if the permit is granted, that the same rates of compensation and the same conditions of employment will be observed by the contractors as are established by the Railroad Wage Board.

The officers of the Machinists' Union are or should be familiar with the conditions existing in railroad shops. They

know that the charges made in their petition are groundless and the circulation of such statements in the daily press is intended merely to influence the action of the Railroad Wage Board which, this week, begins hearings on the question of continuing or abrogating the national agreement. No other single factor has been more largely responsible for the decrease in efficiency in railroad shops than the restrictions imposed by this agreement. Having secured great increases in compensation of railroad shop employees and having imposed conditions that break down discipline and make efficient management difficult, if not impossible, the Federation of Labor is trying to prevent the railroad managers from reducing costs through the only avenue of escape that is now open, by letting work to contract shops. There is little danger that this attempt to muddy the water will deceive the Interstate Commerce Commission or the Railroad Labor Board. Its only effect will be to inflame still further the minds of the uninformed readers of the daily press who believe the mis-statements regarding the Plumb plan and similar propagandism given out by the same organization.

Supervision of the Lesser Crafts

ONE OF THE PERPLEXING PROBLEMS of supervision in the maintenance of way department concerns those crafts requiring the employment of a relatively small number of men. This applies particularly to the painting and water service forces, but on lines doing only a small amount of permanent work it may apply also to the concrete forces. As a general rule, these gangs are supervised by foremen who report to the master carpenter or bridge and building supervisor, but owing to the fact that the duties of the supervisor are concerned much more with bridge and building carpenter work, his position is usually filled from the ranks of the carpenter foremen.

This practice places a definite barrier in the way of promotion for the foremen of the other crafts, while the supervisor, because of his close contact through long experience with carpenter work, has a general tendency to deprecate the importance of the other crafts. Where these conditions prevail, both the immediate and the general supervision of such work as painting and water service repairs and construction will suffer unless they receive special attention from division officers. Some roads have found it of advantage to provide general supervision for these special crafts by the employment of a general foreman or division supervisor with special training in the particular line for which he is made responsible. This opens up a line of promotion for the foremen under him and also places the work under the direction of a supervisory officer who is equipped to recognize the needs of his particular line and present them to his superiors in the proper light. The current retrenchment of operating expenditures presents another angle of this problem. With reduced activities and reduced forces, especially in the minor crafts, the roads are confronted with a surplus of foremen receiving a rate of compensation in excess of that paid in any time in the past, so there is a natural tendency to reduce the number of them on the payroll.

Because of the importance of adequate supervision it has been suggested that the present offers a good opportunity for revising the form of organization, extending the authority of the more promising of the special foremen over a larger territory with the title of general foremen and salaries commensurate with any increase in responsibility. The lessened activities at present will enable these general foremen to become thoroughly adjusted to their new positions by the time that work is again on a normal basis so that they will be enabled to exercise general supervision of the special

crafts in a manner that will be of unquestioned benefit. Undoubtedly, the form of organization in vogue on some railroads will not permit of the adoption of this modification in supervisory arrangement, but the need of improvement in supervision in all departments of the railroads is such that a plan such as the one suggested should be given serious consideration.

The Labor Readjustment in the Maintenance of Way Department

DURING THE LAST FEW YEARS labor has prospered as never before on the railways and elsewhere. It has taken full advantage of the widespread industrial activity to secure greatly increased wages, a shorter working day and important concessions in working conditions, all of which have added greatly to operating expenses. Within the last few weeks these conditions have undergone a marked change. The widespread industrial depression which has set in has created a large surplus of labor, and this in turn is bringing about reductions in wages and the withdrawal of many of the war time concessions in working conditions.

The railways have not escaped the decline in business; the slump has been acute. Coming as this does on top of the financial stringency created by the withholding of more than \$400,000,000 due them from the government and the holding up of the increased rates by several states, it creates a serious problem for the roads which threatens to force many of them to adopt drastic measures to weather the storm. Under these conditions it is not surprising that they too are considering the possibility of reducing expenses and curtailing their expenditures for labor by both reducing the number of men employed and the rates of wages paid. Under the new Transportation Act the managements are under an increased obligation to the public to operate their properties as economically as possible and this requires that they take advantage of the falling market for labor as well as materials.

One of the first departments on the railways in which a readjustment in labor conditions will be brought about is the maintenance of way department because it is here that outside labor conditions are first and most directly felt. It is therefore not inopportune to consider certain underlying conditions affecting employment here and their influence on the cost of the work done—the final measure of efficiency. In the past most maintenance of way work and particularly track work has been considered unskilled. No recognition has been given to experience and little or no attempt has been made to retain men in the service. They have been "hired" when business was good and "fired" as readily when traffic declined. This lack of permanency of employment, combined with the lowest market wage rate, has in general brought to the roads only the poorest class of labor which did not desire permanent work or which took the work only until other employment could be secured. While we do not believe that the present demands a continuance of the present high wages, the roads can ill afford to reduce their rates to the lowest in the market as they have done in the past. Rather they should stop at some midway point which will enable them to compete on an equal basis with other industries for *efficient* labor. That such labor can still be attracted to railway work was demonstrated by the influx of native labor on many roads, particularly in the middle west, following the raising of wages in 1918. This is not the time for *minimum* wages for maintenance of way work but rather for a wage which produces a *minimum cost*.

Coincident with the readjustment of wage rates, the present offers an opportunity to replace the drones in the gangs with

workers and to adopt such other measures as will add to the efficiency of the forces, for there are other things besides wages which attract good men into the service. Among these are the readjustment of the working season to increase the permanency of employment and the improvement of living conditions of those employees dependent on the railways for housing and feeding.

Section 10 of the Clayton Law

AFTER HAVING REMAINED inoperative for six years since its passage on October 15, 1914, Section 10 of the Clayton law, which has for its object the regulation of dealings in railroad securities and supplies between companies which have a so-called "interlocking" relationship, became effective on January 1 because President Wilson unexpectedly vetoed a bill passed by Congress to further postpone its effective date. By its terms the law was not to become effective for two years after its passage and because of its unworkable character, and because it was of no particular importance while the government was operating the roads, its effective date has been repeatedly postponed for a year at a time to give Congress an opportunity to amend it. Because of the pressure of other business, and because the law has come within the province of other committees of Congress than those which have been dealing with railroad questions, Congress has failed to give the matter its attention. A substitute, proposed by the Association of Railway Executives, and intended to carry out its purpose in a more practical way has been introduced by Senator Frelinghuysen and Representative Esch, and because it is proposed to make it a part of the interstate commerce law instead of the anti-trust law, it has been referred to the committees on interstate commerce. The Senate committee has already begun hearings on it.

The essential provision of Section 10 is that no common carrier shall have any dealings in securities, supplies or other articles of commerce, or make contracts for construction or maintenance to the amount of more than \$50,000 a year, with another corporation, firm, partnership or association, when the carrier shall have on its board of directors or as its president, manager or as its purchasing or selling officer in the particular transaction, any person who is at the same time a director, manager, or purchasing or selling officer of, or who has any substantial interest in, such other corporation, etc., except on competitive bids, from the bidder whose bid is the most favorable. The law also requires that the carrier having such transactions shall within 30 days file with the Interstate Commerce Commission a complete statement of the transaction and the commission is directed to report violations to the Attorney General.

The commission in October, 1919, issued its regulations prescribing the method of advertising for and securing bids and of reporting the transaction, but they had been held in abeyance because of the repeated postponements of the effective date of the law.

The law as it stands is admittedly unworkable, and it is full of ambiguous and uncertain language, but as it has been interpreted it would interfere with many transactions which it was never intended to reach and a majority of the Interstate Commerce Commissioners have indicated their belief that it should be amended. The purpose of the law is simple and represents a moral principle to which no one can honestly object and to which the railroads are offering no opposition. The purpose is to prevent transactions between a railroad and another company in which any of its directors or officers may be financially interested, to their private advantage instead of that of the railroad. This it seeks to accomplish, however, not by direct prohibition, but by re-

quiring that transactions between companies in which there is such common interest shall be on the basis of competitive bidding.

The great defects in the law are that it tends to restrict dealings in securities which are already completely under the control of the Interstate Commerce Commission under the provisions of the Transportation Act, that it would seriously interfere with transactions between railroads and their subsidiary companies, and that its terms are in many instances vague and uncertain. Probably the most important defect in the law is that it would probably be held to apply, although undoubtedly it was not so designed, to perfectly proper transactions between the component parts of a railroad system, including carrier companies and also separate companies organized by railroads themselves for the purpose of insuring adequate supplies of fuel, ties, ice, etc. The operation of the law for any considerable length of time would make impossible the practice by which large systems buy in quantities for their subsidiary lines and receive in return their securities for capital expenditures. Manifestly the great multitude of such inter-company transactions cannot be advantageously handled under a system of competitive bids which must be advertised in advance, while a requirement that securities of subsidiaries shall be sold only on competitive bids would tend to break up the control of large systems.

The proposed substitute bill omits reference to sales of securities because another law on that subject is now unnecessary and it also excepts transactions between a railroad and common carrier subsidiaries or non-carrier subsidiaries in which the railroad, either alone or together with other common carriers, has an interest equal to one-half ownership.

The Clayton law is very indefinite as to the kind of dealings between railroads and sellers of supplies which it is intended to reach. It does not define, nor does it make any provision for a definition by the Interstate Commerce Commission as to what constitutes a "substantial" interest in the selling company. A railroad cannot always know when one of its officers or directors may own stock in a company that sells to railroads and whose securities are dealt in on the open market, and it may therefore lay itself liable at any time without knowing it unless it safeguards itself by obtaining competitive bids under the regulations prescribed. Even if it knows that one of its directors has a small interest it cannot ascertain in advance whether that will be considered sufficient to bring the transaction within the law. Neither does it make any provision for exempting purchases of patented articles or articles of such a character that they can be obtained from only one source, or materials and supplies that must be procured quickly in an emergency.

The railroads also object seriously to any requirement that purchases must be made from the bidder whose bid is the most favorable unless this is defined in such a way as to relieve them from the necessity of buying from the lowest bidder, and have inserted in the substitute bill a provision which would give them a considerable degree of business discretion in determining which bid, under all the circumstances, is the most favorable, and also the right to secure more favorable terms by negotiation.

If the best way to repeal a bad law is to enforce it until its disadvantages appear clearly President Wilson may have taken the course calculated to hasten action on the part of Congress to amend the law so that it can accomplish its purpose in a practical way and without needless expenditures on the part of the carriers. The Interstate Commerce Commission is lending its co-operation in the effort to have the law made more workable and the congressional committees which now have the matter in charge have a much better appreciation of railroad conditions than those with which it has been necessary to deal heretofore.

The regulations prescribed by the Interstate Commerce Commission to govern transactions which come within the terms of the law are published elsewhere in this issue.

A Very Significant Contrast

THE AMERICAN PUBLIC may not know it, but it is deeply concerned in the hearings regarding national agreements between railways and their employees which began before the Railroad Labor Board on January 10. They involve many millions of dollars annually that the railways are directly, and the public is indirectly, paying to railway employees who do not earn it. Therefore, the public should not fail to take note of the difference between the ways in which the representatives of the labor unions and the representatives of the railways are presenting their cases. The difference is most significant.

The question under consideration is whether certain national agreements made under government control by the Railroad Administration with certain labor organizations shall be perpetuated. The representatives of the unions contend that these agreements should be continued for the protection of their members. The representatives of the railways contend that they should not be continued because they foster inefficiency and cause the waste of many millions of dollars annually. They contend that efficient and economical operation of the railways requires the making of agreements between individual railway companies and their employees which can and will be adapted to local conditions.

The following are the respective ways in which the representatives of the two sides opened their cases:

The spokesmen of the labor organizations charged that the railroads are controlled by a group of New York banks, trust companies and insurance companies which are dominated by J. P. Morgan & Co.—a charge already threadbare from frequent repetition. They allege that the railroads have sent to outside companies for repair a large number of their locomotives and cars and have paid excessive prices for these repairs. They alleged that the railroads have laid off thousands of men, not to reduce expenses, but to break down the unions. In short, they charged against the railroad companies, their directors and officers almost every crime in the calendar except murder. They then stated that they would make no attempt to substantiate these charges at this time, and wound up by intimating that unless the Labor Board adopts a course satisfactory to the employees "the service rendered to the public would inevitably suffer"!

The public will seek in vain in their statement for any discussion of the principle or effect of national agreements versus local agreements of railways and their employees. It will seek almost in vain for anything which relates to any matters over which the labor board has jurisdiction. The only body which, under the Transportation Act, can officially take cognizance of the charges of railroad mismanagement made is the Interstate Commerce Commission. If the spokesmen of the railroad brotherhoods had thought that they had a case for national agreements they doubtless would have presented it. Since they did not present a case for national agreements they must have thought they had none.

On the other hand, the spokesmen of the railroads proceeded at once in their presentation with a discussion of the question of national agreements and of the facts and arguments which they believe show that the national agreements should not be continued. They said nothing which was not directly pertinent to the matters under consideration by the Railroad Labor Board. They might have attacked the railroad labor organizations for many things. They might have recalled how they "held up" the government of the United States to get the Adamson law passed. They might have

recalled how the railroad brotherhoods threatened to strike just before this country was entering the war with Germany because the Supreme Court did not decide the Adamson law case quickly enough to suit the unions. They might have referred to the efforts the railroad labor brotherhoods have been making to form a federation of labor unions which would be so strong that neither the railroad companies nor the people of the United States could resist it. But they did none of these things. They simply discussed national agreements, which was the subject under consideration by the Railroad Labor Board.

It is not an uncommon thing for a man who has just picked another man's pocket to begin crying "stop thief!" in order to divert attention from himself. When a man gets paid for doing work that he doesn't do, or gets two or three or four days' pay for doing one day's work, he is simply "grafting" upon somebody. If he is a railroad employee he is "grafting" directly upon the railways and indirectly upon the public. The national agreements and the interpretations of them which have been made are causing many millions of dollars a year of this kind of "grafting," of which the railways are the immediate and the American public the ultimate victims. The spokesmen of the brotherhoods know that the representatives of the railways are going to lay bare the facts about these matters before the Railroad Labor Board and the public. They want to neutralize the effect of the facts which they know are to be presented. Because the facts about the huge graft of which they are the beneficiaries are to be laid bare, they make wholesale charges of grafting against the railways.

Naturally the railroad brotherhoods want the public to think and talk about the alleged sins of the railroads rather than about their own sins. They have been engaged for years in building up rules and conditions of employment as a result of which their thousands of members have been and still are the recipients of many millions of dollars of "honest graft." Why talk about this, however, when it is so much more interesting and thrilling, and also so much safer for the labor brotherhoods and their members, to shout loudly and recklessly about J. P. Morgan & Company, Wall street and the 25 men, more or less, who are the alleged instruments of Morgan & Company and Wall street in controlling not only all the railroads and railroad equipment companies, but, maybe, all the other industries of this country and the world?

The spokesmen of the employees expressly say they will not try to substantiate their charges "at his time." They were not made to be substantiated. They were made to divert attention from the actual graft obtained by the members of the unions through the national agreements and which the representatives of the railways are prepared to prove, to mere alleged grafting by the railways which the brotherhoods are not prepared to prove.

There was another motive also; the propaganda for the Plumb plan is still being actively carried on. Its advocates consider any and every libel they can spread regarding private management as an effective means of furthering the Plumb plan. There never was a more selfish, unscrupulous, mendacious propaganda carried on than that for the Plumb plan and the attacks now being made by the labor brotherhoods are a part of it.

SAFETY FIRST.—If every man would give a glance, and warn the man who takes a chance; if every man were pennywise, goggles he'd wear to guard his eyes. If every man in chances wild would stop and think of wife and child; if every man could but observe the good that follows steady nerve; if every man, to dodge the ward, would pull that nail from out the board—then we'd all together make safety first—Charles E. Bradley, S. P. Co.

Letters to the Editor

Recognition of Organizations of Subordinate Officers

COLUMBUS, OHIO.

TO THE EDITOR:

It is coming to be realized more and more by all right thinking men that we are living in a world of strange and unfamiliar conditions. Old land marks and guide posts have been swept away, or obliterated and new and strange signs of the times are to a large degree taking their places, and our future success and security as a nation or as individuals depends upon our ability properly to interpret these new phenomena, or perhaps more properly speaking this new aspect of old phenomena.

In the world of economics we are face to face with conditions for which we have no precedent to guide us. The impoverishment of Europe, the debacle in Russia, the Bank of England reserve below 7 per cent, the great extension of bank credits in this country, and the fact that the value of our farm products has shrunk in the past few months by millions of dollars, and that many of our industries are closing for lack of orders, present a problem or series of problems which will not only require the ablest efforts of the wisest minds, but also the hearty and whole-souled co-operation of all classes of our citizens.

In other words, this is no time to "rock the boat."

Nevertheless, there are many men of great influence in the industrial life of our country who believe that this is the time to smash the labor organizations; acting, in fact, somewhat in the same spirit as the farmer whose barn was burning who should seize on that occasion to discharge the hand with whom he had a difficulty the day before, rather than call him in to help extinguish the flames.

The men above referred to are influential and are finding but little difficulty in building up a considerable following among employers who have suffered from the past excesses of labor unions, and by the mistaken zeal of many chambers of commerce throughout the country.

In the transportation field their activities take the form of opposition to the establishment of railway boards of adjustment, and their propaganda is to the effect that they are fighting the closed shop, when the real truth of the matter appears to be that they are opposed to organized labor as such.

This is plainly indicated by their attitude towards organizations which are not strong enough numerically to make them fear the exercise of their strength in the form of strikes.

For example, the Transportation Act of 1920 set up a class of men known as subordinate officials, who should have under this act the same rights of representation and appeal as those accorded to employees who were members of one of the so-called "standard organizations."

Our organization was named by the Interstate Commerce Commission as one of these subordinate official groups. Notwithstanding this fact, however, we have not as yet been able to get them to accord us the same consideration as an organization which they extend to the so-called "standard organizations," and as one result of this condition the majority of the yardmasters of the United States are still working a twelve or thirteen-hour day for less wage per hour than the yard foremen whose work they supervise.

It is true that our membership is possibly less than 5,000 and that we have no strike vote in our constitution, but if the railway executives were really honest in their contention

that they were working for an open shop rather than engaging in an effort to crush all labor organizations, they would extend to smaller and independent orders the same consideration and treatment which they accord the members of the so-called "standard group."

This is not the time to allow old rancors or old quarrels to darken the judgment. It is a time in which methods of conciliation should be employed to bring the various opposing factors in the industrial world together. A time to make an honest effort to get at each other's viewpoint, and to bring about a condition of hearty and whole-hearted co-operation.

The individual who is hoping to use the present industrial depression to smash labor is a "bear on America." He is virtually betting that present conditions will continue and that there will be depression and surplus of labor for years to come.

He is neither a good business man nor a good patriot. He is merely rocking the boat.

J. L. ELDRIDGE,

Senior Grand Vice-President, Railroad Yard Masters of America.

The Business Basis

NORFOLK, Va.

TO THE EDITOR:

Referring to your editorial note on the Psychology of the Purchasing Agent appearing in a recent issue. The purchasing officer on a railroad is one who should be as intimately acquainted with the financial condition of the property as the owner of a mercantile establishment and should guard his interests in the same way. He has been looked upon so long as an order or requisition clerk that it is hard for most purchasing agents to realize that they are anything else.

The time has come when the supply officer must be looked upon as a financial officer instead of an operating one. The railroads are going through a transitional period which involves a transfer from technical to business operation. The future owners, directors and other officers of our railroads will be primarily business men. When this change is brought about, the financial problem will be for the first time established on a sound basis. Until this is the situation, no economical program of development can be carried out. Equipment and maintenance should be done when business is light and it follows that purchasing should be carried on in periods of depression and only nominal purchases should be made during times of great activity. At such times all equipment should be in use instead of undergoing repairs.

No change can be expected under the present conditions, which are necessarily based on the immediate earnings, until the fundamental facts are recognized, and it is not likely that they will be appreciated until the railroads are owned and controlled by business men and operated as business enterprises.

H. C. PEARCE,

Gen. Pur. Agent, Seaboard Air Line.

THE TERMINAL RAILROAD ASSOCIATION OF ST. LOUIS, MO., has received from the Post Office Department, Division of Railway Mail Service, at St. Louis, a letter of commendation appreciative of the splendid handling of the mails, through the Union Station, during the Christmas rush. The letter stated further that officials and employees, from the general manager down, are entitled to commendation of the highest character. And that "the operating officials of all tenant lines, by their hearty co-operation with the company and its service, should share equally in the credit that properly belongs to all, and in the satisfaction that comes from a proper knowledge that an important public duty has been so creditably performed"

The Chilean State Railways Are an Open Market

Government Lines Are Adopting American Methods and Standards and Are Well Represented in the U. S.

By John P. Risque

READERS who have followed the accounts of South American railways appearing in these pages from the note book of the editorial representative of the *Railway Age* sent there to record his impressions, have doubtless concluded, if they were previously unaware of the fact, that the railways on that continent offer, as far as Americans are concerned, a somewhat qualified market for the sale of railway materials. In a general sense, this is the impression which the observer has desired to convey. It is hoped that the account of conditions there has so far been sufficiently truthful and clear

and by rivers flowing from them to the Pacific. The range between the central valley and the coast is known as the Cordillera de la Costa—or the Coast Range. That to the east is the Andes and is crossed by the Arica-La Paz Railway in the north and the Antofagasta & Bolivia system as well as the Transandine lines to Argentina, the two former railways having been referred to in previous articles

To the railway constructor or the intending cultivator of Chile's important railway supply market, doubtful just as to "where to head for," in his intentions to introduce himself and his proposition personally, a trip direct to headquarters, the seat of government and the center of railway directing activities, Santiago, is advised.

This charming city with almost a half million population lies in a veritable garden spot 125 miles by rail inland from Valparaiso, the country's second city and chief Pacific port, and has an elevation of nearly 2,000 ft. Here he can inform himself fully as to the relative situation on the lines from almost every angle: what to go to see, what he can afford to miss. If he speaks the language of the country, it will facilitate his mission considerably. Not that the Chileans are unable to speak English, for many of them do,—especially the government officials with whom the stranger will



Train on the Arica-La Paz About to Enter Long Rack Rail Section

to cause careful reflection and study on the part of those who plan a railway supply sales campaign in those parts.

The situation in Chile is "no man's land," however, as far as railway supplies are concerned, when compared to the conditions bearing on American prospects of success in the markets of her eastern neighbor, the intensely British developed Argentina.

For convenience, reference is again directed to the map of South America which reveals the Republic of Chile as one of the most singular geographical countries in the world. Long and narrow, it constitutes the Pacific front yard of several of its neighbors, with a coast line nearly 3,000 miles in length, a width of from 65 to 250 miles and an average width of 90 miles. Its total area is about 292,000 square miles; its population, reported to be about 3,800,000, is made up of a hardy race of progressive people. They are, in the vernacular of our own hustling populace, "full of pep" and they exhibit this admirable trait in nearly everything that they do, a characteristic example of which is the extreme pride they take in calling attention to the fact that nearly all of the railways of their country are Chilean owned, in contrast to the European dominated transportation systems of their neighbors. This showing of pardonable pride is manifest on every hand, for Chile is Chile's own, and if the "extranjero" does not sense it as soon as he sets foot in the country, that stranger has missed the first item on the bill.

Two ranges of mountains traverse the country from north to south, leaving between them a great central valley, interrupted at intervals by low branches of these mountain ranges

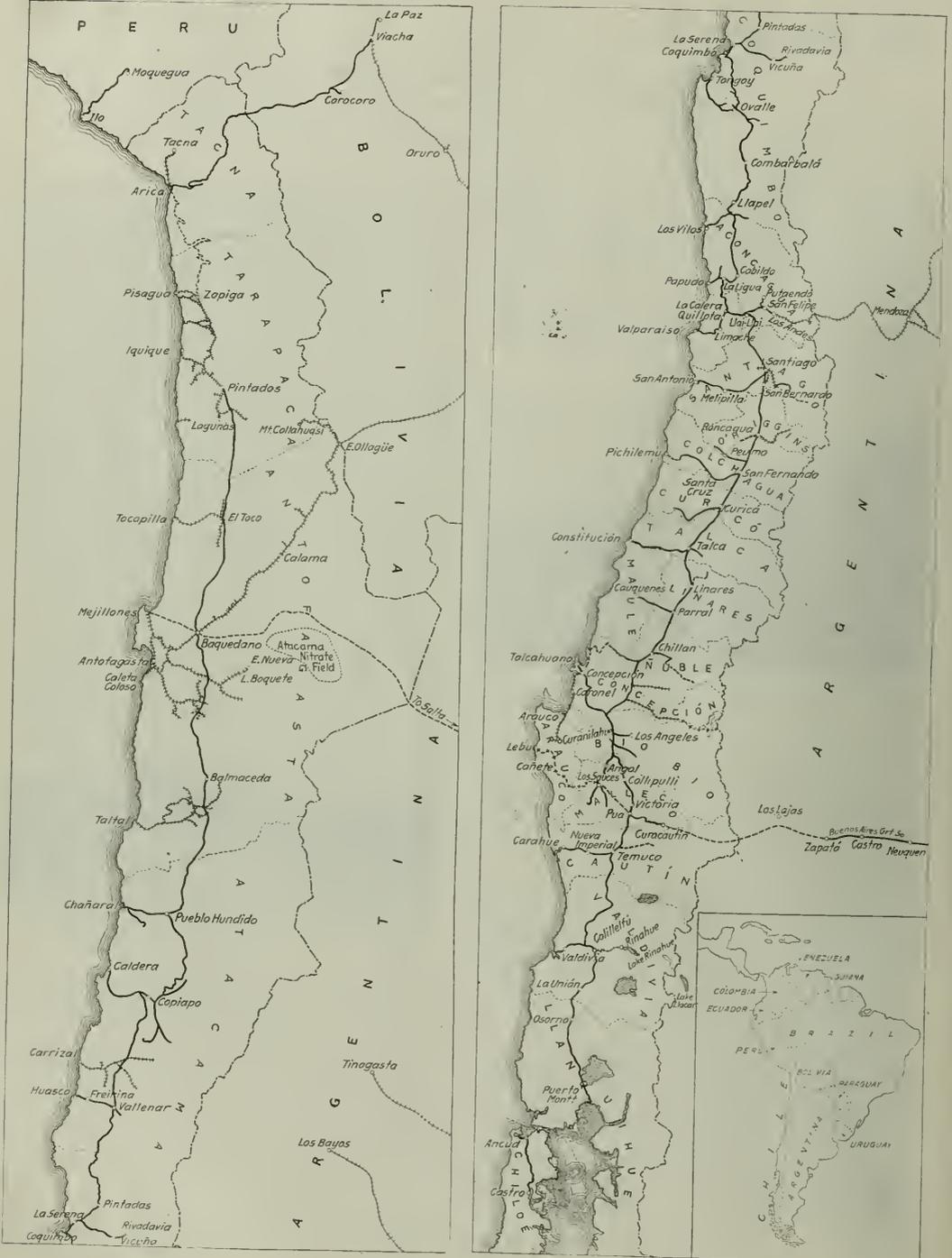


Right of Way Near Frutillar, Chilean State Railways

come in contact. But the familiarity with Spanish is that pronounced asset which promotes an intimacy and a friendship which is an undeniable promoter of a mutually beneficial business relationship.

On account of its enormous length, Chile possesses a variety of climates and can be described as comprising four distinct zones as follows:

The northern or desert zone extends 500 miles south from the Peruvian border. Despite its total lack of rain, rivers and vegetation, it is the greatest source of natural wealth of the country, for it is the great nitrate region and it contains also extensive deposits of copper and iron ore. It is very hot and dry and at places in the province of Atacama no rain has been known for over 50 years. The lack of water is so great that some of the mines have to get their supplies in tank cars while others have managed to secure it by extensive aqueduct piping systems. There are several railway lines

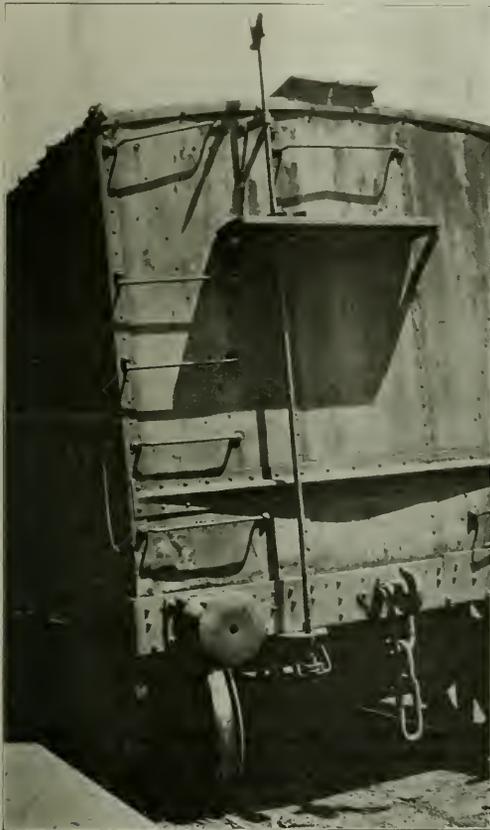


The Railway Map of Chile

connecting the nitrate deposits with the seaports from which there are excellent steamship services. Iquique and Antofagasta are the most important nitrate ports and have a population of some 45,000 and 60,000 respectively. They are surrounded by a bare desert, and each receives its water supply through an aqueduct from sources 80 or 90 miles distant. Despite its importance as a port, Iquique has no harbor, and vessels have to anchor a half mile out. Antofagasta is the port of the Antofagasta & Bolivia Railway and the outlet for a considerable amount of nitrate traffic. Taltal, which lies

of the republic. It contains large sheep raising and forest areas and is thinly populated.

In a similar manner, the 2,195 miles of north and south trunk line, or Longitudinal as it is officially known, can be referred to in geographical sections. Starting in the northern province of Tarapaca, at Pintadas, the lines as far south as Baquedano, a junction on the Antofagasta & Bolivia Railway between Antofagasta and Calama, are operated by private British interests under the name of the Nitrate Railways Company with an approximate mileage of 390. British owned lines connect Pintados with Pisagua and Iquique. Of 4 ft. 8½-in. gage, these railways had, in 1915, 73 locomotives, 53 passenger cars and 1,794 freight cars. From Baquedano south to Pueblo Hundido, a point on the trunk line quite close to the northern border of the province of Atacama, and about half way between Taltal and Caldera, both on the coast, the Chilean government's northern end of the long system is being operated, through recent arrangements, by the British owned Antofagasta & Bolivia Railway. It can be stated, therefore, that the British zone of transportation influence is paramount in the nitrate fields, all the way from the Pueblo Hundido as far north as Pintados, Tarapaca, a zone which contributes more revenues to the state than any other, controlling as it does practically all of the output of the country's bread-winner, as nitrate is known. Official Chilean designation of administration divisions characterizes the operation of the government railways as of three sections. As it is an advantage to be familiar with their local terms, they are referred to in that manner. The Longitudinal Norte (Northern Longitudinal) is the division between Pueblo Hundido and Pintados, the latter point being situated near the northern boundary of Coquimbo. Between Pintados and Calera, the division is known as the Red Central Norte, or the Central Northern System, and Calera will be seen on the map as lying within a few miles of Llai-Llai, a station on the east and west part of the main line from Valparaiso to Santiago. The Red Central Sur, or Southern Central System, includes all of the lines south of Calera to the end of the track at Puerto Montt on the Gulf of Ancud, as well as the relatively short lines on the Island of Chiloe. The following figures, as of 1918, list the rolling stock in use on all Chilean government lines and are official.



End of a Box Car on the Chilean State Railways, Showing Details of Construction

Division	Gage	Locomotives	Pass. Cars	Freight Cars
Arica-La Paz	1 meter	30	44	190
Long. Norte.....	1 meter	26	71	314
Central Norte.....	1 meter	139	120	1,267
Central Sur.....	{ 2 ft., 1 meter, and 5 ft. 6 in. }	641	506	6,478
Branch, Puente Alto-Volcan	2 ft.	6	11	26
Total equipment		842	752	8,275

All divisions but the Central Sur have baggage cars included in the passenger car totals. To the Central Sur's equipment list should be added 106 baggage cars and 806 miscellaneous cars for special service and not definitely described on the list. The government's statement also shows the amount of rolling stock on all private lines in the country, but this list has been omitted here because, in the sense of this article, attempts to transact business with the owners, mostly British, would likely lead the investigator to remote fields—most likely to London.

about 110 miles south of Antofagasta, is the terminus of the Taltal Railway, which also carries a considerable nitrate traffic.

It is understood that at present the Chilean government is negotiating in this country for a loan variously estimated at from \$5,000,000 to \$20,000,000, the proceeds of which are to be used for the purchase of equipment for the government railways. Should this financing be arranged, American concerns would probably be enabled to secure the bulk of the orders. The outcome of the parleys between American bankers and the representatives of the Chilean government is, therefore, awaited with considerable interest.

The second, or mineral zone, extends an additional 500 miles south of the northern zone and is principally a mining center, but there is a considerable agricultural development in the central valley.

The south central agricultural zone is the most populous section of Chile. It includes the most fertile part of the central valley which, in addition to its agricultural products, also produces some coal, certain amounts of minerals and contains large timber areas.

The second installment of this article will appear in an early issue of the *Railway Age*.

The southern, or island, zone is the southernmost part

Repairs in Outside Shops to Be Investigated

I. C. C. Issues Formal Order; Charges Made by Unions to Commission and Labor Board Denied by Mr. Cuyler

WASHINGTON, D. C.

THE INTERSTATE COMMERCE COMMISSION on January 6 announced a formal investigation of charges made by representatives of the railroad labor organizations that certain railroads are paying excessive prices for car and locomotive repairs at outside shops. As reported in last week's issue, Chairman Clark had stated at a hearing before the Senate committee in connection with the hearings on the Clayton law that the commission had been making an informal investigation. The order for the formal investigation was as follows:

"It having been reported to the Interstate Commerce Commission that common carriers by railroad subject to the interstate commerce act have caused and are causing certain of their locomotives and other equipment to be constructed and repaired at construction or repair shops other than their own, and have purchased and are purchasing from or through such shops material and supplies used in such construction and repair, at costs in excess of those for similar construction and repairs in their own shops, including material and supplies therefor, in disregard of efficient and economical management, resulting in unreasonable expenditures, and otherwise contrary to law:

"It is ordered, That the commission, upon its own motion and without formal pleading, enter upon a proceeding of inquiry and investigation into and concerning the matters and things above set forth;

"It is further ordered, That this proceeding be set for hearing at such times and places, and that such persons be required to appear and testify, or to produce such books, documents and papers, as the commission may hereafter direct; and that the investigation be carried on in the meantime by such other means or methods as may be deemed appropriate;

"And it is further ordered, That a copy of this order be served upon each common carrier by railroad subject to the interstate commerce act."

A Statement by the Machinists

Following this announcement by the commission, the National Association of Machinists gave to the press a statement stating that W. Jett Lauck, on behalf of President W. H. Johnston of the machinists' organization, had filed with the Interstate Commerce Commission on January 8, or two days after the commission's announcement, a petition asking for an investigation and charging that the big railroads, "especially those affiliated in a financial way with J. P. Morgan & Co., are closing their repair shops, throwing thousands of union men out of work and giving repair work at extortionate rates to large private equipment companies in which railroad capitalists or banking groups are heavily interested." It was also stated that more than 30,000 union men already have lost their jobs under this plan and a combination of figures was built up as the basis for a statement that the railroads are "milking the national treasury of three-quarters of a billion dollars and manipulating the funds in a campaign to drive the railroad unions out of business," and that in this fashion the railroad managements hoped "to send the unions on the rocks and charge the bill to the public through taxation to pay the subsidies guaranteed by the federal government or by maintaining present high rates to shippers and the traveling public."

Neither the press statement nor the petition explained that the car and locomotive repair work was sent to outside

shops during the guaranty period during which, under the law, the railroads will be allowed to charge to maintenance expenses for the purpose of figuring the guaranty only an amount to be determined by the Interstate Commerce Commission, nor that most of the lay-offs of shop employees referred to occurred at a later period, after the volume of railroad traffic had been greatly reduced. The petition stated that locomotive repair work when done in the outside shops costs the railroads on an average four times as much as it costs in their own shops. The arithmetic was not explained, but it was stated that since locomotive repair work of the entire transportation system of the country amounts annually to between \$500,000,000 and \$600,000,000 the effect would be to burden the general public with an excessive and unwarranted charge of at least half a billion dollars a year. Similarly, it was stated that the cost paid by the railroads for the repair of cars by private companies amounts to at least \$600 a car and if "the Class I carriers alone" would have their repairs done by outside companies on this basis the bill for repair of freight cars would be increased one-quarter of a billion dollars a year. No attempt was made, however, to state that the railroads are having all their cars and locomotives repaired outside. It was stated that data have been secured which show that representative railroad systems have contracted with outside concerns for the repair of at least 50,000 freight cars. The petition says in part:

"We realize fully that your honorable body has no jurisdiction over industrial relations in general or over the relations between railway employees and railway managers. We do claim most emphatically, however, that you cannot permit railroad companies under your jurisdiction to take funds paid by the public for effective transportation machinery, and to use these funds illegitimately and indefensibly for the purpose of disrupting the organizations of railway employees which received government sanction and commendation during the war.

"It is for this reason that we petition you for a complete investigation and hearing. We are prepared to submit to you the facts which we have already collected and which we feel assured that your own records and inquiries will verify. When there has been a complete ascertainment of the facts, and we are afforded an opportunity, we hope to urge in detail for your consideration the following policy in order to correct the evils of which we complain:

"1. That no railroad company be permitted to enter into contracts for repair work on locomotives or cars by outside companies unless given a permit to do so by your honorable body, and

"2. That as a condition to securing such a permit, the railroad companies must show: (a) They cannot do the work which they wish to contract for, or (b) They cannot do it at as low a cost as they can have it done by outside companies, and, (c) If a permit is granted, that the same rates of compensation and the same conditions of employment will be observed by the contractors as are recognized and guaranteed to railway workers by the Transportation Act of 1920, and the Awards of the Railway Wage Board established by this Act."

Later another statement was given to the press quoting Mr. Lauck as to the alleged actual records of contracts for repairing 617 locomotives and about 32,000 cars during the past several months. The total cost for repairing 350 en-

gines in the outside shops was stated to average \$18,026 per locomotive and this was compared with statistics of the Railroad Administration as to the average cost of repairing 1,080 locomotives in company shops during August and September, 1920, which were said to show an average of \$5,096 each. It was also stated that the cost of work done by the large companies averaged much higher than that done by the small concerns. The following table was given as showing a comparison between railroad and private shop costs on the basis of the data secured by the railroad shop organizations and those ascertained by the Railroad Administration:

COST OF LOCOMOTIVE REPAIR WORK BY PRIVATE COMPANIES AND COST OF SIMILAR WORK IN RAILROAD COMPANY SHOPS IN AUGUST AND SEPTEMBER, 1920.

Number of Locomotives	Name of Company Doing Work	Total Cost	Average Cost Per Locomotive
234	Baldwin Locomotive Works.....	\$4,691,176	\$20,048
27	Rome Locomotive Company.....	459,000	17,000
41	American Locomotive Company.....	670,760	16,360
9	Lima Locomotive Works.....	149,535	16,615
11	Charleston Dry Dock Company.....	66,000	6,000
9	Southland Steamship Company.....	54,000	6,000
10	Merrill & Stevens.....	120,000	12,000
6	Broad Foot Iron Works.....	72,000	12,000
1	Pittsburgh Boiler & Mch. Co.....	1,670	1,670
2	Manufacturers Railway Shop.....	25,080	12,540
350	Total and weighted average.....	\$6,309,221	\$18,026
1,080	Railroad Company Shops.....	\$5,504,144	\$5,096

In this statement it was stated that the locomotive repair bill under the private contract system would be raised from \$500,000,000 a year to \$1,500,000,000 annually and the car repair bill from \$400,000,000 to \$800,000,000, a total increase of \$1,400,000,000. A portion of this statement follows:

"Of the 617 repair jobs, 418 were awarded to the Baldwin Locomotive Works, which is closely affiliated with the banking group controlling the railroads. The exact cost is given for repairing 234 of these, the aggregate being \$4,691,176, averaging \$20,048 per locomotive. In other words, to have this work done by the Baldwin company costs nearly as much for 234 engines as for 1,080 similar jobs done in the railroad shops. Seventy-seven engines repaired by the American, Lima and Rome locomotive companies, all large concerns, averaged well over \$16,500 each, while one job done by the Pittsburgh Boiler & Machine Works, a small company, cost only \$1,670, and repairs to 20 locomotives by two other medium sized companies averaged \$6,000.

"More specific, however, is the comparison of the actual cost of a certain type of repair job in the railroad shop and in the private shop. The Railroad Administration very accurately classified the various types of repair jobs and ascertained the average cost of each class in the shops of the different railroad companies. For example, it found that the cost of doing certain work in the shops of the Pennsylvania Railroad in September, 1920, averaged \$4,466 per locomotive. For doing exactly the identical work on 220 of its engines, however, the Pennsylvania Company paid the Baldwin Locomotive Works \$19,057 each, more than four times the cost.

"Similarly, the New York Central farmed out 27 jobs with the Rome Locomotive Co., 41 with the American and 9 with the Lima, the costs ranging between \$16,360 and \$17,000 for each locomotive, whereas the average cost of the same work in the New York Central shops in 1920 had been \$5,773, or about one-third the amount.

"While the exact charge for the work done at 'cost plus' has not yet been ascertained, it is plain from the terms of the contracts that the cost will be very much more than if done in the railroad shops, and quite likely will exceed the extremely high costs cited above. Cost-plus contracts between the Baldwin company and the New York Central, the Seaboard Air Line, the Burlington, the Milwaukee, and other roads, stipulate that in addition to cost of materials

and labor, 110 per cent shall be added to the labor cost (which is usually from one-half to two-thirds of the entire cost) for overhead, and to the total cost thus computed an additional 15 per cent will be added for profit. The Davenport Locomotive Company, in contracts with the Burlington and other roads, provides for the addition of 5 per cent to material cost, 125 per cent to labor cost, and then takes 20 per cent of the total cost as profit. The contracts of the Rome Locomotive Company provide for similar percentages.

"Similar practice with regard to repair work on freight cars has been far more extensive than for locomotives, although it has not been possible to secure as accurate information as to comparative costs in individual instances. Nevertheless, definite figures have been obtained showing that important trunk lines have contracted with private concerns for the repair of at least 32,000 cars of various types. Information as to other contracts has been received, which, however, do not show the number of cars covered. A conservative estimate of the total number would be 50,000. The Baltimore & Ohio alone has had 12,800 cars repaired by the American Car & Foundry Company, the Ralston Steel Car Company and similar concerns, and the latter company contracted with the Norfolk & Western for the repair of 9,000 of its cars. In fact, the Ralston company's contracts cover 11,500 of the 32,000 cars of which we have record.

"A careful estimate made by experts shows that the repair work for which the Ralston company is being paid at the rate of about \$1,800 per car could be done in the company shops for approximately one-half of this amount, or \$900. It is safe to say, therefore, that the excess cost of having these 32,000 cars repaired by private concerns will total \$28,800,000. If the estimate of 50,000 cars is correct, the aggregate excess will be \$45,000,000.

"This is only one phase of the situation, the other (in which we are even more vitally and directly interested) being the starving out of the machinists' organization in railroad shops, which is a preliminary to a drive which will be made upon all railroad labor organizations, and is one part evidently of the nation wide anti-union campaign admittedly being waged by the group of capitalists centering about the Morgan banking system and its affiliated industrial and transportation concerns, of which the U. S. Steel Corporation is one of the most active."

Railroad Repair Contracts Criticized in the House of Representatives

Practically all the data regarding the cost of repairs, as included in the statements of the machinists' union, were brought out in a speech by Congressman Huddleston of Alabama in a recent speech in the House of Representatives. In the report of the speech contained in the Congressional Record, a tabulation of contracts for repairs to locomotives and cars is shown with a further statement of the cost of classified repairs in certain railroad shops. The data regarding repair contracts show that the cost per locomotive ranges from \$1,670 to \$30,275.70. Practically no information is given as to the extent of the repairs. The work done in railroad shops is subdivided under the various classes of repairs, the cost being as follows:

Class 1.....	\$26,069.23 (one road only)
Class 2.....	8,195.64 to \$14,498.14
Class 3.....	4,471.66 to 10,658.39
Class 4.....	2,093.71 to 4,576.11
Class 5.....	1,002.09 to 4,025.45

Mr. Huddleston also presented a table listing the members of several prominent financial institutions that were represented on the boards of directors of about twenty railroad equipment builders and supply manufacturers.

Practically the same charges made in the petition to the Interstate Commerce Commission were presented by B. M.

Jewell, representing the American Federation of Labor, at the Railroad Labor Board hearings in Chicago on Monday last.

Association of Railway Executives

Replies to Labor Leaders

On Tuesday, Thomas DeWitt Cuyler, chairman of the Association of Railway Executives, issued an official statement in which he denied the charges of labor leaders that railroads were paying excessive costs for equipment repairs as an attempt to deceive the public. Mr. Cuyler's statement reads as follows:

"At the very moment when real progress is being made in securing harmony and co-operation between the railroads and their employees, statements are being made to the public, which, whether intended or not, will impede these steps of progress, and if such statements are accepted without question, utterly deceive the public as to the facts.

"The Interstate Commerce Commission has ordered an inquiry into the subject of railroad repairs. The Railroad Labor Board has just started a hearing in Chicago on the subject of railroad working conditions. The railroads are co-operating with the Interstate Commerce Commission and with the Railroad Labor Board in an effort to arrive at the facts, and the proper conclusions to be drawn from the facts.

"In spite of this, W. Jett Lauck, on behalf of the machinists' union, issued to the newspapers from Washington, on Sunday, an inflammatory statement; yesterday, in opening the hearings before the Railroad Labor Board in Chicago, B. M. Jewell made another speech of the same character, utterly extraneous to the subjects under consideration; and today, Mr. Lauck from Washington, issues another statement full of insinuation and false conclusions.

"These it would seem are evidences of a concerted movement to appeal to the public over the heads of the Interstate Commerce Commission and the Railroad Labor Board, and to confuse the effort to deal with the subjects in controversy in an orderly manner. The public should be on its guard against such obvious propaganda.

"The railroad companies are preparing to present under oath the facts concerning equipment repairs to the Interstate Commerce Commission. From the facts available to me, I am confident that the investigation of the commission will confirm the following statements:

"1. Under the Transportation Act, the railroads are bound by rigid restrictions as to what they may pay out for repairs and maintenance.

"During the period covered by most of the so-called excessive charges, the railroads were guaranteed net earnings equal to those of the federal control period. For this guar-

anty period the law specifically excludes all unusual or disproportionate charges. For the period since September 1, the law limits railroad expenses to such items as may be justified 'under an honest, efficient and economical management, and reasonable expenditures for maintenance of way, structures and equipments.'

"It is manifest that for a railroad to incur improper charges for repairing its equipment would invite loss of earnings the company has every motive to conserve.

"2. The work given to outside shops was given last spring and summer when the capacity of the railroad shops was absolutely exhausted; the railroads are not now giving repair work to outside shops and depriving railroad employees of the work unless for reasons of economy or speed; such reductions in forces as are being made in railroad shops are the result of falling off in business.

"3. The figures quoted as to the relative costs of repairs in railroad shops and in outside shops are misleading for the following reasons:

"(a) The costs charged against repairs in railroad shops include no charges for interest on investment, depreciation, overhead expenses. Private companies must include such items in their costs.

"(b) Average costs in railroad and outside shops are not comparable for the reason that in order to conserve capacity and to secure the greatest possible results in the quickest possible time the railroads placed with the locomotive building companies a large amount of their heavy repairs, reserving for their own shops the lighter grade of work.

"(c) The vitally important factor is that it was necessary to get the work done at the earliest possible moment; and the railroads secured from the outside firms the best terms obtainable to get the job done.

"4. When the railroads were returned to private operation there was an abnormal percentage of cars and locomotives in bad order requiring repairs. The excess of bad order equipment was beyond the capacity of the railway shops, and the railway labor engaged in the repair of cars had declined in efficiency and output. These abnormal conditions required abnormal remedies to meet them. It was a matter of time and economy to utilize all the facilities of the equipment concerns of the country for these repairs.

"5. That there is absolutely no truth in the charge that banks and railroad companies are in a 'conspiracy' against labor, the 'open shop,' or upon any other controverted point

"A half truth is as bad as a whole lie. The statements referred to have been given a deceptive plausibility by the clever use of half truths. The whole truth will be ascertained by the Interstate Commerce Commission, and the public advised by that body as to the facts."

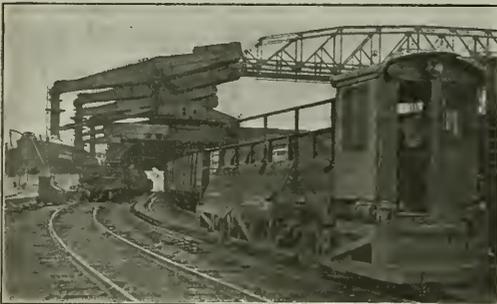


Photo by Ewing Galloway

Ore Docks on the Lake Front at Cleveland



Photo by Ewing Galloway

New York Central Docks at Weehawken, N. J.



Looking Down One of the Transverse Trucking Bridges Which Connect the Track Platforms

Operating a Modern Freight House Efficiently*

Practices Adopted at New Orange Avenue Freight House of
New York Central at Cleveland

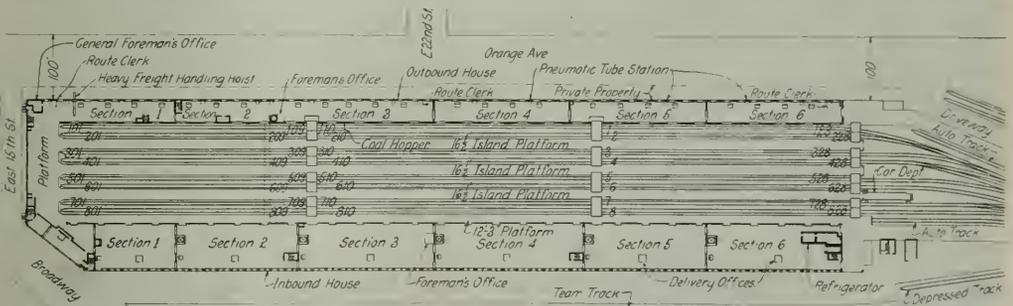
By W. E. Phelps

Assistant Engineer, New York Central, Cleveland, Ohio

IN MARCH, 1918, the New York Central completed at Cleveland, Ohio, its large Orange Avenue freight terminal, which had been several years in building and on which several millions had been expended to produce a plant combining the greatest convenience to the public, exceptionally efficient operating conditions, and an unusual regard for the comfort of its employees. When the new terminal was

served, while the new plant is less than a mile from the center of the business district and on a level with it.

The terminal as a whole, comprises a 3½-mile branch from the New York Central's Cleveland belt line and includes, besides the double-track connecting line, a 1,000-car storage and classification yard and the 35-acre terminal yard proper containing the team yards, which will have about 550



Floor Plan of the Freight House in Relation to the Track Layout

opened, three outbound and three inbound l.c.l. stations, and one team yard, were closed, and all the business was consolidated at the new location. The stations abandoned were largely outgrown and poorly located, 50 or 60 ft. below the level of the business and manufacturing district which they

served, while the new plant is less than a mile from the center of the business district and on a level with it.

House and Track Arrangement

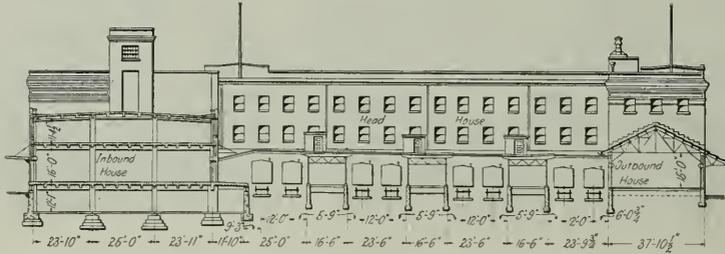
The team tracks range in length from 10 to 30 cars, with driveways 40 ft. or 37 ft. wide, the narrower dimension having been finally determined on as standard. They are largely

*The engineering features involved in the design and construction of this large local freight terminal were described in the *Railway Age* of July 19, 1918, page 117.

paved with good second-hand paving stone (on a 6-in. concrete base) removed from the many streets which were vacated or changed to permit construction of the plant.

The 38-ft. outbound house, and the 75-ft. inbound house are each 1,262 ft. long and stand opposite each other, 156 ft. apart, with the space between them occupied by a 12-ft. 3-in. platform along the inbound house, and four pairs of tracks separated by three 16-ft. 6-in. roofed-over island plat-

into three sections of 9, 10 and 9 cars each by the bridges, so that the eight tracks have a total capacity of 224 cars. With the tracks cut into these short sections, the bridges provide easy access to each platform at intervals, and with a platform (or house door) adjoining each car, door-to-door spotting of cars is entirely unnecessary. The designated number of cars for each track is simply set in and cut for the bridges. As a result of this and the modified "permanent



Cross-Section Through the Freight House Layout, Looking Toward the Head House

forms. There is no platform along the outbound house, the track-side doors of which are 19 ft. wide and 42 ft. apart, center to center. The two houses and the platforms are connected across the west end by a basement-and-three-story headhouse. The main floor of this comprises a platform 50 ft. wide, while the upper two stories, which extend also around over 296 ft. of the outbound house, contain the house offices, record room, employees' cafeteria, recreation rooms, etc.

For operating purposes, the houses and platforms are also

set up" of outbound cars, described later, the house is pulled and set up with unusual rapidity.

"Spot" Numbering System

Freight is handled between cars and trucks all on one floor, the tracks and the streets surrounding the houses being on the same level. The inbound house has full length basement and second floors, reached by seven large elevators; dirty and rough freight, like oil and barrels, baled rags, etc., is placed in the basement, and furniture on the second floor, but most



Interior of the Inbound House Showing the Use of the Lift Truck Trays

connected laterally at the east end and at two intermediate points by three sets of wooden bascule-lift bridges 16 ft. wide, which are raised and lowered by hand. Signal lights, suspended from the roof above the bridges, automatically indicate to trainmen whether they are up or down; continuous-burning red light signals are also shown over the bumping posts at the ends of the eight house tracks.

The house tracks are of 28 cars capacity, and are divided

of the freight is handled on the first floor; fundamentally this is a "one-level" station, as distinguished from some stations recently built in which tracks and driveways are on different floor levels. In the outbound house there are 55 driveway doors, with an automatic five-ton dial scale located between each pair of doors, while the inbound house has 110 driveway doors, with six scales.

The "spot" numbering system for cars at the house gives

the westerly car on each track the number 01, and running from that up to 28 for the easterly car, while each position number is prefixed by the track number, as 101 to 128 for the cars on Track No. 1, 201 to 228 on Track 2, etc. Thus the same position numbers are directly opposite on all tracks, and the system is easily assimilated by the men. Prominent signboards permanently posted on the platforms opposite each car space indicate the numbers.

The equipment used for hauling the freight between houses and cars comprises about 600 four-wheel trailers with 18-in. main wheels, about 40 low-down all-steel trailers for handling barrels, etc., and a number of new-type dollies. The standard type trailers have 3-ft. by 6-ft. platforms, rigid



Outbound Train Handling Special Equipment Used for Hauling Awkward Pieces of Freight

hook couplers, and are equipped with removable pipe or T-iron gates. The earlier types of these trailers were of the usual wooden construction, but 175 recently purchased and put into use are of all-metal construction (except floor), with Hyatt roller bearings, and possess the unusual feature of spring suspension for all four wheels, primarily a floor-saving measure, as well as a spring drawbar device.

Among the dollies are two special types of Stuebing trucks: one a six-ton capacity dolly 9-in. high, with large wheel faces, spring suspension and roller bearings, with a bed of rollers set into the frame, for handling heavy machin-



Typical Trailer Train—Outbound House, Showing Covered Trucking Bridges

ery by rolling on or off; the other a cradle caster type for handling the many shipments of long shafting or forgings with special reference to easy handling into the car.

Eight Mercury tractors, seven small three-wheelers with 30-cell Edison batteries and developing a 600-lb. drawbar pull, and one larger one for handling heavy machines, etc., are the motive power for hauling this freight and equipment. Their batteries are charged at night and given a heavy boost at noon. Trains vary as to the number of trailers, and range as high as 18, the average being about 10. In both houses the crews consist of the motorman and a trainman, the lat-

ter's duties being to couple and uncouple trailers, watch his train to prevent freight from falling, etc.

A Separate Organization for Each House

The house organization, under a general foreman reporting to the agent, consists of two entirely separate units, one for each house and each under a foreman. There are many differences in the handling of the two kinds of freight and some unusual methods are used in each house, so they will be described separately.

A driver with freight for outbound shipment goes first to any one of three route clerks with his bills; these clerks, in conveniently located special booths in the house, have all the requisites, including experience, for properly routing freight. They mark one copy of the bills with the spot number of the car into which the freight is to go, and return it to the driver, together with a ticket showing the number of bills, time of arrival at the house, etc.; the driver then goes to the indicated door and the checker, after transferring the freight onto trailers, chalks it with the spot number shown on the bills, and his symbol letter, and "OK's" the ticket which



Receiving Heavy Machinery with the Help of an I-Beam Runway at the Door

enables the driver to secure his receipted freight bills from the route clerk. This ticket is also marked to show the time of surrender, thus giving a record of the elapsed time at the station. The checker also marks on the ticket the time he started and finished handling the load.

The average loading per trailer at this house is about 1,330 lb., an exceptionally high figure which is accounted for by many metal products, including auto springs, hardware, bolts, nails, wire, rods, bars and plate, and quantities of paints and oils, manufactured in Cleveland. Outbound heavy steel products, machine tools, etc., are transferred from trucks by a freight hoist consisting of an I-beam runway extending 9 ft. out over the driveway, and 26 ft. back into the house, on which are two four-ton, geared trolley hoists, which can be worked separately or together, and easily handle the heaviest loads acceptable at the house, onto whatever equipment is needed for moving them to the cars.

The loaded trailers in each section are lined up in train order and pulled by tractors onto the proper platform, the rear trailers being cut off one by one as they pass the proper

cars. After all the loads have been cut off, the tractor gathers a train of empties which have been partially assembled by the stowers to take back into the house. No trailers have freight for more than one car—there is no "peddling." As soon as the freight has been pulled off the floor, the checker "shoots" his bills to the office by means of a pneumatic tube system, for rating, billing, etc.

On the platforms, a head stower in charge of an entire platform, shifts his men from point to point as necessary to prevent congestion at any one place, and supervises the loading generally.

To minimize the back-hauling of freight which is taken out on a platform, marked for a car which is found to be full when the freight reaches it, about a dozen telephones connected with the house exchange have been placed on the platforms, enabling a stower to notify the foreman promptly when a car is filled, and a special system of "despatchers" phones to each route clerk's and checker's booth allows the foreman to notify these men quickly of this condition. A bulletin board on which each route clerk's, checker's and stower's loading errors are charged up to the individual develops considerable rivalry among them.

A flexible "permanent set-up" is used for outbound cars,



Typical Trailer Movement in the Outbound House

which are arranged in "groups," a group being a number of cars going to one principal station for unloading or further distribution. Each group is permanently assigned to one position on the house tracks, but the assignment of cars within the group is elastic, within the foreman's discretion. This elasticity obviates the necessity of switching set-backs onto precise spot locations and also permits making extra cars without disarrangement of the set-up, at the same time giving nearly all the advantages of a strictly permanent "set-up." Cars are all set at night. The first train of outbound house freight leaves the yard about 45 min. after the house closes, and the second train soon after.

Handling Inbound Freight

In the handling of inbound freight the methods are somewhat analogous, but differ materially in detail. Each firm regularly receiving sizable quantities of freight is assigned a certain space in the house for its freight, the space being marked by suspended signboards, but two of the six sections are assigned to smaller and less regular consignees whose freight is sorted and piled alphabetically according to initial. Thus each consignee's freight is always all together and is always found at the same place in the house, which is a great advantage in reducing confusion.

Tallymen at the cars load all freight on trailers to the different sections, loading them to capacity with any number of lots of freight. They are then hauled by tractor to the

indicated section, and the piler in the section distributes it as necessary. When the lots are large enough to justify it, and the size and shape permit, the freight is piled directly from the trailers onto 3½-ft. by 5-ft. lift truck platforms awaiting delivery. About 400 of these platforms are in use, equipped with stake pockets for use when necessary. One Stuebing 5,000-lb. (hand) lift truck in each section is used to move these loaded platforms to the door for delivery, one man doing it quickly in one easy operation. These platforms and trucks not only speed up delivery and save labor, but are conducive to cleaner and closer piling, and thus save room, this being a valuable feature; it is rather startling to consider that in ordinary freight house operation, according



Some of the New Equipment

to figures from many houses, the floor space occupied by a ton of freight awaiting delivery, figured at fair rental rates, costs close to 20 cents.

A large refrigerator room is maintained for the storage of perishables awaiting delivery or shipment, and facilities are provided for icing a small number of dairy cars. Two tracks are regularly assigned for inbound freight and are set at night and as often during the day as necessary. A comparatively small amount of transfer work is done in connection with the inbound freight work.

The yards are piped for air, and light repairs are made



Loading a Four-Ton Casting on An All-Steel Roller Top Dolly Truck

and air brakes are tested and cleaned as the cars stand at the house for loading or unloading. A car repair shop is also maintained at the classification yard.

Fire drills, with adequate apparatus, are had frequently, and considerable attention is given to fire prevention work. All employees are provided with individual steel lockers and a high class cafeteria and a recreation room are maintained in the office portion of the building, while the house men have a comfortable basement dining room and lounging room, the only place in the house where smoking is permitted. Employees in the house are required to wear badges.

GROUP LIFE INSURANCE for its employees is to be continued by the General Electric Company for another year. During the first year of the insurance plan about \$257,500 in death benefits were paid.

Hearings on Substitute for Section 10 of Clayton Act

Majority of Commission Approves Underlying Principle of Section 10 But Favors Some Modifications

WASHINGTON, D. C.

HEARINGS ON THE FRELINGHUYSEN bill, S. 4576, which was drafted by Alfred P. Thom, general counsel for the Association of Railway Executives, as a substitute for Section 10 of the Clayton act, were begun before a sub-committee of the Senate committee on interstate commerce on Wednesday, January 5. Chairman Clark and Commissioner Meyer of the Interstate Commerce Commission testified briefly, saying that a majority of the commission approved the underlying principle of Section 10, but think that some modifications should be made in it, while some of the commissioners think it should go into effect subject to such changes as necessity for may develop later. They said the commission had had nothing to do with the form of Section 10 and had had no opportunity to discuss the matter after they had been notified that hearings would be held. Commissioner Meyer said that he and Chairman Clark had gone over the substitute bill tentatively and it had seemed to them that the entire effect of the law would be nullified by the insertion of the language to provide that it shall not deprive a carrier of the right to exercise an honest business discretion in determining which bid, under all the circumstances, is the most favorable, nor to prevent it, after having taken competitive bids from doing business on some other basis. Under this provision, he said, a railroad might take bids and then make a separate bargain, as is done commonly in other lines of business and to a certain extent in the railroad business. Commissioner Meyer also said he saw no reason why companies should be allowed to charge supplies against subsidiaries for more than the market price under any condition. The bill provides for the approval of a different price by the Interstate Commerce Commission. The bill provides that a common carrier having such dealings as are required by the law to be made by competitive bidding shall preserve in its office, for such time as the commission shall require, a complete record of the transaction, subject to the inspection of the Interstate Commerce Commission. This, Mr. Meyer said, would throw upon the commission initial responsibility for examining the various bids and records, which would place upon it a great responsibility in connection with the hundreds of thousands of such documents and might result in an "inferior" kind of inspection.

The bill provides that whenever the commission shall, after investigation or hearing, have reason to believe that the law has been violated, it is authorized to refer the matter and its own views or findings thereon to the attorney general. Mr. Meyer thought the commission should be authorized to make recommendations to the attorney general as to certain transactions clearly not against the public interest, although technically in violation of the law.

Chairman Clark said he thought he spoke the consensus of the views of the commissioners when he said that such transactions as the law was really aimed at should be prevented and that even if the law did not reach actual transactions the moral effect would be good, but he pointed out several objections to the Clayton act as it stands and said that it is not in harmony with some of the provisions of the Transportation Act. He pointed out that Section 10 does not prohibit common directors, but merely requires competitive bidding on transactions in which common directors or officers are involved. He also said that the Transportation Act contemplates consolidations, whereas the Clayton act would prevent many transactions in securities between companies in a

single system by the requirement that the dealings in securities must be on competitive bids. He also pointed out that the Transportation Act gives the commission control over the issuance of securities and a degree of control over expenditures by the provision that it shall make rates designed to produce a certain return only under conditions of honest and economical management. He said there ought to be a reasonable limitation on the possibility of improper dealings, but that it should not be so extreme as to stand in the way of carrying out the purpose of the Transportation Act. He agreed with Commissioner Meyer that the language intended to give the railroads discretion would nullify the rest of the bill. Mr. Clark said he believed in the principle of the Transportation Act as it applies to consolidations because the grouping of railroads into fewer larger companies would make possible more economical and efficient operation, give better public service and make possible better regulation. He thought it was in the public interest for a parent company to purchase supplies for its subsidiaries in large quantities, but said that they should be sold to the subsidiaries at the price at which they were purchased. He did not think that a parent company should be required to bid in the open market for the securities of its subsidiaries. Mr. Clark also pointed out that if there is extravagance or even graft in connection with the purchase of supplies or of securities Section 10 would not reach it unless common directors or officers were involved.

Senator Townsend called Mr. Clark's attention to a speech made in the House last week by Representative Huddleston, in which Mr. Huddleston presented a memorandum, evidently prepared for him, charging that railroads are paying excessive prices for locomotive repairs in outside shops as compared with the cost in railroad shops. Chairman Clark said he imagined the memorandum was the same or came from the same source as information which had been furnished to the commission some weeks ago. The commission had started an informal investigation and it had had the accounts of two roads checked up. It seems to be established, he said, that the cost of the repairs of these locomotives has exceeded that of work done in the railroads' own shops. The commission had asked the presidents of some of the roads for an explanation. In one case the reply was that the figures as to the cost in outside shops were not accurate, because they represented only preliminary estimates. In some cases the contracts were made on a cost-plus basis. Some of the railroads had replied that the figures did not represent a fair comparison because the cost figures for the railroad shops did not include overhead, interest or depreciation. Others said that they had paid more for repairs in outside shops, but they had felt justified in incurring the additional expense because they needed to have the repairs made and were not able to perform the work promptly themselves. Except for two roads, Mr. Clark said, the commission's investigation is not yet complete, and while the figures received are "significant and illustrative," they require further investigation. It still remains to be established, he said, whether any interlocking relation was involved between the railroads and the companies doing the work outside, but the commission is going into the matter thoroughly with the purpose to get the exact facts.

Alfred P. Thom, general counsel for the Association of Railway Executives, and S. T. Bledsoe, general counsel for the Atchison, Topeka & Santa Fe, testified before a sub-

committee of the Senate committee on interstate commerce on January 6 and 8 that the effect of Section 10 of the Clayton law would absolutely break up the system by which railroad companies purchase materials and supplies for their system lines and receive in return securities of the subsidiary companies. The requirement that competitive bids must be received on dealings between companies having common officers or directors, they said, would make it impossible for the parent company to buy supplies in large quantities for all its subsidiaries and would also subject it to the danger of losing control of the subsidiaries. They declared that they were in sympathy with the underlying principle of the Clayton act, but that amendments such as are proposed by the Frelinghuysen bill are necessary to make it workable. This bill does not apply to transactions in railroad securities because the Interstate Commerce Commission has been given complete power to regulate security issues by the transportation act.

Mr. Thom pointed out that the railroads have persistently sought to have Congress amend the law before its effective date, without interfering with its prohibition of improper transactions, but that Congress has been so pressed with other matters that the subject had not been considered on its merits before the effective date arrived. One reason was that the matter was not of importance while the government was operating the railroads. He also said that the President had vetoed the bill to again postpone the effective date without having before him the carriers' reasons for asking further postponement. After the law was passed, Mr. Thom said, the carriers had asked the Interstate Commerce Commission to give it a construction, by conference rulings, which would except dealings between railroads and their subsidiaries, but the commission had not felt justified in doing so. He illustrated his remarks as to the effect of the law by examples of the separate corporations required by the Texas laws and by the structure of several of the larger railroad systems. The interpretation put on the law by the commission, he said, would require that all dealings between the separate companies of a system be on the basis of competitive bids.

"We are not opposing," he said, "the underlying moral principle that the purchasing agent of a railroad should not have conflicting outside interests, but we are seeking to amend the law to make it workable, and prevent consequences which were not foreseen when it was passed. We are willing that every proposal we make shall be measured by the standard of public interest. In dealings with subsidiary companies there is no conflict of interest."

Mr. Bledsoe said he did not believe Congress had intended to apply the law to transactions with subsidiaries. He thought it was intended to apply to purchases of supplies and sales of securities, but that all doubt should be removed. He showed the committee that the Atchison system consists of five separately-operated lines, several of which are held by Texas corporations, all of the securities of which are owned by the Atchison. The parent company buys most of the materials and supplies for all of them and bills them at cost plus a small handling charge. It also owns most of the system equipment and through trains operate over the system lines. Repair shops are distributed over the lines at convenient points and the repair bills are apportioned on a basis of use. "The details of these transactions are so minute that it would not be possible to handle them on a basis of competitive bids," Mr. Bledsoe said, "and if these great systems are to be maintained in an efficient state of operation you cannot dismember them. If the law is to be applied to these dealings all that is sought to be accomplished by the transportation act would be nullified."

He also pointed out that the Sante Fe lines are joint users of 18 separate depot and terminal companies. He did not know how these terminal company operations can be made a

success if the owning companies cannot have their representatives serve as directors, or if competitive bids are to be required.

Mr. Bledsoe also declared that purchasing by competitive bids is an expensive method and that a good purchasing agent should be able to buy at a lower price by negotiation. The proposed bill would give a railroad the right to buy at less than the lowest bid if possible to do so by negotiation.

Mr. Thom continued his statement on January 8. He said that railroads frequently find it necessary to organize separate companies to furnish fuel and other supplies which are merely an alter ego of the railroad company and in reality a part of its departmental organization. The method of purchasing by competitive bids, he said, has been adopted by governments merely as a safeguard against dishonesty. The Clayton law would practically commit the roads to doing nearly all their buying on competitive bids.

For many kinds of purchases it is practically impossible for the railroad to prepare complete specifications which will cover its requirements and the personal equation with the manufacturer is important. A good purchasing agent can obtain better prices by negotiation with manufacturers than by merely accepting the lowest bid; and frequently it is better economy to buy from responsible manufacturers at a higher price than the lowest bid. Under the law it would be impossible to reject all bids and then negotiate for a still lower one. It would be necessary to ask new bids.

Mr. Thom said that the method of negotiating with bidders results in an economy of millions of dollars. For example, if a railroad asks bids for a thousand cars and the price is satisfactory it might want to increase its order to 1,500 or 2,000 cars at the same price, but under the law it would be necessary to ask new bids.

Senator Kellogg remarked that it would not do much good to require western railroads which as a practical matter must buy rails from the Colorado Fuel & Iron Company because it has the only rail mill in the west, to ask for competitive bids.

The Clayton act, Mr. Thom said, will bring out a horde of impossible adventurers that will try to make the lowest bid with the idea of selling the contract to someone else and will sue the railroads if they reject their lowest bids as not the most favorable. The law does not define what constitutes the most favorable bid.

Mr. Thom then explained the Frelinghuysen bill, proposed as a substitute for Section 10, which does not apply to dealings between railroads and their common carrier subsidiaries but does require competitive bidding for the purchase of supplies from companies having common directors or officers. The bill, however, allows the railroads an honest business discretion in determining which bid, under all the circumstances, is the most favorable. It does not apply to dealings with non-carrier subsidiaries if the railroad owns a majority of its stock except that the railroad would not be allowed to purchase from such subsidiaries at more than the market price except on approval of the Interstate Commerce Commission. Referring to charges made by the International Association of Machinists that railroads are having cars and locomotives repaired at outside shops at excessive prices, Mr. Thom said that the Interstate Commerce Commission had ordered a full investigation. He said that when the railroads were returned by the government an amazingly large majority of their cars and locomotives were in bad order. As much repair work as possible was done in railroad shops and what could not be done by the roads themselves had to be sent to outside shops or left undone. He also said that there was often a difference in the character of the work done in the outside shops, because the equipment requiring the heaviest repairs was sent to them.

Mr. Thom also pointed out that the public is protected by

the provision in the transportation act that the Interstate Commerce Commission shall adjust rates to give a fair return only under honest, efficient and economical management.

Chairman Clark of the Interstate Commerce Commission appeared before the committee again on Wednesday morning and stated that the commissioners are fully agreed that the existing law should be modified and are unanimous in recommending a number of modifications in the Frelinghuysen bill, which he outlined. The commissioners were agreed that the law should not be applied to dealings in securities because the commission already has complete jurisdiction over that subject under the provisions of the transportation law. They were also agreed that it should not be made to apply to transactions between railroads and their carrier subsidiaries or non-carrier subsidiaries controlled by at least one half ownership or by a lease, but the commissioners were opposed to allowing very much discretion in dealings for the purchase of supplies between companies in which there is an interlocking interest.

The first change proposed was one in the title to make the bill an amendment to Section 10 of the Clayton law instead of repealing it, but to insert a provision referring to it in the interstate commerce law so as to make it a part of that law. The commissioners also thought that the law should become effective within 60 or 90 days from its passage instead of at the end of the year. It was also proposed that the law should not apply to transactions amounting to less than \$100,000 a year. The present law applies to transactions amounting to more than \$50,000 a year, and the Frelinghuysen bill applies only to dealings or contracts to the amount of more than \$50,000 in any one transaction. Chairman Clark pointed out that the latter proposal placed too little limitation because transactions could be split up into several amounts each less than \$50,000. Another amendment to the proposed bill suggested was that it should apply to all officers, directors or agents. The commission proposed to eliminate the provision allowing the carrier to apply to the Interstate Commerce Commission for a decision as to what constitutes a substantial interest, for the reason, Mr. Clark said, that it is impossible to define in advance what constitutes a substantial interest, as this may depend on various circumstances. The commission also proposed to strike out the language allowing the carrier to exercise an honest business discretion in determining which bid is most favorable and authorizing it to negotiate with the bidders for more favorable terms. To allow so much discretion, Mr. Clark said, would practically nullify the purpose of the act, and to allow the carrier to increase the quantity to be purchased after having received bids without inviting new bids would make it possible to have a private understanding with one of the bidders that he could secure a larger order than that specified in the bids. He pointed out that the law would not prevent a carrier from negotiating with bidders for more favorable terms except where the interlocking interest exists.

When Mr. Thom asked if the commission would not be willing to provide for emergency purchases without competitive bidding, Mr. Clark said he thought that emergencies could be taken care of in the regulations. He thought there would not be many emergencies in which either the law or the regulations would cause embarrassment because there is no restraint except where the interlocking interest exists. The commission also objected to the provisions in the substitute bill by which carriers might secure the approval of the Interstate Commerce Commission for a different price than the existing market price on transactions between carriers and their non-carrier subsidiaries. The commission also proposed substantially the language of the present law requiring carriers to file with the commission within 30 days a full and detailed record of the transactions which are subject to the law. The Frelinghuysen bill merely proposes that such

records shall be preserved by the carrier in its office subject to the inspection of the commission. Chairman Clark said that if carriers were not required to report the commission would have very little information as to possible violations and if carriers are going to have such transactions as those aimed at in the law they should report the facts to the commission.

Chairman Clark said the commission thinks that Section 10 is out of harmony with the provisions, purpose and principle of the transportation act and that it would be impracticable, if not impossible, for the carriers to conduct their financial business or for the commission to administer its functions of regulating them if limited by the unyielding provisions of Section 10.

Senator Townsend asked if the chairman had anything further to say relating to the charges of excessive prices being paid for car and locomotive repairs in outside shops. Mr. Clark said the commission is proceeding with its investigation and intends to ascertain the exact facts, but no facts had yet been demonstrated from which it could give the committee any reliable conclusions. He said the commission had checked up the figures used by Representative Huddleston of Alabama in a speech in the House, but had not been able to verify them. He pointed out that locomotives had been put to a very severe strain during the war period and said there may have been a very good reason for a railroad to send them to outside shops. It also may be found, he said, that in some instances this was done with a disregard for cost. It may also be found that there was some interlocking interest, but the commission is not yet able to state a conclusion. As to whether there had been under-maintenance of the equipment during the period of federal control, he said there are different views, but he would say that ever since the European war broke out there has been a continuous and tremendous pressure for transportation and equipment has been used to the maximum in an attempt to accomplish the largest possible amount of public service.

Bill to Provide for Partial Payment of Guaranty

WASHINGTON, D. C.

A BILL to MAKE the Transportation Act provide clearly and specifically what the railroads and the Interstate Commerce Commission have contended it already contemplated, but which the Comptroller of the Treasury and the Supreme Court of the District of Columbia have said it does not provide, that is, partial payments to the railroads on account of their guaranty for the six months after the termination of federal control, was introduced in Congress on January 6 by Representative Winslow of Massachusetts. If the bill is passed it would enable the railroads to collect a large part of the \$300,000,000 or \$400,000,000 of their guaranty that is due without waiting for the long and tedious process of final adjustment of the exact amounts. The bill also applies to the amounts due to many of the short lines that were relinquished from federal control as reimbursement for their deficits incurred by reason of federal control.

The Winslow bill proposes to amend and reenact subdivision (g) of Section 209, relating to the six months' guaranty, so as to read as follows:

"(g) The commission shall, as soon as practicable after the expiration of the guaranty period, ascertain and certify to the Secretary of the Treasury the several amounts necessary to make good the foregoing guaranty to each carrier. The Secretary of the Treasury is hereby authorized and directed thereupon to draw warrants in favor of each such carrier upon the Treasury of the United States for the amount

shown in such certificate as necessary to make good such guaranty, it being the true intent and meaning hereof that whenever, and as often as, the commission shall certify to the Secretary of the Treasury an amount as certainly due and necessary to make good the foregoing guaranty to any such carrier, the Secretary of the Treasury is hereby authorized and directed, upon receipt of such certificate, to draw a warrant in favor of such carrier upon the Treasury of the United States for the amount shown in such certificate as an amount necessary to make good the foregoing guaranty, whether such amount is in final settlement or in partial payment, and the Comptroller of the Treasury is hereby directed to countersign the same forthwith. The Secretary of the Treasury shall thereupon deliver the said warrant to such carrier, and the Treasurer of the United States is hereby directed to pay the same, upon presentation, out of the appropriation made therefor in this subdivision. An amount sufficient to pay such warrants is hereby appropriated out of any money in the Treasury not otherwise appropriated.

"In ascertaining the several amounts necessary to make good the foregoing guaranty to each carrier the commission is further authorized, in the case of debits and credits to railway operating income which cannot at the time be definitely determined, to make, whenever in its judgment practicable, a reasonable estimate of the net effect of any such items, and, when agreed to by the carrier interested, to use such estimate as a definitely ascertained amount in certifying the amounts due under the said guaranty, and such estimates so agreed to shall be binding in final settlement."

It also proposes to amend and reenact subdivision (g) of Section 204, pertaining to the short lines that were relinquished during the period of federal control, to make it read similarly.

The House committee on interstate and foreign commerce has referred the bill to the Interstate Commerce Commission for an opinion and has announced a hearing on the bill at Washington on January 14. The railroads have also announced their intention of taking an appeal from the recent decision of the Supreme Court of the District of Columbia denying the petition of the Grand Trunk Western for a mandamus to compel the Secretary of the Treasury to honor a certificate of the Interstate Commerce Commission for a partial payment on account of its guaranty.

A. R. A. Tackles Fuel Conservation

THE FIRST ACTIVE STEP toward improving fuel efficiency to be undertaken by the American Railway Association has been the organization of joint committee which held its first meeting in New York on January 6. The motive leading toward a more active participation in fuel conservation is the necessity for more rigid economy in the operation of the railroads. It is anticipated that traffic will not be as heavy and hence that the gross revenues will be less during 1921 than in the preceding year and it is realized that the only way in which the railroads can look forward with certainty to an improvement in their net revenues during the coming year lies in the enforcement of greater economies in operation. Officials directing this movement believe that it is incumbent upon the railroads to demonstrate the utmost efficiency in every direction in conformity with the spirit of the Transportation Act.

The fuel bill, on account of its size and its susceptibility to greater efficiency both in purchase and consumption, appears to afford the greatest opportunity for substantial savings. With this in view, the American Railway Association directed the appointment of a representative committee on fuel conservation which will undertake to outline the policies of this association toward fuel conservation.

This committee is comprised of 21 members. Seven members represent the operating department; seven, the mechanical department, and seven represent the service of supply. The members of the committee representing the operating department are: J. B. Parrish, general manager, Chesapeake & Ohio; E. M. Costin, general manager, Big Four; W. M. Jeffers, general manager, Union Pacific; J. E. Hutchinson, general manager, St. Louis-San Francisco; W. D. Robb, vice-president, Grand Trunk; H. M. Eicholtz, assistant to vice-president, Chicago & North Western, and H. McVeagh, assistant to general manager, Big Four.

Those representing the mechanical department are: C. H. Wiggins, superintendent motive power, Boston & Maine; Wm. Schlafke, mechanical manager, Erie; G. H. Emerson, chief of motive power and equipment, Baltimore & Ohio; Jos. Hainen, assistant to vice-president, Southern; W. J. Tollerton, general mechanical superintendent, Chicago, Rock Island & Pacific; John Purcell, assistant to vice-president, Atchison, Topeka & Santa Fe; H. M. Curry, general mechanical superintendent, Northern Pacific, and W. L. Robinson, superintendent of fuel and locomotive performance, Baltimore & Ohio.

The service of supply is represented on the committee by the following members: S. B. Wight, manager purchases and stores, New York Central; Samuel Porcher, general purchasing agent, Pennsylvania; H. B. Grimshaw, assistant to general manager, Seaboard Air Line; L. N. Hopkins, purchasing agent, Chicago, Burlington & Quincy; F. A. Bushnell, purchasing agent, Great Northern; G. E. Scott, purchasing agent, Missouri, Kansas & Texas, and T. Britt, general fuel agent, Canadian Pacific.

William Schlafke, mechanical manager of the Erie, was selected as chairman and William Jeffers, general manager of the Union Pacific, and Samuel Porcher, general purchasing agent of the Pennsylvania, were selected as vice-chairmen. V. R. Hawthorne, secretary of the Mechanical Division of the American Railway Association, was made secretary. The chairman and vice-chairmen constitute a committee of direction of the Fuel Conservation Committee. The official headquarters of the committee will be at the American Railway Association offices in Chicago.

As a beginning of its work, the committee decided to undertake at once the study of four subjects:

- 1—Organization of fuel conservation.
- 2—Inspection of fuel and preparation of specifications for fuel.
- 3—Statistics.
- 4—Existing methods of conservation—mechanical and others.

Four sub-committees were appointed to make special studies of these subjects for report to a general meeting of the Fuel Conservation Committee to be held within 30 days. The personnel of the Committee on Organization of Fuel Conservation is as follows: W. J. Tollerton, chairman; W. D. Robb and S. B. Wight. The committee on inspection of fuel and preparation of specifications consists of E. M. Costin, chairman; G. H. Emerson and L. N. Hopkins. The committee on statistics is comprised of F. H. Hammel, chairman; T. Britt and H. M. Curry, and the committee on existing methods of conservation includes John Purcell, chairman; J. B. Parrish and G. E. Scott.

THE SUIT OF THE STATE OF NEW YORK against the Interstate Commerce Commission, asking for an injunction to restrain the commission from enforcing its proposed increases in intrastate passenger rates in New York is to be heard by the United States District Court at Norwich, N. Y., on January 22. The ten members of the Interstate Commerce Commission, as a body, and as individuals, are named as defendants.



Some Grading Work on the Delaware & Hudson

Analysis of Railroad Grading Develops Trend Curves

Valuation Departments of Representative New England Roads

Present Interesting Study of Reproduction Costs

IN ARRIVING AT the cost of reproduction of the properties of the roads as of the year 1914, many interesting and difficult questions have arisen. Various railroads of the country, through their valuation departments, have endeavored to make such studies of their properties as would help or enable the engineers of the Bureau of Valuation of the Interstate Commerce Commission, and others, to determine what is a fair and equitable figure. One of the most complete studies of this nature is a grading report made by a committee representing the New England carriers which has gone into the question of unit costs of grading in a very thorough and comprehensive manner.

The report, which covers about one hundred pages of type-

sufficient to show the methods which were used by the committee in developing the diagrams or "trend" curves and may be used as a guide for developing similar studies in other localities wherein the surrounding conditions are more or less uniform. It must be conceded here that this form of study will not apply where an attempt is made to cover a section of country which has widely different industrial and topographical characteristics.

Type of Country and Roads Represented

The roads represented in the report are the Bangor & Aroostook, covering eastern and northern Maine; the Boston & Albany, covering Massachusetts and eastern New York:

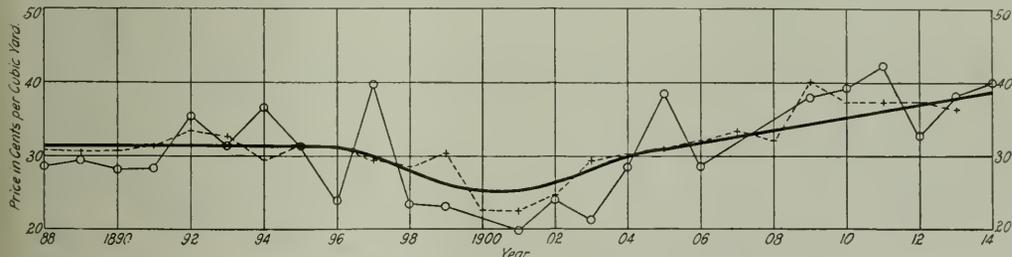


Fig. 1. A Typical Trend Curve of an Individual Road

written matter, tables and diagrams, presents all of the contract data dealing with common excavation, loose rock and solid rock, that this committee could secure and covered the moving of over 34,000,000 cu. yd. of excavation from bank to fill, exclusive of the work on the Southern New England. This represents all of the work of any magnitude which has been done between 1880 to 1915 in the territory covered by the New England railroads. The results obtained from the data and the diagrams confirm what is a matter of common knowledge, that is, that the costs between 1896 and 1900 were low and that from 1900 to 1915 they have increased. The data given herein, while not complete, is

the Boston & Maine, covering northern Massachusetts, eastern New York, Vermont, New Hampshire and southeastern Maine; the Central New England, covering western Connecticut and eastern New York; the Central Vermont, covering Vermont, Massachusetts and Connecticut; the Delaware & Hudson, covering eastern New York; the Maine Central, covering southern Maine and New Hampshire, and the New York, New Haven & Hartford, covering Massachusetts, Rhode Island, Connecticut and southeastern New York.

The section of country thus represented consists topographically of a comparatively narrow coastal plain backed by foothills which become mountainous over a considerable

portion of New Hampshire, Vermont, northwestern Connecticut and western Massachusetts. The coast line is very irregular, being broken by rocky headlands and indented by tidal estuaries with deep deposits of silt, causing heavy subsidence and difficulty in depositing fills.

The rock is largely volcanic, generally granite and con-

hills are full of springs and the rainfall and snowfall are heavy. These springs usually make trouble where the rock lies in pinnacles and saddles or where an impervious clay underlies the sand or gravel, and frequently require pumping, especially where the cut runs with the grade. In many cuts the common excavation approaches hard pan.

Methods Used in Analyzing

The prices shown in the accompanying tables were all figured on the "one way" basis, that is on a single price from cut to fill. At first it was attempted to work out the grading on the basis of the contract price without the overhaul and to determine separately a price for overhaul. It was found, however, that not only was there no consistency between the methods adopted by the Bureau of Valuation and the practices of the various carriers, but that no continuous plan had been followed in the case of the individual carriers for any considerable number of years. Some of the contracts named

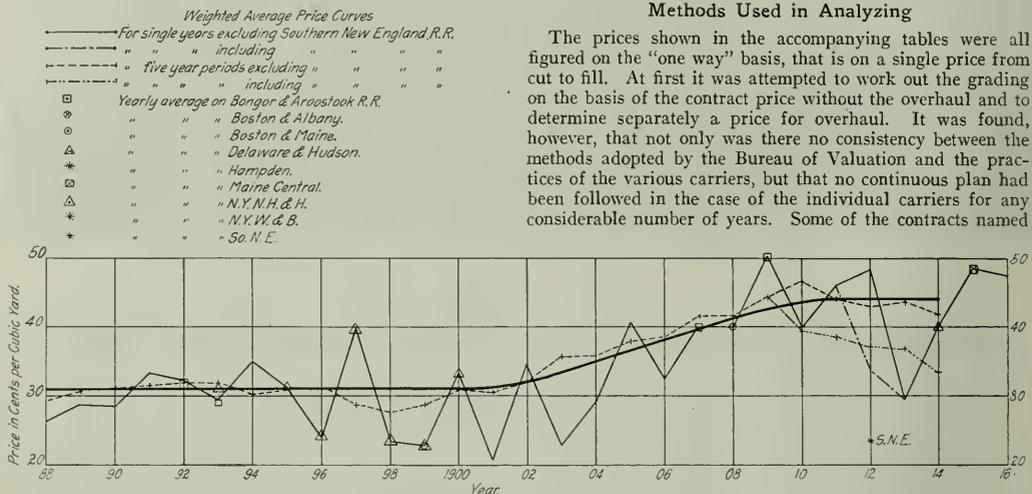


Fig. 2. The Trend Curves Between 1888 and 1916, Showing Yearly Weighted Average of Individual Roads

glomerates. Slate predominates locally in some sections of Maine, Vermont and eastern New York, marble in parts of Connecticut, Massachusetts and lower Vermont and sandstone with fissures filled with trap rock in the Connecticut valley south of the Massachusetts-Vermont line. The rock as a rule is hard to drill and difficult to handle. It generally occurs in small quantities, in saddles and pinnacles cov-

er a price in place, including all haul, some named a free-haul limit of 500 ft., some 600 ft., others 1,000 ft. and others still another distance beyond which overhaul would be set up as a pay quantity.

As a result of this condition, the only common basis to which all the data could be brought was "cost in place" including haul. The diagrams were plotted on that basis and

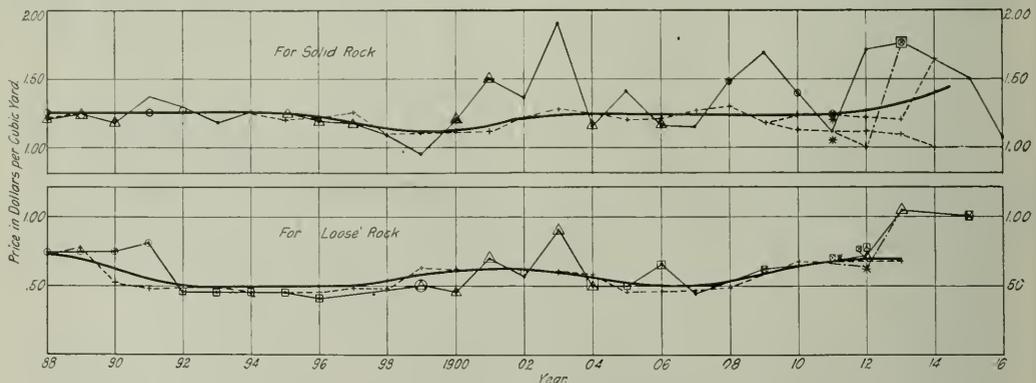


Fig. 3. Trend Curves of Loose Rock and Solid Rock for the New England Group

ered by an overburden of earth of irregular depth. For this reason the grade line of the New England railways has usually been kept high and the deficiency made up from borrow.

The earth is generally gravel or clay or a combination of the two, while the cuts are frequently of sand which, when wet, as is often the case, becomes of a quicksand nature. The

tables were reduced to the same basis, although where the data were available the tables show the two factors separately. Where no figures appear in the overhaul column the cost of haul is included in the total price.

Table I illustrates a part of a typical analysis of one of the roads in question. The data are grouped by years, the date of the contract being the one governing its place in the

tabulation. Taking the year 1911 for an example it will be seen that there were but two contracts, one involving the moving of 13,790 cu. yd. at a cost of 35 cents a yard, or a total cost of \$4,826.50, and the other involving 106,715 cu. yd. at 42 cents a yard or \$44,820.30. Following the first contract through it will be seen that there was a total overhaul cost of \$716.83 which when reduced by the percentage

is also shown in Table II, and graphically by the dotted line in Fig. 1. This method is simply the taking of the weighted average costs of the work let in the individual years, as for instance 1880, 1881, 1882, 1883 and 1884, averaging them mathematically and tabulating the results as a five year weighted average to be represented at the middle of the period, that is, at the year 1882. The next figure was ob-

TABLE I—COMMON EXCAVATION COMPILATION SHOWING WEIGHTED AVERAGE CONTRACT PRICES OF GRADING FOR ROADWAY, YARDS AND TERMINALS

Year	Location	Quantity cu. yd.	Price	Amount	Overhaul		Totals by years					
					Total Amount	Per cent common is to total	Total amount incl. overhaul	Price per cu. yd. O. H.	Quantity cu. yd.	Amount incl. O. H.	W. A. price per cu. yd. incl. O. H.	
												Amount
1910—Walpole-So. Framingham—double tracking		87,133	\$0.35	\$30,496.55	\$4,229.46	89	\$3,764.22	\$34,260.77	\$0.393	288,927	\$113,093.36	\$0.391
Hawleyville-Botsford—double tracking		63,471	.32	20,310.72	18,846.45	33	6,219.33	25,059.05	.418			
Naugatuck Jct.—No. leg. of wye		14,355	.33	4,737.15	1,042.73	51	531.79	5,268.94	.367			
Ashton, R. I.—side track—Godard Co.		800	.35	280.00				280.00	.35			
Woonsocket, R. I.—new freight factory		19,932	.33	6,577.56				6,577.56	.33			
Botsford-Shelton—double tracking		69,771	.35	24,419.85	5,228.39	37	1,934.50	26,354.35	.378			
Cedar Hill—engine facilities		6,996	.35	2,448.60				2,448.60	.35			
Larchmont—grading—pro. freight facilities		1,764	.27	476.28				476.28	.27			
Cohasset-Greenbush—double tracking		24,705	.42	10,376.10	642.85	81	520.71	10,896.81	.441			
Totals and W. A. price		288,927	\$0.345	\$100,122.81								
1911—E. Prov.-E. Jct.—2d track impr.		13,790	\$0.35	\$4,826.50	\$716.83	69	\$494.61	\$5,321.11	\$0.386	120,505	\$50,674.21	\$0.421
Westerly, R. I.—E. G. C., etc.		106,715	.42	44,820.30	555.00	96	\$32.80	45,353.10	.423			
Totals and W. A. price		120,505	\$0.41	\$49,646.80								
1912—Westchester, N. Y.—eastbound class. yard		1,594	\$0.45	\$717.30				\$717.30	\$0.45	243,995	\$79,944.55	\$0.328
Berk. Jct.-Brookfield Jct.—double tracking		9,000	.40	3,600.00				3,600.00	.40			
New Haven—west cut		6,901	.25	1,725.25				1,725.25	.25			
New Haven—west cut		7,900	.40	3,160.00				3,160.00	.40			
Brookfield Jct.-New Milford—double tracking		218,600	.30	65,580.00	\$5,800.00	89	\$5,162.00	70,742.00	.324			
Totals and W. A. price		243,995	\$0.31	\$74,782.55								
1913—Fluteville, Conn.—imp. lines of sight		1,093	\$0.50	\$546.50				\$546.50	\$0.50	45,490	\$17,346.42	\$0.381
Princeton, Mass.—pro. wye track		8,426	.34	2,864.84				2,864.84	.34			
Middleboro, Mass.—pro. wye track		2,928	.40	1,171.20				1,171.20	.40			
Woonsocket, R. I.—new freight facilities		13,036	.3975	5,181.81				5,181.81	.397			
Clinton Wire Cloth Co.—side track		2,335	.35	992.25				992.25	.35			
Clinton—Swift Co. side track		356	.35	124.60				124.60	.35			
Olneyville, R. I.—E. G. C.		12,961	.25	3,240.25	\$1,472.00	96	\$1,413.12	4,653.37	.359			
Ansonet, Mass.—pro. side track		3,855	.47	1,811.85				1,811.85	.47			
Totals and W. A. price		45,490	\$0.35	\$15,933.30								

69 (per cent common to total) gave an overhaul charge of \$494.61. Adding this to the contract cost gave a total cost, including overhaul of \$5,321.11 for moving 13,790 cu. yd., or a cost of 38.6 cents per cu. yd. In the second contract the total cost, including overhaul, came to \$45,353.10 for moving 106,715 cu. yd., or a unit cost of 42.5 cents per cu. yd. The total yardage for the year was then 13,790 plus 106,715 or 120,505 cu. yd., handled at a total contract price of \$5,321.11 plus \$45,353.10 or a total of \$50,674.21, thus giving a unit cost of 42.1 cents per cu. yd. for the year.

The last figures which are shown in the three right-hand columns of the table represent the weighted average for the year 1911. This procedure was followed out for each year and for each individual road. In this particular illustration the tables and diagrams are devoted to common excavation, the same procedure, however, was followed out in the classification of loose rock and of hard rock, of which however only the composite diagram or trend curves are shown.

Securing General Averages for Plotting

The total yearly averages or weighted averages for each road were then tabulated as shown in Table II, which is representative of a part of one of the tables presented in the report.

The results so obtained were plotted on a diagram which is shown in Fig. 1, the light solid line representing the yearly averages. In order to smooth out the irregularities due to any preponderating influence of some local work, a running average was developed by five year periods, which

tained by taking the years 1881, 1882, 1883, 1884 and 1885 and repeating the process and showing the result as for the year 1883. In the fourth column, after the year 1894, will be seen the figure 940,736 which represents the total yardage

TABLE II—WEIGHTED AVERAGE PRICES FOR FIVE-YEAR PERIODS WITH OVERHAUL, EXCAVATION—COMMON—ROADWAY, YARDS AND TERMINALS

Year	Contract price		Quantity	W. A. P.	Amounts	Year to which	
	Price	Amount					Sum—5-yr.	periods	Sum—5-yr.	W. A. P. applies
1890.	172,546	\$0.281	48,476.78	806,894	\$0.308	\$248,826.26	1888
1891.	95,976	.282	27,076.35	902,870	.306	275,901.61	1889
1892.	336,333	.352	118,251.96	1,066,109	.307	327,415.35	1890
1893.	94,164	.314	29,588.41	923,526	.313	289,093.87	1891
1894.	241,717	.366	88,521.51	940,736	.332	311,915.01	1892
1895.	962,112	.312	300,481.89	1,733,302	.326	563,920.12	1893
1896.	984,017	.239	235,359.10	2,618,343	.295	772,202.87	1894
1897.	636,740	.396	253,277.28	2,918,750	.311	907,228.19	1895
1898.	4,772	.233	1,110.60	2,829,358	.311	878,750.38	1896
1899.	532,043	.230	122,214.76	3,119,684	.292	912,443.63	1897
1900.				2,157,572	.284	611,961.74	1898
1901.	215,131	.198	42,639.31	1,388,686	.302	419,241.95	1899
1902.	242,804	.240	58,272.96	994,750	.225	224,237.63	1900
1903.	142,605	.211	30,019.92	1,132,583	.224	253,146.95	1901
1904.	406,983	.286	115,574.40	1,007,523	.245	246,506.59	1902
1905.	527,427	.384	202,715.76	1,534,950	.292	449,223.35	1903
1906.	569,471	.286	162,624.22	1,889,290	.301	569,207.26	1904
1907.				1,646,486	.31	510,934.30	1905
1908.				1,503,881	.32	480,914.38	1906
1909.	3,455	.380	1,312.90	1,100,353	.333	366,652.88	1907
1910.	288,927	.396	113,055.36	861,853	.321	276,992.48	1908

dealt with in the years 1890 to 1894, inclusive, at a total cost of \$311,915.01 or at an average unit cost of 33.2 cents per yard. According to the method already described this would then be plotted or shown as of the year 1892. This method was carried out for each road and the results tabu-

lated and plotted as shown. After the diagram had been completed the general trend of the prices was developed by drawing an unbroken line making a graphical average of the high and low spots already plotted.

The next step after securing the averages of the individual roads was the combining of the results so obtained into a general tabulation of all the roads represented in the New England group. The total annual yardages moved, the total cost, and the unit cost were tabulated as in Table II and a five year running average taken for the group. A representative period is shown in Table III and covers the years 1890 to 1910, inclusive. The results were then plotted as shown in Fig. 2.

TABLE III—WEIGHTED AVERAGE PRICES FOR 5-YEAR PERIOD ON ALL NEW ENGLAND ROADS—EXCAVATION—COMMON—ROADWAY, YARDS AND TERMINALS—INCLUDING OVERHAUL

Year	Totals by years			Totals by 5-year periods			Year to apply W.A.F.
	Quantity	Amount	W.A. price	Quantity	Amount	W.A. price	
1890...	288,415	\$82,353.31	\$0.286	3,365,805	\$1,041,967.59	\$0.310	1890
1891...	718,164	219,014.46	.306	3,554,564	1,114,484.53	.314	1891
1892...	1,567,937	507,161.04	.323	3,655,706	1,167,094.06	.319	1892
1893...	703,427	207,646.02	.295	4,647,220	1,482,718.89	.319	1893
1894...	377,765	132,381.22	.350	4,921,654	1,484,039.37	.301	1894
1895...	1,279,929	397,978.14	.311	3,993,487	1,230,155.61	.308	1895
1896...	995,626	258,878.95	.240	3,294,832	1,023,626.19	.311	1896
1897...	636,740	253,277.28	.398	3,874,139	1,110,259.43	.287	1897
1898...	4,772	1,110.60	.233	2,766,644	769,679.65	.278	1898
1899...	97,072	219,014.46	.229	2,002,149	572,981.01	.289	1899
1900...	172,434	57,358.36	.333	4,133,664	1,271,981.81	.308	1900
1901...	231,131	47,439.31	.205	4,349,528	1,320,969.51	.304	1901
1902...	2,768,255	947,019.08	.342	3,951,409	1,263,981.96	.320	1902
1903...	220,366	50,098.50	.227	6,335,604	2,249,598.93	.355	1903
1904...	558,953	162,026.91	.290	6,794,025	2,425,159.95	.357	1904
1905...	2,556,629	1,043,015.33	.408	5,908,829	2,231,179.20	.378	1905
1906...	689,552	222,992.33	.323	5,716,809	2,192,527.30	.384	1906
1907...	1,883,059	753,046.33	.400	6,402,517	2,657,077.07	.415	1907
1908...	28,616	11,446.40	.400	4,895,017	2,030,985.15	.415	1908
1909...	124,661	627,136.68	.504	6,941,148	3,065,648.42	.442	1909
1910...	1,049,129	416,363.41	.397	7,193,630	3,341,126.89	.464	1910

Effect of the Southern New England

In connection with the plotting of the composite diagrams an interesting feature developed through the use of the data obtained on the Southern New England. The committee felt that, in preparing the report, the work on the Southern New England should not be included as it was done under a losing contract manifestly unbalanced, there being a suit pending between the contractor and the road for about one and one-half million dollars, due to a disagreement over classification of material. The work, however, was included separately in order to show what effect its inclusion would have on the results obtained from the other roads of the group.

Referring to Fig. 2 it will be seen that there is a second dotted line beginning at the year 1909 and running downwards to the year 1914. This lower line represents the effect of combining the work of the Southern New England during the year 1912 with the remainder. The yardage in question was exceptionally large in comparison to that of the other roads, being approximately 60 per cent of the total yardage moved in that year and consequently dominates the weighted average. Excluding these figures the general trend of prices for common excavation is shown by the heavy smooth line. The general trend of prices for loose rock and solid rock are shown in Fig. 3.

The Hampden railroad quantities were reclassified to correspond with the government specifications and the sub-contract figures included in the general average and used in the report although the Public Service Commission of Massachusetts found after investigation that the amounts paid the sub-contractors were low and that the higher figures paid to the principal contractors were substantially correct for grading in Massachusetts at that time.

No attempt was made to fix a definite unit price for grading for the individual carriers. The point where the trend line crosses 1914 on the composite diagram is an average for New England and may be or may not be, according to the committee, the proper price to apply to the grading of any one carrier's property.

We are indebted for the above information to H. J. Sargent, assistant chief engineer of the Boston & Maine, Boston, Mass., who has been chiefly instrumental in originating and preparing this study.

Loan Fund Nearly Exhausted

WASHINGTON, D. C.

THE INTERSTATE COMMERCE COMMISSION ON January 11 issued a statement giving the status of the revolving fund created by section 210 of the Transportation Act, 1920, for the purpose of enabling the rail-carriers of the country "properly to serve the public during the transition period immediately following the termination of federal control." The total amount of the revolving fund is \$300,000,000, and it has been commonly referred to as the \$300,000,000 loan fund, but of which \$40,000,000 has been reserved temporarily to meet claims and judgments arising out of operations during the period of federal control as provided in section 206 of the Transportation Act, 1920—leaving \$260,000,000 available for loans to the carriers.

The total of loans approved by the commission, as of December 31, 1920, is \$205,721,357, as follows:

To aid in meeting maturing indebtedness.....	\$86,173,750
To aid in the acquisition of equipment.....	41,385,870
To aid in making additions and betterments to existing equipment.....	17,291,294
To aid in making additions and betterments to way and structures to promote the movement of freight-train cars.....	60,870,443

Additional loans aggregating \$51,653,594 may be made on pending applications, the commission said. This will leave \$2,625,049 of the revolving fund available for additional loans. There will be credits to the revolving fund, during the transition period, of interest and repayments of principal with respect to loans heretofore made, which credits will be available for still further loans.

The Treasury Department on January 10 also issued a statement of the various payments it had made under the transportation act, as follows:

Total Payments at Close of Business January 8, 1921—	
(a) Under Section 204, for reimbursement of deficits during federal control.....	\$622,877.49
(b) Under Section 209, paragraphs (h) and (i), for advances on account of the sum estimated to be necessary to make good the guaranty therein provided.....	260,266,874.00
(c) Under Section 210, for loans from the revolving fund of \$300,000,000 therein provided.....	166,445,937.00
Total.....	\$427,335,688.49

The railroads to whom payments have been made by the Treasury for loans under section 210, and the aggregate amounts severally paid to them in this respect are as follows:

Atlanta, Birmingham & Atlantic.....	\$200,000
Baltimore & Ohio.....	3,000,000
Bangor & Aroostook.....	20,000
Boston & Maine.....	11,656,479
Buffalo, Rochester & Pittsburgh.....	1,000,000
Carolina, Clinchfield & Ohio.....	3,000,000
Central New England.....	300,000
Chicago Great Western.....	2,445,373
Chicago, Indianapolis & Louisville.....	200,000
Chicago, Milwaukee & St. Paul.....	25,340,000
Chicago, Rock Island & Pacific.....	9,862,000
Chicago & Western Indiana.....	8,000,000
Erie.....	8,000,000
Fort Smith & Western, Receiver.....	156,000
Gulf, Mobile & Northern.....	17,910,000
Illinois Central.....	515,000
Kansas City, Mexico & Orient, Receiver.....	4,440,000
Maine Central.....	2,500,000
Missouri Pacific.....	1,653,000
New York Central.....	8,871,760
New York, New Haven & Hartford.....	26,775,000
Northern Pacific.....	6,730,000
Pennsylvania.....	6,000,000
Rutland.....	61,000
Salt Lake & Utah.....	800,000
Seaboard Air Line.....	300,000
Texas Mississippi Terminal.....	6,073,400
Terminal Railroad Co. of St. Louis.....	1,000,000
Virginian.....	896,925
Waterloo, Cedar Falls & Northern.....	1,000,000
Western Maryland.....	60,000
Wheeling & Lake Erie.....	300,000
Western Maryland.....	1,400,000
Total.....	\$166,445,937

Labor Board Opens Hearings on Working Conditions

Carriers Oppose Perpetuation of National Agreements Employees File Charges Against Roads

THAT THE NATIONAL AGREEMENTS between the railroads and various classes of their employees, instituted within six months before the end of federal control, should not, in the interests of "honest, efficient and economical management" be continued longer under private operation, was contended by representatives of the railroads before the Railroad Labor Board on January 10 during the opening hearings on the demand of railway employees for the perpetuation of these agreements.

"The only parties who are fully qualified to consider such regulations are the individual managements and their employees," testified E. T. Whiter, chairman of the Conference Committee of Managers of the Association of Railway Executives, which is presenting the carriers' side of the controversy.

The reasons for the carriers' opposition to national agreements were outlined during the course of Monday's hearings in the opening statement on behalf of the railroads. This opposition, according to Mr. Whiter's testimony, is based on the facts that:

(1) They are ultra-restrictive and therefore prevent the honest, efficient and economical management demanded by the transportation act;

(2) The variable conditions in different sections of the country make the universal application of their provisions impracticable;

(3) The existing rules, the continuation of which is proposed by the men, are capable of various constructions;

(4) The existing agreements provide that the rules contained therein shall apply to all employees of any particular craft regardless of the department of the railroad in which the man is employed; thus leading to a division of jurisdiction and a conflict in the working rules applicable to employees engaged in the same work;

(5) The existing agreements have destroyed acknowledged efficient and economical practices such as the piece-work system for regulating rates of pay;

(6) The railroads must have relief from the rules controlling the employment of men, which are so restrictive as to prevent them from obtaining a sufficient number of employees in certain departments, thus interfering with output and causing delay to the movement of traffic;

(7) The agreements contain many rules which provide for payment for work not performed, and thereby cause many millions of dollars of unnecessary expense annually.

"The railroads do not object to schedules (the technical term for railway agreements) properly negotiated and entered into with their own employees," Mr. Whiter said, "as is evidenced by the fact that nearly all, if not all, of the roads represented by this committee, have had schedules with the various train service organizations for many years.

"Prior to federal control, some roads had schedules with other classes of their employees; many had no schedules with any crafts other than the train service organizations, but there were no so-called 'national agreements' which made all rules uniformly the same throughout the country. All roads that did have schedules directly negotiated them to fit their own conditions with their own men, and in every case the railroads had the undisputed right to negotiate their own schedules, which was denied during federal control.

"Under governmental control the railroads were unified, and the director general entered into so-called 'national

agreements' with the shopmen, maintenance of way employees, clerks, firemen and oilers, and signalmen. The first of these so-called 'national agreements' was made with the shop crafts less than six months, and the last, that with the signalmen, only a few days before the return of the roads to their owners. These agreements, which were of universal application for the period of federal control, were specifically recognized by the parties signatory thereto as effective during this period only, and contain nothing that would impose such obligation upon all roads alike after individual responsibility had to be assumed by the separate railroads for their successful operation as separate properties. Therefore, we contend that under private control consideration must necessarily be given to the conditions and peculiarities of operation on the individual properties in the preparation of any regulations governing the working conditions of employees of those properties. The only parties who are fully qualified to consider such regulations are the individual managements and their employees.

"Many of the rules in the so-called 'national agreements' are," he continued, "so ultra-restrictive that they positively prevent reasonably economical operations, and result in serious interference with efficiency and production. There should be no such interference with the responsibility of the managements as might unreasonably impair the efficient and economical operation of the properties, of which responsibility the managements cannot divest themselves, and which responsibility is specifically placed upon them by the provisions of the Transportation Act, 1920, in the following language:

The Commission * * * shall give due consideration among other things, to the transportation needs of the country and the necessity (under honest, efficient and economical management of the existing transportation facilities) of enlarging such facilities in order to provide the people of the United States with adequate transportation.

"The responsibility upon the individual properties, and the variable conditions which are encountered in the different sections of a country so large as the United States, we hold makes impracticable the universal application of the provisions of the so-called 'national agreements.' We hold also that many of the rules are so worded that they are capable of various constructions and have resulted in so-called interpretations which are in fact new rules: others are impractical of application without incurring excessive penalties. Experience in trying to work under the rules has demonstrated that they have resulted in extraordinarily numerous questions from both the employees and the managements. This in itself makes the rules particularly objectionable. We respectfully ask, therefore, that this board leave the individual roads free to negotiate their own schedules, so as best to meet justly the widely varying conditions on the different roads. We hold that this principle is recognized in Section 301 of the Transportation Act itself, which provides that the railroads and their employees shall negotiate directly with each other to the fullest extent before referring questions at issue to other tribunals.

"The so-called 'national agreement' covering the shop crafts provides that the rules contained therein apply to all employees of any particular craft regardless of the department in which employed. Under these conditions portions of gangs are necessarily governed by one set of rules and other portions of the same gangs by another, which is obvi-

ously wholly wrong in principle and practice. Employees of each department should be separate and distinct from the employees of any other department, and should be governed entirely by the rules or schedules of the department in which they are employed. There should be no division of jurisdiction. It is true that certain mechanical work is required in the maintenance of way department. Nearly all of it is road work, performed under entirely different conditions than prevail in shops and shop rules are not applicable. The employees who perform this work must be trained, supervised and promoted by the officials of the department in which they are employed, in order to secure that efficiency, economy and despatch which is essential to good management and the proper discharge, by the railroads, of their duties as common carriers. Rules agreed upon by the individual railroads with their employees can be so constructed as to give employees who are members of the same craft, but employed in different departments, all of the protection to which they are justly entitled.

"Those roads, represented by this committee, which have been working on the eight-hour-day basis, will continue to do so unless changed by mutual agreement with their employees, but they must have the right to re-establish more efficient and economical practices, when it is found desirable and practicable to do so. We refer, among other things, to piece-work methods which were abolished. This action has cost many millions of dollars to the roads which had for years successfully produced much of their output by piece-work methods. The excess cost, which is really a loss to the railroads, is piling up day after day and will continue to do so as long as the railroads are prevented from re-establishing the piece-work basis and until the railroads are free to re-establish such former practices they will not be able to comply wholly with the requirements of the transportation act. By this method the output of the shop is increased, and the workmen on account of their ability and skill are afforded opportunity for receiving increased compensation over and above what they would receive working on the day basis. The piece-work method is well recognized as being the most efficient method of operation and proof of this is the large number of manufacturing plants throughout the United States which are working on a piece-work basis and further proof that many men desire piece work, is that, when this method of pay was abolished, a great many employees left the railroad shops and entered the service of car building and other manufacturing plants where the piece-work system of pay was in effect. Among the elements set forth in the Transportation Act for determining rates of pay is 'The training and skill required.' We hold that the piece-work system of pay affords a specific basis for compensating employees under this requirement, which at the same time is just and reasonable."

Mr. Whiter then pointed out the necessity for relief from the restrictive rules regarding employment which are interfering with output and causing delay to the movement of traffic and the fallacy of perpetuating national agreements with organizations which do not represent all the employees of a particular class on all railroads. In conclusion he said:

"We believe that the board should not approach this subject from the angle of a schedule with any organization; or that the board can properly say what organizations shall or shall not represent the employees. The subject should be dealt with from the standpoint of what are the proper regulations for the character of service under consideration, and that the question of whether they shall be applied on the individual properties, in the form of a schedule with certain organizations, depends upon the policy of the individual property and the desire of the majority of the respective classes of employees on that property.

"We firmly believe that the board will be convinced that

the widely varying conditions on the different railroads can be properly considered and disposed of only by direct negotiations on the individual properties, and will accordingly deny the request of the employees for continuation or perpetuation of the so-called 'national agreements,' together with the interpretations and rulings thereon."

B. M. Jewell Attacks Railroad Managements

Prior to Mr. Whiter's opening statement, B. M. Jewell, president of the Railway Employees Department of the American Federation of Labor, read a statement on behalf of the employees charging that the railroads have broken faith with the public, violated the Transportation Act and defrauded the public of millions of dollars. Mr. Jewell's specific charges, which he promised to substantiate later, were virtually the same as those recently filed with the Interstate Commerce Commission by W. J. Lauck on behalf of the International Association of Machinists.

To these charges, Mr. Whiter replied as follows:

"The statement made on behalf of the labor organizations this morning consists of a series of reckless general charges which their spokesman says they will not attempt to substantiate at this time and which have no relevancy whatever to the question of the continuance of National Agreements or to any other question now pending before the board.

"The apparent purpose of the labor leaders in introducing such a statement is to divert public attention from the consideration of the matters actually in controversy and under consideration by the Railroad Labor Board.

"The very fact that they are trying in this manner to divert public attention from the matters actually in controversy leads to the conclusion that they have no confidence in the real merits of their case.

"To us it is a matter of profound regret that in a hearing so important there should be injected a series of charges admittedly unsubstantiated and that these charges should be coupled with the insidious intimation that unless this Board follows a course satisfactory to the employees 'the service rendered to the public will inevitably suffer.'

"The statement read into the record this morning will not divert us from the presentation in an orderly manner of the real question long pending before the Board."

Immediately after the hearing was opened by Chairman Barton, it was announced that several smaller organizations, not parties to the controversy which led to the Board's Decision No. 2, would be heard in the present case. Representatives of the "associated standard recognized railroad labor organizations" immediately protested against making these organizations, of which the Railroad Yardmasters of America is typical, parties to the present controversy or hearing from them during the progress of this case. However, the Board had already informed representatives of these smaller organizations that although they were not properly parties to this controversy they would be permitted to make presentations to the Board after the testimony on behalf of the organizations party to the dispute had been heard. The Board's decision was upheld by Chairman Barton, who stated that representatives of these organizations would be heard despite the opposition of the "standard" organizations.

L. E. Shepard, president of the Order of Railroad Conductors, speaking on behalf of the train service brotherhoods in Group 1, also requested the Board to give an immediate decision dealing only with the four transportation brotherhoods postponing the hearings, if necessary, to do so. This, according to Mr. Shepard, would enable these brotherhoods to promptly negotiate their contracts with the various roads and would serve to clarify the present case.

Mr. Whiter replied that, if the case of the train service brotherhoods was closed, his case would also be closed subject to the right to rebuttal statements. Mr. Whiter did,

however, request the Board to continue the hearings and render a decision for all organizations at once.

Carriers' Testimony on Shop Crafts Agreement

In presenting the carriers' opposition to the perpetuation of national agreements and the reasons therefor, Mr. Whiter took up in consecutive order the rules contained in the agreement made with the Shop Crafts approximately six months before the end of federal control. In presenting this testimony, Mr. Whiter first quoted the rule, second, outlined the carriers' objection to it and the reasons therefor, and third, cited numerous examples, either from adjustment board dockets or from the actual experiences of individual roads in working under the various rules of this agreement. These actual cases showed the impracticability of the universal application of rules which do not take into account the varying conditions on different carriers.

The presentation of material of this character continued on January 11 and 12, Mr. Whiter reading with but few interruptions. The large volume of these examples prohibits their inclusion here. However, several of those which clearly show the punitive effects of certain rules contained in the National Agreement are given below to show the character of the testimony which is being made before the Board.

How National Rules Prevent Efficient and Economical Operation

Regarding Rule 7, which provides that (1) for continuous service after regular working hours, employees will be paid one hour for 40 minutes' service or less, (2) they shall not be required to work more than one hour without being permitted to go to meals, (3) employees called or required to return to work will be allowed 5 hours for 3 hours and 20 minutes' service or less, and (4) they shall be required to do only such work as held or called for, Mr. Whiter showed the punitive effects of the rule by the following example:

"A machinist on the Florida East Coast was notified that he would be required to work overtime to finish up work already begun on an engine. He was allowed to go to his work at the proper time and upon returning found other mechanics working on the engine. Owing to the nature of his part of the work he could not begin until the other men were through. While waiting on them he was ordered to inspect another engine and make out report. This completed, he was allowed to return to the job for which he was held and complete it. He was then ordered by the foreman to complete the shift.

"The employee's position was that he is entitled to 6½ hours, 1½ hours for the first hour and 5 hours for returning for the job for which he was held over, and 5 hours (a second call) for the inspection job, with the differential of 5 cents per hour, then 5 hours (a third call) for completing the shift.

"The railroad's position was as follows: The machinist was instructed to finish the application of a pair of engine truck-wheels. He was held up by other workmen and had to wait some time. While waiting he was sent to make the usual periodical inspection on another engine. In the meantime it developed that one of the second-trick machinists did not show up and he was instructed to fill his place. We contend he is entitled to 5 hours for the engine inspection at the differential rate, and time and one-half up to 11 p. m., the finishing time of the second shift.

"The decision allowed the machinist not less than 16½ hours for the time in question, 5 hours of which will be paid for at the differential time."

Regarding this Mr. Whiter said:

"This decision penalizes the railroad for the time not worked. It will be noted that this employee was allowed three five-hour calls; also one and one-half hours' pay for

the ninth hour, a total of 16½ hours' pay for work performed within a spread of eight hours."

As an indication of the manner in which these rules operate to increase expenses and award labor an unreasonable wage for the service rendered, Mr. Whiter submitted statistics compiled by the Norfolk & Western showing the actual expense incurred under Rule 7 of the Shop Crafts Agreement. These statistics show that in the month of August, 1920, for instance, mechanics, helpers and apprentices on its lines received 4,944 calls, they worked 10,509 hours, they were paid for 24,720 hours and the punitive payments by the company totaled \$8,900.

Rule 10 of the Shop Crafts Agreement provides for the payments to be made to employees sent out on the road for emergency service. As evidence of the manner in which this rule operates to increase labor costs exorbitantly, Mr. Whiter cited the following instance which occurred on the Atchison, Topeka & Santa Fe:

On April 1, four carmen were sent from Newton, leaving at 8.25 a. m., arriving at Bader at 9.45 a. m., working from that time until 3.20 p. m., or four hours and thirty-three minutes each, renewing a truck body bolster. When the work was completed it was too late to catch a train to Newton, but by going to Strong City and awaiting the arrival of a train at 1.00 a. m., they were enabled to arrive back at Newton at 5.00 a. m., April 2. The time allowance for each man was 28 hours, or straight time from 8.00 a. m. to 5.00 p. m., time and one-half from 5.00 p. m. to 1.00 a. m., and double time from 1.00 a. m. to 5.00 a. m. The company was compelled to pay these four men a total of 112 hours at 67 cents per hour, amounting to \$75.04 for work which would have occupied the time of one man 18 hours and 12 minutes, which at 67 cents per hour amounts to \$12.20. This is a difference of \$62.84.

Regarding Rule 12 of the Shop Crafts Agreement, which provides for the payments to be made when it is necessary to fill temporary vacancies at outlying points, Mr. Whiter said in part:

"The railroads object to the interpretation of this rule which has been claimed on some roads, namely: That it is mandatory that men should be taken from their regular work in order to fill temporary vacancies at outlying points, even when such temporary vacancies might be filled by employing a man at such local point. It has been a common practice that when a man is obtainable at such outlying point, he may be employed to fill such temporary vacancy instead of sending a regular employee from the main point. There is no good reason why the employer should send a man from a home point to fill a vacancy at an outlying point and pay traveling expenses, etc., if the employer can get the work done by temporarily employing a man at the local point.

"As illustrative of the unreasonableness of this portion of the rule especially when considered in connection with the mandatory requirements that men must be sent from home station to fill a temporary vacancy, regardless of the widely varying conditions in different parts of the country and the ability at many points to have such work satisfactorily performed by the employment of men at such local points, the following is shown:

"Recently on account of a shortage of men and a heavy movement of traffic on the Norfolk & Western out of Williamson, W. Va., it was necessary to send 5 machinists from Bluefield, a distance of 101 miles. Each of these machinists worked 8 hours per day, first three days, for which they were each paid 72 hours at time and one-half for 24 hours' work, which gave to each man approximately \$52.00 for no service performed whatever, in addition to \$29.92 paid for the 24 hours' work."

Seniority shall rule in filling desirable vacancies according to Rule 18 of the Agreement. The manner in which this

rule impairs the efficiency of shop forces was shown by Mr. Whiter in reciting the following incident:

"At Havelock, Neb., on the Chicago, Burlington & Quincy, a man bid in on a machine. In about a week another machine was bulletined and this man exercised his seniority rights again. This slowed up the work on both machines. Another in the boiler shop at Havelock changed his job five times in three weeks. It should be strictly up to the foreman to fill these positions and not the crafts."

Norfolk & Western Case Completed

Hearings on the controversy between the Norfolk & Western and its trainmen and conductors before Bureau No. 3 of the Board ended on January 6. The opening session of these hearings was outlined in the *Railway Age* of January 7. The first real point of difference between the Norfolk & Western and its yard employees was indicated early in the opening session when L. B. Going, attorney for the Association of Railway Trainmen, requested permission of the Board to be heard when certain portions of the controversy were discussed. This portion of the controversy, the request of the trainmen that only "promotable" men be employed in yard service, that members of the Brotherhood of Railroad Trainmen be given preference in employment of yard men and not less than 85 per cent of all yard men be members of that organization, actually came before the Board on January 4. Val Fitzpatrick, vice-president of the Brotherhood of Railroad Trainmen, told the Board that serious consequences would result if the colored organization was heard by the Board and allowed to interfere with the progress of the present case. After executive consideration, the Board issued the following statement in reply:

"Bureau No. 3 understands that the Transportation act of 1920 imposed upon the Railroad Labor Board the duty of hearing such cases as are formally brought to its attention by the parties directly interested. Such submissions having in this case been formally made, the hearings must necessarily be confined to the parties directly interested and no others can be permitted to intervene. This ruling of Bureau No. 3 is not understood to preclude any employees who have a bona fide dispute with the railroad from bringing it to the board in accordance with the procedure outlined in the Transportation Act of 1920. The Bureau must also recognize the right of contracting parties to legislate for and represent the class of peoples with whom such contracts are executed by the carriers."

The position taken by the management in this particular portion of the controversy was that it would not concede to the rule requested because it would place an undesirable restriction on the opportunities for employment of colored men in its yards and that incorporation of the proposed rule would already complicate an already embarrassing situation. Mr. Fitzpatrick contended on the other hand that the rule was proposed to require the company to handle efficient and competent men so that those white men now in yard service would not suffer from the act of inefficient and incompetent colored employees. In support of this contention, Mr. Fitzpatrick charged that discrimination had been and was being made against white employees inasmuch as negroes have not been and are not prosecuted for rule violations whereas white yardmen are immediately disciplined. Mr. Neill, speaking for the carrier, stated that the proposed rule is aimed solely at barring the negro from a railroad yard under the guise of his not being "promotable" even though many are efficient and capable of promotion. In reply to this contention, Mr. Fitzpatrick stated that a large majority of the negro yardmen were inefficient and incapable and totally unfitted in the interest of safety to perform yard service.

Many other points in the controversy between the carrier and its employees were discussed before the Board. These include the (1) employees' request for a new rule covering the handling of baggage and joint baggage and express; (2)

employees' request for rule governing leave of absence of trainmen; (3) request for a rule pertaining to the duration of agreement; (4) the request that yardmen handling work for wreck trains in yard limits be paid yard rates instead of road rates; (5) the seniority rights of foremen; (6) compensation for yardmen called to office to make reports for statement; (7) yardmen riding cars on hump or gravity yard will not be required to control more than one car unless coupled together; (8) preference in filling switchtender positions should go to partially disabled yardmen and train service employees; (9) claim of seniority rights for certain employees; (10) requests that trainmen be assigned as baggage men; (11) various claims for adjustment for overtime for individual employees, and (12) request for a new rule relating to motor or other cars operated on schedules and orders.

Pullman Conductors Request Increased Wages

Hearings in the controversy between the Pullman Company and its conductors over wages and working conditions opened on January 5, before the full board. The employees, who are asking for an increase from the present step-rate basis of \$155.00 to \$190.00 per month for 240 hours or less in regular assignment to a step-rate basis of from \$200.00 per month or 83.55 cents per hour to \$225.00 per month or 93.75 cents per hour, were represented by M. S. Warfield, president of the Order of Sleeping Car Conductors. The company in this case was represented by F. L. Simmons, assistant to the general auditor.

During the hearing it developed that the Pullman Company had granted its employees a flat raise of \$30.00 per month following the increases awarded train service employees by the Board's decision of July 20. Mr. Warfield admitted that this increase placed sleeping and parlor car conductors on a par with other train service employees but contended that such a rate of pay does not consider the extra degree of responsibility placed upon Pullman conductors. In presenting this point Mr. Warfield said: "A higher percentage of pay for sleeping car conductors is believed to be justifiable owing to the fact that they have until September 3, 1919, the date of the application of Amendment 1 to supplement 17 to General Order 27, been the lowest paid classes in train service, their expenses away from home are heavier because their trips are longer and require a larger expenditure for food, because hotel accommodations are higher, personal attire being exacting according to the requirements of the company and because conductors are subject to call during their sleeping hours."

The statement made by Warfield during the course of the hearings that as far as he knew Pullman conductors were now operating under Amendment No. 1 to Supplement 17 to General Order 27 was challenged by Mr. Simmons, who stated that the Transportation Act continued the rates of pay of the Railroad Administration only until September 1.

The hearings in this case continued until January 6, when the Board took the case under advisement.

A "SCHOOL OF SIGNALING," maintained by the Lancashire & Yorkshire, has graduated in ten years 2,041 students, and at the end of the last term, December 16, the chairman of the company awarded 15 valuable prizes and 186 certificates to 201 graduates. The course, apparently, is not for signal maintainers or mechanics, but for signalmen (operators) in cabins; and a large proportion of the students appear to be station clerks, station helpers and various classes other than those who are directly engaged in signaling or are seeking employment in signal cabins. The total number enrolled in the session just closed was 1,421. The apparatus and methods of the school seem to be somewhat like American railroad schools—those on the Erie, the Pennsylvania and the New York Central, where telegraphy and station clerical work are taught.

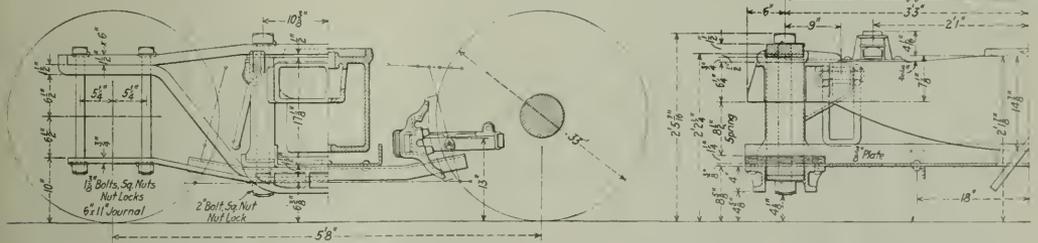


Sulphuric Acid Tank Cars of 70 Tons Capacity

Tank Made with Three Longitudinal Sheets Is Feature of
Equipment Built for General Chemical Company

THE TRANSPORTATION of dangerous chemical products in large quantities has become so common that it receives but little attention from the railroads that move this traffic. To build equipment which permits handling such commodities in regular service without extraordinary precautions requires a high degree of skill in design and high-class workmanship. This is well exemplified in the recent order of 70-ton tank cars built by the American Car & Foundry Company for the General Chemical Company.

Foundry Company and the General Chemical Company, the owner's arrangement of dome fittings and outlets being applied. The tank conforms to the A. R. A. Class III tank specifications and is built to withstand a pressure of 300 lb. per square inch. The diameter inside the sheets is 85¼ in. and the length between the outer rows of rivets is 32 ft. The cylindrical section of the tank is made up of three longitudinal courses, each in one piece. The length of riveted seams is reduced considerably by this design. The bottom sheet is

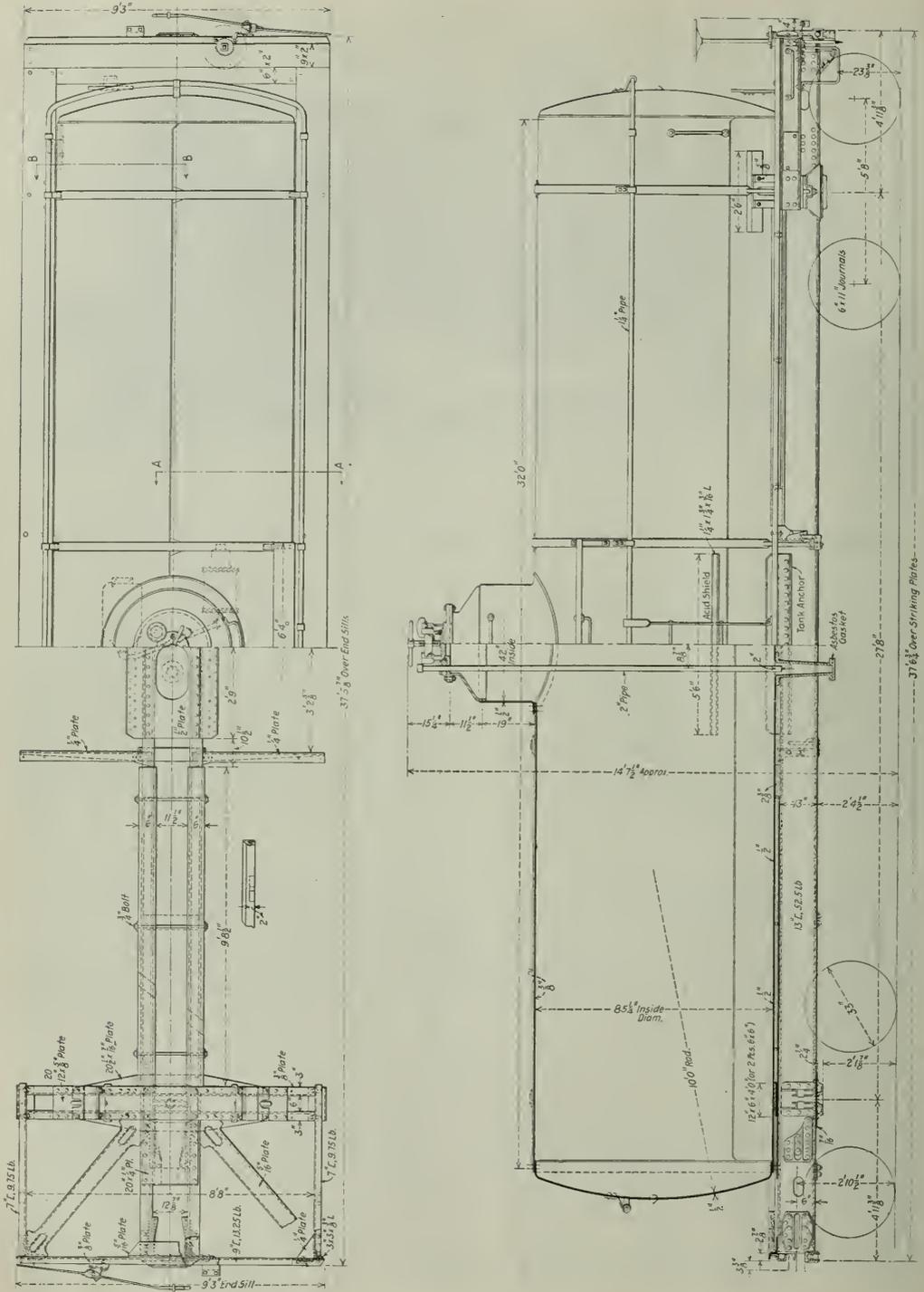


Arch Bar Truck Used with 70-Ton Tank Car

These cars have a capacity of 9,800 gal. of sulphuric acid. The concentrated acid is nearly twice as heavy as water and if any considerable quantity of water comes in contact with the liquid, a violent explosion will occur. For this reason, the tanks must be strong, absolutely free from leaks and the dome must be tightly sealed.

With the exception of two cars built for the General Chemical Company in 1916, the fifty cars on this order are, so far as known, the first 70-ton acid tank cars constructed. The design was worked up jointly by the American Car &

Foundry Company and the General Chemical Company, the owner's arrangement of dome fittings and outlets being applied. The tank conforms to the A. R. A. Class III tank specifications and is built to withstand a pressure of 300 lb. per square inch. The diameter inside the sheets is 85¼ in. and the length between the outer rows of rivets is 32 ft. The cylindrical section of the tank is made up of three longitudinal courses, each in one piece. The length of riveted seams is reduced considerably by this design. The bottom sheet is



Plan and Side Elevation of General Chemical Company 70-Ton Acid Tank Car

Car Loading Again Decreases

WASHINGTON, D. C.

THE NUMBER OF CARS loaded with revenue freight during the week ended January 1, 1921, which includes the New Year holiday, was less even than the loading during Christmas week, which was less than for any week in 1920 except one week during the switchmen's strike last April, according to the weekly report of the Car Service Division of the American Railway Association. The total was 598,905, as compared with 745,446 during the corre-

travel at all. In fact, the higher rates will have a healthy effect. It will possibly stop a lot of very useless travel, and help the great congestion on passenger trains so that legitimate travel can enjoy a reasonable degree of comfort. For the past four months I have been forced to travel a great deal. I can hardly secure a berth on a sleeper without reservation days ahead, and often have to stand in passenger cars. The slowing up of all kinds of business has reduced freight tonnage a great deal; the rate had nothing to do with this. If freight were hauled free now there would be no more tonnage. Harris is wrong; the rates should be slightly

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

Summary—All Districts, Comparison of Totals This Year, Last Year, Two Years Ago. For Week Ended Saturday, January 1, 1921

Districts	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Mdse. L. C. L.	Miscellaneous	Total revenue freight loaded			Received from connections			
										This year 1921	Corresponding year 1920	Corresponding year 1919	This year 1921	Corresponding year 1920	Corresponding year 1919	
Eastern	1921	4,849	2,879	44,336	1,510	5,296	1,011	34,779	46,791	141,451	.....	.....	.....	178,888	.....	.....
	1920	5,860	3,769	48,103	3,862	7,385	1,050	28,929	87,982	.....	186,940	148,811	.....	223,210	185,825	.....
Allegheny	1921	2,205	3,252	51,840	5,945	2,930	2,333	28,542	40,664	137,711	.....	.....	.....	99,782	.....	.....
	1920	2,550	2,989	52,904	3,274	3,771	1,561	34,052	50,085	.....	151,186	145,029	.....	114,726	137,302	.....
Pochohantas	1921	78	85	17,857	361	1,259	29	1,873	4,144	25,688	.....	.....	.....	12,597	.....	.....
	1920	114	78	23,050	610	1,447	236	130	6,976	.....	32,641	24,764	.....	16,402	15,266	.....
Southern	1921	2,388	1,812	24,299	724	9,736	1,759	26,916	22,546	90,180	.....	.....	.....	49,883	.....	.....
	1920	3,105	2,853	30,734	131	15,930	2,302	16,864	46,945	.....	118,864	86,465	.....	74,055	54,918	.....
Northwestern	1921	8,187	6,682	6,416	1,272	6,528	1,090	18,516	16,778	65,469	.....	.....	.....	36,076	.....	.....
	1920	11,756	9,729	12,653	936	10,742	1,236	15,871	31,311	.....	94,234	84,021	.....	50,708	52,439	.....
Central Western	1921	9,157	7,626	20,910	252	2,155	1,701	21,525	26,796	90,122	.....	.....	.....	40,380	.....	.....
	1920	9,565	10,851	24,083	375	3,781	2,308	19,281	38,756	.....	109,000	84,289	.....	66,444	44,832	.....
Southwestern	1921	3,234	1,614	4,566	486	4,731	417	12,504	20,732	48,284	.....	.....	.....	35,931	.....	.....
	1920	3,647	2,128	7,257	473	4,932	548	11,160	22,436	.....	52,581	39,362	.....	45,892	34,473	.....
Totals, all roads.	1921	30,098	23,950	170,224	10,550	32,635	8,340	144,657	178,451	598,905	.....	.....	.....	435,537	.....	.....
	1920	36,597	32,397	198,784	9,661	47,988	9,241	126,287	284,491	.....	745,446	.....	.....	591,437	.....	.....
	1919	32,396	33,715	158,068	.....	35,734	12,832	.....	339,996	.....	.....	612,741	.....	.....	525,055	.....
Increase Compared . . .	1920	.....	.....	.....	889	.....	.....	18,370	.....	.....	.....	.....	.....	.....	.....	.....
Decrease Compared . . .	1920	6,499	8,447	28,560	.....	15,353	901	.....	106,040	146,541	.....	.....	.....	137,900	.....	.....
Increase Compared . . .	1919	.....	.....	12,156	10,550	.....	.....	144,657	.....	.....	.....	.....	.....	.....	.....	.....
Decrease Compared . . .	1919	2,298	9,765	.....	3,099	4,492	.....	.....	161,545	13,836	.....	.....	.....	71,518	.....	.....
December 25	1920	29,147	19,814	177,308	10,956	39,314	2,497	158,918	194,321	639,275	684,784	549,975	514,363	588,644	562,602	.....
December 18	1920	35,505	30,470	223,153	12,750	48,626	14,127	186,997	245,230	796,858	806,734	796,116	587,099	576,770	672,533	.....
December 11	1920	36,820	31,799	230,396	13,904	51,194	17,673	192,143	259,968	834,897	761,940	820,202	614,178	596,785	683,649	.....
December 4	1920	37,109	30,903	230,228	15,643	53,971	27,195	195,571	281,542	872,162	789,286	837,806	605,876	589,350	657,578	.....

L. C. L. merchandise loading figures for 1921 and 1920 are not comparable, as some roads are not able to separate their L. C. L. freight and miscellaneous of 1920. Add merchandise and miscellaneous columns to get a fair comparison.

sponding week of 1920 and 612,741 during the corresponding week of 1919 and 641,057 in 1918. During one week of April, 1920, the loading fell to 584,000 and during one week of December, 1918, it was only 550,000. With those two exceptions, the loading for the week ending January 1 was the lowest that has been recorded for three years. The summary as reported by the Car Service Division is given in the table.

advanced in both passenger and freight. Railroads must be efficient and give service and they can't do it and pay the high union wages they have to pay without higher rates."

* * * * *

One View of the Rate Question

THE INTERSTATE COMMERCE COMMISSION is receiving a good many letters of complaint from various persons that freight and passenger rates are too high. In a recent issue we published some extracts from correspondence between Senator Harris of Georgia, who expressed a desire to see lower rates, and Chairman Clark of the commission, who pointed out to the senator some of the reasons why rates had to be advanced. The commission has since received a letter from one of the senator's constituents, N. K. Smith, president of the Golden Rule Case Stores, Milledgeville, Ga., who disagrees with the senator on the subject. He says: "I note that Senator Harris is in favor of lowering freight rates. I beg to state he is in error. Freight and passenger rates are if anything too low yet. The freight rates do not now affect the price of goods hardly to any perceptible degree. And passenger rates are not high enough to retard



Photo from Underwood & Underwood, N. Y.

The M. K. & T. Station at San Antonio, Texas

General News Department

The Buffalo, Rochester & Pittsburgh has discontinued its Employee's Magazine with the January issue in the interest of economy.

Colonel Frederick Mears, chairman and chief engineer of the Alaska Engineering Commission, in charge of the Government railway in Alaska, is to address the Western Society of Engineers, Chicago, on January 20, on Alaska and Alaskan railways.

The Interstate Commerce Commission has ordered a proceeding of inquiry and investigation as to the cost of railroad fuel in 1920 in response to a Senate resolution directing it to report the increased cost of railroad fuel in 1920 over that for 1919.

Appropriate legislation making it possible for the railroads to collect immediately a portion of the \$400,000,000 due them under the guaranty provisions of the Transportation Act is urged in a resolution adopted by the board of directors of the Chamber of Commerce of the United States.

The next regular meeting of the New York Railroad Club will be held at the Engineering Societies' Building, New York City, on Friday evening, January 21, 1921, at eight o'clock. Samuel O. Dunn, editor of the *Railway Age*, will address the club on the subject of "Is the Railroad Problem Really Being Solved?"

The Atchison, Topeka & Santa Fe on January 10, withdrew from its joint use of the Oakland Mole terminal of the Southern Pacific, and its trains now run to and from its own terminal at Ferry Point, Richmond. The withdrawal was made possible by the revocation of the order of the Railroad Commission of the state of California that the Santa Fe must remain at the Oakland Mole.

Senator Trammell, of Florida, on January 10 introduced in Congress a bill to require a reduction in rates charged by the railroads by amending Section 15-a of the interstate commerce act to provide that the fair return, which under the law is 5½ per cent, with a possible addition of ¼ per cent, in the discretion of the Interstate Commerce Commission, shall not exceed 4 per cent on the aggregate value of railroad property.

The directors of the American Railway Association, at a meeting in New York on January 6, elected Daniel Willard (B. & O.), chairman of the board and re-elected R. H. Aish-ton president of the association. W. G. Besler (C. of N. J.), was chosen first vice-president, in place of W. T. Tyler, and Hale Holden (C. B. & Q.), second vice-president in place of E. H. Coapman. J. E. Fairbanks is general secretary and treasurer.

Peter Bronski and S. Kalonowsky, section men on the Chicago & Erie, were presented with \$50 each as a reward for their honesty in turning over to the proper authorities four bags containing Liberty Bonds, drafts, leases, wills, notes and certificates of deposit valued at approximately \$500,000, which they found near the track at Highlands, Ind. The property had been stolen from the National Bank of Clifton, Ill., on the night of November 19.

The record of efficiency tests and observations in the Eastern Region of the Pennsylvania for October shows an average of 99.9 per cent perfect; number of tests 37,427; failures, 40. Five divisions—Cumberland Valley, Tyrone, Trenton, Norfolk and Elmira—with a total of 8,189 tests, had a perfect score; seven divisions—Cresson, Juniata, Atlantic, Baltimore, Delaware, Schuylkill and Philadelphia Terminal—had one failure each out of a total of 12,946 tests.

Senator Robinson of Arkansas on January 11 introduced in the Senate a bill providing that after July 1, 1924, all cars or parts of cars used for transporting baggage and express in interstate commerce shall be of such construction and character and furnished in such manner as shall be required by the Interstate Commerce Commission. The bill also provides that after that date the commission shall not allow to be used any full railway baggage or express car which is not constructed of steel or of steel underframe or equally indestructible material.

Wisconsin is the first state to get to the Supreme Court of the United States in an effort to overturn the decisions of the Interstate Commerce Commission ordering increases in intrastate passenger fares to correspond to the increases in interstate rates allowed by the Interstate Commerce Commission. The Public Service Commission and the attorney general of the state have filed an appeal from the decision of the United States Court for the Eastern district of Wisconsin, under which the railroads of the state obtained an injunction to prevent state interference with the federal commission's order.

Surpluses of freight cars in the United States, as reported to the Car Service Division of the American Railway Association, for the week ending December 31, amounted to 197,733 cars, this being the daily average for the six days. It is almost four times as large as the average one month previous. For the same period the average number of cars short—total deferred car requisitions—was 3,808, which is less than one-fifth the reported averages one month before. The surpluses largely exceeded the shortages in all classes of cars; but in the week ended December 23 the balance of gondola cars was the other way, to give the exact figures 4,711 surpluses and 6,974 shortages.

Employees of the Atlanta, Birmingham & Atlantic, following a conference of their representatives with B. L. Bugg, president, say that they will insist on having a proposed general reduction in wages passed on by the government labor board. President Bugg told them that the reduction in wages which had been announced by the company on December 29 must be put into effect on February 1, the reduction to be a sum equal to one half of the total advances which have been made in wages of employees since December, 1917. He said that the reduction would affect operating expenses to the extent of \$100,000 a month, and presented a statement showing that in September, October and November the road had failed to meet operating expenses by about \$98,000 a month.

President Samuel Rea, of the Pennsylvania Railroad, has issued a circular to employees to whom annual or other passes are issued, reminding them that the privilege of free transportation carries with it a duty to surrender seats in crowded trains to pay passengers. Even with a slackening of traffic, says the circular, the passenger facilities will in all probability continue to be somewhat overtaxed for some time to come. This duty may be performed without embarrassment to any one, and without attracting needless attention, by simply arising and moving to another part of the car or train. "Patrons, on all occasions, should be treated as guests, and whenever any question arises, we should sacrifice our own individual comfort for theirs. The railroads are judged in the public's mind as much by the conduct of their employees as by any other single factor. What the public thinks of the railroads, whether good or evil, will inevitably in its turn react upon the welfare of every one of us. It is, therefore, to our direct personal interest to give every passenger the best possible impression."

Automobile drivers to the number of 3,886 were warned during the month of October by Pennsylvania Railroad watchers, assigned to grade crossings to check up careless people. These warnings were served through officers of the states of New Jersey and Pennsylvania. These watchers consumed a total of 3,043 hours of time in their work, and it appears that 87 per cent of all automobilists driving over grade crossings failed to observe proper caution. The railroad's campaign was begun in July and has been conducted in co-operation with the commissioner of highways of Pennsylvania and the commissioner of motor vehicles of New Jersey. On the evening of November 29, an automobile disregarded a watchman's signal at the gas house crossing at Carlisle, Pa., although the warning was given when the automobile was 300 ft. from the track. The driver attempted to cross; his motor stopped while he was on the tracks and a fatal accident was averted only by the prompt action of the watchman, who ran east along the track and flagged the approaching passenger train. During the first six months of last year 47 persons were killed and 162 injured in accidents to automobiles at grade crossings on the Pennsylvania system, while in the same period of the year before, 58 were killed and 146 injured.

Reunion of Construction Division U. S. A.

The annual reunion of those who were identified with the Construction Division of the Army during the war will be held at the Morrison Hotel, Chicago, on February 25 and 26. The afternoon of the first day and the morning and afternoon of the second day will be devoted to business sessions, and the annual banquet will be held on the evening of February 26.

The membership of the Construction Division Association consists of those who served in the Construction Division of the Army during the war, either in uniform or as civilians. The officers are: President, Col. Clark C. Wright, of George C. Nimmons & Co., 122 South Michigan avenue, Chicago; vice-president, Col. J. N. Willcutt, of R. D. Willcutt & Sons Company, Boston, Mass.; secretary, Major George Gibbs, Jr., Washington, D. C.; assistant secretary, William Kennedy, officer of Col. Evan Shelby, 63 Wall street, New York; and treasurer, Major A. C. King, 8 South Dearborn street, Chicago. Col. E. C. Stockdale, of Page & Hill, 19 South La Salle street, Chicago, is chairman of the entertainment committee.

Roads Must Have Legislation to Collect Guaranty

Chief Justice McCoy, of the Supreme Court of the District of Columbia, on January 3, rendered a decision sustaining the recent decision of the comptroller of the treasury that the secretary of the treasury may not make partial payments to the railroads, on account of their guaranty for the six months following the termination of federal control, in advance of a final audit by the Interstate Commerce Commission showing the entire amounts due. The court denied the application of the Grand Trunk Western for a writ of mandamus to compel the secretary of the treasury to honor a certificate for \$500,000 issued by the Interstate Commerce Commission. The application for the writ was filed as a test to determine the rights of the railroads generally to whom between \$300,000,000 and \$400,000,000 is due on account of the guaranty. The court disagreed with the contention of counsel for the railroad company that the expression "several amounts" in the transportation act indicated that Congress intended that partial payments might be made. The court construed the word "several" as meaning respective payments to the several roads, not several payments to a single road. An effort will be made to expedite the payment of the guaranty by seeking legislation such as is recommended by the Interstate Commerce Commission in its annual report to provide clearly that partial payments may be made without awaiting the long process of final adjustment of the exact amount.

Railway Executives Meet

The member roads of the Association of Railway Executives met on January 7 in the board room of the New York, New Haven & Hartford, Grand Central Terminal, New York. A resolution was adopted endorsing the Frelinghuysen bill to amend Section 10 of the Clayton act so as to exempt inter-company transactions within a given railroad system from

the competitive provisions of the act. Counsel A. P. Thom was instructed to lend his support toward securing the passage of the bill presented by Representative Winslow amending the Transportation Act so as to authorize the Treasury Department to make partial payments on account of the six months' guaranty to the carriers in advance of final payments.

W. J. Harahan, president of the Chesapeake & Ohio, and E. J. Pearson, president of the New York, New Haven & Hartford, were elected to the standing committee. The election of R. H. Aishton as president of the American Railway Association was approved, as was also the decision of the American Railway Association to continue the Car Service Division with W. L. Barnes as manager. A report on the American Railway Express Company was read which had to do with the form of contract between that company and the carriers. The framing of tariff regulations governing the prepayment of charges on freight shipments to Canada was discussed and referred to the Railway Accounting Officers' Association for adjustment.

Howard Elliott, chairman of the board of directors of the Northern Pacific, on behalf of the members of the Association of Railway Executives, presented T. DeWitt Cuyler, chairman of the association, with an old English silver salver and a letter testifying to his accomplishments as chairman, as a token of appreciation of his services "to the American railroads and the American public."

A. R. E. A. Nominates Officers

The nominating committee of the American Railway Engineering Association has selected the following candidates for officers for the ensuing year:

President, L. A. Downs, vice-president and general manager, Central of Georgia, Savannah, Ga.; vice-president, E. H. Lee, vice-president and general manager, Chicago & Western Indiana, Chicago; secretary, E. H. Fritch, Chicago; treasurer, G. H. Bremner, district engineer, Bureau of Valuation, Interstate Commerce Commission.

Directors (three to be elected): A. M. Burt, assistant to vice-president—operation, Northern Pacific, St. Paul, Minn.; C. F. W. Felt, chief engineer, Atchison, Topeka & Santa Fe System, Chicago; J. V. Hanna, chief engineer, Kansas City Terminal, Kansas City, Mo.; F. G. Jonah, chief engineer, St. Louis-San Francisco, St. Louis, Mo.; B. H. Mann, signal engineer, Missouri Pacific, St. Louis, Mo.; G. J. Ray, chief engineer, Delaware, Lackawanna & Western, Hoboken, N. J.; A. O. Ridgway, assistant chief engineer, Denver & Rio Grande, Denver, Col.; H. L. Ripley, valuation engineer, New York, New Haven & Hartford, Boston, Mass.; Geo. H. Webb, chief engineer, Michigan Central, Detroit, Mich.

Members of Nominating Committee (five to be elected): J. R. W. Ambrose, chief engineer, Toronto Terminals, Toronto, Ont.; R. H. Ford, assistant chief engineer, Chicago, Rock Island & Pacific, Chicago; E. A. Hadley, chief engineer, Missouri Pacific, St. Louis, Mo.; C. P. Howard, senior civil engineer, Bureau of Valuation, Interstate Commerce Commission, Chicago; R. H. Howard, chief engineer, maintenance of way, Wabash, St. Louis, Mo.; C. E. Johnston, general manager, Kansas City Southern, Kansas City, Mo.; A. Montzheimer, chief engineer, Elgin, Joliet & Eastern, Joliet, Ill.; J. V. Neubert, engineer, maintenance of way, New York Central, New York; Frank Ringer, chief engineer, Missouri, Kansas & Texas, St. Louis, Mo.; A. F. Robinson, bridge engineer, Atchison, Topeka & Santa Fe System, Chicago.

November Earnings \$41,544,063 Short of Estimate

Reports made by the railroads to the Interstate Commerce Commission show that the net railway operating income for November of the Class I railroads was \$57,741,937, which is \$41,544,063 or 41.8 per cent below the amount which it was estimated would be earned under the increased rates fixed in August by the commission in accordance with the Transportation Act.

The tabulation is based on reports received from 200 railroads with a total mileage of 229,754 miles.

Upon the basis of this operating income, the carriers would earn annually approximately 3½ per cent on the value of their properties as tentatively fixed for rate making purposes by the commission, says a statement issued by the Association of Railway Executives. This is 1.1 per cent below that

estimated on the basis of October earnings. To have realized a return of 6 per cent on their valuation as provided by the Transportation Act, the railroads should have earned \$99,286,000 as their November quota.

Total operating revenues for November were \$568,697,087, or an increase of 34.6 per cent over those for the same month last year, which, however, was marked by the coal strike. Total operating expenses were \$485,466,885, or an increase of 29.2 per cent compared with the same previous month. While the net railway operating income is an increase of 170.8 per cent over that for November 1919, this increase is principally due to the strike of bituminous coal miners during that month one year ago, which greatly reduced the freight tonnage.

Compilations show, however, that for the first quarter since the expiration of the guaranty period on September 1, the net railway operating income totals \$219,507,735, which is \$101,449,265 less than was estimated would be earned under the rates fixed by the commission and effective on August 26 last. On the basis of that net operating income for the three months' period, the carriers would earn 4.1 per cent annually. To have earned 6 per cent upon their tentative valuation, their net operating income should have been \$320,957,000 during that period.

As in the case of September and October, the net operating income in every district fell below the 6 per cent return during November. Calculating on the basis of the showing for November, the railroads in the Eastern district would earn 3.06 per cent upon their tentative valuation, the Southern district 3.12 per cent and the Western district 3.96 per cent.

A New Year's Greeting

President Samuel Rea, of the Pennsylvania Railroad, has addressed to the public a New Year's message in the form of a poster which appears on all public and employees' bulletin boards on the road. This bulletin says, in part:

More than 250,000 men operate this railroad. It is the largest public service institution in the world. It represents more than two billion dollars of the invested savings of our citizens. The Pennsylvania Railroad Company has 131,115 stockholders, of whom 62,795 are women. Nearly every insurance policy holder or saving-fund depositor in this country has a personal stake in its welfare, through the investments of our banks and protective institutions. Many educational and charitable organizations, as well, have their endowments in its securities. The public service rendered by it in the movement of passengers and freight is equivalent to one-eighth of that of the combined railroads of the United States. The road has 27,000 miles of track, 8,000 locomotives and 300,000 cars. These are of the highest standard, and designed to promote public safety and convenience.

But it is the men of the Pennsylvania Railroad who, by ability, loyalty, initiative and faithful work, make the service what it is. The tasks of these men are not easy, and are seldom showy. They must be performed day and night, weekdays and Sundays, in storm and in cold and regardless of difficulties. Since the company resumed the management of its property the percentage of passenger trains arriving on time has been constantly increasing and the average speed of the movement and delivery of freight has steadily improved. The aim of the management is to promote the enthusiasm of every officer and employee in behalf of a high standard of public service.

That there may be progressive improvement in the service rendered to the public, our passengers, shippers and friends are invited to commend directly to the men notably praiseworthy acts upon the part of the railroad employees, and to bring such acts in detail to the attention of the management.

CANADA AND ITALY.—A new direct steamship service between Montreal and Italian ports, using St. John in the winter, is announced by the Canadian Pacific Ocean Services; an arrangement with the Navigazione Generale Italiana for sailings to Genoa and Naples, the latter to be the terminal point. The Navigazione Generale Italiana will employ one of its finest passenger ships, in conjunction with a German vessel, recently acquired by the Canadian Pacific, to be renamed the "Montreal."

Traffic News

Southeastern Express Company

Since the Interstate Commerce Commission has approved the merger of the express companies into the American Railway Express Company and the form of contract proposed by the express company and offered by it to the railroads to provide for the division of earnings and expenses on express business, there has been some speculation as to the intentions of the Southeastern Express Company, which was incorporated in Alabama on October 6, 1920, "to own and operate a railway express business in the Southeast and elsewhere." This company has for directors and officers men connected with some of the strongest banks in the South, some of whom are directors of leading railroads. While no announcement has been made, it is known that some of the Southern roads were opposed to signing the contract proposed by the American Railway Express Company, claiming that some of its provisions are unfair to the railroads, and that they were especially opposed to the unification of the express business and it is believed that the new Southeastern company may shortly enter the field as a competitor of the American Railway Express.

Passenger Traffic in September

More passengers were carried by the railroads in September, 1920, after the increase in passenger fares, than were carried in September, 1919, according to statistics just issued by the Interstate Commerce Commission, but the average journey was slightly shorter. The number of revenue passengers carried was 104,351,950, as compared with 103,204,614 in September, 1919, but the average journey per passenger was only 41.25 miles, as compared with 41.84. As a result the passenger-miles decreased from 4,318,000,000 to 4,294,000,000. The average fare paid by each passenger was \$1.23, as compared with \$1.06 in September, 1919, and the average per mile was 2.99 cents, as compared with 2.54.

On the other hand, the number of tons of freight offered the railroads for transportation during September was slightly less than in September, 1919, 203,913,000,000, as against 207,000,000,000, but the average haul on each railroad was longer, 186.06 miles as against 173.33 miles. The average revenue per ton per mile was 1.15 cents as against .95 cents in 1919. This represents an increase of 20 per cent, showing that a considerable volume of freight was handled in September that had been given to the railroads before August 26, when the rate increases of 25 to 40 per cent went into effect.

Operating Statistics for October

The Interstate Commerce Commission's summary of operating statistics for October shows a slight decrease in some of the factors measuring the operating efficiency of the railroads as compared with the returns for September and August, although the average mileage per car per day for the month, 28.6, exceeded that for any preceding month in 1920. The net ton miles, including non-revenue freight, totaled 42,252,000,000, which represents an increase of 4.7 per cent over October, 1919. The average train load was 756 tons as compared with 753 in October, 1919, but in September the average had been 767 and in August 788. The net ton miles per car day average 564 as compared with 526 in October, 1919, but in September the average was 568. The average car load, 30 tons, was one-tenth of a ton less than the average for August and September, but it exceeded the average for October, 1919, by 1.8 tons. The percentage of unserviceable cars was 7.3, which is the same as was reported in October, 1919. The average cost per freight train mile, selected accounts, for the month was \$2.15 as compared with \$1.60 in October, 1919. The cost per passenger train mile, selected accounts, was \$1.16 as compared with 90 cents. The average cost of coal per net ton was \$4.77 as compared with \$3.16 in October, 1919.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF NOVEMBER AND ELEVEN MONTHS OF CALENDAR YEAR 1920

Table with columns: Name of road, Average mileage operated during period, Freight, Passenger, (Inc. total), Maintenance of Way and Equip., Structures, Traffic, Trans-portion, General, Total, Operating ratio, Net railway operation, Operating income (or loss), Net after interest, Increase comp. with last year.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF NOVEMBER AND ELEVEN MONTHS OF CALENDAR YEAR 1920—(CONTINUED)

Name of road.	Average mileage operated during period.		Operating revenues.		Total maintenance of way and structures.		Operating expenses.		Total.	Operating railway operation.	Net from operating (or loss).	Net operating income (or loss).	Net rental.	Increase (or decrease) comp. with last year.
	Nov.	11 mos.	(Inc. mils.)	(Inc. mils.)	Way and structures.	Equip- ment.	Traffic.	Trans- portation.						
Chicago, Milwaukee & St. Paul.	10,605	11,373,995	2,507,329	15,795,504	1,804,483	4,257,064	162,810	6,970,941	425,884	13,694,996	86.70	2,100,505	1,789,407	1,012,957
Chicago, Rock Island & Pacific.	10,106	10,797,282	2,088,127	13,784,282	2,462,949	3,849,663	1,452,666	7,546,188	4,761,188	14,889,663	96.29	5,871,307	6,574,883	11,030,390
Chicago, St. Paul, Minn. & Omaha.	11 mos.	247	2,498,127	2,563,278	462,264	857,055	50,570	1,463,995	138,253	2,863,322	111.70	299,943	376,154	607,863
Chicago, Rock Island & Pacific.	Nov.	7,662	7,955,783	2,715,114	11,461,100	1,971,997	2,460,022	164,586	5,325,682	2,857,234	110,000,278	3,304,822	3,833,014	721,807
Chicago, Rock Island & Pacific.	11 mos.	76,620	82,648,563	31,163,513	124,081,386	23,494,489	31,422,037	1,437,098	56,359,606	2,226,166	115,801,711	8,280,367	8,053,012	659,179
Chicago, Rock Island & Pacific.	Nov.	461	4,367,881	1,220,991	5,826,317	658,337	1,098,590	112,361	2,750,340	19,807	74,645	74,645	80,752	166,791
Chicago, Rock Island & Pacific.	11 mos.	7,459	8,048,847	694,513	31,675,455	1,317,475	1,958,590	112,361	3,700,940	166,056	5,100,036	965,348	801,462	801,469
Chicago, St. Paul, Minn. & Omaha.	Nov.	374	6,656,528	25,640	69,616,198	2,026,278	2,026,278	339,340	14,895,245	88,849	45,588,944	3,895,246	2,678,726	248,922
Chicago, St. Paul, Minn. & Omaha.	11 mos.	3,749	45,205,093	7,875,523	29,246,289	4,624,013	5,266,126	4,899,240	18,289,585	12,794	63,884,574	84,957	93,124	212,600
Chicago, St. Paul, Minn. & Omaha.	11 mos.	374	5,126,373	275,874	5,453,234	843,833	1,881,311	53,233	2,299,931	127,060	5,229,143	314,591	1,103,091	665,649
Cincinnati, Indianapolis & Western.	Nov.	321	315,073	63,793	393,686	87,920	88,577	10,655	181,844	22,772	393,012	674	46,255	33,331
Cincinnati, Indianapolis & Western.	11 mos.	1,069	1,401,659	251,326	7,737,651	1,328,811	1,971,621	103,561	4,403,440	219,734	4,403,440	490,383	526,968	1,632
Colorado & Southern.	Nov.	1,099	10,507,288	2,785,257	14,477,898	2,534,140	3,235,811	311,583	5,198,609	542,429	11,745,699	81,41	2,682,186	2,095,514
Colorado & Southern.	11 mos.	454	959,620	298,927	1,307,592	150,363	262,440	11,003	373,676	401,943	1,049,103	360,363	238,941	195,410
Colorado & Southern.	11 mos.	454	7,849,865	3,741,692	11,850,512	1,889,948	2,642,248	87,689	5,300,181	10,347,365	87,687	1,461,406	1,215,278	831,146
Colorado & Southern.	11 mos.	2,759	10,507,288	2,785,257	14,477,898	2,534,140	3,235,811	311,583	5,198,609	542,429	11,745,699	81,41	2,682,186	2,095,514
Colorado & Southern.	11 mos.	266	1,645,650	50,600	7,244,045	1,151,043	1,661,511	2,988	113,120	11,146	242,417	88,73	37,899	29,153
Colorado & Southern.	11 mos.	266	1,072,866	475,412	1,644,059	401,014	1,627,280	928	702,627	1,441	1,280,243	581	352,854	84,745
Colorado & Southern.	11 mos.	43	35,814	1,181	118,196	103,912	218,600	198	52,441	14,951	90,661	76,70	2,535	1,859
Colorado & Southern.	11 mos.	376	1,567,973	37,681	5,087,709	791,442	868,112	12,56	1,369,971	87,643	3,029,958	113,35	356,995	450,338
Colorado & Southern.	11 mos.	376	1,567,973	37,681	5,087,709	791,442	868,112	12,56	1,369,971	87,643	3,029,958	113,35	356,995	450,338
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Colorado & Southern.	11 mos.	376	1,567,973	37,681	5,087,709	791,442	868,112	12,56	1,369,971	87,643	3,029,958	113,35	356,995	450,338
Colorado & Southern.	11 mos.	376	1,567,973	37,681	5,087,709	791,442	868,112	12,56	1,369,971	87,643	3,029,958	113,35	356,995	450,338
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Colorado & Southern.	11 mos.	376	1,567,973	37,681	5,087,709	791,442	868,112	12,56	1,369,971	87,643	3,029,958	113,35	356,995	450,338
Colorado & Southern.	11 mos.	376	1,567,973	37,681	5,087,709	791,442	868,112	12,56	1,369,971	87,643	3,029,958	113,35	356,995	450,338
Colorado & Southern.	11 mos.	376	1,567,973	37,681	5,087,709	791,442	868,112	12,56	1,369,971	87,643	3,029,958	113,35	356,995	450,338
Colorado & Southern.	11 mos.	376	1,567,973	37,681	5,087,709	791,442	868,112	12,56	1,369,971	87,643	3,029,958	113,35	356,995	450,338
Colorado & Southern.	11 mos.	376	1,567,973	37,681	5,087,709	791,442	868,112	12,56	1,369,971	87,643	3			

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF NOVEMBER AND ELEVEN MONTHS OF CALENDAR YEAR 1920—CONTINUED

Table with columns: Name of road, Average mileage operated during period, Freight, Passenger, Total operating revenues, Operating expenses, Net from way and structures, Net from traffic, Total, Operating ratio, Net from railway operation, Operating income, Net after taxes, Increase (or decrease) in net operating income last year. Rows include various railroads such as Great Northern, Gulf Coast Lines, Gulf & Ship Island, etc.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF NOVEMBER AND ELEVEN MONTHS OF CALENDAR YEAR 1920—CONTINUED

Name of road.	Average mileage during period.			Operating revenues			Maintenance of way and structures.			Operating expenses			Total.	Operating ratio.	Net railway operation.	Operating (or loss).	Net after rentals.	Increase (or decr.) comp. with last year.		
	Nov.	11 mos.	11 mos.	Freight.	Passenger.	(inc. misc.)	Total.	Equip. ment.	Equip. ment.	Traffic.	Trans- portation.	General.							General.	
Missouri Pacific	7,300	7,907,489	1,834,325	2,383,102	4,671,680	284,911	9,012,268	2,841,911	9,012,268	2,841,911	9,012,268	2,841,911	9,012,268	78.14	2,571,891	1,260,202	1,852,836	2,002,320	1,108,839	
Monongahela Connecting	11 mos.	7,299	78,601,957	19,726,005	107,427,259	1,634,645	267,444,919	16,747,405	46,729,561	6,948	193,018	6,948	193,018	79.34	579,451	430,097	359,032	415,864	141,864	
Montour	56	197,615	1,085	205,490	39,351	609,514	1,662	49,898	7,477	158,765	7,477	158,765	77.26	44,116	54,116	76,015	121,326	76,015	121,326	
Nashville, Chattanooga & St. Louis	11 mos.	56	1,436,061	13,641	1,514,020	368,198	6,081,531	32,460	431,931	80,745	3,178,102	80,745	3,178,102	103.66	53,842	109,389	79,917	260,977	260,977	
Nevada Northern	11 mos.	1,247	13,524,545	5,022,359	25,973,144	4,693,564	6,993,768	6,644,146	10,334,694	6,627,454	22,405,033	6,627,454	22,405,033	99.93	14,708	511,869	4,585	977,444	977,444	
Newburgh & South Shore	11 mos.	165	64,982	104,185	81,219	20,530	11,611	655	25,319	4,192	1,624,248	4,192	1,624,248	76.86	18,791	9,711	10,530	23,883	23,883	
New Orleans Great Northern	11 mos.	284	1,990,346	53,691	2,444,723	44,014	54,326	34,883	1,043,331	48,646	1,657,407	48,646	1,657,407	98.29	28,810	69,705	61,327	64,327	64,327	
New York Central	11 mos.	6,069	24,276,316	7,989,407	35,103,764	4,678,734	84,569,277	274,374	1,409,013	1,155,598	2,365,984	1,155,598	2,365,984	95.48	112,020	3,568,282	452,798	3,568,282	452,798	
Cincinnati Northern	11 mos.	6,049	20,978,146	88,248,564	337,349,022	62,791	666,768	90,441,360	1,117,259	34,576,294	8,575,415	318,668,692	8,575,415	318,668,692	64.46	18,690,331	6,945,000	4,388,531	41,010,292	41,010,292
Cleve., Cin., Chic. & St. Louis	11 mos.	2,409	5,980,905	1,569,274	8,062,170	1,105,388	17,666,994	165,609	3,251,283	163,344	6,750,201	163,344	6,750,201	83.31	13,151,469	10,791,182	8,840,602	8,840,602	8,840,602	
Indian Harbor Belt	11 mos.	170	61,942	8,445,946	1,254,279	2,845,997	33,391	5,943,283	246,690	10,333,509	122,233	18,757,563	122,233	18,757,563	104.19	40,408	51,094	198,596	393,643	393,643
Kanawha & Mifflin	11 mos.	176	1,143,015	611,986	4,931,229	903,891	1,766,386	46,952	1,895,860	153,945	4,853,796	153,945	4,853,796	88.04	96,961	241,478	628,316	448,341	448,341	
Lake Erie & Western	11 mos.	738	968,542	62,047	1,083,822	143,191	343,807	19,572	1,539,628	29,027	10,943,194	29,027	10,943,194	87.02	140,638	96,748	68,609	170,547	170,547	
Mifflin Central	11 mos.	415	2,674,754	1,433,109	5,442,030	1,059,304	1,506,522	8,877	2,904,187	17,387	6,667,744	17,387	6,667,744	86.37	1,053,977	839,231	480,437	583,157	583,157	
Pittsburgh & Lake Erie	11 mos.	224	3,718,156	305,128	4,391,259	527,652	11,070,118	21,675	11,934,096	70,022	40,151,396	70,022	40,151,396	89.36	1,570,097	252,882	2,356,808	1,483,200	1,483,200	
Butland R. R.	11 mos.	415	2,674,754	1,433,109	5,442,030	1,059,304	1,506,522	8,877	2,904,187	17,387	6,667,744	17,387	6,667,744	86.37	1,053,977	839,231	480,437	583,157	583,157	
Toledo & Ohio Central	11 mos.	593	4,356,071	81,719	1,901,684	175,539	321,634	115,278	3,529,557	259,640	10,937,413	259,640	10,937,413	90.44	1,155,763	601,238	1,061,515	944,723	944,723	
New York, Chicago & St. Louis	11 mos.	575	23,937,507	114,173	37,515,781	284,644	57,505	51,492	1,091,505	76,175	2,086,276	76,175	2,086,276	77.84	6,901,131	4,375,802	2,753,703	2,753,703	2,753,703	
N. Y., New Haven & Hartford	11 mos.	2,003	5,671,654	47,235,238	11,822,960	114,662,960	19,238,075	27,622,608	635,337	60,778,432	780,884	2,014,286	780,884	2,014,286	77.88	5,680,750	4,669,111	4,662,925	4,662,925	
Central New England	11 mos.	301	6,387,655	290,937	6,979,889	1,780,116	13,974,474	41,243	4,692,773	183,520	7,645,359	183,520	7,645,359	110.81	7,413,438	4,330,9	2,977,453	3,107,509	3,107,509	
New York, Ontario & Western	11 mos.	569	897,594	145,336	1,195,602	144,070	311,975	15,613	3,561,228	27,373	10,355,158	27,373	10,355,158	86.58	10,434	13,244	1,134	1,134	1,134	
Norfolk & Western	11 mos.	2,961	4,477,532	150,985	78,107,975	306,995	78,107,975	306,995	78,107,975	306,995	78,107,975	306,995	78,107,975	97.72	1,780,437	3,391,181	1,181,881	4,741,881	4,741,881	
Norfolk Southern	11 mos.	936	8,407,049	1,853,989	7,192,434	1,549,493	4,972,888	18,009	318,253	32,077	531,321	32,077	531,321	83.76	10,476	7,739	1,141	1,141	1,141	
Northwestern Pacific	11 mos.	6,655	8,070,039	1,310,855	12,603,569	1,260,353	13,327,522	3,847,246	4,424,587	809,334	8,466,062	809,334	8,466,062	81.78	1,886,881	1,111,111	1,111,111	1,111,111	1,111,111	
Minnesota & International	11 mos.	1,934	66,600	42,459	118,091	13,792	25,182	615	52,776,891	2,724,166	87,936,980	2,724,166	87,936,980	86.01	14,253,861	1,111,111	6,141,881	6,141,881	6,141,881	
Pennsylvania R. R.	11 mos.	7,259	42,469,536	11,426,031	58,108,817	6,462,550	15,997,617	456,130	96,569,293	43,971	1,166,965	43,971	1,166,965	69.11	7,011,513	5,876,644	4,711,960	13,600,774	13,600,774	
Haltom, Chesapeake & Atlantic	11 mos.	87	168,138	40,793	15,724	18,535	22,432	1,622	1,474	5,185	172,049	5,185	172,049	106.95	1,409	1,664	1,335	1,335	1,335	
Long Island	11 mos.	398	6,830,009	14,853,331	23,068,913	3,340,234	5,005,347	202,465	1,376,531	665,262	3,250,876	665,262	3,250,876	106.95	1,409	1,664	1,335	1,335	1,335	
Maryland, Delaware & Virginia	11 mos.	82	81,811	30,056	111,139	18,640	10,705	979	91,143	2,943	1,314,149	2,943	1,314,149	167.83	6,610	0.18	1,178	1,178	1,178	
Monongahela Ry.	11 mos.	106	3,572,822	316,763	3,980,652	1,279,044	647,044	11,801	1,409,117	10,413	861,705	30,362	1,415,105	64.1	186,417	4,746	334,106	334,106	334,106	

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF NOVEMBER AND ELEVEN MONTHS OF CALENDAR YEAR 1920—CONTINUED

Table with columns: Name of road, Average mileage operated, Operating revenues (Passenger, Freight, Total), Maintenance of Way and Equip. structures, Trans-shipment, T. aff., General, Total, Operating ratio, Net from operation, Operating income (or loss), Net after rentals, and Increase (or decrease) last year. Rows include various railroads such as New York, Phila. & Norfolk, West Jersey & Seaboard, Peoria & Pekin Union, Pere Marquette, Phila., Bethlehem & New Eng., Philadelphia & Reading, Atlantic City, Port Reading, Pittsburgh & Shawmut, Pittsburgh & West Virginia, Quincy, Omaha & Kansas City, Richmond, Fredericksburg & Potomac, St. Louis-San Francisco, Ft. Worth & Rio Grande, St. Louis, San Francisco & Tex., St. Louis Southwestern, St. Louis Southwestern of Texas, San Antonio & Anansas Pass., Seaboard Air Line, South Buffalo Ry. Co., Southern Ry., Alabama Great Southern, Cinc. New Orleans & Tex. Pacific, Georgia Southern & Florida, Mobile & Ohio, New Orleans & North Eastern, Northern Alabama, Southern Ry. in Mississippi, and Southern Pacific.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF NOVEMBER AND ELEVEN MONTHS OF CALENDAR YEAR 1920 (CONTINUED)

Name of road	Average mileage operated during period		Operating revenues		Maintenance of way and structures		Equipment		Operating expenses		General	Total	Operating ratio	Net railway operation	Operating income (or loss)	Net comp. with last year	Increases (or decreases)	
	Nov.	11 mos.	Passenger.	Freight.	(inc. misc.)	Total	Transp.	Traffic.	Transp.	Station.								Operating
Atlanta Eastern	383	318,803	425,618	63,288	49,913	63,288	49,913	123,364	4,085	123,364	23,240	271,668	63.83	153,950	124,543	107,558	98,251	136,058
11 mos.	380	2,862,409	6,099,117	3,795,272	843,986	38,761	2,979,674	78,599	1,283,572	38,761	2,979,674	68.59	1,283,572	843,986	492,322	366,682	158,030	158,030
Galveston, Harrisburg & S. Antonio	1,383	1,739,914	2,523,941	525,000	156,831	525,000	156,831	1,021,700	39,348	1,021,700	87,520	2,440,557	92.01	1,916,871	2,018,099	2,322,227	3,746,202	452,885
11 mos.	1,383	17,934,941	25,622,624	4,931,222	6,972,638	4,931,222	6,972,638	10,917,479	799,388	10,917,479	2,206,953	28,185,355	92.01	19,176,871	21,018,099	23,222,227	37,462,202	452,885
Houston & Texas Central	915	274,208	1,256,131	275,000	287,986	275,000	287,986	504,330	21,797	504,330	32,471	1,121,527	89.29	134,659	83,953	27,492	281,059	27,492
11 mos.	900	2,114,447	10,786,490	2,751,000	4,232,452	2,751,000	4,232,452	4,582,959	182,991	4,582,959	309,878	10,375,036	94.31	619,324	62,757	205,599	1,543,521	205,599
11 mos.	150	1,934,279	6,205,154	2,355,917	771,977	2,355,917	771,977	4,706,883	35,445	4,706,883	75,534	8,571,492	104.44	-121,875	-219,148	-353,260	677,223	-353,260
Louisiana Western	207	3,667,791	11,135	222,014	12,385	222,014	12,385	1,364,919	18,594	1,364,919	18,594	514,204	100.79	-4,025	-33,347	-52,340	208,005	-52,340
11 mos.	207	3,667,791	11,135	222,014	12,385	222,014	12,385	1,364,919	18,594	1,364,919	18,594	514,204	100.79	-4,025	-33,347	-52,340	208,005	-52,340
Morgan's L. & T. R. & S. Co.	400	709,660	1,817,447	949,097	265,678	949,097	265,678	1,725,490	19,003	1,725,490	23,550	3,450,587	97.55	1,078,526	955,990	538,682	234,547	538,682
11 mos.	400	6,713,084	2,005,161	9,424,808	1,971,463	2,157,447	1,971,463	3,350,598	141,000	3,350,598	309,257	8,144,040	86.41	1,280,768	711,202	432,181	357,838	432,181
Texas & New Orleans	469	682,034	1,823,514	965,482	209,000	965,482	209,000	430,472	10,654	430,472	26,065	1,198,976	113.77	142,647	168,769	277,125	168,769	
11 mos.	469	6,311,758	1,933,414	9,700,189	2,559,732	2,614,606	2,559,732	3,641,455	103,629	3,641,455	246,000	7,979,749	73.64	498,813	438,168	167,484	1,184,814	438,168
11 mos.	161	1,483,883	220,741	1,413,317	61,255	115,900	61,255	404,380	60,225	404,380	60,225	914,500	64.71	307,537	210,753	305,641	92,806	305,641
Spokane International	165	603,978	2,403,333	132,723	31,778	132,723	31,778	2,768,883	272,958	2,768,883	62,274	3,421,863	123.17	2,256,579	1,231,477	1,033,739	637,089	1,033,739
11 mos.	161	5,458,853	220,741	1,413,317	61,255	115,900	61,255	404,380	60,225	404,380	60,225	914,500	64.71	307,537	210,753	305,641	92,806	305,641
Spokane, Portland & Seattle	549	549,588	1,946,933	805,364	124,226	805,364	124,226	21,669	24,999	21,669	24,999	62,737	61.79	307,537	210,753	305,641	92,806	305,641
11 mos.	549	5,491,151	2,148,847	8,399,442	1,751,159	1,748,057	1,748,057	62,274	2,768,883	2,768,883	62,274	3,421,863	123.17	2,256,579	1,231,477	1,033,739	637,089	1,033,739
11 mos.	292	1,899,317	51,273	235,358	55,241	70,192	4,983	158,645	11,348	300,393	11,348	300,393	118.56	-47,035	-53,878	-88,354	10,623	-53,878
11 mos.	292	1,922,363	591,654	2,702,859	552,755	582,235	552,755	582,235	55,240	1,116,418	118,151	4,728,422	100.95	-35,384	-80,417	-87,205	109,996	-87,205
Tennesse Central	36	468,440	1,322,428	71,055	93,180	71,055	93,180	88,528	9,398	88,528	82,994	158,327	82.94	99,911	88,014	158,327	82,994	158,327
11 mos.	36	4,477	13,561,602	958,727	724,980	958,727	724,980	1,014,654	101,454	3,849,798	88,006	5,123,628	91.051	4,476,017	17,276	17,276	17,276	17,276
11 mos.	3	4,477	13,561,602	958,727	724,980	958,727	724,980	1,014,654	101,454	3,849,798	88,006	5,123,628	91.051	4,476,017	17,276	17,276	17,276	17,276
11 mos.	3	4,477	13,561,602	958,727	724,980	958,727	724,980	1,014,654	101,454	3,849,798	88,006	5,123,628	91.051	4,476,017	17,276	17,276	17,276	17,276
11 mos.	3	4,477	13,561,602	958,727	724,980	958,727	724,980	1,014,654	101,454	3,849,798	88,006	5,123,628	91.051	4,476,017	17,276	17,276	17,276	17,276
St. L. Merchants Bridge Terminal	Nov.	2,883	9,988,562	686,450	88,908	56,923	88,908	212,469	9,663	212,469	9,663	4,303,974	91.46	37,282	-21,161	31,171	61,162	37,282
11 mos.	2,883	9,988,562	686,450	88,908	56,923	88,908	212,469	9,663	212,469	9,663	4,303,974	91.46	37,282	-21,161	31,171	61,162	37,282	
St. Louis Transfer Ry.	Nov.	6	117,721	111,285	11,189	205	44,952	2,219	69,851	59.34	47,870	45,900	41,543	316.88	245,308	35,278	35,278	35,278
11 mos.	6	1,262,941	107,535	170,681	2,283	62,771	26,335	936,715	74.17	326,229	321,524	245,308	316.88	245,308	35,278	35,278	35,278	
Texas & Pacific Ry.	Nov.	249	2,477,823	986,318	3,981,433	661,600	953,026	45,415	11,748,529	106,177	3,537,381	89.10	434,042	408,000	308,407	96,416	308,407	
11 mos.	249	23,161,032	37,588,969	7,215,456	8,237,623	43,999	16,641,716	1,109,991	34,101,718	90.72	3,487,051	2,390,062	971,982	2,316,011	2,316,011	2,316,011	2,316,011	
11 mos.	247	1,126,340	563,565	1,853,949	336,499	491,106	30,774	1,079,469	80,492	2,018,301	108.87	164,367	237,967	51,844	77,413	77,413	77,413	
Toledo Plover & Western	Nov.	434	881,797	3,177,99	105,293	193,705	20,661	333,731	16,419	671,607	671,607	1,610,927	71.02	371,769	354,790	306,756	161,941	306,756
11 mos.	434	8,994,562	39,621	103,507,21	2,130,981	2,059,854	154,153	4,070,951	169,888	8,565,044	82,994	17,653,333	133.57	1,432,887	338,991	161,941	161,941	
11 mos.	128	83,940	19,921	127,210	27,162	2,196	9,188	9,188	9,994	160,860	136.45	33,650	33,650	4,669	16,364	16,364	16,364	
11 mos.	128	688,854	397,841	1,376,383	249,383	258,395	30,776	970,597	84,248	1,600,152	116.26	223,769	-79,194	-3,947	205,311	205,311	205,311	
Union R. P. of Penn.	Nov.	45	1,137,603	75,010	317	65,815	7,768	979,346	86.09	1,243,257	144,237	340,472	343,615	343,615	343,615	343,615	343,615	
11 mos.	45	11,045,621	7,067,233	30,568,636	6,527,476	5,402,598	472,575	13,125,690	1,469,037	27,452,221	89.81	3,116,416	1,152,547	584,757	3,938	3,938	3,938	
11 mos.	3,634	87,261,062	2,790,264	130,714,150	18,633,208	23,314,951	997,597	46,610,906	3,552,849	85,937,088	71.33	34,728,061	28,273,719	30,156,869	30,156,869	30,156,869	30,156,869	
Union Pacific	Nov.	1,168	1,256,835	464,162	876,112	326,577	326,577	326,577	44,041	694,004	38,433	1,839,646	79.40	385,645	389,747	300,320	300,320	
11 mos.	1,168	12,566,815	4,641,623	8,776,112	3,265,777	3,265,777	3,265,777	3,265,777	44,041	694,004	38,433	1,839,646	79.40	385,645	389,747	300,320	300,320	
11 mos.	2,359	3,239,291	651,768	4,174,714	584,429	742,327	44,753	1,364,265	152,327	2,660,400	70.93	1,213,274	4,067,433	1,015,735	284,113	284,113	284,113	
11 mos.	2,359	30,594,672	7,160,614	41,371,333	6,869,087	6,708,214	378,114	13,623,671	1,445,937	29,026,934	70.16	12,344,389	9,096,739	9,304,619	71,933	71,933	71,933	
Oregon Wash R. R. & N. V. Co.	Nov.	222	2,041,953	655,339	2,922,123	894,137	502,828	35,885	1,335,101	152,430	2,909,625	103.41	68,510	384,517	603,880	603,880	603,880	
11 mos.	222	20,874,191	7,067,233	30,568,636	6,527,476	5,402,598	472,575	13,125,690	1,469,037	27,452,221	89.81	3,116,416	1,152,547	584,757	3,938	3,938	3,938	
11 mos.	238	2,520,985	414,642	3,183,785	1,008,562	513,010	27,723	1,621,996	160,119	3,351,981	306.12	193,138	334,848	390,314	35,617	35,617	35,617	
Utah R.	Nov.	98	203,975	835	205,762	30,298	32,643	672	46,989	32,643	101,937	100.79	33,347	33,347	33,347	33,347	33,347	
11 mos.	98	2,039,751	8,627	1,818,356	231,764	337,025	2,039,751	8,627	1,818,356	231,764	337,025	100.79	33,347	33,347	33,347	33,347	33,347	
11 mos.	98	2,039,751	8,627	1,818,														

Equipment and Supplies

Locomotives

THE BOSTON & MAINE is contemplating converting 18 Consolidation type locomotives to switching type locomotives. The company will not carry out the work in its own shops.

Freight Cars

THE CANADIAN NATIONAL RAILWAYS are asking for prices on 5,000 freight cars.

THE EGYPTIAN STATE RAILWAYS will inquire soon, through the car builders, for 50, 10,000-gal. tank cars.

THE RHODESIAN RAILWAYS, reported in *Railway Age* of November 26, as inquiring for 100 gondola cars, have ordered this equipment from German builders.

THE LOUISVILLE & NASHVILLE, reported in the *Railway Age* of December 24, as contemplating the purchase of 2,700 additional freight cars, is now inquiring for 2,000, 40-ton box cars, 300, 55-ton gondola cars, 300, 40-ton coke cars, and 100, 40-ton stock cars.

Passenger Cars

THE ANN ARBOR is inquiring for 8 all-steel passenger train cars.

THE MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE has ordered 3 steel dining cars from the American Car & Foundry Company.

THE SOUTHERN RAILWAY, reported in the *Railway Age* of October 15, as inquiring for 50 passenger cars and 50 baggage cars, has renewed its inquiry for this equipment.

SPANISH GOVERNMENT.—A cablegram from Commercial Attache Cunningham, Madrid, Spain, reports that bids will be opened by the Spanish Government on February 14, in Madrid, for 119 passenger cars and 152 baggage cars.

Iron and Steel

OKURA & Co., 30 Church street, New York, has ordered from the United States Steel Products Company 8,750 tons of 100-lb. rails for use on the South Manchurian Railway.

Signaling

THE NEW YORK, NEW HAVEN & HARTFORD has ordered an 80-lever style "A" mechanical interlocking machine from the Union Switch & Signal Company, for installation at the west end of the New Haven station.

THE NEW YORK CENTRAL has ordered an electro-pneumatic interlocking machine from the Union Switch & Signal Company, for installation at Mott Haven Junction, New York City; 22 working levers, model 14 type, fitted with illuminated lever light indicators.

RESEARCH GRADUATE ASSISTANTSHIPS, maintained by the Engineering Experiment Station of the University of Illinois, Champaign, now number sixteen, including two which have been established under the patronage of the Illinois Gas Association. These assistantships, for each of which there is an annual stipend of \$600, are open to graduates of approved American and foreign universities and technical schools, and applications should be sent to Dean C. R. Richards before March 1. Preference is given to applicants who have had some practical engineering experience following the completion of their undergraduate work. Appointments are made in the spring, and they become effective the first day of the following September.

Supply Trade News

E. M. Blake, production engineer of Charles R. McCormick & Co., San Francisco, and president of the National Association of Railroad Tie Producers, died suddenly at San Francisco on January 12.

The Regan Safety Devices Company, Chicago, proprietor of the automatic train stop which is in use on the Chicago, Rock Island & Pacific, has been incorporated in the state of New York; James S. Regan, president; capital, 500,000 shares of no par value.

George E. Tebbetts, formerly with the construction and engineering division of Stone & Webster, Boston, Mass., and previous to that time bridge engineer of the Kansas City Terminal, has become associated with the railroad department of the Roberts & Schaefer Company, engineers and contractors, Chicago.

D. E. Sawyer has been re-elected general sales manager of the Pollak Steel Company, Cincinnati, Ohio, with office at 120 Broadway, New York; S. K. Morrow, manager of operations, has been appointed manager of sales for its three plants, with office at the Cincinnati works; C. G. Talbott, assistant manager of operations, has been appointed manager of rolled products for the Marion plant; A. C. Wehl, superintendent of the Cincinnati plant, has been appointed general works manager in charge of operations and productions of the Cincinnati, the Chicago and the Marion plants, and V. W. Prather, cost auditor for the Cincinnati plant, has been appointed auditor of the three plants. R. A. Mitchell has succeeded Mr. Wehl as superintendent of the Cincinnati plant; J. H. Deickman has been appointed manager of materials and inspection of its three plants; W. P. Woods has been appointed auditor and G. H. Tallaksen, superintendent of the Chicago plant. The company has recently distributed a unique souvenir; it is a pen made in the form of a miniature standard M. C. B. car axle, with mechanical wheel seat and journal and rough turned center.

Verona Tool Works

The Verona Tool Works, Pittsburgh, Pa., has been re-organized, Alex Laughlin buying the controlling interest of the company from Harry S. Paul, who has retired. The officers of the new company are: William F. Hart, president; Emanuel Woodings, vice-president and general manager, and

F. G. Magnus, secretary and treasurer. John B. Seymour has been appointed district sales manager at Chicago, succeeding Howard C. Mull, who has resigned to accept service with another company, and Porter L. Laughlin has been appointed assistant district sales manager at Chicago, effective January 1.

William F. Hart, the president of the company, entered business with the Lorain Steel Company at Lorain, Ohio, then a part of the Federal Steel Company, in 1899. In 1904, this plant was made a part of the National Tube Company and at that time Mr. Hart was transferred to the Pittsburgh office of the latter company, where he remained until 1909. Upon the latter date he



W. F. Hart

of the National Tube Company and at that time Mr. Hart was transferred to the Pittsburgh office of the latter company, where he remained until 1909. Upon the latter date he

entered the service of the Central Tube Company, Pittsburgh, Pa., which company he was serving as vice-president at the time of his appointment to the presidency of the Verona Tool Works in November, 1920. Previous to 1909 Mr. Hart was in the operating and manufacturing end of the steel business but since that time his experience has been entirely executive, embracing both manufacturing and sales.

Emanuel Woodings, vice-president and general manager of the company, entered upon his thirty-fourth year of service with the company on January 6, 1921. His service began in the machine shop of the company in 1877, and he has served successively as

foreman, superintendent and general manager. He was promoted to the latter position in 1904, and upon the reorganization of the company, was elected vice-president.

John B. Seymour, who has been appointed district sales manager at Chicago, was born in Newburyport, Mass., in 1877, and was educated at Yale, graduating in the class of 1899. He immediately

entered the engineering service and, until 1904, was employed by different roads in the Middle West. During that year he became connected with the National Lock Washer Company as sales agent, being promoted to western manager in 1911. In 1917 he resigned to enter the second officers' training camp at Fort Sheridan and during the war served as a lieutenant in the infantry. Upon his return from abroad and since his discharge, Mr. Seymour has been engaged in exploration and development work upon various different projects.

Porter L. Laughlin, assistant district sales manager at Chicago, attended Washington and Jefferson College and in 1913 became connected with the Central Tube Company, Pittsburgh, Pa. He served this company successively as purchasing agent, assistant to the general manager and special representative from January 1, 1912, to December 1, 1920, except for the period from September, 1917, to February, 1919, when he served in the army as a lieutenant in the infantry.

C. E. Adams, vice-president of the Air Reduction Sales Company, New York, has been elected president to succeed A. F. Blagden, who has resigned to become associated with the American Dyewood Company, New York. **John McHugh** has been elected a director to succeed H. R. Hoyt, deceased.

George A. Post will retire from the presidency of the Standard Coupler Company, New York, on January 31, having notified the directors of the company in November last of his desire to devote his time and energies to other interests with which he is identified. Mr. Post has been president of the Standard Coupler Company since its organization in

1894. His successor will be **Edmund H. Walker**, who has been associated with Mr. Post as vice-president of the company for the past 15 years.

R. J. Hinkle, whose appointment as railroad representative of the Garlock Packing Company, Palmyra, N. Y., for the territory embracing eastern and southern railways, with headquarters at Philadelphia, Pa., was announced in the *Railway Age* of December 31, began railroad work as a machinist apprentice in the Frankfort (Ind.), shops of the Toledo, St. Louis & Western. He later was mechanical draftsman in the office of the superintendent of motive power at Frankfort until 1908, and he then served as mechanical draftsman on power and transmission machinery during the construction of the Argo (Ill.) plant of the Corn Products Refining Company. From 1910 to 1913 he was chief mechanical engineer for Armour Car Lines at Chicago, and in 1914 served as special representative of the Railway Terminal Commission of Chicago. He was appointed general manager of the Hill City Railway Company in 1915, in which position he served to date with the exception of a period during the war, when he served as first lieutenant in the Engineer Corps in connection with the office of Director General of Military Railways at Washington, D. C. He is a son of **C. L. Hinkle**, general manager of the Chicago Great Western.

Obituary

William H. Sayre, president of the American Abrasive Metals Company, New York, died suddenly at his home in Glen Ridge, N. J., on January 6. He was born at Mauch Chunk, Pa., in 1865, and graduated from Lehigh University as a mechanical engineer in 1886, and since that time has been actively engaged in some line of business in which his engineering ability was applied. He began his practical experience in railroad building in the Northwest. Mr. Sayre later became president of the International Contracting Company, executing many dredging contracts in New York and other harbors, and also served as a consulting engineer on the Cape Cod canal. He was among the first to apply electric welding commercially, having organized the Federal Electric Welding Company, New York, and the Anthracite Electric Welding Company, Wilkes-Barre, Pa. In 1911 he organized the American Abrasive Metals Company, of which he was president until the time of his death.

Trade Publications

"WINTER IN CANADA."—The Canadian Pacific has issued a 32-page attractively prepared booklet, which shows by word and pictures something of the charm of the Canadian winter from coast to coast.

DUFF JACKS.—The Duff Manufacturing Company, Pittsburgh, Pa., has issued a new catalog of 140 pages listing its complete line of jacks, including track, car, locomotive, bridge, journal, trench brace and cable reel jacks. The first pages of the catalog are devoted to illustrations, tables and descriptions of the individual jacks, and the latter portion to illustrations and lists of the parts of all jacks.

ENGINEERS' AND SURVEYORS' SUPPLIES.—A 40-page catalogue of field and office supplies has been recently issued by the C. F. Pease Company, Chicago. This book lists drawing, profile and cross-section papers; tracing cloths; blueprint papers and blue-printing machines; drafting-room furniture and such field supplies as transits, levels, ranging poles, leveling rods, etc. The book is well illustrated, while prices and descriptions of each article are given.

TUBULAR STEEL POLES.—Bulletin No. 14-C of the National Tube Company, Pittsburgh, Pa., is an attractive 48-page booklet which sets forth the advantages of tubular steel poles. The application of this type of support to high automatic or manual signals, trolley wires, telegraph and telephone lines, transmission lines and lighting fixtures, is illustrated and described. A tabulation of sizes, weights, etc., facilitates the selection of the pole best suited for the particular service. The closing pages of the bulletin are devoted to tables, giving the properties of steel pipe



E. Woodings



J. B. Seymour

Railway Construction

ANN ARBOR.—This company has awarded a contract to the American Bridge Company for the erection of a bridge over the Raisin river at Dundee, Mich.

ATCHISON, TOPEKA & SANTA FE.—This company is accepting bids for the construction of a one-story brick addition to its machine shop at Argentine, Kan. The structure will be 102 ft. by 115 ft. in area and will cost about \$45,000.

ATLANTA & ST. ANDREWS BAY.—This company has applied to the Interstate Commerce Commission for authority to abandon service on a branch from its mail line just north of Panama City, Fla., to St. Andrews, Fla.

ATCHISON, TOPEKA & SANTA FE.—This company, which was announced in the *Railway Age* of November 26 (page 951), as contemplating the construction of a coaling station at Shawnee, Okla., has awarded the contract for this work to Fairbanks, Morse & Co., Chicago.

CHESAPEAKE & OHIO.—This company contemplates the construction of a new passenger station at Covington, Ky.

CHESAPEAKE & OHIO.—This company contemplates the construction of a new roundhouse at Peru, Ind.

DULUTH & IRON RANGE.—This company will rebuild its station at Allen Junction, Minn., which was recently destroyed by fire.

FORT WORTH & DENVER CITY.—This company contemplates extensions and improvements to its shops and engine house facilities at Fort Worth, Childress and Amarillo, Tex.

GOLDEN BELT.—This company has applied to the Interstate Commerce Commission for a certificate authorizing the construction of a line to cost \$64,000,000 from Great Bend to Buckeye Township, Ellis County, Kan.

ILLINOIS CENTRAL.—This company, which was announced in the *Railway Age* of December 10 (page 1044), as accepting bids for the strengthening and raising of its levee at Helena, Ark., at a cost of approximately \$30,000, has awarded the contract for this work to M. J. Roach, Memphis, Tenn. The company has withdrawn its inquiry for bids for the construction of frame freight and passenger stations at Sarpy, La., to cost approximately \$20,000, and at Dowell, Ill., to cost about \$8,000, and will construct these stations with company forces.

LOUISVILLE & NASHVILLE.—This company, which was announced in the *Railway Age* of December 3 (page 997), as contemplating the construction of a 600-ton coaling and sanding station at Loyall, Ky., has awarded a contract to the Roberts & Schaefer Co., Chicago, for a reinforced concrete gravity sanding plant at Loyall.

LOUISVILLE & NASHVILLE.—This company, which will construct a 600-ton coaling station at Loyall, Ky., with company forces, has ordered the automatic coal elevating machinery for this station from the Ogle Construction Company, Chicago.

MISSOURI, KANSAS & TEXAS.—This company contemplates extensions to its freight house and rearrangement of its yard facilities at Kansas City, Mo., at an approximate cost of \$100,000.

MORGANTOWN & WHEELING.—This company has awarded a contract to B. M. Chaplin & Co., Morgantown, W. Va., for the construction of a second main track from Randall, W. Va., to Osage, a distance of one mile. The work will involve the construction of two small steel bridges.

POTATO CREEK.—The Interstate Commerce Commission has issued a certificate authorizing this company to construct an extension of 2.22 miles to a connection with the Pennsylvania at Hamlin, Pa., and to abandon 13.49 miles of its present line between Keating Summit and Norwich.

TEXAS MIDLAND.—This company has applied to the Interstate Commerce Commission for a certificate authorizing the construction of a line between Greenville and Commerce, Texas, a distance of 14 miles.

Railway Financial News

DIVIDENDS have been declared by the following roads:

Central of Georgia.—Common, 2½ per cent preferred, 3 per cent; payable December 31 to holders of record December 31.

Nashville, Chattanooga & St. Louis.—¾ per cent semi-annual, payable to holders of record January 22.

Pere Marquette.—First preferred, 1¼ per cent quarterly, payable February 1 to holders of record January 15.

Pittsburgh & West Virginia.—Preferred, 1½ per cent quarterly, payable February 28 to holders of record February 1.

ANN ARBOR.—The Interstate Commerce Commission has approved a loan of \$400,000 to this company to aid the carrier in meeting maturing indebtedness aggregating \$620,000. The company itself is required to finance \$320,000 to meet the loan of the government.

BANGOR & AROOSTOOK.—This company has been authorized by the Interstate Commerce Commission to issue \$320,000 of equipment trust certificates to be sold at not less than 95.5 per cent of their face value and to pledge the deferred lien equipment trust certificates, together with certain bonds, with the Secretary of the Treasury as security for a loan from the United States government.

BOYNE CITY, GAYLORD & ALPENA.—This company has applied to the Interstate Commerce Commission for authority to issue short term notes amounting to \$250,000 for two years at 7 per cent.

CHESAPEAKE & OHIO.—This company has been authorized by the Interstate Commerce Commission to procure the authentication and delivery by corporate trustee of \$2,502,000 of its first lien and improvement 20-year, 5 per cent, mortgage bonds and to pledge \$2,206,000 of this amount, together with \$1,553,000 of the bonds as part security for a loan from the government.

CHICAGO & EASTERN ILLINOIS.—The foreclosure sale of this road, set for January 11, has again been postponed until February 8.

FEDERAL VALLEY.—This company has been authorized by the Interstate Commerce Commission to issue \$24,940 of promissory notes at 7 per cent, payable to the order of the Lima Locomotive Works, and \$3,000 of promissory notes at 7 per cent to the Ohio National Bank of Columbus, Ohio.

HUNTINGDON & BROAD TOP MOUNTAIN.—The Interstate Commerce Commission has approved a loan of \$60,550 to this company to aid it in the construction of a modern bridge on its main line at or near Saxton, Pa., at a total estimated cost of \$150,000. The company itself is required to finance about \$60,500 to meet the loan of the government.

LEHIGH & HUDSON RIVER.—The stockholders of record September 10, 1920 are given the right to subscribe at par between January 10 and February 10 to \$2,987,000 capital stock to the extent of 173.7 per cent of their holdings. All payments of subscriptions shall be made at the office of the treasurer on or before February 10. After February 10 fractional receipts, resulting from the payment of fractional warrants, will not be converted into stock, but will be redeemed in cash, at said office, at rate of \$100 per whole share. The stockholders on September 10, 1920, increased the authorized capital stock from \$1,720,000 to \$5,000,000. The proceeds of the above \$2,987,000 stock will be used to pay off the \$2,587,000 mortgage debt and the \$400,000 debentures which matured July 1, 1920. The balance of the increased stock, \$293,000 will be held in the treasury.

MARION & RYE VALLEY.—This company has applied to the Interstate Commerce Commission for authority to assume liability as guarantor and endorser of a note to be issued by the Virginia Southern for a loan of \$38,000 from the United States Government.

MORE HAVEN & CLEWISTON.—This company has been authorized by the Interstate Commerce Commission to issue \$50,000 of first mortgage 6 per cent gold bonds.

NASHVILLE, CHATTANOOGA & ST. LOUIS.—This company has filed an application with the Interstate Commerce Commission for

authority to issue and sell \$495,000 of its first consolidated mortgage 5 per cent gold bonds now nominally issued under the mortgage of April 2, 1888, which are due on April 1, 1928, to reimburse the treasury for expenditures and furnish it with working capital. It is proposed to sell the bonds at not less than 86 2/4 to the Harris Trust & Savings Bank, Chicago.

NASHVILLE, CHATTANOOGA & ST. LOUIS.—The stockholders will vote March 7 on authorizing the directors to take all necessary steps to legally consummate the execution, issuance and sale of \$1,000,000 first consolidated mortgage 5 per cent gold coupon bonds of 1883, or any portion thereof.

PENNSYLVANIA.—The resignation of A. W. Mellon, of Pittsburgh, as a director of this company, was accepted at a meeting of the board on January 12. Mr. Mellon's resignation was presented so as to save both himself and the Pennsylvania Railroad from any embarrassment that might arise because of Section 10 of the Clayton Act, which became effective January 1, 1921, respecting so-called interlocking directors. Mr. Mellon has been a director since February, 1920.

The stockholders will vote March 8 on the following propositions:

(1) Authorizing an increase of the indebtedness to be made when and as prescribed by the directors; (2) of changing the date of the annual meeting of, and the annual election of directors by the stockholders; (3) Leases of the railroads, property and franchises of the following companies, now operated as part of the system, viz.: Cincinnati, Lebanon & Northern; Cleveland, Akron & Cincinnati; Cumberland Valley & Martinsburgh; Englewood Connecting; Grand Rapids & Indiana; Indianapolis & Frankfort; Louisville Bridge & Terminal; New York Bay, New York, Philadelphia & Norfolk; Ohio Connecting; Ferth Amboy & Woodbridge; Pittsburgh, Cincinnati, Chicago & St. Louis; Pittsburgh, Ohio Valley & Cincinnati; South Chicago & Southern; Toledo, Columbus & Ohio River; and Wheeling Terminal. It is stated that the company has not yet determined the amount of increase in indebtedness which stockholders will be asked to authorize at the annual meeting on March 8. It is understood that at the present time there is indebtedness authorized of \$65,000,000 which has not been availed of. The amount of increase sought above this \$65,000,000 available will be announced later. The fact that an increase in indebtedness is authorized does not mean that the company will issue bonds or notes up to the full amount of the authorization, but it gives the company leeway to meet financial requirements when needed.

PITTSBURGH & LAKE ERIE.—This company has applied to the Interstate Commerce Commission for authority to issue promissory notes aggregating \$1,500,000 for six months at 6 per cent, payable to the order of the applicant at the Union Trust Company of Pittsburgh in renewal of outstanding notes.

RICHMOND TERMINAL.—This company has applied to the Interstate Commerce Commission for authority to issue two time notes for \$12,500 each, one to the Richmond, Fredericksburg & Potomac and one to the Atlantic Coast Line, dated January 1, 1921, payable on or before January 1, 1924, at 6 per cent.

SOUTHERN.—This company has been authorized by the Interstate Commerce Commission to issue \$5,900,000 of development and general mortgage 4 per cent bonds and to pledge them with the Secretary of the Treasury as security in part for a loan of \$3,825,000 from the government.

WATERLOO, CEDAR FALLS & NORTHERN.—The Interstate Commerce Commission has approved the making of a loan of \$60,000 to this company to aid the company in meeting its maturing indebtedness in a total principal amount of \$144,325. The company itself is required to finance \$84,325 to meet the loan of the government.

WESTERN MARYLAND.—This company has been authorized by the Interstate Commerce Commission to issue \$2,700,000 of first and refunding mortgage 5 per cent gold bonds and to pledge them with the Secretary of the Treasury as security for a loan from the government of \$2,122,800.

WHEELING & LAKE ERIE.—The Interstate Commerce Commission has approved a loan of \$500,000 to this company to aid it in meeting its maturing indebtedness, amounting to \$1,008,800. The carrier itself is required to finance \$508,800 to meet the loan of the government.

WILMINGTON, BRUNSWICK & SOUTHERN.—This company has applied to the Interstate Commerce Commission for a loan of \$200,000 to be used in paying off certain bank loans and for the purchase of ten 40 ft. box cars, fourteen 40 ft. flat cars, one freight locomotive, 70 pound rail for two miles of line, and additional dock facilities at Southport costing \$35,000.

Railway Officers

Executive

H. W. Miller has been appointed vice-president in charge of operation of the Southern, succeeding E. H. Coapman, deceased.

T. S. Davant, who retired as vice-president in charge of traffic of the Norfolk & Western on January 1, was born at Gillsonville, S. C. He entered railway service in 1865. In 1869 he became station agent for the Charlotte & South Carolina (now part of the Southern) at Ft. Mills, S. C. The same year he became chief clerk of the consolidated agency of the Charlotte, Columbia & Augusta (also now part of the Southern) at Columbia, S. C. In 1871 he became chief clerk in the office of the general freight and passenger agent of the same road. From 1874 to 1877 he was general freight and passenger agent for the Port Royal (now a part of the Charleston & Western Carolina). During the latter year he became assistant general freight and passenger agent of the Memphis & Charleston (now a part of the Southern). In 1886 he became general freight agent of the East Tennessee, Virginia & Georgia (now a part of the Southern) and remained in that position until 1892, when he went to the Norfolk & Western in the same capacity. In 1903 he was promoted to freight traffic manager, and in 1907 to vice-president and traffic manager. Mr. Davant became vice-president in charge of traffic in 1912.

Operating

J. D. Beaver has been appointed superintendent of transportation of the Pittsburgh, Shawmut & Northern, with headquarters at St. Marys, Pa., effective January 1.

F. M. Metcalfe, superintendent of the safety section of the Northern Pacific, with headquarters at St. Paul, Minn., has been appointed assistant to the general manager, with the same headquarters, effective January 1.

H. A. Adams, who has been appointed assistant to the general manager of the Union Pacific, with headquarters at Omaha, Neb., with jurisdiction over all safety work, effective



H. A. Adams

January 1, entered railroad service in 1885 as a brakeman and conductor on the Kansas City, Fort Scott & Gulf, now a part of the St. Louis-San Francisco. During the next 20 years he was employed as brakeman and conductor on the Southern Pacific, with headquarters at Los Angeles, Cal., and later in the same capacity with the Atchison, Topeka & Santa Fe, with headquarters at Kansas City, Mo. In 1905 he was appointed inspector of safety appliances and accident investigation by the Interstate Commerce Commission, and was associated with the Commission until 1917, when the government took over the operation of the railroads. During the period of federal control, Mr. Adams was regional supervisor of safety of the Central Western region, with headquarters at Chicago. He returned to the Interstate Commerce Commission on March 1, 1920, taking up his former work, which he continued until December 31, 1920, when he resigned to accept his appointment with the Union Pacific.

Peter Groome, general safety agent of the Union Pacific, with headquarters at Omaha, Neb., has been appointed assistant superintendent on the Colorado division, with headquarters at Denver, Colo., effective January 1.

Allan Pollok has been appointed manager of dining cars, hotels and restaurants of the Southern Pacific, with headquarters at San Francisco, effective January 1, succeeding **S. M. Estabrook**, who has been appointed assistant manager of dining cars, hotels and restaurants.

A. Allerton, manager of the Algonquin Hotel, St. Andrews, N. B., and the Place Viger Hotel, Montreal, both hotels of the Canadian Pacific, has been appointed manager-in-chief of hotels of that company, effective January 1, succeeding **F. L. Hutchinson**, who has resigned to engage in other business.

W. R. Hensley, trainmaster of the Louisville, Henderson & St. Louis, who has been on a leave of absence since August 28, while serving as vice-chairman of the sub-committee on car service at Louisville, Ky., assumed his regular duties on December 15 upon dissolution of the sub-committee. Acting trainmaster **J. S. Moorman** has again become assistant trainmaster and car accountant.

F. M. Metcalfe, superintendent of the safety section of the Northern Pacific, with headquarters at St. Paul, Minn., who has been appointed assistant to the general manager, with the same headquarters, effective January 1, has spent his entire railroad career in the service of the Northern Pacific. From 1907 to 1917, he was successively chief clerk to the general manager and representative of the vice-president in charge of operation. When the government took over the railroads Mr. Metcalfe was made superintendent of safety, the position which he held at the time of his recent appointment.

Traffic

G. A. Harrison, general agent, passenger department of the Grand Trunk at Portland, Me., will also act in the same capacity for the Canadian National effective January 1.

J. D. Anderson has been appointed commercial agent on the Hocking Valley, with headquarters at Toledo, and **H. E. Todd** has been appointed commercial agent with headquarters at Columbus, Ohio.

J. A. Werne, general agent on the Great Northern, with headquarters at Boston, Mass., has been transferred to New York, succeeding **A. D. Mercer**, who has resigned, effective January 1. **Charles H. Walker** succeeds Mr. Werne.

Henry Blakely, general freight agent of the Northern Pacific with headquarters at St. Paul, Minn., has been promoted to freight traffic manager, effective January 1, succeeding **John B. Baird**, who has retired from active service.

T. B. Montgomery, assistant freight traffic manager of the Northern Pacific with headquarters at St. Paul, Minn., has been appointed general freight agent, effective January 1, succeeding **Henry Blakely**, who has been promoted to freight traffic manager.

J. B. Baird, freight traffic manager of the Northern Pacific, who retired on January 1, was born June 21, 1855, at Woodlawn, Md. He began railway work in 1876 as a clerk in the general offices of the Pennsylvania at Philadelphia. Later he went to the Chicago, St. Paul, Minneapolis & Omaha, as a clerk in the general manager's office, and was subsequently employed as rate clerk in the general freight office of the Northern Pacific. Mr. Baird was in time promoted to assistant general freight agent and served in that capacity until May 1, 1903. He was then appointed general freight agent and served in that office until his appointment as freight traffic manager, which came November 1, 1913.

Mechanical

Paul Lebenbaum has been appointed assistant electrical engineer of the Southern Pacific, with headquarters at San Francisco, Cal., effective January 1, succeeding **F. E. Geibel**, resigned.

W. J. Robieder, general master car builder of the Canadian Pacific, has retired and the position has been abolished. The duties of general master car builder have been assumed by the assistant chief mechanical engineer.

R. Preston, assistant superintendent of motive power of the Canadian Pacific, with headquarters at Winnipeg, Man., has been promoted to superintendent motive power and car department, Eastern Lines, with headquarters at Montreal, effective January 1.

H. H. Stephens, master mechanic of the Pecos division of the Atchison, Topeka & Santa Fe with headquarters at Clovis, N. M., has been promoted to mechanical superintendent of the Southern district with headquarters at Amarillo, Tex., effective January 1, succeeding **W. D. Deveny**, assigned to other duties. **W. D. Hartley**, general foreman, locomotive department, at Richmond, Calif., succeeds Mr. Stephens at Clovis.

Engineering, Maintenance of Way and Signaling

P. C. Connelly, roadmaster on the Western Pacific, with headquarters at Oakland, Cal., has been appointed general roadmaster, with the same headquarters, with jurisdiction over the entire line, effective January 1.

L. A. Guthrie, signal inspector on the Canadian National, with headquarters at Winnipeg, Man., has been promoted to signal supervisor, with jurisdiction over the lines between Winnipeg and Watrous, Sask. He will retain his former headquarters.

A. H. Porter, engineer of roadway of the Charleston & Western Carolina, with headquarters at Augusta, Ga., has been promoted to valuation engineer, with the same headquarters, and **L. S. Jeffords**, formerly assistant engineer on the Atlantic Coast Line, with headquarters at Savannah, Ga., has been appointed engineer maintenance of way, with headquarters at Augusta, Ga., the positions of engineer of roadway, assistant engineer and general roadmaster having been abolished.

Obituary

John W. Daly, general Western agent of the New York Central with headquarters at Chicago, fell dead at the entrance to the Muchlebach Hotel, Kansas City, Mo., on the evening of January 12.

Robert C. Sattley, valuation engineer of the Chicago, Rock Island and Pacific, died suddenly at his home in Chicago on December 31. He was born in Ferrisburgh, Vt., on November 26, 1856. He was educated at the University of Vermont, graduating in the class of 1879, and entered railroad service in the same year as assistant engineer on the Northern Pacific. He was made superintendent of bridges and buildings in 1894, and served in this capacity until 1905, when he became division engineer. In 1907 he was appointed assistant engineer on the Chicago & North Western, and after a year of service as locating engineer on the Denver, Laramie & Northwestern, he accepted an appointment as valuation engineer on the St. Louis-San Francisco. In 1910 Mr. Sattley was appointed valuation engineer of the Chicago, Rock Island & Pacific and served continuously in this position until his death.



R. C. Sattley

EDITORIAL

Railway Age

EDITORIAL

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One tendency in railway tie purchases during recent years has been toward a greater dependence on supplies obtained off the line, the reason given for this being the depletion of local woodlots along the right-of-way. This is obviously a natural consequence of the reduced forest areas in the more densely settled portions of the country, but it would be well to ascertain if other influences have not been at least partially responsible. Owing to the fact that the small tie producers, farmers and others who deliver ties in small quantities along the right-of-way, have no ready market for their product other than that afforded by the railway, these men are required to sell their ties at the prices fixed by the roads. In at least a few instances railways have been accused of establishing schedules of prices without a proper regard for the cost of production and there is a feeling on the part of some students of tie marketing that this condition has had a pronounced influence in reducing local tie production. One authority on this subject declared recently that if the railways which formerly obtained ties along their own lines would make suitable adjustments of the prices offered to the local tie producers large supplies of ties could be developed along their lines for less money than they are now paying in the open market. In view of the present need for the most scrupulous economy, it would be well for railway officers to study this situation carefully.

That British railway supply manufacturers have made great progress during the past year toward regaining their export trade is shown by the reports of the Board of Trade for the eleven months ending November 30. The exports of locomotives during the period were valued at \$18,192,387 (on the basis of \$3.50 to the pound) as against \$4,898,330 for the similar period in 1919. The improvement in the export figures for rails and freight cars, while marked, was not in as great proportion. The exports of rails were valued at \$8,555,614 for the first eleven months of 1920 and \$6,400,068 for the 1919 period. Similar figures for freight cars are \$18,245,839 and \$7,093,527 respectively. This increase in British exports is no greater than could well be expected upon the gradually returning pre-war production of British industries, especially in view of the heavy investments of British capital in foreign railways and the large orders for railway materials which are placed by the British colonies, the bulk of which under normal conditions are naturally diverted to concerns in the mother country. British manufacturers are, moreover, in a relatively more favorable position in the export trade than their American competitors because of the almost world-wide premium on the dollar. We have heard a great deal during the past five or six years of industrial disorganization in Great Britain and the improbability of an early return of pre-war production in that country. It was even predicted in some quarters that Britain would be a negligible factor in the export trade for many years to come. The 1920 figures, however, prove that British manufacturers have been able to increase their railway exports

to the point where they can supply an increasingly large part of the demands of the colonies and of the British-owned roads in South America and elsewhere. In view of the great improvement shown in 1920 it is apparent that the famous skill of the Britisher in export trade was not irreparably lost during the recent world conflict.

A general movement to abandon the block-signal rule "stop and proceed" and to allow trains to pass an automatic signal (set in the horizontal position) without stopping, would inflict a severe jar on a custom of 60 years' standing; the custom of requiring enginemen to bring their trains to a full stop—a stop prima-facie unnecessary—in circumstances where (according to the general opinion among railroad officers) there is no other way to make sure that the engineman can and will stop, if and when a stop is found to be necessary. But a rule is not necessarily good because it is sixty years old, and the plea of our New Jersey correspondent, printed in another column, is deserving of attention. He wants the opinion of the up-to-date operating officer. That is easily stated; the officer will say that his enginemen are not sufficiently well disciplined; if you give them an inch they will take an ell; on up grades, where excessive speed is impossible, the stop may be omitted with safety, but everywhere else it is as necessary as it is to have derrails at the ends of side tracks or to have various other safeguards predicated on the assumption—or, rather, the fact—that good men make mistakes. But unnecessary stops do cause a great variety of difficulties and losses, especially on very busy lines; and it is mortifying to reflect that the biggest reason why we tolerate them is that we have not been able to educate our enginemen as well as we should like to. The superintendent who shall have the boldness to allow enginemen everywhere to pass automatic stop signals at five miles an hour, at all times when a clear road ahead is plainly visible, and maintain the practice with success for a reasonable length of time, will deserve a medal.

It is perhaps proper to remind the reader that in arguing in favor of hastening trains past stop signals, we have not forgotten the value of a stop to aid the dull or shortsighted engineman in learning that it is for his own interest to slacken speed enough to increase the distance between himself and the preceding train. In the great majority of cases it is desirable to let the train ahead get far enough away to give a clear distant indication; and it would be a good thing if enginemen were disciplined to do this much more than they do. The main reason, however, for abolishing the stop is to save the cost and avoid the contingent dangers of stopping, and to avoid delays which are otherwise unnecessary. Some roads have already adopted the rule that on passing a signal giving the caution indication, the enginemen shall shut off steam, even when it is entirely safe not to shut off.

The Use of Block Signals as Teachers

simply an element of discipline. Perhaps, when this feature of discipline has been carried out long enough, and its value has become generally appreciated, the same principle can be adopted in connection with signals giving the stop indication.

South America generally does not offer the most promising field to American manufacturers of railway supplies who are seeking foreign markets because the railway lines in most of the countries are owned in large part by British and other foreign capitalists who naturally are prejudiced in favor of products from their own countries. Chile, however, is a notable exception to this general rule; the Chilean railways are for the most part state-owned and are not dominated by foreign capital. The Chilean railways are, therefore, freed from prejudice against American supplies and offer one of the most promising markets in South America for American equipment. American goods must, of course, be able to compete in price and quality with those of foreign manufacturers and arrangements must be made whereby credits at least as liberal as those offered by other countries can be extended when purchases are made. The general railway situation in Chile, a detailed discussion of which will be found elsewhere in this issue of the *Railway Age*, is such that rather extensive construction will probably be undertaken before a great while and consequently the market for materials will become correspondingly more important. It is understood that an effort will soon be made by the Chilean government to place a substantial loan in this country. The outcome of these negotiations will be awaited with considerable interest in view of the fact that the large part of the proceeds of this issue will probably be devoted to the purchase of equipment for the government railways.

Any consideration of ways to increase the productive capacity of railroad shops involves a study of the three important

Why New Shop Machinery Is Needed

component factors in shop operation; namely, machinery, men and methods. As conditions now stand the first of these factors offers a fertile field for improvement either by the purchase of new machinery and equipment or by obtaining more effective service from that already in use. Present arrangements for replacing worn out shop machinery are entirely inadequate, as shown by the relatively small amounts of money set aside each year for depreciation. In fact, these amounts are so small as to indicate that depreciation must be figured on a basis of thirty or forty years' useful service for each tool. Admitting that some tools now operating in railroad shops have already exceeded this estimated life, their continued use undoubtedly costs the railroads much more than would their retirement. Cars and locomotives have increased both in size and number and it is obvious that they cannot be kept in good repair with the same shop facilities used when equipment was lighter. In addition, many locomotives ten years old and over need the application of modern capacity increasing improvements in order to earn greater revenue. Both repair work and reconstruction programs are being delayed because many railroad shops operate under the handicap of worn out, inefficient machinery, too light for the work. Still further evidence of the need for better shop facilities, including machinery, is afforded by the large amount of locomotive and freight car repair work which has been performed for the railroads recently at outside shops. An informal investigation and checking up of accounts by the Interstate Commerce Commission has apparently shown that this work costs more than when done in the railroad's own shops. The commission asked the roads for an expla-

nation and some of the presidents replied that they felt justified in incurring the additional expense because they needed to have repairs made and were not able to perform the work promptly themselves. Is not this a serious indictment of present conditions and an indication of the immediate need for more and better shop machinery.

Along with the stringent economies that are now being prosecuted so diligently and effectively in all branches of the railway service, there is ample opportunity to investigate certain methods and changes in the maintenance field that will bring about marked economies. As the maintenance of way organization stands today, it has certain faults, somewhat inherent but not by any means incurable, that are exceedingly expensive. Briefly they are concerned with waste labor effort through lack of proper supervision and looseness of organization, the difficulties attendant to the distribution of materials and supplies, the uncertainty as to exactly what the year's work will be, and others, all tending toward an accumulative waste of materials and labor.

It is true that this condition has been alleviated in part on some roads by the adoption of various well-thought-out and modern methods with the result that certain phases of the work have been better co-ordinated to the financial advantage of the road. Much, however, remains to be done—in fact, little more than a start has been made so far toward putting the maintenance of way department upon a really constructive and systematic basis. The outstanding need is for a broader view of this question. To illustrate, a certain road has developed an excellent method, including a diagrammatical representation for the efficient handling, purchasing and renewing of rail. Another road has instituted somewhat similar ideas but on a different phase of maintenance work. Both systems have been comparatively successful but neither road has gone beyond its own individual developments, believing in each case that the method will only apply to the one thing. Yet practically every branch of maintenance work can be systematically planned, even diagrammatically represented, with the result that the work will be performed better and cheaper through the tightening-up of the organization, the closer supervision of men and materials and the increased opportunity for more positive and co-ordinated planning. The more thoroughly the work is visualized the more thoroughly it will be done, and thoroughness denotes economy.

The reduction of operating expenses, desirable at all times, is absolutely necessary for many roads just now. There is

Real Economy Versus Mere Retrenchment

an easy way to improve the operating ratio temporarily by making drastic reductions in maintenance expenditures. This is a pit that is always open and the usual number of railroad officers will fall into it in the search for economy. It must be admitted that the necessity for reducing expenses in all departments exists and no argument can be advanced against a general curtailment of expenditures but on the other hand the theory that operating expenses cannot be reduced when traffic is declining and that all savings must be effected in maintenance expenditures is fundamentally wrong. Maintenance work on track and structures is necessarily curtailed at this season and this matter will very largely take care of itself during the winter months. In the equipment department, however, the condition is quite different. At the present time on the majority of roads the percentage of locomotives and cars in unserviceable condition is abnormally large. It would be a great mistake to

reduce forces to the numbers required to do only current maintenance work so long as this situation continues. Under the circumstances, the most desirable method of effecting a saving would be by reducing the cost of transportation. The expenditures included under this one classification make up from 45 to 55 per cent of all operating expenses. There are further opportunities for reduction in wages and fuel costs but the problem is one that requires careful study and close co-operation by the operating and mechanical departments. While many of the factors of expense are governed by local conditions, there are certain fundamental principles that can be applied on all roads and a series of editorials will discuss the application of these principles of efficiency to the reduction of the expense of conducting transportation.

Purchasing and Stores Progress

THERE IS NO DEPARTMENT of the railroad that is developing with greater rapidity than the Service of Supply. In reviewing the progress of other departments it is possible to point to the acquisition of new equipment or the improvement of existing facilities as an indication of the advancement that has been effected. But with the Service of Supply, the structure is an organization wherein the physical equipment is altogether secondary. It would not be difficult to find improvement in material handling facilities, particularly in the more extensive use of tractors and other mechanical means for handling material, or in the completion of new stores facilities as in connection with the new locomotive terminals on the Pennsylvania Lines; but the real progress has been effected in a return to normal operation under private management and in the development of a more definite objective, broader policies and a stronger organization for the purchase and handling of supplies.

During the brief period in which the Stores Section of the Railroad Administration attempted to standardize stores practices throughout the country it was discovered that based upon the performance of the thoroughly efficient railroad, a vast opportunity existed on less efficiently managed railroads for effecting economies in the handling of supplies. While the return to private management has enabled each railroad to resume the pursuance of policies best suited to individual requirements, there is hardly a supply organization on any of the railroads that did not gain something from the earnest work of a few men in Washington who held a very high conception of the Service of Supply. It is a remarkable testimonial to the work of the Stores Section that one of the largest and most progressive eastern railroads should not only alter its stores organization in conformity to the suggestions of the Administration but that the president of this railroad should insist upon a continuation of the new organization plan upon return to private management.

Another interesting development within the year has been undertaken by an important western system in the direction of standardizing stores methods with a view to realizing some of the potential economies attached to the handling of 40,000 different items of material involving many millions of dollars. The task of purchasing these materials and holding stocks to a minimum has become increasingly difficult during a year of price readjustment. Any purchase that could be duplicated a few weeks later at a lower price is often the subject of criticism and many railroad officials who can understand why a retail merchant must reduce his stock at the present moment do not appreciate the fact that a railroad storekeeper must keep his stocks as low as possible for the same reason. One of the encouraging developments of the year, however, has been the growth of a better spirit of co-operation between all departments and the Atlantic City convention which brought the Stores and the Mechanical Sections of the American Railway Association together did much to bring these two departments into closer touch.

How the "National Agreements" Rob the Public

THE EVIDENCE which E. T. Whiter, chairman of the Committee of Managers representing the railways, is submitting to the Railroad Labor Board in the hearings regarding "national agreements" shows that they are the most rotten and indefensible agreements ever entered into by any employers and employees.

They were made by the director general and certain labor unions under government control. Mr. Whiter is cramming the record of the proceedings with cases of employees who, under the agreements and the interpretations of them made by the Railroad Administration's National Boards of Adjustment, have got large amounts of money for which they never did any work, or have got several times as much money as was justified by the work they did. The fact that leaders of the labor brotherhoods are seeking to have perpetuated these robber agreements and the many millions of "honest graft" extorted under them should be sufficient evidence to the public of the sincerity and public spirit which caused them to open the hearings before the Labor Board with wholesale charges of waste and speculation against the managements of the railways.

In his sworn testimony Mr. Whiter has shown that the Pere Marquette Railway was compelled to pay \$9,364 in back pay to four employees because their titles under these agreements were changed by a decision of the director general. A car repairer on the Virginian Railway was paid \$1,000 for work he never did. He was laid off with other employees because there was no work for him to do. When he became entitled under his "seniority rights" to be re-employed the road refused to take him back because his eyesight was defective. The road was compelled to pay him from the time his "seniority rights" would have entitled him to re-employment because he had not been told his eyesight was bad when it laid him off!

A train on the El Paso & Southwestern was delayed one hour and thirty minutes and an employee was paid *five hours' time* for making repairs to a window which took *thirty minutes*, when a foreman who was present could have done the work without delaying the train.

A machinist on the Santa Fe for 77 days performed the duties of a night roundhouse foreman while the foreman was sick. The foreman's pay for this time would have been \$665, but the machinist for substituting for him received \$921.

Four car men on the same road were sent out on the line to do a piece of work that took 4 hours and 33 minutes. The company was compelled to pay these men for 112 hours' work.

Five machinists on the Norfolk & Western were sent to an outlying point where they actually worked eight hours per day for three days. Each of them had to be paid straight time for the 24 hours they did work, and time and a half for 72 hours they didn't work.

The Shop Crafts Agreement provides that when employees are required to check in and out on their own time they will be paid for one hour extra at the close of each week, no matter how few hours they may have worked. This rule in the first six months of 1920 cost the western roads \$2,730,166, the eastern roads \$2,913,548, and the southern roads \$801,944, a total of \$6,445,658 for work which never was done. In an entire year the amount paid under it for work not done would be \$14,500,000. And this is but one of the 182 rules in the Shop Crafts Agreement!

Examples of this kind have been cited almost without number. The public naturally will ask how rules governing working conditions and wages which would produce such results could ever have been put into effect, and how they

can possibly be defended. Anybody who will wade through the mass of technical details which is being presented before the Railroad Labor Board can find out. But the fact is, it makes no difference how the rules came into existence or what technical defense of them may be made. They resulted under government control in many millions of dollars being given to the employees for work that never was done. They are having the same effect under private operation, and will continue to have until they are set aside. The public has been and is paying the bill. The farmer who works ten, twelve or sixteen hours a day is paying it. Men who do eight hours' work for eight hours' wages and ten hours' work for ten hours' wages in other industries are paying it. Whatever technical defense may be offered, there cannot be, in the court of reason or fairness, any valid defense made for agreements which result in railway employees getting many millions of dollars a year for work they do not do from people who get paid only for work that they do.

It may be said that outrageous payments for work not done, such as those cited, might be eliminated by revising the national agreements and rules. But one of the main reasons why the national agreements produce such outrageous and indefensible results is that they apply throughout the country regardless of differences in local conditions on the various railways. A rule which is fair on a railway in New England, for example, may be wholly unfair, and produce outrageous results, on a railway in Arizona where the local conditions are wholly different.

The only way to eliminate the enormous wastes caused by the national agreements is to abolish them. The only way to establish rules and working conditions which will be fair to the employees, the railways and the public is to let the individual railways and their own employees make agreements which will be applicable to local conditions. This is what the railways are contending for, and they ought to have the support of the public. The farmer, shipper and consumer are interested in this and all questions relating to railroad costs, because the cost is what makes the rates which all the public have to pay, directly or indirectly.

Baltimore & Ohio

DURING FEDERAL CONTROL the operation of the Baltimore & Ohio was so divided that the properties of that system, constituting over 5,000 miles of line, were under the jurisdiction of six federal managers reporting to the directors of four different regions. These federal managers also had jurisdiction over lines other than parts of the Baltimore & Ohio System. Because of its position with respect to the large coal fields of Pennsylvania, West Virginia and Ohio the Railroad Administration, as a part of its policy of unified operation and control, essayed to utilize the Baltimore & Ohio as a coal carrier and it gave preference to that traffic to the detriment of more lucrative general traffic. These changes naturally had a tendency to upset the normal methods of operation over the system to the extent that some parts of the line were over-burdened with business, while other parts were called upon to handle considerably less business than usual, the decrease being in business carrying higher rates. These considerations, combined with the fact that the latter part of the period of federal control was characterized by high prices for material and labor and a policy of watchful waiting on the part of the Railroad Administration, show that the results of operation by the Railroad Administration of the Baltimore & Ohio for 1919 cannot be taken as an indication of what that system may do now that it has been returned to its owners to be operated under the new conditions.

The task that Daniel Willard has had before him as president of the Baltimore & Ohio has been—to state the

matter in its broadest terms—to build up the Baltimore & Ohio system. The progress that he and his fellow officers have made, both with respect to the physical development of the property and the adjustment of its position from a traffic standpoint, has been pointed out in these pages on more than one occasion as most noteworthy. While the balanced development was interrupted during federal control, this period was not without some notable achievements; more than \$21,000,000 was expended upon the property largely in the extension of yard and terminal facilities including two large new repair shops, and the addition of approximately \$18,000,000 worth of equipment; the company demonstrated an exceptional ability to produce and handle coal, more than 4,993,684 tons having been originated on its lines or those of immediate connections in the peak period of October, 1919, and there was handled over the line between Cumberland and Martinsburg, which might be termed the eastern throat of the road, a total tonnage of 26,925 tons per mile of line in the same month. Notwithstanding these achievements the Baltimore & Ohio traffic was seriously dislocated and there is now before the company two tasks: to resume the definite program for physical betterment, and also to re-establish its trade position, which was seriously disarranged during federal control.

The physical progress that the Baltimore & Ohio has made under Mr. Willard's administration has been very great and full details concerning it may be obtained from review of the 1916 annual report which appeared in the *Railway Age* of August 17, 1917, page 265. In this connection, it should also be noted that the Baltimore & Ohio has devoted no small amount of attention to building up a diversified business along its lines. The Baltimore & Ohio is primarily a coal road, the proportion of bituminous coal tonnage to total tonnage carried ranging about 45 to 47 per cent. This has possibly been something of a disadvantage because of the amount of traffic carried has varied too closely with the fluctuations in the coal industry. From the standpoint of the industrial department, however, it is an advantage because a new industry proposing to establish itself on the lines of the system can be assured under normal conditions of a cheap and steady fuel supply from the mines served by the Baltimore & Ohio system. Inasmuch as the system extends from Baltimore inland to Chicago and St. Louis with numerous branches to other important industrial centers and traverses some of the richest sections of the United States, it was to have been expected that this industrial development work should have been successful and have brought much high-grade traffic to the road. The fact that Baltimore is one of the country's leading export cities has also had its effect, although just at present export trade in general commodities has fallen off considerably from the war period.

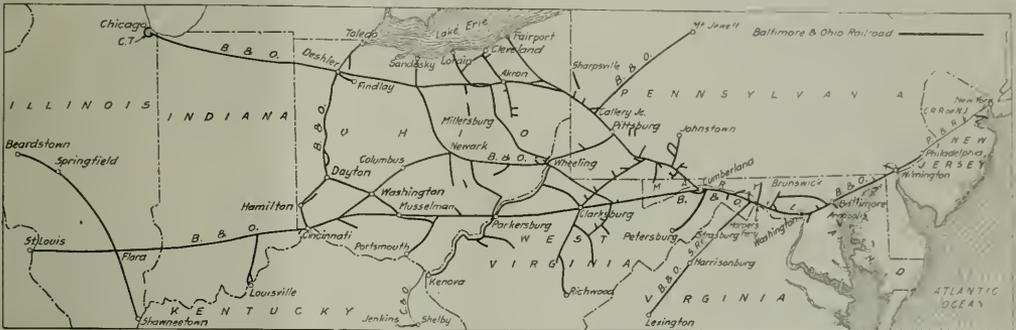
Nevertheless, despite the increase in general business, the Baltimore & Ohio is still primarily a coal road. One of the largest factors in export trade at present is coal. There are many countries of Europe and also in South America that used to depend on Welsh coal. The lack of shipping during the war and the lessening of output because of strikes and other action on the part of the British miners have tended to eliminate this supply so that today America has a splendid opportunity to compete in furnishing the world's coal. Through its up-to-date Curtis Bay pier at Baltimore, the Baltimore & Ohio is in a strategic position to secure its share of this export trade in coal. More export coal is handled through Hampton Roads than through Baltimore, but it will be borne in mind that at the latter place there are the Chesapeake & Ohio, the Norfolk & Western and the Virginian, whereas at Baltimore there are, practically speaking, only the Baltimore & Ohio and the Western Maryland. The dumpings at Curtis Bay are of interest; the figures include bunker and coastwise coal as well as export. For 1915, a pre-war year, the total was 2,600,000 tons; for 1919,

1,900,000 tons. For the first ten months of 1920 it has been approximately 4,000,000 tons. The month of October this year broke all records and was at the rate of over 7,000,000 tons for the year.

It is interesting to sketch the manner in which coal is handled on the Baltimore & Ohio, not only because coal constitutes nearly half the tonnage, but also because it shows in what a favorable position the road is to handle coal, economically. Coal from the Baltimore & Ohio territory comes from five important fields. The West Virginia or Fairmont field supplies approximately one-third of all the coal from these fields; about 75 per cent of the coal from this field moves east. The Meyersdale or Somerset district supplies about 18 per cent, nearly all of which moves east. The Pittsburgh or Youghiogheny district supplies about 13 per cent and about half of this moves east and half west. The Cumberland or Piedmont district, which is the district from whence comes the George's Creek coal, supplies about 8 per cent, nearly all of which moves east. The fifth field, the Ohio or No. 8 field, supplies about 26 per cent, nearly all of which moves west. In addition to this a large quantity of coal is obtained from the Kentucky fields served by the Sandy Valley & Elkhorn. This road is owned by the Balti-

trains are combined into 7,000-ton trains whence they run to Brunswick. They are classified at this point and 5,000 ton trains are run to the tidewater coal pier at Curtis Bay. Like the coal roads at Hampton Roads, the Baltimore & Ohio handles its coal at tidewater with the assistance of a pooling arrangement. Thus cars are classified at Curtis Bay into 29 classifications, of which 14 are pool and 15 non-pool classifications. Under the pooling arrangement a shipper is credited with the coal as soon as it is loaded at his mine. He can then draw upon the particular pool to which his coal is assigned whether the coal he loaded has been received at tidewater or not. The saving in car supply and the facility of operation can readily be appreciated.

The figures in the annual report of the Baltimore & Ohio for 1919, as is customary with the reports of this road, are shown in much more detail than is common with most roads. They show that the total freight revenue in 1919 was \$136,802,852 as compared with \$129,877,038 in 1918; the number of revenue tons carried in 1919 was 88,862,248 as compared with 95,346,229 in 1918. The increase in revenue with a decrease in tonnage is explained by an increase in the earnings per ton mile from .0763 cents in 1918 to .0795 cents in 1919 and an increase in the average haul from



The Baltimore & Ohio System

more & Ohio but does not connect with it. Coal from it moves over the Chesapeake & Ohio to Cincinnati and thence north over the Baltimore & Ohio, Toledo & Cincinnati Division to Toledo. There is sufficient coal from this field so that combined with the large amount of other traffic interchanged with Southern lines at Cincinnati it makes the line from Cincinnati to Toledo one of those of greatest traffic density on the Baltimore & Ohio system.

A study of the map of the Baltimore & Ohio will show that the Fairmont field has a fairly direct route to the lakes at Lorain and the Somerset field a similar route through the Pittsburgh district to the lakes at Fairport. It has been noted, however, that most of the coal from these fields moves east. Inasmuch as the lines from these fields meet near Cumberland, it results that the section from Cumberland east is the portion of greatest traffic density on the Baltimore & Ohio system. The traffic to Curtis Bay moves over the line to Baltimore. A considerable portion of the traffic northbound, however, does not go through Baltimore, but reaches the Philadelphia & Reading at Shippensburg, going over the Western Maryland from Cherry Run or over the Cumberland Valley from Martinsburg.

The line from Grafton east to Cumberland is also of more than ordinary interest. Coal from the Fairmont region is assembled at Grafton. Coal leaves Grafton in 3,750-ton trains, three heavy Mallet locomotives being used to haul these trains up the 2.2 per cent grade to the summit at Terra Alta. At Keyser, a short distance west of Cumberland, these

179 miles to 194 miles. The passenger revenue in 1919 was \$31,724,006 as compared with \$30,871,710 in 1918.

The total railway operating revenue for the year was \$182,620,016 as compared with \$175,259,575 in 1918. The railway operating expenses for the year were \$169,869,125 as against \$161,792,511 in 1918. The net railway operating income for the year was \$5,055,991 as compared with \$7,080,814 in 1918. The standard return for the system was \$30,035,093.

It is noteworthy in this connection that the expenditures for maintenance of way showed practically no increase in 1919 over 1918. The facts in the report show that the road was unquestionably undermaintained, particularly during the late part of federal control. The new steel rail put in track in 1919 amounted to only 28,262 tons, and in 1918 to 40,314 tons; in 1917 the total was 72,263 tons and in 1916, 77,150 tons. Expenses for roadway maintenance and for track laying and surfacing in 1919 also show considerable decreases as compared with 1918, despite increased costs. The road is now busily engaged in making up these deficiencies in maintenance and such figures as man hours for maintenance of way, material applied, etc., for 1920 will show great increases over the period of federal operation.

It is hardly possible this early to essay to determine how the Baltimore & Ohio will fare under the new rates. Nevertheless, it is worth noting that the figures for revenues and expenses for the month of October, 1920, may be said to show a really remarkable change as compared with October,

1919. We give herewith a few of the important items selected from the figures for October.

	October, 1920	October, 1919	Increase
Freight revenues.....	4,614,952	15,087,094	5,527,858
Passenger revenues.....	2,986,463	2,331,643	654,820
Railway operating revenues.....	25,015,395	18,917,768	6,097,627
Maintenance of way and structures.....	3,045,010	2,412,293	632,717
Maintenance of equipment.....	6,000,369	4,904,080	1,096,289
Transportation.....	11,124,014	7,481,750	3,642,264
Railway operating expenses.....	21,101,131	15,413,104	5,688,297
Net railway operating income.....	2,881,282	1,531,457	1,349,825

It is, of course, not advisable to make too much of the figures for one month but it certainly is worthy of comment that the net railway operating income in October, 1920, was nearly double that for October, 1919, despite increases of one-quarter in expenses for maintenance of way and of one-fifth in expenses for maintenance of equipment.

One of the interesting features of the finances of the railroads at present is the use of the revolving fund provided by the Transportation Act. The Baltimore & Ohio was included in the roads whose applications were passed upon by the special committee appointed for this purpose by the Association of Railway Executives. The application of the company was for \$7,087,000, including \$5,000,000 for additions and betterments and \$2,087,000 for improvements to existing equipment. The Interstate Commerce Commission has approved a loan of \$3,000,000 for additions and betterments. It is understood also that the company is expecting to finance the purchase of equipment to a value of approximately \$13,000,000, through the National Railway Service Corporation, headed by S. Davies Warfield, and in that connection the Interstate Commerce Commission has approved a loan of \$5,200,000 from the revolving fund. The Baltimore & Ohio secured from the Railroad Administration 100 Mikado, 30 Pacific, 26 Mallet and 40 switching locomotives and 500 fifty-ton box, 500 seventy-ton gondola and 1,900 fifty-five-ton hopper cars, which allocated equipment was financed through the equipment trust agreement made in January, 1919, between the director general of railroads, the Guaranty Trust Company of New York and the carriers.

It was noted above that the standard return for the Baltimore & Ohio system was \$30,035,093. This figure was inclusive of the compensation for the Baltimore & Ohio itself, and also of the Staten Island Rapid Transit, the Coal & Coke, the Sandy Valley & Elkhorn, and the Baltimore & Ohio Chicago Terminal. The corporate income for the system shows other corporate income of \$3,441,088, this representing chiefly dividend income from shares in companies not included in the Baltimore & Ohio system and the item of miscellaneous rent income. The gross corporate income was \$33,476,181. The net corporate income in 1919 was \$8,580,022, as compared with \$5,042,106 in 1920, the difference in these figures being explained chiefly by the difference in the figures of revenues and expenses applicable to the period prior to January 1, 1918, settled for account of the corporation by the Railroad Administration. The 4 per cent dividends were paid on the preferred stock but no dividends were paid on the common stock both in 1919 and 1918. The 1919 figures include an item of \$1,750,000 income appropriated for additions and betterments to road. The balance transferred to profit and loss in 1919 was \$4,428,088 and in 1918, \$2,656,061.

The following table shows the principal figures for operation under the government in 1919 and 1918. The figures given are for the Baltimore & Ohio system:

	1919	1918
Mileage operated.....	5,154	5,152
Freight revenue.....	136,802,852	129,877,038
Passenger revenue.....	31,724,006	30,871,710
Total operating revenues.....	187,620,016	175,259,575
Maintenance of way and structures.....	26,168,745	26,038,246
Maintenance of equipment.....	56,264,804	49,285,380
Traffic expenses.....	1,886,255	1,979,542
Transportation expenses.....	79,727,341	79,344,095
General expenses.....	4,389,465	4,070,420
Total operating expenses.....	169,869,125	161,792,511
Taxes.....	4,872,096	4,829,146
Operating income.....	7,857,724	8,618,088

Letters to the Editor

"Keep Trains Moving"

LAWRENCE, N. J.

TO THE EDITOR:

Your distinguished advertiser who rings the changes on "Signals Keep Trains Moving" is doing a very good thing for those thoughtless operating officers whose spirit of enterprise has been deadened by their worship of the Standard Code, and other ancient formulas; and these behind-the-times members of the railroad profession will be awakened, after a time, let us hope.

But this slogan does not wholly cover the case. The *man who rules the signals* ought to do a little more effective thinking on the subject of keeping trains moving. You spoke recently of the "tonnage signal," an automatic block signal freed from the absurd rule that when the signal is set against a train the engineman must come to a full stop, even if he can see a clear track for two miles ahead. Why call this a "tonnage" signal? What does "tonnage" mean, anyway? If it is right that the stop rule should be suspended for one train, why not for all trains? If the restriction can be removed at one place, why not at all places? The "tonnage signal" is found mostly on steep grades, but, with the hundred-car trains now in vogue, an ascent of 15 feet to the mile may become a steep grade. In short, this relaxation of the stiff rule of the ancients is needed everywhere.

This rule requiring an engineman to stop his train for no other reason than to convince the officers, or their spotters, that he *can* stop it, was introduced in the old days of hand brakes and of drawbridges not signaled; and it would seem that we have kept it in force simply because we are too dull to see its absurdity and wastefulness; too slow to use modern facilities and methods which are fairly forcing themselves on our attention.

What can the up-to-date operating officer say against a general movement to abandon the stop-and-proceed rule?

R. H. A.

A Passenger Awards First and Second Prizes for Rough Handling

BOSTON, MASS.

TO THE EDITOR:

Through your columns I wish to ask if, as a penalty for the use of steel cars and heavy locomotives, passengers are forever to be subjected to the jerking of trains when starting. If we are, I think that here is an opportunity for the booster.

It appears to be almost the rule now that a locomotive cannot start a train without backing and creating slack, and this operation and the following start is of the slam-bang order, nerve racking, and when it occurs with sleeping cars, is not conducive to sleep.

In my observation the _____ road is the worst offender and the _____ next.

Furthermore, I am led to think that the quick acting brake is not quick enough, for the brake application nearly always causes a car slam. Those who are studying the rehabilitation of our railroads will, in a consideration of the above features, find something to work upon. The present condition is not creditable.

F. W. DEAN.



The Missoula Gorge. On the St. Paul Near Missoula, Montana

Train Handling with Electric Locomotives*

Passenger Service Requirements and Passenger Train Operation —Helpers Are Not Necessary

By W. S. H. Hamilton

Railway Equipment Department, General Electric Company

PASSENGER TRAINS are run on a schedule which allows a certain running time over a division. This running time is based mainly on the average speed the motive power can make without too great an effort, the nature of the track and the country through which it runs. These last two items are especially important in mountain railroading. It is usually possible in reasonably good weather to make faster time than that called for by the running time without exceeding the limits of safety or comfort to passengers and this allows more or less time to be made up.

The requirements then for the motive power for passenger service are ability to handle certain train weights over a given profile at the speeds required by the schedule efficiently and smoothly, maintaining quite closely the schedule speeds at all times with the trains on time and with them late, to handle them on all parts of the run at the maximum speed permitted by the safety and comfort of the passengers in order that the maximum amount of time may be made up. A large amount of time may be made up by taking advantage of the profile and holding the maximum permissible speed at all times and skillful engineers can make up considerably more time with the same motive power than unskilled or inexperienced ones, simply by taking advantage of conditions.

Electric locomotives for such service are shown in Figs. 1 and 2. The principal dimensions are given in Table I. There are five of the General Electric locomotives which at present are in service on the coast division and ten of the Westinghouse type handling the passenger trains on the Missoula and Rocky Mountain divisions. The original 42

General Electric locomotives are now used to haul freight on all three electrified divisions.

Locomotive Characteristics

The speed tractive effort curves on resistance when motorizing for the gearless locomotive are shown on Figs. 4 and 5.

TABLE I—PRINCIPAL DIMENSIONS OF PASSENGER LOCOMOTIVES

	General Electric	Westinghouse
Total weight	521,200 lb.	550,000 lb.
Total weight on drivers.....	457,680 lb.	336,000 lb.
Non-spring-borne weight per driving axle.....	9,500 lb.	7,800 lb.
Length over-all.....	76 ft. 0 in.	88 ft. 7 in.
Height over cabs.....	14 ft. 11 1/2 in.	14 ft. 6 in.
Height over pantograph, locked down.....	16 ft. 8 in.	16 ft. 7 1/4 in.
Total wheelbase.....	67 ft. 0 in.	79 ft. 10 in.
Maximum rigid wheelbase.....	13 ft. 9 in.	16 ft. 9 in.
Diameter of driving wheels.....	44 in.	68 in.
Diameter of idle wheels.....	36 in.	36 in.
Heater capacity.....	4,000 lb. steam	4,000 lb.
Water capacity.....	per hr. 30,000 lb.	25,500 lb.
Oil capacity.....	6,000 lb.	750 gal.
Compressor capacity.....	150 cu. ft. per min.	150 cu. ft. per min.
Number of motors.....	12	12
Type of motor.....	(Bi-polar) GE-100	(Twin) 4-pole
	General Electric	
	Tapped field	Full field
Locomotive rating.....	3,480	3,380
Total tractive effort one-hour motor rating.....	36,000	46,000
Speed, miles per hour.....	36.2	27.5
Total horsepower continuous.....	3,200	3,200
		Westinghouse
		4,200
		66,000
		23.8
		3,360

It will be noted that there are a total of eight running speeds provided; four full field and four tapped field. The four full field speeds can be used anywhere including mountain grades (1.5 per cent or over), but the four tapped field speeds only on lighter grades or with light trains on mountain grades. The highest full field speed is sufficient to take the maximum train up a grade at a speed slightly

*This is the first of a series of three articles on this subject. The second will deal with freight train operation and the third with the use of helpers in freight service. The author acted as an instructor to engineers on the locomotives used on the C. M. & St. P. from December, 1915, to August, 1917, and from December, 1919, to April, 1920.

faster than the schedule speed and there is another running speed slightly lower which is about right for just making running time. The maximum speed up grade selected for electric locomotives is usually between 25 and 30 m.p.h. on mountain grades and is in excess of that which is made by steam engines when double heading.

In descending mountain grades regeneration is used to control the speed. Two connections of regeneration are available, one covering the range from 20-65 m.p.h. and the other from 10-30 m.p.h. The first connection is the one ordinarily used. The speeds permissible when descending mountain grades (1.5 per cent and over) vary from 20 m.p.h. on grades having bad curves, rocks, etc., up to 35-40 m.p.h. for open straight track. The first limit is set by the ability to stop within a limited distance on account of vision and the second represents about the maximum speed from which the air brakes can be safely relied on to stop the trains. On lighter grades higher speeds may be made but the maximum is usually 50-60 m.p.h.

Regenerative Braking

Regeneration saves the wear and tear on brakes, shoes, etc., and also the jar to the train caused by the repeated applications of the brakes. When operating with steam power on grades with numerous curves the trains are taken down by means of successive applications and releases of the air brakes, never making a heavy application and only occasionally releasing them entirely. This results in a fairly even speed. On the heaviest grades this method cannot be used because of the tendency to gradually apply the brakes hardest on the cars at the rear of the train and put most of the work on those brake shoes. This is the reason for the occasional complete releases referred to above. They are usually made when the train is entirely in a curve or just entering one so that the train will not speed up too much while the brakes are entirely released.

The practice on the heaviest grades, particularly when nearly straight, is to allow the train to accelerate to the maximum speed, say 35-40 m.p.h., allowed on that grade, then a fairly heavy application of the brakes is made and the

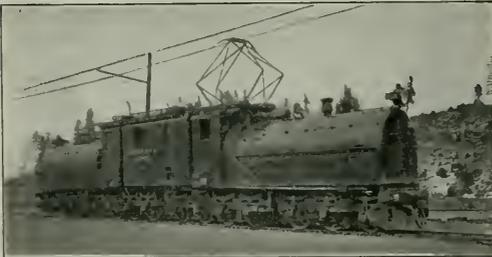


Fig. 1. The Bi-Polar Gearless Passenger Locomotive Built by the General Electric Company

brakes are kept applied until the train slows down to about 15-20 m.p.h., when the brakes are entirely released and the train is allowed to run free until the maximum speed is again reached, which gives time enough for recharging the brake pipe. This results in considerable jar to the train but makes the brakes on all cars apply uniformly. Retainers are not ordinarily used on passenger trains.

This jar is eliminated by the use of regeneration and the train may be held at a uniform speed. Within the capacity of the locomotive this speed may be varied to obtain the maximum desirable for any given part of the grade. This variable speed regeneration is especially desirable when handling train weights less than the maximum, as then a

wide range of speeds can be obtained. Stops for cooling brake shoes and wheels are also eliminated which are required on some grades when operating with steam power.

Little Helper Service Required

The electric locomotive has a big advantage over steam power in that it is entirely feasible to build a locomotive big enough to go over the entire profile and thus eliminate helpers on the heaviest grades. This is best shown by Table II.

With electric operation helpers are not used at all on the passenger trains. The locomotive shown in Fig. 1 weighs



Fig. 2. The Quill-Gearred Passenger Locomotive Built by the Westinghouse Electric & Manufacturing Company

265 tons and is capable of handling a 960-ton train, trailing (13 cars) on a maximum grade of 2.2 per cent. This

TABLE II—HELPERS ON C. M. & ST. P. RWY. STEAM OPERATION
Eastbound Passenger Trains

Division	Helper station	Helped train to	Distance	Helpers	Distance
Coast	Cedar Falls	Rockdale	19.2	Rockdale	19.2
Coast	Kittitas	Boylston	10.5	Beverly	29.3
Missoula	Avery	Roland	21.7	Haugan	37.8
Rocky Mountain	Butte Yard	Donald	14.9	Donald	14.9
Total miles electrified divisions..... 646.2					
Total miles helpers required..... 66.3					
Percentage of miles helper required to total miles electrified divisions 10.2					
Total helper district miles..... 101.2					
Percentage of helper district miles to total miles electrified divisions. 15.7					

Note—With trains more than 10 cars or about 735 tons trailing, it was customary to provide helpers on the coast division from Renton or Maple Valley to Cedar Falls in addition to that shown. On the Rocky Mountain division it was customary to double head the train over the entire division from Deer Lodge to Harlowton under this condition.

Westbound Passenger Trains

Division	Helper station	Helped train to	Distance	Helpers	Distance
Rocky Mountain	Lennep	Loweth	9.7	Loweth	9.7
Rocky Mountain	Piedmont	Donald	20.7	Donald	20.7
Missoula	Avery	Haugan to East Portal	14.1	Avery	37.8
Coast	Beverly	Boylston	18.8	Kittitas	29.3
Total miles electrified divisions..... 646.2					
Total miles helpers required..... 63.3					
Percentage of miles helper required to total miles electrified divisions 9.8					
Total helper district miles..... 97.5					
Percentage of helper district miles to total miles electrified divisions. 15.1					

Note—The double heading on eastbound trains on the Rocky Mountain division frequently required considerable double heading on the westbound trains in order to return the engines to the proper terminals.

permits it to operate on any grade between Harlowton and Seattle. The elimination of helpers saves considerable time previously required by stops and delays incident to cutting helpers in and out of the trains. Where helper districts form a considerable portion of the division it is certainly best to make the locomotive large enough to handle the train over the entire division alone.

very noticeable in handling passenger trains on light grades, either ascending or descending. A steam locomotive when shut off at once shoves back against the train and tends to bunch the slack. When making slow-downs for curves it is necessary to keep working a small amount of steam to prevent this action even while the brakes are applied on the train. With the electric locomotive this is no longer necessary, as when power is shut off there is little or no tendency to bunch the train slack.

On grades of about .4 per cent maximum descending the electric locomotive will coast with the train very easily and seems to have about the same friction as the train. On grades of about .6 per cent maximum it is possible to regenerate a little. Steam engines on these grades would require working a small amount of steam (drifting throttle).

Starting on Grades

When standing on mountain grades the train is held by keeping the independent brakes applied on the locomotive with brakes released on the train. When it is desired to

is usually as close to the wheel slipping point as can be held.

In stopping on an ascending mountain grade the controller is eased off a couple of notches or so at a time until it reaches the second or third notch. With the controller in this position the train is allowed to "stall," the independent brakes are applied and the controller is then shut off.

When taking a siding on an ascending mountain grade the controller is shut off slowly to a notch in which the train will just keep moving. This allows the brakeman to get off

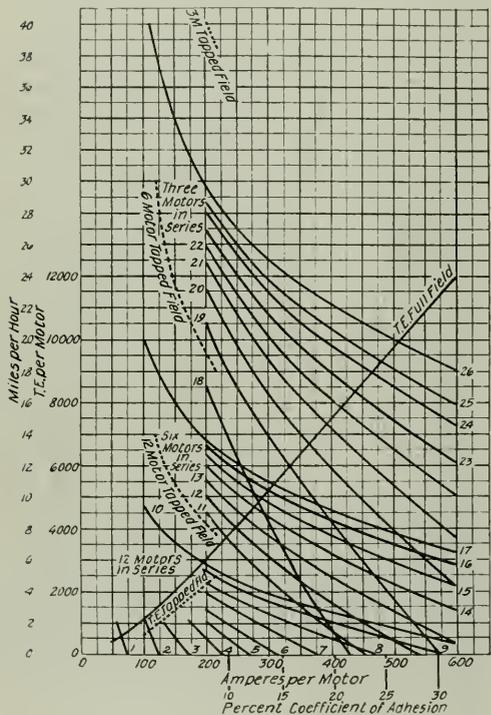


Fig. 4.—Speed-Tractive Effort Curves on Resistance with 12, 6 and 3 Motors in Series for the Gearless Locomotive

start the train, the controller is pulled out two or three notches and the brakes released, the controller being then brought out notch by notch until the train either moves or the locomotive slips its wheels. An experienced engineer keeps close watch on the ground while doing this to see exactly when the train first starts, although he also manages to watch the ammeters so as not to apply too much current. As soon as the train has started moving the controller is held in that notch until the locomotive has moved a few feet, and then the acceleration is continued at the desired rate. This

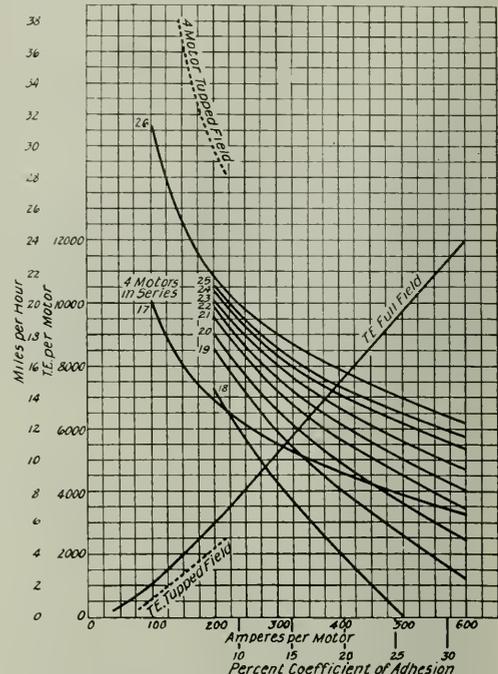


Fig. 5.—Speed-Tractive Effort Curves on Resistance with 4 Motors in Series for the Gearless Locomotives

and run ahead to open the switch and allow the train to head in on the passing track without actually stopping. The train is then speeded up by bringing the controller out a few notches, but when the rear of the train is nearly over the switch it is necessary to move the controller back several notches again in order that the rear brakeman may get on after closing the switch without having to stop the train.

The Use of Regenerative Braking

During regeneration four of the motors are used to excite the fields of the other eight which return energy to the line. A separate handle on the controller is used to control the regeneration and this is known as the braking handle to distinguish it from the main handle which controls the acceleration and motor grouping.

Two methods are provided for commencing regeneration. The first method permits of commencing regeneration without interrupting the motoring current entirely although reducing it in amount. This method is very desirable when tipping over the summit of a grade, as then the locomotive passes over into regeneration very easily. Furthermore, some of the grades tip over very sharply, and it is necessary to

keep power applied to the train until it actually gets on the down-grade and begins to speed up. This can be done very conveniently by this method.

The second method was intended for use when starting from rest on descending mountain grades. It allows regeneration to be commenced without any motoring current being applied first. When using this method the train is allowed to start from rest and run free until a speed of 5 to 10 m.p.h. is obtained, depending upon the grade, the independent brakes on the locomotive being used to some extent to control this speed. Regenerative braking connections are then applied, and after they have been fully established, the operation is the same as with the first method. Theoretically, this should allow better train handling than the first method, since there is no motoring first to pull out the train slack.

Practically no difference was found by several months' experience, and the first method is used almost entirely now. From this it may be concluded that any method of applying regeneration to a passenger train will be successful providing that there is not too much motoring at first. In passing it may be noted that in the older geared passenger locomotives supplied the C. M. & St. P., it was necessary to apply full motoring connections before regeneration could be commenced, and these locomotives were very successful in service for several years. They were finally converted into freight locomotives by changing the gear ratio. This was done because at the time they were purchased it was considered desirable to have only one type of locomotive for both freight and passenger service and not to adopt a purely passenger type until more locomotives were required.

When descending a mountain grade regenerating, if it is desired to stop the regeneration is slightly decreased by moving the braking handle back one or more notches, the automatic brakes are applied with a light service application of about 10 lb., and when the line ammeter indicates that the current returned to the line is nearly zero both handles are shut off and the application of the automatic brakes is continued to the desired degree to stop the train. The independent brakes apply on the locomotive as soon as the controllers are shut off. As soon as the train comes to rest the automatic brakes are released on the train and the independent air brakes are applied on the locomotive to hold the train.

In starting again, the independent brakes are released and power is applied to start the train. The controller is brought out to the position where regeneration can be commenced and regenerative braking connections are established as previously outlined.

It is sometimes necessary when regenerating to make slow downs at a faster rate than the regeneration will make them. This is done by applying the automatic air brakes on the train, the independent brakes being kept released automatically. In case the speed should be reduced too much the locomotive will commence to motor and if this becomes objectionable in amount the controller is shut off until the brakes are released and full speed can be resumed. There is no difficulty in using the air brakes and regeneration at the same time.

Kind of Control Required

In order to meet the conditions of train handling as described above successfully, especially those for mountain grade operation, the control equipment of the locomotives must be so designed that power may be applied gradually both to prevent wheel slipping of the locomotive and also to prevent jolts to the train. This requires an ample number of steps of resistance and proper proportioning of the same. The accelerating curves on resistance are shown in Figs. 4 and 5. The increments of tractive effort between steps when accelerating to a maximum of 25 per cent coefficient of ad-

hesion are about 22,000 lb. for the 12 motors. This is about the maximum increment between steps that should be applied to a passenger train. The change in coefficient of adhesion between steps is about 5 per cent, which represents somewhere near the maximum for this weight of locomotive which should be allowed if the wheels are not to slip too easily when going from one resistance step to the next.

Furthermore, if the train is to be handled smoothly the same steps should be obtained when turning off the controller as when turning it on. This bars out arrangements such as used on some trolley cars where the power circuit is opened as soon as the controller is started back toward the off position.

Ample capacity should be provided in the rheostats. The above locomotive can be worked at 300 amperes, corresponding to 14 per cent coefficient of adhesion for about 10 minutes or at 485 amperes corresponding to 25 per cent coefficient of adhesion for about 5 minutes without overheating the rheostats. These values represent approximately the capacity required for mountain grade service.

Regulations for Competitive Bidding Under Clayton Law

THE REGULATIONS issued by the Interstate Commerce Commission on October 6, 1919, governing the method for obtaining competitive bids on transactions covered by the Clayton law, which became effective on January 1, are as follows:

1. When any carrier, subject to the act to regulate commerce, is required by section 10 of the Clayton Anti-trust Act to call for bids for securities, supplies, or other articles of commerce, or for the construction or maintenance of any kind or part of its carrier property such carrier shall prepare specifications, form of proposals and contract, setting forth clearly and so far as applicable in each case in detail a description or descriptions of the matters and things for which bids are requested, the terms, times and conditions of delivery and payment, the place or places where delivery or performance is to be made, the character, amount, and terms of securities offered or sought, and a full description of the supplies or other articles required or offered for sale, hypothecation, or purchase, and shall make and attach to such specifications such maps, drawings, and illustrations and state such other substantial facts or conditions as are or may be necessary to a full understanding of the premises and procedure by bidders. Such specifications, drawings and illustrations in each case shall be kept open at the principal office or offices of the carrier for full examination, free of charge, by persons desiring to examine the same with a view to bidding, and, upon request, such carrier shall furnish to any person or persons desiring the same true and accurate copies of such specifications, maps, drawings and illustrations; provided that the carrier may make a charge for such copies so furnished, the charge not to exceed the reasonable cost of making and forwarding the copies requested.

The carrier shall publish in each case a request for bids in at least two daily newspapers of general circulation, at least two publications in each week for two weeks, the first publication to be at least two weeks immediately preceding the day when the bids are to be submitted; one such newspaper shall be published or shall be of general circulation in the city or town where the principal operating office of the carrier is located and the other newspaper shall be published in one other of the following cities nearest to the operating or financial office of the carrier or the place where the contract is to be performed, namely: New York, N. Y., Boston, Mass., Chicago, Ill., St. Louis, Mo., Atlanta, Ga., San

Francisco, Cal., and Portland, Ore.; and a printed copy of the published notice in each case shall be posted in plain view, for two weeks immediately preceding the day on which bids are to be received, on a bulletin board, designated for that purpose, in a public and conspicuous place in the building where the principal operating office of the carrier is located. Such published notices shall describe in general but intelligible terms the proposed contract, giving its serial number, and the special matter or things for which bids are requested, and the date on or before which the bids must be submitted, and the person by whom and the office at which the bids submitted will be received and opened as herein provided. The carrier may in said notice reserve the right to reject any and all bids and may, at its option, require each bidder to tender a bond in a reasonable sum to be therein named, with sufficient surety or sureties conditioned upon the faithful and prompt performance of the terms of the contract.

2. Every bid to receive consideration shall be submitted at the place specified in the notice on or before noon of the day on which the bids are to be opened and the bids shall be opened after noon and before six o'clock, on the day and at the place and by the person or persons designated in the notice. Each bidder may attend in person or by duly authorized representative at the opening of the bids, and shall be afforded an opportunity to do so and to examine each bid. The bids shall forthwith be tabulated in conformity with the form of proposal prepared and a copy of such tabulation shall be promptly furnished to any bidder or his authorized representative upon application thereof.

When required by the notice, each bid shall be accompanied by tender of a bond in the amount specified in the notice with sufficient surety or sureties conditioned upon the faithful and prompt performance of the proposed contract. A bond shall be required only in cases where the notice for bids expressly calls for a bond.

Each bid shall be enclosed with accompanying papers in a plain envelope securely sealed bearing no indication of the name of the bidder or the amount of the bid, and shall be marked "Bid under proposed contract No. —," and shall be addressed to the officer of the carrier designated in the notice to receive the same.

Each bid shall state the name and address of the bidder and, if the bidder be a corporation, the names and addresses of the officers, directors and general manager thereof and of the purchasing or selling officer or agent in that transaction and, if the bidder is a firm, partnership or association, the bid shall give the names and addresses of each member thereof, and of the manager, purchasing or selling officer or agent in that transaction.

3. After receiving and opening bids as aforesaid, the carrier receiving the same shall within 48 hours in cases where the sale or purchase of securities is the undertaking, and within ten days where bids are for supplies, equipment, other articles of commerce and for construction or maintenance work, accept the most favorable bid considering (1) the lowest price or prices for the supplies, equipment, and other articles of commerce, and for the construction or maintenance work, described in the advertisement, and the highest price or prices offered for any securities or property, so described, for sale by the carrier, and (2) the ability and reliability of the bidder, financial and otherwise, to deliver the property or to perform the work or transaction, or to pay for the securities, described in the advertisement, giving due consideration to any bond or security tendered by the bidder. If the right be reserved in the notice all bids may be rejected and the carrier may readvertise for bids. The carrier shall notify the successful bidder of the acceptance of his or its bid, and the bidder shall within ten days execute the required contract, and, if required by the notice, execute a

good and sufficient bond for the faithful and prompt performance of the contract. In case the successful bidder shall neglect or fail within said time to execute the contract or bond as aforesaid the carrier may within five days award the contract to the next most favorable bidder, ascertained as herein provided for determining the most favorable bidder. If neither the most favorable bidder nor the next most favorable bidder shall execute a contract and qualify as aforesaid, the carrier shall readvertise for new bids.

4. Each carrier after having made and executed a contract as and in the manner above specified shall within 30 days after the execution of such contract file with the Interstate Commerce Commission a statement of the transaction giving, (a) a copy of the published notice; (b) the names of all bidders, and, if the bidder be a corporation, the names and addresses of the officers, directors and general managers thereof and of the purchasing or selling officer or agent in that transaction, or if the bidder be a partnership or firm, the names and addresses of the members of the firm, the general manager and purchasing or selling agent thereof, and the total amount of each bid; (c) the name of the bidder to whom the contract was awarded together with a copy of the contract; and (d) if any other than the lowest or the highest bid, as the case may be, is accepted as being most favorable to the carrier, the reasons for such acceptance. The statement shall be made in typewriting, in pamphlet form on pages not less than 8 by 10½ in. in size nor greater than 9½ by 12 in. in size, bound on the longer edge of the page, the paper to be of durable quality fit for permanent record.

5. [As amended October 4, 1920.] In the case of each bid so taken as aforesaid, the carrier shall preserve and keep open for examination by the Interstate Commerce Commission or any duly authorized examiner thereof, (a) a copy of the resolution or order of the board of directors, executive committee, or officers of the said common carrier specifying the purposes and terms of the contract for which the bids were invited; (b) a copy of the specifications, maps, drawings, and illustrations upon which bids were made; (c) copies of the notices published, sworn to by or on behalf of the publisher of each paper, respectively, giving the dates and times of publication; (d) the original bids received, designating the bid accepted and giving a statement of the reasons for accepting the same; (e) a copy of the contract entered into between the carrier and the accepted bidder, together with a copy of the bonds if any; (f) references by number of volume and page to the records of proceedings of the stockholders, directors, or executive committee of the carrier. The files in each transaction shall be securely fastened together and given the contract number and each document therein shall be numbered consecutively and at the conclusion there shall be a sworn statement by the president, a vice president, or the general manager of the carrier, stating that the files in No. — contain true and complete records and statements of all the negotiations had in connection with the contract therein set forth. Such files shall not be broken or any part destroyed by the carrier or any officer or agent of the carrier without written authorization from the Interstate Commerce Commission.

SOUTH GEORGIA has been brought into closer touch with North Georgia and the cities of the North, East and West, through the establishment by the Southern Railway of an over-night freight service between Atlanta and South Georgia points. The new train is "The Wiregrass Special." It will leave Atlanta every night at 7 o'clock and Macon at 2 o'clock the following morning, carrying through carded freight to Macon and South Georgia points and making delivery from Atlanta at most of these points the following day. The train will be run over the Georgia Southern & Florida.

Legislation Urged to Require Payment of Guaranty

Railway and Supply Representatives Show Carriers Seriously Handicapped by Treasury's Stand

THE PRECARIOUS SITUATION in which the railroads have been placed as the result of the ruling of the comptroller of the Treasury, which prevents the Secretary of the Treasury from honoring certificates of the Interstate Commerce Commission for partial payments on account of the nearly \$400,000,000 still due the railroads of their guaranty for the six months following the termination of federal control, was explained on January 14 before the House committee on interstate and foreign commerce by Alfred P. Thom, general counsel for the Association of Railway Executives; Thomas DeWitt Cuyler, chairman of the association; Samuel Rea, president of the Pennsylvania; M. L. Bell, general counsel of the Rock Island and the Minneapolis & St. Louis; Daniel Willard, president of the Baltimore & Ohio, and others. Frank W. Noxon, secretary of the Railway Business Association, also showed how the resulting delay on the part of the railroads in paying their bills and the curtailment of purchases are hurting the supply industry and business generally. The hearing was on the bill introduced by Representative Winslow to amend the guaranty provisions of the transportation act so as to provide clearly what the railroads and the Interstate Commerce Commission had construed it to mean and to require the Treasury to make partial payments without waiting for the months or years required to make the final adjustment of the accounts necessary to an exact determination by the commission of the final amounts due the roads.

Mr. Thom said the situation faced by the roads for the lack of the cash which they supposed they had been guaranteed is so serious as to make it necessary to appeal to Congress for legislation to interpret clearly what it had meant in the law. He said he personally had no doubt that the law as written permits partial payments. A final accounting to determine the exact amounts, which the treasury officials hold is necessary, might take years and it was the purpose of Congress to make the funds available to the roads in the transition period so they could properly perform their duty to the public. The supreme court of the District of Columbia has sustained the Treasury department and the case has been taken to the district court of appeals, but Mr. Thom said the situation will not wait until it can go through the supreme court.

Representative Sims of Tennessee said the Treasury was empty and the money with which to pay the railroads was not there to be paid out.

"I do not understand that we are dealing with an insolvent government," Mr. Thom replied.

No Rich Carriers in Country Today

Thomas DeWitt Cuyler, chairman of the Association of Railway Executives, said in part:

"There is no such thing as a rich carrier in this country today, because balances are held up to the extent of millions of dollars; supplies from material men are unpaid for; most of the carriers have no means of securing further money; they have exhausted their borrowing powers on the securities such as they would have gotten from their strong boxes; exhausted their resources and find themselves in a position where they cannot carry on unless they have some relief under the workings of this act. It is important that this transportation act be applied as stated on its face rather than to be held up for months and months, and possibly years, until these balances are ascertained and then paid. I cannot

impress upon the committee too strongly the situation of the carriers today. It is no fault of the transportation act, except this construction of it by the secretary of the Treasury. I feel justified in saying that it is a very, very serious condition and one that Congress should settle. Congress has stated how the transportation business of this country should be carried on and how can the secretary nullify what Congress has said? It is admitted that large sums are due the carriers and why should not a partial payment certificate be filed which would permit the carriers to at least have something of the amount which is owing to them? Now, a carrier can only borrow for the purpose of paying its fixed charges and operating expenses; it cannot borrow for the purpose of paying dividends. The Pennsylvania Railroad, for instance, has actually earned its dividends but has no cash with which to pay them and it cannot go to the government and get cash; it has exhausted practically all of its resources and cannot go to the banks and borrow money from them."

"What amounts, would you say, are the railroads unable to pay?" asked Representative Barkley of Kentucky.

"I know of one road where there is over 20 millions due now and it might run up into the hundreds of millions," said Mr. Cuyler. "The roads have not the credit and are cutting down to a minimum and ordering just enough equipment for safety and not any for renewals."

Asked if the credit of the railroads is actually exhausted, Mr. Cuyler said: "I did not mean to say actually exhausted, but rather in great jeopardy."

"Do you mean to say that the railroads are potentially insolvent?" was asked.

"No sir; but if the railroads are not granted this relief of these partial payments they will be in a very bad situation," Mr. Cuyler said. "If the bill had been followed out, the terms carried out as meant, the railroads would be in a satisfactory condition and if the railroads can receive partial payments as authorized by the Interstate Commerce Commission the financial difficulties of all the railroads would be greatly benefited. This is neither a charity nor a gift. I think we are entitled to these sums because the government used the railroads and we are entitled to pay for the loss we suffered by reason of the government's use of the railroads."

Mr. Cuyler said the Southern Railway, which did not accept the guaranty, is preparing to sue the government for \$84,000,000 on account of claims resulting from federal control.

Statement by Samuel Rea

Samuel Rea, president of the Pennsylvania Railroad, said in part:

"Since the conclusion of the guaranty period, and although traffic rates have been increased, the resulting net earnings have not at all produced the results anticipated when the rate increases were granted, and although for many of the roads the last four months of the year should produce the largest proportion of their net income for the entire year, that result has not been realized. Consequently, the railroads of the country being unable to obtain payments on account of the amounts due them for the guaranty period, and having no material relief or net earnings resulting from the months following the guaranty period, find themselves very short of cash, so that they are unable either to pay their

current bills for fuel, materials and supplies or to settle their accounts among each other, many of these bills and accounts being long past overdue.

"Applying the situation to the Pennsylvania Railroad system, which carries about 12 per cent of the entire railroad business of the country, there was due for the guaranty period to cover operating expenses and compensation a total of over \$99,900,000, of which there was advanced to it during the guaranty period \$59,100,000, leaving a balance due for the guaranty period of over \$40,800,000. The consequence of this situation is reflected in the position of the Pennsylvania system, where a very large amount of vouchers, due and payable, are being withheld owing to inability to pay the same, and at the same time there is due the Pennsylvania system about \$10,000,000 in traffic balances from other railroad companies, and they for the same reason are unable to make payment. When the condition of all the railroads of the country is considered, it will be seen how largely their inability to pay their current bills is causing financial distress to their creditors and the financial institutions that have been called upon to assist in carrying the burden.

"The remedy for this situation is the passage of the legislation recommended by the Interstate Commerce Commission so as to require the certification and payment of partial amounts due to the carriers for the guaranty period. Further, to authorize the Interstate Commerce Commission in the case of deferred claims, or deferred debits or credits, to railway operating income, which cannot presently be definitely determined, to make reasonable estimates and when agreed to by the carrier to use the same in certifying the amount as final settlement of the guaranty period. This recognizes the fact that special claims for loss or damages to property, or personal injuries, etc., cannot be currently ascertained, and that it is essential, rather than to hold up the final settlement for the guaranty period, to dispose of the same by making a reasonable estimate which can be gaged by experience."

Rock Island Situation Explained by M. L. Bell

Mr. Bell said the Rock Island had no cash when its property was returned by the government except \$4,000,000 for working capital received from the Railroad Administration in accordance with a provision of the transportation act. It got along, however, during the guaranty period, without asking for an advance, assuming that it could get one whenever it was needed, but the back wages took about \$4,000,000 and left it in a position where it could not pay current bills. It owes \$6,000,000 for materials and supplies and about \$6,000,000 on traffic balances, while other roads owe it about \$8,000,000. The company's estimate of the guaranty indicates that \$12,346,000 is clearly due it but no one can say for several months what the exact amount will be. The company has a loan of over \$10,000,000 from the War Finance Corporation which was called for December 1. On explanation of the inability to pay the time was extended and it was suggested that the company try to collect something from the Railroad Administration. It is, however, unable to force a settlement with the Railroad Administration and it is paying about \$2,000 a day interest on its loan while it receives no interest on the delayed guaranty.

The Minneapolis & St. Louis had to ask for an advance on its guaranty every month. Mr. Bell said, and therefore has only \$300,000 to \$400,000 due, but the Rock Island is penalized because it tried to adopt a conservative policy.

Secretary Houston Suggests Other Methods

Chairman Esch of the committee read a letter from Secretary of the Treasury Houston opposing the Winslow bill but suggesting, if Congress desired to hasten the payments to the railroads, that the object be accomplished in another way. For example, he said, the law might be changed to

provide for advances up to July 1, 1921, in the same way it provided for advances on applications filed before September 1, 1920, under which \$264,000,000 has been paid. Or the law might provide for partial payments with a provision that the final claims of the railroads should be filed by September 1, 1921. He took the position that the slowness of the railroads in filing their claims with the commission was the principal cause of delay, entirely ignoring the claims still to be made against the railroads and the adjustment of the maintenance accounts.

"As to the propriety of allowing partial payments of public money to the carriers to sustain them while they prepare additional claims for losses incurred under their own management," he said, "I do not venture to express an opinion, but the government should have a protection not afforded by this bill. The amount of the government's obligations should be ascertained at the earliest possible moment. I should suppose it to be in the interest of the carriers to present their final claims as early as possible."

The plan proposed by the Winslow bill, he said, would cause an unwarranted disturbance of the present financial methods of the government. "The guaranty does not represent compensation for any service rendered to the people of the United States and I can think of no reason why the claims of the carriers under this bountiful provision should be made without proper safeguards." He also objected to the use of estimates by the commission in making certificates, saying that under such a method the commission could not make a certificate which would be final against a subsequent claim of the carrier.

Roads Not Asking for Special

Consideration, Says Mr. Willard

Daniel Willard, president of the Baltimore & Ohio, said the roads are not asking for alms or a bonus or any special consideration. The government is not asked to give the railroads a present. The guaranty was provided because the railroads were required to do business for six months at rates that were admittedly inadequate. The deficits during that period, he said, were due to that fact, to the heavy expenditures necessary to repair the equipment, which was in bad condition, and to the \$200,000,000 or more of back wages which the roads had to pay for the period May 1 to August 31.

The Baltimore & Ohio, he said, has its accounts in such shape now that it could make a settlement with the commission for the amount due except certain items which are indeterminate because claims against the road have not yet been settled. These, he said, would probably be between \$500,000 and \$1,000,000, but there is certainly due the road \$12,000,000 to \$14,000,000 concerning which there is no possible question. This amount should be paid now as a partial payment and the indeterminate amounts adjusted later.

The Baltimore & Ohio owes \$6,000,000 to \$7,000,000 for supplies and has had to practically stop purchases because it cannot see how to pay for them. He had instructed the purchasing agent not to buy any materials without his personal approval. The company is not paying dividends and is not earning its interest. The rates are not compensatory now, he said, but he was hopeful that when business picks up again they will be found to be adequate and said he expected that when conditions become more normal rates can come down again.

Situation a Serious Obstacle to Business Welfare

William J. Hobbs, vice-president of the Boston & Maine, said his road owes \$5,000,000, largely overdue, for materials and supplies, including coal; it has owed over \$7,000,000 to other roads for several months, and over \$1,000,000

of its taxes are overdue. "The situation is extremely acute," he said, "and we are at our wits' ends as to how to meet our obligations or as to how we are to get supplies in the future. The situation is a serious obstacle to the welfare of our business community because people with whom we have contracts find it difficult to meet their own obligations."

Chairman Clark Explains I. C. C.'s Attitude

Chairman Clark of the Interstate Commerce Commission said the commission had never questioned its power to issue certificates for partial payments until the Secretary of the Treasury declined to honor a certificate of that nature. It only asks authority to issue certificates for amounts due beyond peradventure, so that the government will be amply protected, leaving the balance for later adjustment. The commission has certified advances amounting to \$264,000,000 on applications filed before September 1, leaving approximately \$367,000,000 still unpaid, including some \$32,000,000 to the express company, although the exact amount will be affected by claims still to be presented to the railroads which affect their operating expenses for the guaranty period and by the commission's decision as to the amounts which may be charged for maintenance.

"The guaranty was provided," Chairman Clark said, "because it was obviously impossible for the railroads to earn operating expenses, taxes and fixed charges under the rates and wages, which had been fixed by the government, in effect at the end of federal control. It was provided so the roads, during the six months before the rates could be readjusted, could have the same return they would have received if they had remained under federal control. The commission has no choice as to the exact method but it is of the opinion that legislation should be enacted to provide for the payment of sums clearly due and we see no reason why business principles should not apply here as they do elsewhere where people make partial payments on account."

When Mr. Sims asked if it would be necessary for the commission to make further advances in rates, Mr. Clark said that the rate-making rule of the transportation act does not require any given scale of rates but that the railroads shall receive as nearly as may be a certain sum of money. If rates are advanced too much they would tend to reduce the amount of traffic and consequently the earnings. The commission is not required to advance rates to a point where they will not produce revenue.

Effect on Supply Industry

Explained by Frank W. Noxon

Frank W. Noxon, secretary of the Railway Business Association, appeared before the committee on January 15 to explain how the situation is affecting the railway supply industry. He said in part:

"Information began coming to us sometime ago that many railroads were holding up accounts due our members and giving as their reason that they could not collect large sums certified as owing to them by the government. The same reason was said to have been given by some roads for not ordering supplies or for requesting manufacturers to delay delivery of goods already ordered.

"Members communicating with us in many cases refrained from stating the amounts overdue them, and in other cases specified the amounts but requested that their names be not published as it might injure them to have their embarrassment become known. It is proper to say, however, that distress attributed to this cause is widespread, that amounts due 60 days or more apparently aggregate several hundred millions and that consequent industrial shutdown and unemployment of labor involve very large numbers of men.

"One large company normally employing in its main works and several subsidiaries many thousand men has fur-

nished us with a comparison of collections now and a year ago, as follows:

"January, 1920, collections, 47 per cent of accounts receivable, indicating a turnover or average collection period of 70 days.

"December, 1920, collections, 23 per cent of accounts receivable, indicating a turnover or average collection period of about 130 days.

"The sales terms of that company are 30 days. On this basis as of December 1 about 66 2/3 per cent of its railroad accounts receivable were overdue. The amount was about \$4,000,000. Accounts due 60 days or more were 40 per cent and totalled \$2,400,000, and accounts due 90 days or more were 12 per cent or \$720,000. The figures quoted are for the parent company. We are informed that a less favorable showing would be reported for the subsidiaries. The interest here referred to sells its appliances to all the railroads throughout the country and its situation may be taken as typical.

"It is clear from what our members tell us that this strain is greatly aggravating their difficulty in keeping labor at work. Many report that they are wholly or partly shut down and others that they fear they soon will be.

Tends to Spread Unemployment

"Members advise that they have been obliged to fall back upon their local banks to carry them. This increases the credit strain on the community and tends to spread unemployment. It also costs the borrower interest which he can never recover. Some members say that the railway accounts overdue them equal from a quarter to a third of their capital. A company which does a business of \$15,000,000 a year, half of it with railroads, declares that it now has to provide \$2,000,000 more working capital than a year ago, and each month of laggard railway remittances adds nearly a million to this.

"One result of the tying up of these payments is that those to whom the roads owe money cannot pay cash for materials and so lose the discounts which they are accustomed to earn.

"Some of our members in the South who deal in lumber say that there is hardship among farmers who are accustomed to cut railway ties but find this market largely or wholly closed to them. Postponement and cancellation of orders has piled up ties and other lumber supplies in the hands of dealers."

Mr. Noxon said that if the railroads should receive their guaranty the effect would be much greater than that represented by the amount of money involved, because a large part of it would be paid to companies that have had difficulty in meeting their own bills and would be passed on to many people. It would greatly stimulate new business and assist materially in relieving the business depression. He said the people he represented did not feel that the present depression will be protracted as a result of economic causes, but that it will only be of short duration unless serious mistakes are made. He said he did not ask that novel or indulgent methods be improvised, but merely that the usual business method of paying on account be followed. "We defer to lawyers," he said, "as to the precise method. What we want is that the situation be met. If money is to be borrowed, it should be borrowed by the government, which can get the lowest rate. Thousands of people are now suffering. These companies are doing their utmost to keep the business depression from becoming worse by keeping their organizations together."

Short Line Railroad Situation "Most Serious"

Bird M. Robinson, president of the American Short Line Railroad Association, said that the situation among the short line railroads is most serious. If a majority do not

secure some relief in the near future a great many will go into bankruptcy. The money due the railroads under the guaranty provisions, he said, is not a contribution but constitutes funds which the government legally and morally owes them. The short line railroads are in dire need of the funds, Mr. Robinson said.

Mr. Robinson said the Interstate Commerce Commission has interpreted Section 204 to mean that only railroads which had an actual deficit could get the benefit of it, but he hoped that after a hearing the commission could be induced to change its interpretation. Very few of the short lines, he said, have filed their claims with the government for the guaranty period because they have had to do so much work to bring their accounting methods within the requirements of the commission and they had received very little benefit from the loan fund. The commission had allocated \$12,000,000 to the short lines at their request, but so far they have received less than \$1,000,000 from the fund because they are not in a position to obtain loans unless a more liberal attitude as to the security requirements is assumed by the commission.

Coal Companies Represented

Charles D. Drayton appeared on behalf of several coal companies, to whom railroads owe three and a quarter millions of dollars for fuel, of which two millions became due in December. The coal companies, he said, in turn owe the money for supplies, so that 400 or 500 concerns are interested. They have been unable to obtain further banking accommodations, and if the fund could be paid to the railroads and in turn distributed through the business community it would have a very important effect in relieving the depression.

Otis B. Kent, general solicitor of the Merchants and

proposed that partial payments be made of amounts declared to be certainly due by the Interstate Commerce Commission so that there was no possibility of overpayment. He said that the Secretary of the Treasury seems to think that the railroads are delaying the presentation of their claims. This is not the case, he said. The railroads want their money as soon as they can get it, but there are many items which enter into the accounts which cannot be known at this time. He suggested that provision might be made in the law that the Interstate Commerce Commission shall prescribe a time within which claims must be presented.

Representative Winslow has introduced a new bill to provide that the American Railway Express Company may receive partial payments on account of its guaranty. A bill has also been introduced in the Senate by Senator Townsend to accomplish the same purpose as the Winslow bill, that is, to authorize the Secretary of the Treasury to honor certificates for partial payments.

Operating Statistics for November

WASHINGTON, D. C.

THE NET TON MILES of freight handled by the railroads in November aggregated 37,458,624,000, according to the monthly summary compiled by the Bureau of Railway Economics. This was approximately 5,000,000,000 less than the total for October, but was about 5,000,000,000 more than that for November, 1919, when the coal strike was in progress, 2,000,000,000 more than that for November, 1918, and 1,000,000,000 more than that for November, 1917.

The average mileage per car per day for November was 26.8, which was greater than that for November of the three

Region	Average miles of road operated	Net ton-miles (thousands)	Freight car-miles (thousands)		Freight cars on line daily		Efficiency ratios			
			Total	Loaded per cent to total	Total	Unserviceable	Car-miles per day	Tons per car	Per cent of unserviceable cars	
New England Region	8,155	936,954	36,121	37,185	101,217	10,699	18.5	25.2	10.6	
Great Lakes Region	23,124	6,641,619	342,306	219,670	64.2	420,452	37,061	27.1	30.2	8.8
Ohio-Indiana-Allegheny Region	26,542	9,191,701	397,740	251,269	63.2	592,279	37,483	22.4	36.6	6.3
Poconontas Region	5,339	2,263,748	88,172	51,981	59.0	92,396	7,362	31.8	43.5	8.0
Southern Region	37,723	4,484,338	249,581	158,063	63.3	283,063	24,446	29.4	28.4	8.6
Northwestern Region	47,394	4,826,908	277,442	172,637	62.2	350,071	27,417	26.4	28.0	7.8
Central Western Region	52,218	6,336,959	375,410	233,789	62.3	358,062	25,643	34.9	27.1	7.2
Southwestern Region	32,070	2,776,397	157,232	103,968	66.1	221,085	11,484	23.7	26.7	5.2
Grand total—all regions	331,565	37,458,624	1,944,004	1,228,552	63.2	2,418,625	181,595	26.8	30.5	7.5

Miners Transportation Company, asked that Section 209 be amended to apply to his company so that it might receive the same guaranty as the railroad-controlled water lines and the other coastwise lines that were relinquished before the end of federal control.

A Concluding Statement by Mr. Thom

Mr. Thom made a concluding statement to reply in brief to the letter of the Secretary of the Treasury. He denied that the provisions of the Winslow bill would upset the time-honored methods of the Treasury Department. He made the point that Congress has made the Interstate Commerce Commission the auditing body for the guaranty payments on the ground that it is the most expert authority on railroad accounting. The Treasury Department had referred the certificates to its auditor, who had held that the Treasury should not honor the certificates, not after an audit of the accounts, but on a construction of the law. He said that in several other instances Congress has prescribed a method of audit independent of that of the Treasury department and that where Congress has provided some other method of audit the accounts need not be further audited by the Treasury department. He pointed out that it was only

preceding years, but was less than the average made in August, September or October, 1920. The average carload, however, established a new record, 30.5 tons. The best previous record for the year was 30.1 tons in September. The Railroad Administration had reported an average of 30.4 in August, 1918.

STOCK DIVIDENDS aggregating \$775,875,932 in par value have been declared since the United States Supreme Court handed down its decision last March that stock dividends are not taxable.

THE WOOD OF THE MANGROVE TREE which is found in French Guiana, is considered by the French as a wood that will not rot. All exposure and efforts to break down its fiber in four years' experiments by the French railway service, have been useless. The grain of the wood is so close as to practically exclude all moisture. Its density is placed at 110, as against 40 for fir and 70 for oak. In addition to this closeness of fiber the mangrove has a large amount of tanning in its composition. This protects it from insects and such blights as mold and damp. While not as brittle as oak, it has twice the resistance to flexion and has about the same potency against crushing and twisting.



The Reconstructed Consolidation

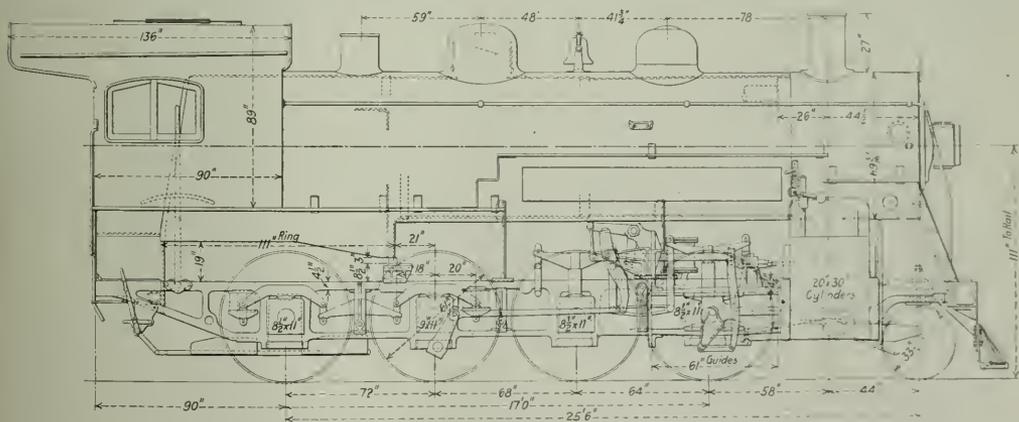
Practical Reconstruction of Old Locomotives*

One of the Most Obvious Steps Contributing to More Intensive
Operation of Motive Power

THE PROBLEM OF ENLARGING the capacity of motive power to meet the ever increasing traffic demands is universal, but the railroads are very rapidly approaching the time when the mere addition of new locomotives will not suffice. It is first necessary for the railroads to get the utmost service out of every locomotive they have. This phase of the subject has already

immediate and obvious solution to a given problem; to neglect the full utilization of what we have, before we ask for more. So it is with locomotives, and many railroads that are perpetually struggling with the financing of locomotive purchases are neglecting the latent possibilities in the power which they have.

One of the reasons why railroads have overlooked the full



Up-to-Date Consolidation Reconstructed from a Cross-Compound Locomotive

been touched upon in articles which the *Railway Age* has published in regard to the locomotive terminals and it will be dealt with at greater length in a subsequent article. The next step must be that of raising the capacity and efficiency of every existing locomotive to the highest pitch. It is a very human inclination to overlook the most

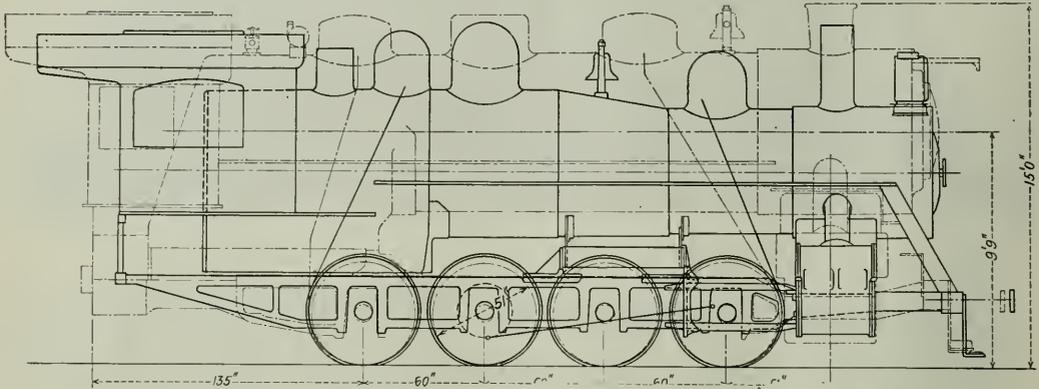
development and utilization of existing locomotives is that they have permitted the very department responsible for this development to go into a partial eclipse. Thus decisions relating to new locomotive details and the disposition of old locomotives are often made by men who are not thoroughly familiar with mechanical matters.

If there is any doubt as to what the mechanical department can accomplish with existing power a survey of what

* The first of a series of articles which the *Railway Age* is planning to publish dealing with the problem of intensive motive power management.

is being done in this direction on a few railroads will prove convincing. The description that follows relates to an important work that is being executed under the direction of the mechanical department of the Boston & Maine. It is not claimed that what has been accomplished on this railroad has not been duplicated elsewhere nor that the mechanical department of this railroad occupies a more enviable position than elsewhere, but the old locomotive problem is an

The motive power problem on the Boston & Maine differs from that of many railroads on account of a large mileage of secondary or branch lines on which there is no occasion to operate very heavy locomotives even if the roadbed and structures would permit. A glance at the map of this railroad reveals a complex network of lines, but aside from a few main freight and passenger arteries, these lines afford no opportunities for a reduction in operating expenses by the



View of Proposed Reconstructed Eight-wheel Switcher Compared with the Standard Eight-wheel Switcher

important one with the Boston & Maine and fortunately the good judgment of the mechanical department has been largely relied upon in the solution of this problem.

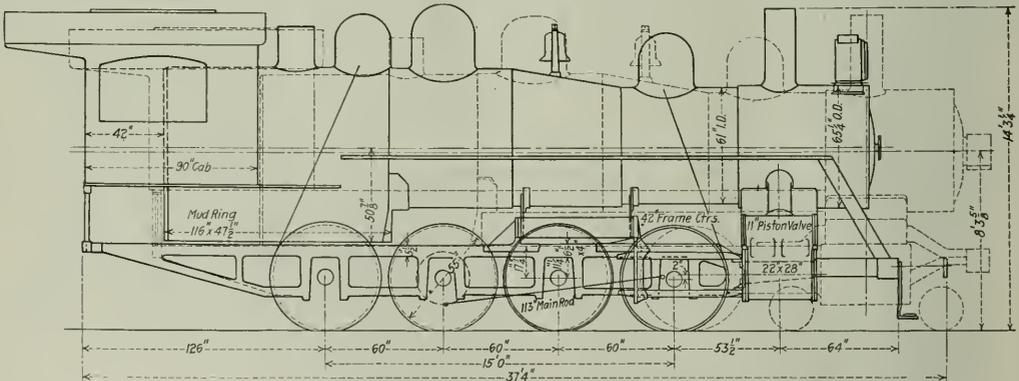
What the Mechanical Department Can Do

In a paper on the subject of increasing the capacity of old locomotives, C. B. Smith, mechanical engineer of the Boston & Maine, recently outlined to the American Society of Mechanical Engineers some of the broad principles ap-

introduction of new and heavier locomotives. But where the motive power cannot be increased in size there is still the opportunity to save in operating expenses by the introduction of more economical locomotives and to reduce maintenance costs by improving the design of motive power.

Situation on the Boston & Maine

There were two ways in which this could be accomplished on the Boston & Maine. The replacement of old locomotives



Eight-wheel Switcher to Be Reconstructed from Twelve-wheel Locomotive (shown in broken outline)

plying to the reconstruction of old locomotives but did not outline the extent to which this work has progressed on the railroad with which he is connected. Some idea as to the breadth of this undertaking may be inferred from the statement that the conversion of more than 250 locomotives was originally contemplated and that nearly 100 of these have now been raised to a standard of efficiency that compares favorably with the most modern power.

with new locomotives, modern in design and equipment, would have effected the desired result so far as the operating and maintenance results were concerned but would have added considerably to the fixed charges which have long been a serious problem with New England railroads. On the other hand the reconstruction of many existing locomotives afforded the same opportunity for reducing operating and maintenance costs and it was found that this could not

only be accomplished with less money than required by an investment in new locomotives but in this way the problem of the old locomotive, uneconomical and difficult to maintain, was disposed of.

Problem of the Old Locomotive

Every railroad has its old locomotive problem and many have in a measure done what the Boston & Maine is doing; but for those railroads with which the old locomotive, relegated to branch line service, is still a white elephant, the following outline of the locomotive reconstruction work undertaken on the Boston & Maine should prove helpful. The reconstruction program of that road has included principally the saturated steam Consolidation type locomotives purchased in 1911 under the direction of the New Haven management, and locomotives of the same class acquired prior to that date.

In all, approximately 150 Consolidation and 40 Pacific type locomotives are involved. Subsequently, the Boston & Maine purchased locomotives of the same type and practically the same weight but equipped with superheaters and other modern appliances. These locomotives have proved to be ideal for many divisions of the railroad and the first step towards reconstruction was obviously in the direction of equipping the locomotives purchased in 1911 with superheaters which is all that is necessary to raise their efficiency and capacity to the standard of the more recent Consolidation and Pacific type locomotives.

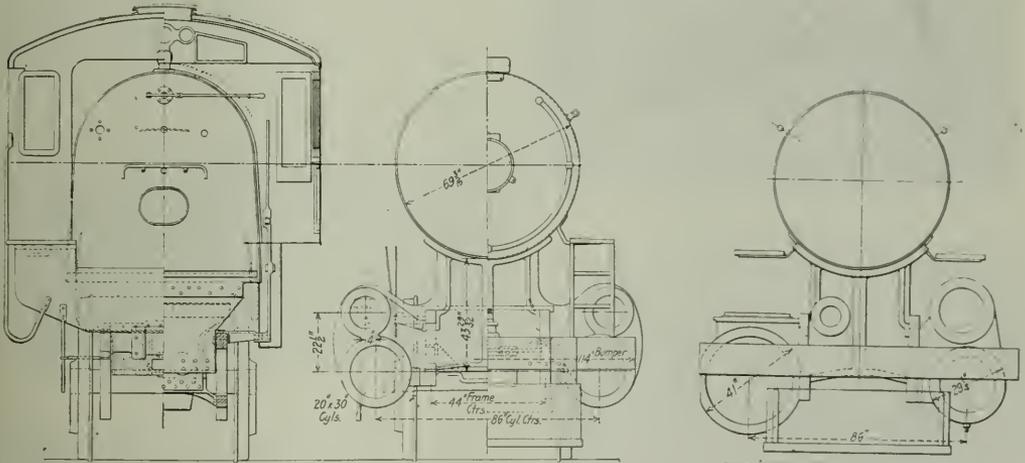
The next step was gradually to extend the application of superheaters to the older Consolidation type locomotives of which there were 110 susceptible to reconstruction. These

the conversion of 10 Cross-compounds with cylinders 22 in. and 35 in. in diameter and 32 in. stroke into modern single expansion, superheater locomotives. The principal dimensions of the original and the reconstructed locomotive are given together with the corresponding dimensions of the more modern Consolidation locomotives which were the first to be constructed.

Principal Dimensions, Boston & Maine Consolidation Locomotives

Class	K-6		K-7	
	Original Built 1920	Reconstructed 1916	Original Built 1911	Reconstructed 1916
Tractive effort...	34,000 lb.	33,400 lb.	40,500 lb.	43,400 lb.
Factor of adhesion...	4.41	4.58	4.5	4.25
Weight on drivers...	150,000 lb.	153,000 lb.	182,000 lb.	185,000 lb.
Total weight, locomotive...	175,000 lb.	178,000 lb.	206,000 lb.	210,000 lb.
Wheelbase, driving...	17 ft.	17 ft.	17 ft.	17 ft.
Wheelbase, locomotive...	25 ft. 6 in.	25 ft. 6 in.	26 ft.	26 ft.
Driving wheel diameter...	61 in.	61 in.	61 in.	61 in.
Valves...	Piston & slide	Piston	Piston	Piston
Valve gear...	Stephenson	Walschaert	Walschaert	Walschaert
Cylinders...	22 in. x 32 in. 35 in. x 32 in.	20 in. x 30 in.	22 in. x 30 in.	24 in. x 30 in.
Boiler pressure...	200 lb.	200 lb.	220 lb.	180 lb.
Firebox...	65 in. x 102 in.	65 in. x 102 in.	71 in. x 108 in.	71 in. x 108 in.
Tubes, number and diameter...	326—2 in.	165—2 in.	366—2 in.	344—2 in.
Flues, number and diameter...	326—2 in.	165—2 in.	366—2 in.	344—2 in.
Tubes, length...	16 ft.	24—5 1/2 ft.	14 ft. 9 in.	30—5 1/2 in.
Heating surface...	2,717 sq. ft.	1,380 sq. ft.	2,986 sq. ft.	1,567 sq. ft.
Flues...	2,717 sq. ft.	1,380 sq. ft.	2,986 sq. ft.	1,567 sq. ft.
Firebox...	143 sq. ft.	143 sq. ft.	180 sq. ft.	172 sq. ft.
Arch tubes...	143 sq. ft.	143 sq. ft.	25 sq. ft.	25 sq. ft.
Total...	2,860 sq. ft.	2,060 sq. ft.	3,189 sq. ft.	1,833 sq. ft.
Superheater...	431 sq. ft.	431 sq. ft.	591 sq. ft.	591 sq. ft.

It can easily be imagined just how unsatisfactory a saturated steam cross-compound Consolidation type locomotive



Sections of the Original Cross Compound Consolidation (right) and Reconstructed Consolidation (centre and left)

locomotives, which have been appropriately referred to as being of the "early-modern" design, all have over 30,000 lb. tractive power but lack the refinements that are now recognized as essential to efficiency and capacity. They are arranged in six groups differing in design, according to the date purchased. As the older designs were encountered, it was found necessary to broaden the work of reconstruction so as to include many changes in addition to the application of superheaters.

Reconstruction of Consolidation Type Locomotives

The most interesting development in connection with the reconstruction of the Consolidation type locomotives involved

of these dimensions would prove under modern conditions both from an operating and maintenance standpoint. But it will be observed from the dimensions and drawings of the reconstructed locomotive that this locomotive now compares favorably with the more modern Consolidation engines. The work of reconstructing six of these old locomotives was recently completed at the Schenectady works of the American Locomotive Company and the cost to the railroad was less than half of what new locomotives of similar weight and capacity would have cost.

In the execution of this work, it has been the policy of the Boston & Maine to regard one locomotive as a standard to which older locomotives would be made to conform. In

the case of the Consolidation locomotives, those purchased in 1913 and at a later date were regarded as a standard for efficiency to which the locomotives of the same type acquired in 1911 and prior to that date were made to conform. Having decided upon a standard, the locomotives which required the least alteration were first taken in hand. With the Pacific type locomotives and some of the Consolidations, the installation of superheaters alone sufficed to bring these locomotives up to the desired standard. This has involved a regular program of superheater installations for old locomotives which is still actively under way.

Reconstruction of Other Locomotives

But as the work on locomotives most susceptible to improvement is nearing completion, the reconstruction of types that involve considerable changes is under consideration. The most interesting example that can be cited in this connection is the projected reconstruction of 18, Twelve-wheel type freight locomotives into Eight-wheel switchers. A diagram submitted in connection with this article not only shows the character of the reconstruction work involved but indicates an interesting similarity between the proposed Eight-wheel switcher and the standard locomotive of the same type developed under the direction of the Railroad



An Old B. & M. Locomotive with Polygonal Faced Driving Wheels Designed to Increase Adhesion (Now Converted Into Standard Eight-wheel Passenger Locomotive)

Administration. This diagram also illustrates the manner in which the wheel loads have been re-distributed. The principal items entering into the reconstruction of these locomotives will be new frames which will be slightly heavier in section and new cylinders that will be correctly proportioned in accordance with the new design which will take into account the installation of a superheater.

It is anticipated that the new Eight-wheel switcher will prove a very useful and economical locomotive, whereas the old Twelve-wheel locomotives have demonstrated the reverse and have proved very extravagant in maintenance costs.

Another interesting phase of this work is presented by a large number of small Eight-wheel passenger locomotives which from a capacity standpoint are entirely adequate for the branch line service in which they are engaged but are both uneconomical in operation and maintenance. The policy with respect to all of these locomotives having 18 in. by 24 in. cylinders, or larger, is to replace the old crown-bar boilers with new radial stayed boilers somewhat larger in dimensions and equipped with superheaters.

THE NASHVILLE BOARD OF TRANSPORTATION TRUSTEES has adopted resolutions urging the sale of the Tennessee Central Railroad.

Pennsylvania Joint Reviewing Committee

THE NEW AGREEMENT between the officers of the Pennsylvania Railroad System and representatives of its train service employees, which was described in the *Railway Age* of January 7, page 106, was completed at a meeting in Columbus, Ohio, on January 13, when members of the joint reviewing committee, representing the whole of the railroad system, were chosen. The chairman is R. V. Massey and the vice-chairman H. R. Karns. It was voted to have a new election for these officers every six months so that each office should be held, in turn, by a representative of the management and a representative of the employees. The permanent headquarters of this committee will be at Pittsburgh, Pa., and regular meetings will be held there on the second Thursday of each month.

The names of the members of the joint committee are given below. It will be seen that each of the four regions of the System is represented. On the part of the employees there are nine members, this because the locomotive engineers have three general chairmen on the Pennsylvania System, instead of two as in the case of the other brotherhood; but it is arranged that one of the enginemen shall drop out whenever a vote is taken, thus preserving the equality of voting power, eight on each side. Not less than a two-thirds vote is required to decide any question presented. Each of the employee representatives is a general chairman of the union to which he belongs. The names are as follows:

MANAGEMENT REPRESENTATIVES.

R. V. Massey, Philadelphia, assistant general manager, Eastern region; H. A. Enochs, Philadelphia, superintendent labor and wage bureau, Eastern region; N. W. Smith, Pittsburgh, assistant general manager, Central region; H. K. Brady, Pittsburgh, superintendent labor and wage bureau, Central region; W. M. Wardrop, Grand Rapids, Mich., general superintendent, Michigan division; W. W. Burrell, Chicago, superintendent labor and wage bureau, Northwestern region; W. C. Downing, Indianapolis, general superintendent, Indiana division; E. B. Dithridge, St. Louis, assistant to general manager, Southwestern region.

EMPLOYEE REPRESENTATIVES.

H. R. Karns, Pittsburgh, Brotherhood of Locomotive Engineers; William Park, Sunbury, Pa., Brotherhood of Locomotive Engineers; H. W. Fleming, Pittsburgh, Brotherhood of Locomotive Engineers; S. C. Coven, Philadelphia, Order of Railway Conductors; W. T. Saul, Pittsburgh, Order of Railway Conductors; H. E. Core, Philadelphia, Brotherhood of Locomotive Firemen and Enginemen; D. D. Miller, Pittsburgh, Brotherhood of Locomotive Firemen and Enginemen; R. A. Knoff, Pittsburgh, Brotherhood of Railroad Trainmen; C. E. Musser, Philadelphia, Brotherhood of Railroad Trainmen.

Under the plan, as adopted, there will be "Men and Management" meetings once a month on every division; another for every grand division and also one for each of the four general operating regions.

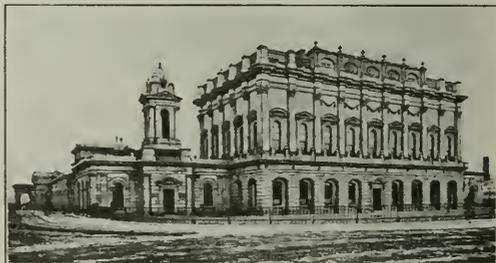


Photo by Keystone View Co.

Kings Bridge Station at Dublin, Ireland, the Scene of Numerous Riots



The Central Sur's Bridge Over Cantin River Near Temuco

The Chilean State Railways an Open Market

American Supply Exporters Compete on Equal Terms Owing to
Lack of Foreign Domination

Part II

By John P. Risque

IN PART I of the discussion of the Chilean State Railways, which appeared in the *Railway Age* of last week, a general outline of the railway situation in the country was given, together with the opinion of the correspondent concerning the possibilities of the government lines as a market for American railway supplies. The second part of this article is in-

previously pointed out the Longitudinal Norte, in connection with British interests in control of the connecting Nitrate Railways, constitutes what may be called a local zone. These lines are almost wholly engaged in carrying nitrate from inland fields to the several ports on the coast. The Red Central Norte is in the same category, the only difference being that with no nitrate fields to provide it with profitable traffic, it, in comparison with the remunerative activities of the Longitudinal Norte, is nearly starved to death. This brings us to Valparaiso. Looking back over the ground just traversed and considering it for temporary convenience as an uninterrupted system, it is pertinent to point out the existence of another factor which has rendered the northern section of the Chilean government lines almost impotent as far



Bella Vista Station, Valparaiso



A German Compound Ten-Wheeler in the New Shops at San Bernardo

tended to give the reader a more complete idea of the size, importance and peculiarities of the Chilean state railways. Reference to the map published with Part I of this article will probably be helpful.

The government railways of Chile can be most easily visualized by dividing them into two sections. The first of these embraces the lines north of the La Calera, Aconagua (near Valparaiso), and the second takes in all the government lines south of La Calera. The northern section is composed of two systems: the Longitudinal Norte which extends from Pintados, Tarapaca, to Pueblo Hundido, Atacama, and the Red Central Norte which extends from Pueblo Hundido to La Calera. The southern section (south of Valparaiso) is known as the Central Sur. The northern section may appear to be an important traffic artery from north to south. In reality, it is nothing of the sort. As has been

as the long haul is concerned. This factor is the existence of several lines of efficiently run steamships which transact practically all of the local as well as the through business between the numerous ports on the coast as well as the transportation of nitrates to foreign markets.

From a standpoint of military strategy the usefulness of the northern lines, in connection with the lines south of

Valparaiso, would show itself of tremendous value in making possible the relatively quick mobilization of troops along the entire coast line, and it is even claimed that those lines were originally conceived with that sole idea in view.

On the Red Central Norte some very heavy grades are encountered which necessitate the use of rack rail, of which there is about 28 miles in use on grades as heavy as 6 per cent. There are some long tunnels on the route, where the line traverses country that has presented severe obstacles to the builders.

The Central Sur system of the state railways, 744 miles long, is more popularly known as "Chile's main line," because of the density of traffic arising from the concentration of population in the districts of Valparaiso and Santiago, as well as the appearance of the fast and good sized trains that run on its 5 ft. 6 in. track. This system has numerous branches, prominent among which are those running to San Antonio, Talcahuano, Concepcion, Curanilahue, Valdivia, Constitucion and other points and, last but not least, the busy branch from Llai-Llai, on the main line between Valparaiso and Santiago, to Los Andes, where passengers en route to Argentina by way of the celebrated Transandine Railway, spend the night whether they wish to or not. The Central Sur is a very busy line with both passengers and freight, particularly between Valparaiso, Santiago and Concepcion, to which points fast and frequent express trains are run daily over its broad gage track.

Rolling stock on all of the Chilean lines presents a picture that is almost as varied as the scenery. Car characteristics on both narrow and broad gage lines follow our own designs. On the cars of the broad gage lines, in and about Valparaiso and Santiago, can be found the names of American manufacturers. Freight cars seem to hail from everywhere. Some are four-wheel and some eight-wheel styles and they are built of wood, pressed steel, or steel skeletons with wooden linings. Chain and hook couplers are generally used but here and there on some new equipment—and very generally on the wide gage passenger cars—automatic couplers appear. These are indications of the Chilean railroaders' attitude of mind, for they are thinking seriously of standardization and modern methods, and progress along these lines is being made regularly.

Locomotives are of an infinite variety of types and sizes and sufficiently different one from another as to discourage the most ambitious advocate of standardization known. They are of all sizes and makes—French, German, English, American. Chile's collection of motive power is comparable to a permanent international locomotive exposition; but the varied assortment makes good advertising for the manufacturers, because all the engines seem to be running "square." Their appearance, too, is interesting; some have bright red driving wheels and many brass trimmings and others fewer decorations, but all of them are spick and span.

Valparaiso's congested and ancient shops will soon be relieved by the opening of the new and elaborate repair plant at San Bernardo, a suburb within 10 miles of Santiago where it is planned to take care of all the repairs in that section and to manufacture everything possible on the job. The buildings for these shops have been completed and are being rapidly equipped with the American machinery, the deliveries of which were interfered with during the war. The shops are expected to be in operation by the early part of this year. Track conditions along the Longitudinal Norte and the Red Central Norte are fair; on the Central Sur, excellent.

After Uncle Sam's recent experience with government operated railways, almost any American taking the fast run from Valparaiso to Santiago will pause to admire the Chileans' success with state ownership and operation. Evidence of the Chileans' determination to stop at nothing short of bringing their lines to a state as nearly perfect as possible is shown by the railway officers' intense interest in new meth-

ods which vitally affect the welfare of the lines. A general installation of signals is on the program, together with other improvements. In this connection it is worth while mentioning that representatives of the Chilean State Railways have maintained headquarters in the United States for three years and that there are 15 young Chileans engaged in railway work here, and that, furthermore, the Chilean government plans to send 10 men here annually to study our roads.

In the library of the state railway headquarters in Santiago, can be found "estudios," studies of almost every conceivable method of operation, finance and equipment of lines; some are studies of various organizations, some of proposed extensions and new lines, some are histories of certain divisions. In fact, there seems to be, neatly bound and easily available for the investigator, a volume on pretty nearly any subject of importance to efficient railway operation. One of the most interesting and typical of these is "Folleto Num. 3," bearing the mark of the state railways printing plant and dated 1912. It gives the details of the various systems of administrative organizations of railways in use in the principal countries of the world. Another volume of 114 pages sets forth in in-



Las Palmas Tunnel, Near Valparaiso, on the Valparaiso-Santiago Line

teresting detail the details of planning, surveying, constructing, and equipping the Arica-LaPaz Railway. The work is illustrated by photographs and outline drawings of locomotives, stations and shops along the line. Still another volume deals with the intricacies of car lighting equipments.

Reference to the subject of nitrate, Chile's thermometer of financial temperature, is timely here. On June 1, 1920, encouraging reports from Santiago stated that the Nitrate Producers' Association had made it known officially that the total tonnage of that commodity exported for the year had reached 95,000 tons, as compared to 55,000 tons the preceding year, and added that the prosperity of that industry means a solid financial situation for the government, an abundance of work and the increased welfare of the community.

It will probably be remembered that in 1919 the government of Chile sent a commission to the United States to seek a loan of about \$30,000,000 with which it proposed to make additions to its railway equipment, but that the commission, empowered to negotiate at 5 per cent, made no progress when it was found impossible to float the loan at less than 6 per cent. When Chile finally succeeds in obtaining the much needed funds—and the improved nitrate situation encourages hope in that direction—the long delayed plans of her railway administration will take definite shape.

The third and concluding part of the discussion of the railways of Chile will appear in an early issue of the *Railway Age*.

How "National Agreements" Cause Huge Wastes

Multitude of Examples Cited Before Labor Board Show
How Employees Get Millions for Work Not Done

THAT THE RAILROADS of the country are fighting for the right to operate their properties economically and efficiently in accord with the specific requirement of the Transportation Act and demand of the public has been brought out during the past week in the hearings before the Railroad Labor Board at Chicago on the demand of the various railway brotherhoods for continuation of the National Agreements adopted under government control and standardizing the working conditions of railway employees throughout the country.

The carriers, represented by E. T. Whiter, chairman of the Conference Committee of Managers of the Association of Railway Executives, are opposing the continuation of these National Agreements solely on the ground that the most economical and efficient operation is impossible so long as they exist. Mr. Whiter has emphasized several times during the presentation of his testimony that a fight is not being made upon agreements between railroads and their employees but upon agreements which are national in scope and therefore do not and cannot allow for widely varying local conditions which make their strict and uniform interpretation and application often produce results which are outrageous or ludicrous. They result in a great many cases, in seriously impairing the efficiency of working forces and in causing large amounts of money to be paid to employees for work which is not done.

Mr. Whiter's presentation on behalf of the carriers has thus far dealt exclusively with the carriers' objections to the agreement with the railway shop crafts, the reasons for their opposition, and the manner in which the application of each rule operates to impair efficiency and destroy economy. The bearing this case has on (1) the transportation rates and (2) the relations between employers and employees in other industries has, therefore, not been emphasized. However, as the real issues in the fight are being brought to light, there are indications that business men are beginning to see the probable indirect effect on their own fields of the application of these agreements in the railroad field. For instance, if all employers were forced to pay their employees a bonus of one hour's pay each week for checking in and out on their own time, as the shops crafts agreement forces the railways to, the economy of operation of every industry would be impaired. Furthermore, under the terms of the Transportation Act the public is required to pay rates sufficiently high to cover operating expenses and allow a fair return on the value of the carrier's property. This means that the public must pay for the unnecessary expense caused by these national rules.

The ridiculous and outrageous results the application of the National Agreements is constantly causing have been illustrated by Mr. Whiter by a multitude of specific examples, some of which were given last week and others of which are the following:

One of the rules in the shop crafts agreement requires that when employees are called or required to return to work, they will be allowed 5 hours' pay for 3 hours and 20 minutes' service or less. The Norfolk & Western carefully figured the actual cost of the punitive payments made under this rule on its line and found that in the first eight months of 1920 they totaled \$42,142.44. During this period the company made 22,758 "calls" (requests for additional work) upon its shop employees. In response to these "calls" the employees worked 49,718.9 hours and were paid for 113,756 hours of service. A further check disclosed that 94.5 per cent of these

"calls" were merely continuous service, the requirement to finish tasks already begun and which it was in accord with efficient and economical practice to continue to completion.

A machinist who had been employed by the Baltimore & Ohio was taken out of service after a medical examination had revealed the fact that the employee was afflicted with a communicable disease. The organization of which he was a member contended that his dismissal was in violation of one of the rules of the National Agreement, and after some controversy the road was forced to pay the employee \$1,155.30 regardless of the fact that the employee was in the meantime employed in outside industries, earning in one position alone, \$532.20.

The Chicago & Eastern Illinois discharged a locomotive inspector for failure to report defects in accordance with the Interstate Commerce Commission's rules and instructions. A controversy ensued, the employees maintaining that one of the rules of the National Agreement had been violated in discharging the inspector. As a result of this controversy it was ruled that he should be reinstated and paid for time lost. The Chicago & Eastern Illinois was forced to pay him \$1,612.31, although it was known that the man was working for a coal company while out of the employ of the railway.

Another of the rules of the shop crafts agreement provides that when employees are required to check in and out on their own time they shall be paid one hour extra at the close of each week regardless of the number of hours worked during the week. The application of this rule during the first six months of 1920 cost the railroads \$6,445,658.73. This total includes the hourly rate increases provided by the Board's recent wage award for but two months, May and June. Therefore, the total would be increased during future periods to the extent of the increases awarded shop employees for four of the six months. This would make the total annual cost to the railroads of this one rule more than \$14,500,000.

The Michigan Central is now faced with a claim involving nearly \$2,000.00 in pay for a carman's helper who had been straightening bolts. The brotherhood claimed that the man was entitled to a blacksmith's rating and pay because he had been doing work which is listed in the National Agreement as blacksmith's work. If the brotherhood's contention is carried, it will mean that reclamation of work of this character will have to be discontinued because the cost would be prohibitive.

Traffic demands on the Long Island require the operation of certain sub-stations 16 to 18 hours of the 24, commencing at 5:30 a. m. Prior to the execution of the shop crafts agreement the first shift at these sub-stations started work at various times between 5:30 a. m. and 7:00 a. m. and each shift worked eight continuous hours, or longer if required, time and one-half being allowed for more than eight hours work. Under present conditions the men must be paid a minimum of five hours' pay for 3 hours and 20 minutes' work or less in advance of 7:00 a. m. As a result the Long Island is paying \$4.25 per man to operate each sub-station one-half hour from 6:30 a. m. to 7:00 a. m.

On the Midland Valley after December 26, 1918, three coach repair men, the first man working from 6:00 a. m. to 2:00 p. m.; the second working from 2:00 p. m. to 10:00 p. m., and the third working from 10:00 p. m. to 6:00 a. m., were employed by the road at one of its terminals. Under the terms of the National Agreement the road was later required to pay each of these employees five hours' pay for

the work each performed in advance of the starting time provided by the agreement, notwithstanding the fact that only eight hours of actual service was required of each shift. In other words, because the starting time of each of the shifts was one hour in advance of the starting time set by the agreement it was necessary for the road to pay each employee 13 hours' pay for but eight hours of actual service.

A mechanic employed by the Cincinnati, Indianapolis & Western was recently required to make a trip to an outside terminal. The train arrived there at 2:10 p. m. and his actual work required about one hour. The man was relieved before 4:00 p. m. However, it was necessary for him to remain at the terminal all night as there was no returning train until 5:00 a. m. the following morning. After sleeping all night and upon his return to his home station he requested the payment of \$34.84 for the one hour of actual work in accordance with the rules of the National Agreement.

At the close of a regular working day of eight hours, the testing of an engine on the Chicago, St. Paul, Minneapolis & Omaha, was not completed. This work would have been completed in the following hour but a leak developed which necessitated some additional work, and consequently the task was not completed until 30 minutes past the ninth hour. Under the provisions of the National Agreement this resulted in paying six men five hours' pay each for one-half hour's work.

On the same road it became necessary to send a sheet metal worker from Hudson, Minn., to Minneapolis to repair some water tanks. In order to reach Minneapolis early enough to make these repairs he left Hudson at 6:30 a. m. The regular starting time for this employee under the terms of the National Agreement is 7:00 a. m. Consequently he submitted a claim for five hours' pay for the 30 minutes from 6:30 a. m. to 7:00 a. m., a large part of which was spent on the train.

The Cincinnati, Indianapolis & Western recently reported that on two different occasions employees have been called for work outside of their regular hours and the call cancelled before they left home. Acting in accordance with an interpretation of the shop crafts agreement these employees requested the payment of five hours' pay for being called.

The Atchison, Topeka & Santa Fe in June conducted a test in its shops at Shopton, Iowa, and found that there were 34 cases where employees worked over the ninth consecutive hour to complete necessary work to put engines in service. The actual time worked in all 34 cases was 46.2 hours, and for this work the men were paid for 170 hours, making a punitive payment for 123.8 hours. The same road has reported that there have been many cases where, on account of a second shift man not reporting for work, a first shift man has been requested to continue work in the former's place. One man who performed such work on the second shift recently claimed five hours' pay for each job performed during the second shift. This would mean that the employee would be paid, in addition to his regular hourly pay, for 20 hours of work for being requested to perform four different tasks in the second shift.

At Strong City, Kansas, a Santa Fe train left at an hour that necessitated having a carman start his work at 6:45 a. m., or 15 minutes in advance of the time for the remainder of the carmen to commence their day. Under the terms of the National Agreement the road was compelled to pay five hours' pay per day for this 15 minutes of service, or \$90.50 for a total of 7½ hours' work per month. It was impossible to effect any other arrangement without placing an entire night force in service and it was therefore necessary to change the departing time of this train.

The Norfolk & Western recently had a case where a machinist, whose regular reporting time was 7:00 a. m., was at the shop 15 minutes early. An engine which was ready to leave the terminal, had a broken water glass. The machinist

was requested to apply a new water glass, and for this 15 minutes of initial overtime the company was required to pay for 5 hours' work.

One of the rules of the shop crafts agreement provides that when employees are changed from one shift to another they will be paid overtime rates for the first shift of each change. This rule, according to the Atchison, Topeka & Santa Fe, cost, in September, 1920, on the western district of its eastern lines alone, \$593.98, for which no service of any kind was received. As a matter of fact, the changing of employees from one shift to another in the exercise of their seniority rights caused a reduction in efficiency and lowered production.

A car repairer employed by the Norfolk & Western recently requested a transfer from the third shift to the first shift. The railroad contended that the transfer being made upon the employee's request he was not entitled to the overtime allowed by the National Agreement. This contention was overruled and it was necessary to pay this employee time and one-half for the entire first day of the new shift.

A steel car repairer in the freight car department of the Atlantic Coast Line at Waycross, Ga., received in that capacity 67 cents per hour. Having had some previous experience in repairing steel passenger cars and locomotive tender frames he had been called from time to time to assist in this work when the regularly assigned passenger repair men were unable to keep up with the requirements of the work. When so called this repairer had been paid at the rate of 72 cents per hour for each hour that he worked on steel passenger cars or locomotive tender frames. The brotherhood of which he is a member contended that under the National Agreement, he was entitled to the permanent rate of 72 cents per hour regardless of the particular class of work upon which he is engaged. The railroad contended that the employee had been paid the rate applicable to each class of work for the actual number of hours of service rendered, and that he had therefore been adequately compensated for his services. Although it was pointed out that the assistance of this man in working on passenger equipment and locomotive tender frames was required only in emergency cases, it was ruled that he should, according to the rules of the National Agreement, be paid the higher rate continuously because of the emergency work which he had performed.

The Chicago Great Western, because of a train delay recently, was not able to distribute its pay checks until 20 minutes after the ending of the first shift at one of its shops. The employees who were forced to wait the 20 minutes for their pay checks requested, under certain rules in the National Agreement, overtime for all of the time detained after the completion of their regular assignments.

A boilermaker employed by the St. Louis-San Francisco left the service of that road on October 31, 1919. He did not receive his pay check until November 7 because of poor mail service. Acting under one of the provisions of the shop crafts agreement, he demanded and was awarded pay for six out of the eight days after he quit work that elapsed before he received his check.

One of the rules of the shop crafts agreement provides that "should an employee be assigned temporarily to fill the place of a foreman he will be paid his own rate, straight time for straight time hours and overtime for overtime hours, if greater than the foreman's rate." A later interpretation of this rule provides that when employees are temporarily filling a foreman's position they will work the same number of hours as the foreman whose place they are filling is required to work and will be paid for overtime accordingly. The Atchison, Topeka & Santa Fe requested a machinist to take the place of a foreman who was off duty on account of sickness for 77 days. The regular foreman's salary was \$265 a month and during the 77 days in question he would have earned \$664.53. The amount paid the machinist's substitute at his

hourly rates during this period was \$921.30, an increase of \$256.77 over the foreman's regular rate for a period of 77 days.

Under this same interpretation it was necessary for the Michigan Central to pay one of its machinists, whose regular tour of duty is from 8:00 a. m. to 4:00 p. m., and who was temporarily to relieve a foreman whose regular tour of duty was from 7:00 a. m. to 6:00 p. m., five hours for the work he performed in filling the foreman's place between 7:00 a. m. and 8:00 a. m., the machinist's regular rate of 72 cents per hour for the time worked from 8:00 a. m. to 4:00 p. m., time and one-half for the hour between 4:00 p. m. and 5:00 p. m., and five hours for the hour between 5:00 p. m. and 6:00 p. m. In other words, the mechanic was paid 19½ hours for 11 hours of service and his daily earnings averaged about \$5 per day more than the average daily earnings of the man whose place he was filling regardless of the fact that he could not, because of lack of experience, fill the position with the same degree of efficiency as the regular foreman.

So far all of these examples of the manner in which the National Agreements work out in actual practice have dealt with their interference with operating economy. It is also true that other of the rules operate to seriously interfere with the efficiency of working forces. For example the following cases have been reported:

The Norfolk & Western recently advertised a stoker repair job which was requested by a machinist who had been operating a lathe for a number of years but who knew nothing of stoker repair work. He was assigned to the new work, continuing until he had become fairly efficient. Soon after he returned to the lathe work when a vacancy occurred. In the meantime the railroad suffered by not receiving the amount of work that it rightfully expected from a capable stoker repair man and an efficient lathe man.

The Virginian Railway discharged a car repairer in February, 1919. When his turn came to be reemployed in accord with his seniority, the company refused to reinstate him on the ground that he was afflicted with very poor eyesight and was therefore in constant danger in the shops. The man's brotherhood took up his case and obtained a ruling under one of the clauses of the shop crafts agreement that, inasmuch as he was not advised at the time of his discharge that his eyesight was defective, he should be reemployed and paid not only for the time lost from the date his seniority would have required his reemployment, but for all of the overtime his shift had worked during this period. The total payment that had to be made under this interpretation for work not done was over \$1,000.

It recently became necessary for the Cincinnati, Indianapolis & Western to reduce forces about 35 per cent because of a decline in business. The employees were informed of this necessity and their shop committee suggested that half of the men be worked for three days and the other half the remaining three days of each week in order that all might be employed and earn enough to live. When the general officers of the brotherhood were informed of this plan it was immediately rejected and the company was forced to make a 35 per cent reduction in the shop force regardless of the fact that they could have reached an agreement with their own men which would have reacted to the men's benefit.

An engine on the El Paso & Southwestern was ready to go to its train recently when it was discovered that a window light was broken in the engine cab. The locomotive engineer insisted that it be replaced. There was no engine carpenter on duty at that time and it was therefore necessary for the foreman to call one, although he could have performed the work in a few minutes. The result was that the train was delayed for one hour and 30 minutes and the employee called

to do the work was paid for five hours time, although the work took only 30 minutes.

At an outlying point on the Buffalo, Rochester & Pittsburgh four inspectors and one foreman are employed. Prior to the execution of the National Agreement the foreman also inspected cars in conjunction with his supervisory duties. Since then this man cannot do any car inspecting himself but must devote his entire day to supervising the work of the other four men; an extravagant, unnecessary and unbusinesslike arrangement.

Section men employed by the Bangor & Aroostook removed some damaged parts of a section motor car and applied them after they had been welded in the company's shop. This led to a dispute and it was ruled that this had been done in violation of the National Agreement and should not be done again even though these cars are scattered all over the road's lines.

Another of the rules in the shop crafts agreement provides that employees serving on shop committees shall be paid for time spent in conferences with company officers. The Atchison, Topeka & Santa Fe was recently requested by a shop committee to conduct an investigation regarding trouble between a car foreman and a car repairer. This investigation extended one hour and 22 minutes beyond the regular tour of duty of one of the committeemen and he accordingly made claim for and was paid six hours and 30 minutes' pay for the extra one hour and 22 minutes which this investigation had taken.

The Chicago, St. Paul, Minneapolis & Omaha recently scrapped an engine at its St. Paul shop. Skilled mechanics were used for the entire work in accord with the provisions of the National Agreement. Machinist helpers and laborers could have performed this work as satisfactorily as mechanics and effected a saving of at least one-third in the cost of labor, in addition to releasing skilled mechanics for more essential service.

As a result of the strict interpretation of one of the rules in the shop crafts agreement the Pere Marquette was recently compelled to pay a total of \$9,363.94 in back pay to four employees because their titles were changed although their work had remained the same.

As stated before, the carriers' fight is against the continuation of National Agreements, and not against agreements between the managers and employees on individual railroads. These examples taken from Mr. Whiter's testimony show the impracticability of economically applying national rules to working conditions of railway employees regardless of the varying conditions under which these employees work.

The testimony presented to the Board from the opening of these hearings on January 10 to January 12, was reported in the *Railway Age* of January 14 (page 199). Subsequently, Mr. Whiter continued the presentation of a mass of evidence and specific cases to show that economical and efficient operation are impossible as long as the Shop Crafts Agreement is continued in effect. Mr. Whiter's testimony regarding this agreement was completed on January 18, following which representatives of several of the larger carriers presented detailed statistics to show that the abolition of the piece work system of pay in railroad shops has resulted in serious decreases in the efficiency of the individual worker and consequently in the output of the shops. A more complete report of this testimony will be included in the next issue of the *Railway Age*.

So far there has been little discussion during any of the Board's hearings. Mr. Whiter has been permitted, by both the brotherhood's representatives and the members of the Board, to continue his testimony without interruption. The character of the evidence and specific cases placed before the Board is shown in the preceding examples which are based entirely upon the testimony already submitted.

Freight Car Loading

WASHINGTON, D. C.

THE NUMBER OF CARS loaded with revenue freight during the week ended January 8 was 706,413, as compared with 830,673 in the corresponding week of 1920, 723,801 in 1919 and 696,907 in 1918. While the total was greater than for either of the two preceding weeks, which included the Christmas and New Year holidays, it was about 90,000 cars less than for the week ending December 18. The summary as compiled by the Car Service Division of the American Railway Association follows:

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

Summary—All Districts, Comparison of Totals This Year, Last Year, Two Years Ago, for Week Ended Saturday, January 8, 1921

Districts	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Mdse. L. C. L.	Miscellaneous	Total revenue freight loaded			Received from connections		
										This year 1921	Corresponding year 1920	Corresponding year 1919	This year 1921	Corresponding year 1920	Corresponding year 1919
Eastern	1921	5,191	4,044	47,452	1,460	6,925	1,888	40,349	54,435	161,744	.....	.....	193,916	.....	.....
	1920	6,284	4,312	54,335	3,639	8,246	1,053	32,168	94,919	.....	204,956	169,730	.....	222,402	185,889
	1919	3,321	3,600	57,090	6,745	3,505	3,332	31,530	45,428	153,851	.....	.....	101,459	.....	.....
Allegheny	1921	2,709	3,785	56,063	3,929	4,234	1,763	38,426	58,870	.....	169,779	158,735	.....	115,185	130,613
	1920	1,56	142	23,436	398	1,282	63	2,742	5,046	32,765	.....	.....	13,095	.....	.....
	1919	211	164	22,633	649	2,029	329	130	9,789	.....	35,934	29,449	.....	17,593	15,430
Pocahontas	1921	3,036	2,056	26,997	794	11,958	1,967	32,405	25,770	104,983	.....	.....	53,825	.....	.....
	1920	3,250	2,919	25,895	202	16,314	2,210	17,619	51,963	.....	120,372	103,207	.....	71,078	57,085
	1919	11,660	9,215	6,236	1,237	10,597	1,141	22,010	24,268	86,354	.....	.....	.....	.....	.....
Southern	1921	13,450	10,687	15,523	1,057	16,031	1,739	18,471	39,771	.....	116,729	104,549	.....	55,127	62,673
	1920	12,648	10,312	33,522	301	2,677	1,863	25,902	31,787	109,012	.....	.....	45,729	.....	.....
	1919	10,783	12,927	25,692	409	5,380	2,359	21,599	42,635	.....	121,984	107,969	.....	63,129	52,371
Northwestern	1921	4,678	1,825	5,561	544	6,038	463	14,655	23,940	57,704	.....	.....	42,938	.....	.....
	1920	4,168	2,592	9,197	514	6,331	599	13,593	23,925	.....	69,919	50,162	.....	52,345	39,799
Southwestern	1921	39,690	31,494	190,284	11,479	42,982	10,717	169,093	210,674	706,413	.....	.....	492,817	.....	.....
	1920	40,855	37,386	209,338	10,399	58,565	10,252	142,006	321,872	.....	830,673	.....	.....	596,859	.....
	1919	41,641	46,091	193,744	.....	45,270	11,693	27,087	85,362	.....	.....	723,801	.....	.....	543,265
Total all roads	1921	4,168	2,592	9,197	514	6,331	599	13,593	23,925	.....	69,919	50,162	.....	52,345	39,799
	1920	39,690	31,494	190,284	11,479	42,982	10,717	169,093	210,674	706,413	.....	.....	492,817	.....	.....
	1919	40,855	37,386	209,338	10,399	58,565	10,252	142,006	321,872	.....	830,673	.....	.....	596,859	.....
Increase compared with 1920	1920	41,641	46,091	193,744	.....	45,270	11,693	27,087	85,362	.....	.....	723,801	.....	.....	543,265
Decrease compared with 1920	1920	1,165	5,892	19,054	.....	15,583	.....	.....	111,198	124,260	.....	.....	.....	104,042	.....
Increase compared with 1919	1919	.....	.....	.....	.....	11,479	.....	169,093	.....	.....	.....	.....	.....	.....	.....
Decrease compared with 1919	1919	1,951	14,597	3,460	.....	2,288	976	.....	174,688	17,388	.....	.....	50,448	.....	.....

L. C. L. merchandise loading figures for 1921 and 1920 are not comparable as some roads are not able to separate their L. C. L. freight and miscellaneous of 1920. Add merchandise and miscellaneous columns to get a fair comparison.

January 1	30,098	23,950	170,224	10,550	32,635	8,340	144,657	178,451	598,905	745,446	612,741	453,537	591,437	525,055
December 25	29,147	19,814	177,308	10,956	39,314	9,497	158,918	194,321	639,275	684,784	549,975	514,363	588,644	562,602
December 18	35,505	30,470	223,153	12,750	48,626	14,127	186,997	245,230	796,858	806,734	796,116	587,099	576,770	672,533
December 11	36,820	31,799	230,396	13,904	51,194	17,673	193,143	239,869	834,897	761,940	820,202	614,178	596,785	683,649

The freight car surplus for the week ending January 8 had increased to 258,678 cars, of which 171,214 were box cars and 38,722 were coal cars. The shortages reported amounted to only 1,929 cars.

The percentage of freight cars on their home lines, which was so reduced by the pooling of the cars during federal control, has been restored to nearly a normal condition since the business depression has relieved the demand for cars. On January 1, 45.2 per cent of the cars were at home, as compared with only 21.9 per cent on February 29, 1920, when the roads were returned. When the roads were taken over on January 1, 1918, about 44 per cent of the cars were on home lines. On May 1, 1917, the percentage was 52.8.

Summary of General Conditions

The Car Service Division has issued the following summary of general conditions as of January 12:

Box Cars.—Reports show that requirements for box cars are being satisfactorily protected. To stimulate continued progress in the return of cars to home roads, it is important that all concerned co-operate to the fullest possible degree in facilitating the return of cars to owners in anticipation of heavier demands later on.

Auto Cars.—Demand for auto cars is being fully met. Cars in excess of requirements should be disposed of in accordance with Car Service Rules. Where loading is available, cars should be forwarded into auto-manufacturing territory in preference, precaution being exercised to avoid loading with cement, flour and other commodities leaving a residue which will damage the finish of autos.

Stock Cars.—Practically all requirements for stock cars are being filled.

Refrigerator Cars.—Orders for refrigerator cars are being filled currently in all sections. It is anticipated, however, that the demand for refrigerators will be somewhat more active at an early date, making it expedient that cars be handled with despatch. Permission has been given temporarily to load refrigerators with dry freight in direction of the empty movement.

Open Top Cars.—The end of the first 15-day period of the new year finds the railroads, with some few isolated exceptions, distributing a full supply of open top cars to all commodities requiring this class of equipment. In fact a virtual surplus exists and a few of the large coal loading lines

are experiencing difficulty in currently absorbing the return movement of empties. The production of bituminous coal is being fully protected so far as car supply is concerned; the limiting factor at this time is a rapidly softening coal market with a relatively reduced demand for transportation facilities. This may be considered an opportune time for an active drive to relocate open cars on the principle of ownership. Some instances of refusals to accept cars in accordance with Car Service Rules have been brought to our attention. Without the unqualified co-operation of all lines in strict observance of the Car Service Rules as they now exist, we cannot hope to make reasonable progress in getting cars back to the home roads. It is manifestly necessary that cars be kept moving without restrictive measures that might militate against the attainment of the desired objective.

Flat Cars.—The demand for this particular type of equipment at this time would indicate that the carriers have sufficient supply generally to protect their requirements.

Seven Embargo Districts

The Car Service Division has issued a circular announcing a reduction in the number of embargo districts from 10 to 7 and a re-grouping of the roads in the districts. The new district headquarters will be at Atlanta, Ga., Boston, Mass., Chicago, Ill., Fort Worth, Texas, Montreal, Que., Philadelphia, Pa., and Winnipeg, Man.

A considerable reduction in force was made by the Car Service Division on January 1. D. E. Spangler, who has been in charge of open-top car distribution, has returned to the Norfolk & Western as general superintendent of transportation.

Railway Water Treatment Pays Large Returns

Results Obtained on Rock Island Point to Advantage of Investment in Softening Plants

By Paul M. LaBach

Engineer of Water Service, Chicago, Rock Island & Pacific, Chicago

THE ROCK ISLAND SYSTEM serves a territory of which the outlying points are Chicago; Memphis, Tenn.; Fort Worth, Tex.; Santa Rosa, N. M.; Denver, Colo., and Minneapolis, Minn. On its lines there are 412 water stations, or one about every 20 miles. The spacing of these stations is not dependent upon whether they are convenient places to get water, but upon the needs of the locomotives.

The best water supplies are found in Minnesota, Missouri, Arkansas and Louisiana. But even in these states, if wells are resorted to they will frequently give hard water. In addition the surface water usually carries silt for part of

steam except where the exhaust can be utilized for heating or other purposes.

Chemical analyses are made at intervals of all water used by locomotives. Before any prospective supply is used an analysis is first made. A tabulation of these analyses shows that out of 412 sources of supply, 290 furnish water of over 10 grains hardness per gallon. Of the 117 stations which take water from streams, all may be said to carry large quantities of silt part of the year and a number practically all of the year.

Started in 1904

In 1904 the executive officers became interested in the softening of water by the Porter-Clark process. The first plants built were of the gravity-flow intermittent type. These were followed by the repumping intermittent variety and finally by the continuous type of steel construction. Since its introduction, the continuous type has been used in the majority of cases except where special circumstances have favored the gravity intermittent type. The lack of available funds for this, as well as other construction work, in the last 10 years has prevented any large program being carried out, the policy generally being to pick out the isolated points where the money returns were the greatest at the time. These comparisons were made by multiplying the number of thousands of gallons of water used by the number of pounds incrustants removable per 1,000 gal.

At the present time this has resulted in plants scattered pretty generally over the system and a change in policy has consequently been adopted, the aim being to fill in the "blank" points and thus secure engine districts on which all the water requiring it will be treated. Another point of view has also entered into the subject, that is, the clarifying of water. Muddy water does more damage than is ordinarily appreciated. As mud is readily removed in a softener, the muddy water territories with hard water are to be handled with reference to both the suspended and dissolved solids.

With this object in mind the worst bad water territories (quantity and quality both being considered) naturally divide themselves into two areas, which are somewhat different in character, but of equal importance from an operating point of view. The first of these is on the line extending from Chicago to Valley Junction, Iowa; from Davenport, Iowa, to Trenton, Mo. (between Princeton and Wabash Crossing), and from Bureau, Ill., to Peoria. This is heavy traffic territory in which delays due to locomotive boiler troubles would be of prime importance. As explained in a previous paragraph the water is hard and, in wet weather, the streams carry a large amount of mud.

The second territory referred to extends from Kansas City to Santa Rosa, N. M.; from Herington, Kan., to Fort Worth, Tex., and from Shawnee, Okla., to Sayre. This district is different in character from the first. The water carries somewhat greater quantities of incrustants, but muddy streams are fewer in number. In addition to this the water towards the southwest is higher in the sulphates of lime and magnesia and various alkali salts are present. The result of this is that corrosion and pitting are found. It has been



Water Softening Plant at Armourdale, Kan.

the year at least. In Illinois, Iowa, Nebraska and Kansas the water is either muddy or hard, usually both. In the southwest it is scarce and contains another class of impurities which are known by the general term, "alkali."

In the development of water in this large area many methods have been followed. The easiest is to buy of a municipality, and this is done at 25 per cent of the stations. The balance is handled by company forces. About 50 per cent of the water comes from open or tubular wells, 25 per cent from streams, 10 per cent from impounding reservoirs and the balance from lakes, springs, etc. From these various sources over eight billion gallons are pumped by company forces per year and over one billion gallons are purchased from others. The methods of pumping the water are as varied as the sources of supply. Steam, internal combustion engines, electricity and gravity stations are found. However, the policy of late has been to use other power than

generally known for some years that this trouble is due to electrolytic action and in this case is superinduced by the large amount of sulphates in the water. It is thought that the best method of remedying this will be to have all water in these districts under chemical control. This will give an opportunity to work out such methods as scientific investigation may make available from time to time.

Results Obtained

In one year the total amount of water given complete treatment was 1,642,510,000 gal., and the amount given partial treatment with soda ash was 311,460,000 gal.

Computations based on the A. R. E. A. formula of 10 cents saved through the removal of each pound of incrusting solids give the total of \$358,552 saved per year, not including interest, repairs or depreciation of plant. The total cost of plants was \$305,587. This gives a gross operating saving of 117 per cent. If the interest on the cost of plant is 6 per cent this will be reduced to 111 per cent. Depreciation and repairs will subtract another 8 per cent and thus leave the net profit at 103 per cent on invested capital. In this computation no credit has been taken for mud removed, although a large quantity has been taken out at many of these points. The saving due to the elimination of mud must be estimated in each particular case. No formula of general applicability has been devised.

In this accomplishment two elements have entered into the result, namely, supervision and design. The two operating districts of the Rock Island each have a supervisor of chemical tests and a supervisor of water stations, in addition to the division forces, whose duties require them to follow the daily operations of each station. By the follow-up methods installed, satisfactory treatment is secured with all the different types of plants when operated properly. When in good working order the question of operating capacity is the principal element of difficulty. The capacity varies even with apparatus of the same design and any crowding or hurrying the process produces much harm. The "intermittent" and "soda ash" apparatus is home made. With a few exceptions the tubs are wooden. The "continuous type" machines are of the general type made by the patentees at the time of installation, with such variations as were thought to best suit local conditions.

Softener Installations

Among the continuous type machines there are several different varieties. At Burr Oak the water is treated and stored in one tank.

The tank is 50 ft. in diameter by 50 ft. high, with a 12-ft. downtake and has a rated capacity of 50,000 gal. per hr. Some changes have been made since its installation which

softeners. In order to conserve labor they are all installed adjacent to the pumping plants so that the pumper can operate and care for them. At three of the stations, owing to the extreme distance from the pumping plants to the storage tanks, it was found necessary to repump the treated water. These plants are all of the type K-Graver construction with a quartz filter in the top and double agitators in the downtake. One pump forces the water into the softener and another of the same capacity takes the water after it is filtered and sends it through the long pipe line to the storage tank. One of the photographs shows the treating plant at



Water Treating Plant at Geneseo, Ill.

Geneseo, Ill., where a pipe line two miles long is required. This plant has a rated capacity of 15,000 gal. per hour.

The most recent type is shown in photograph of the softener at Armourdale, Kan., the engine terminal at Kansas City. It was built in two steel standpipes which had been erected some years before, the machinery in Graver Type K. The treating tank at the left has a downtake with a set of double agitators driven by a water wheel. This is the only machinery on top, the balance being on the ground. When the water rises to the top of the softener, it is carried down

SUMMARY OF RESULTS OF WATER TREATMENT ON THE ENTIRE SYSTEM

	Cost of plants	Total M. gal. treated	Cost chemicals	Labor and supervision	Total	Incrustants lb. removed	Saving at 10c. a lb.	Net saving
First District	\$180,203	803,600	\$22,539	\$6,933	\$29,472	1,577,660	\$157,766	\$128,294
Second District	125,384	1,150,370	not given	not given	67,986	2,982,540	298,245	230,258
System	305,587	1,953,970			97,458	4,560,110	456,011	358,552

Net saving equivalent to 111 per cent on investment.

have added to the amount of agitation, both for chemicals and mixing with raw water. A water wheel drives the agitators in the downtake. An electric motor drives the chemical mixers and pumps on the ground level. The control apparatus is of the Booth make.

With this machine hardness has been reduced from 21 to 4 gr. per gal. and averages 5. The cost is much lower than some others due both to the design and a favorable market, the plant having cost \$17,205 while the gross saving per annum is \$24,021.

On the Illinois division there are four continuous type

again by a 12-in. pipe to the bottom and across to the storage tank. The outlets in the latter are at an elevation of 22 ft. By this means the water is given 2½ hours more time to settle after leaving the softener. The apparatus has no filter.

PASSENGER TRAIN PERFORMANCE, as reported by the Pennsylvania for the first ten months since the termination of Federal control, shows an increased percentage of trains on time from 77.4 per cent in March to 82.3 per cent in December. The number of trains making schedule time increased from 87.8 per cent in March to 92.3 per cent in December.

Railroad Brief Advocates Partial Payments of Guaranty

WASHINGTON, D. C.

A BRIEF HAS BEEN FILED by counsel for the Association of Railway Executives and for the Grand Trunk Western in the court of appeals, District of Columbia, in connection with the appeal from the decision of the Supreme Court of the District of Columbia denying a writ of mandamus to compel the Secretary of the Treasury to honor a certificate of the Interstate Commerce Commission in favor of the Grand Trunk Western for \$500,000 as a partial payment on account of its guaranty for the six months following the termination of federal control. This is a test case which involves nearly \$400,000,000 due the railroads of the country.

Answering a rule to show cause why the writ should not issue, the brief says the secretary did not deny any of the allegations of the petition, but made two points in defense:

1. The secretary contended that paragraph (g) of section 209 of the Transportation Act, 1920, contemplated and authorized only one payment in the case of each carrier, such payment to be made only after the Interstate Commerce Commission had ascertained the entire amount due; that he was not required to pay the amount stated in the certificate of the commission in the case at bar, because of the qualification in paragraph three thereof reserving to the commission the right to certify "additional amounts found due to said Grand Trunk Western Railway Company to make good to said carrier the guaranty of section 209 of the Transportation Act of 1920." As an aid to his construction, the secretary called attention to paragraph (h) of section 209 of the act, providing for advances during the guaranty period of such sums, not in excess of the estimated amount necessary to make good the guaranty, as were necessary to enable the carrier to meet its fixed charges and operating expenses, and providing that the United States receive security against the contingency of such advances being in excess of the amount of the guaranty as finally determined by the commission.

2. As a further defense the secretary quoted several sections of the revised statutes and of general legislation relating to the powers and duties of the secretary, treasurer, comptroller of the Treasury, and auditors, and stated that the comptroller had rendered a decision against the payment of the certificate and that the auditor for the State and other departments had made a certificate "finding the sum of \$500,000 due the petitioner under paragraph (g) of section 209."

To this answer the relator demurred. The court overruled this demurrer and dismissed the petition, from which the relator prosecutes this appeal. The brief says in part:

Clearly paragraph (g), read in its ordinary meaning, authorizes the commission to issue more than one certificate. The commission is to certify the several "amounts." This "amounts" cannot mean amounts to all the carriers, for the paragraph says "the several amounts (in the plural) necessary to make good the foregoing guaranty to each carrier." Also, the secretary is directed to draw "warrants" (in the plural) in favor of "each" carrier (in the singular). There is, of course, to be but one warrant for each certificate, so the words "for the amount (in the singular) shown in such certificate (in the singular) as necessary to make good such guaranty," are entirely consistent with the petitioner's theory.

Manifestly, Congress was not concerned with the number of payments to be made, but merely with establishing an absolute safeguard against overpayment by requiring certification by the Interstate Commerce Commission. Congress could safely leave to the commission the details incident to ascertainment. There was no intent to place any limitation upon the time at which payments definitely ascertained to be due might actually begin. The prime purpose of the act, insofar as the guaranty provisions are concerned, being to assure the carriers a "railway operating income," and the ascertainment and certification by the Interstate Commerce Commission (the body equipped to check with absolute accuracy the railway accounts) being for the purpose of precluding any payment in excess of the amount necessary to make good the guaranty, the restriction to one payment becomes entirely foreign to the Congressional intent. The obvious in-

tervention of Congress was that there should be ascertainment and certification in such form as satisfied the Interstate Commerce Commission, and as many certificates and warrants thereon as might be necessary to make good to the carriers the guaranty of "railway operating income."

Congress did not intend to penalize the carriers which did not during the guaranty period apply for advances. A carrier might have been so possessed of funds prior to September 1, 1920, as not to have been able to bring itself at that time within the terms "necessary to enable it to meet its fixed charges and operating expenses," and yet on December 1, 1920, because of increased operating costs and decreased revenue, he desperately in need of amounts ascertained to be due it by the United States under the guaranty provided in the transportation act. The failure to ask for a mere advance on a sum of money estimated as hereafter possibly to become due, can certainly have no relation to the right later to collect an amount definitely determined and past due.

The amount due under the guaranty is to be ascertained by reference to the difference between the transportation receipts of the carrier during the guaranty period and the expenses during that period properly chargeable to operation in arriving at net railway operating income. Thus an increase in receipts or a decrease in expenses would decrease the amount of the guaranty, whereas a decrease in receipts or an increase in expenses would increase the amount of the guaranty.

But since the guaranty period, from March 1 to September 1, 1920, has been completed, the receipts are now definitely known and were known when the commission's certificate was issued on November 24, 1920, and, although these receipts may be decreased by some bills proving uncollectible, they cannot possibly be increased. The exact expenses of the guaranty period are not yet known. There are outstanding law suits, for example, which may increase the expenses, but a part of the expenses are now certainly known. Under paragraph (i) (3), section 209 of the act, the commission, in arriving at the amount of the guaranty, is to fix the amount to be allowed for maintenance expenses under a definite rule set out in the statute. That rule is that the commission shall allow the same amount of maintenance expenses as is provided for "in the proviso in paragraph (a) of section 5 of the standard contract." This proviso requires the allowance of the same maintenance expenses as during a corresponding period of the test period, plus additional amounts made necessary by the increased cost of labor and materials during the guaranty period over what they were during the comparable part of the test period.

It is, therefore, manifest that it is possible now to ascertain a minimum amount for these maintenance expenses, to-wit: what they are already known to be for the test period, and for the commission to know, not to guess, that at least that amount is to be allowed for expenses, and that this amount of expenses may be increased, but cannot be decreased.

There is nothing in the Transportation Act, 1920, which suggests that the secretary has any discretionary power. Assuming that the relator's construction of the act is correct, the duty of the secretary to draw the warrant is purely ministerial. None of the statutes quoted in the answer of the secretary by the language used in them, expressly limits the duty of the Secretary of the Treasury to draw a warrant under paragraph (g) of section 209 of the Transportation Act, 1920, and none of them enables him, by referring the question of his prospective act to the Comptroller of the Treasury, to convert a ministerial duty into a discretionary power. So to hold would be to say that the Secretary of the Treasury may, at his election, always subordinate the mandate of the Congress to his will.

If his power be one of discretion to draw warrants or not as he is advised by the Comptroller of the Treasury, after the certification by the Interstate Commerce Commission, under paragraph (g), of section 209 of the Transportation Act, 1920, there must disappear the right to compel him to draw a warrant no matter what the form of the certificate. In other words, if the statutes quoted in the answer as affecting the disbursement of the public funds by the Secretary of the Treasury are so general and all embracing in character that they make the decision of the Comptroller of the Treasury binding in all cases involving the payment of money from the Treasury, then all the power respecting payment of moneys expressly appropriated is in the hands of the secretary and the comptroller. And if this is so, then until the Congress repeals these general statutes (useful and necessary in connection with the disbursements to which they really apply), any special appropriations for the public welfare may fail of realization, and the courts of the United States will be powerless to enforce the deliberate and lawful Congressional intent.

But the answer of the secretary is not the law. A clear and simple distinction exists between two classes of payments to be made from the public funds. There are other payments to be made from the public funds than those to which these statutes refer. For example, the comptroller cannot decide that a federal

judge should have certain deductions made from the salary provided for him by the Congress. Such a contention has been expressly denied.

Congress has under the Constitution the full power to appropriate the public funds. It may make a special appropriation for a definite and lawful public purpose and direct its payment forthwith from the Treasury, or it may appropriate for the payment of unascertained amounts for a definite and lawful public purpose and create a special body with full discretionary power to ascertain the amounts lawfully due under the appropriation. In neither of these cases could the Comptroller of the Treasury change the amount of the appropriation definitely made by Congress or definitely determined by the body authorized to ascertain such amount.

By the Transportation Act, 1920, Congress expressly named the Interstate Commerce Commission as the body which should "ascertain and certify to the Secretary of the Treasury the several amounts to make good the foregoing guaranty to each carrier," and directed the secretary to draw warrants thereon and appropriated "an amount sufficient to pay such warrants." Consequently, in the words adopted by the Supreme Court in *Smith v. Johnson*, supra, "the opinion of the Comptroller of the Treasury was extra-official, was not required by law, and constituted a purely gratuitous act." If by the proper construction of the act as determined by the court the relator is entitled to a warrant, no adverse decision by the comptroller can prevent the court from issuing its writ of mandamus to compel the Secretary of the Treasury to draw such warrant.

The comptroller and the treasurer are not made parties to this proceeding because they have not as yet failed in the performance of any duty. The relator does not admit that there is any necessity for the comptroller to sign a warrant issued by the Secretary of the Treasury under section 209 (g) of the Transportation Act, 1920, but if it is necessary for the comptroller to countersign it he obviously cannot do it until the secretary has first drawn the warrant. When the secretary has drawn the warrant it is then a mere ministerial act for the comptroller to countersign it.

Hearing on Proposed Amendment of Clayton Law

WASHINGTON, D. C.

HEARINGS BEFORE THE SENATE committee on interstate commerce on the proposed amendment of Section 10 of the Clayton law relating to railroad purchases were concluded on January 14. Chairman Clark of the Interstate Commerce Commission in continuing his testimony, which was reported in last week's issue, said the commission recommended the addition of two paragraphs to the bill, to provide that it shall be unlawful for any officer, director or agent of a carrier to receive, directly or indirectly, any benefit or profit in respect of the negotiation, hypothecation, purchase or sale by the carrier of any stocks, bonds or other evidences of interest or indebtedness issued by a carrier or non-carrier corporation, also to require reports to the commission of any such transactions. Mr. Clark said that Section 20-a of the act contains a similar provision with relation to securities issued by a carrier and that the proposed amendment would apply to the sale by a carrier of securities that are not issued by it.

Senator Smith took occasion to question Chairman Clark regarding the surcharge for Pullman passengers authorized by the commission in connection with the general rate advance. Senator Kellogg asked if it is not right that the Pullman passenger pays more to the railroad than the coach passenger. The commission thinks so, said Mr. Clark, because the Pullman car is much heavier than the coach, while it accommodates less than half as many passengers, and the commission thinks it is a sound proposition that the railroad is entitled to more for the more comfortable and more expensive service it furnishes for Pullman passengers. Senator Smith insisted that the passenger pays the Pullman Company for that service when it buys a Pullman ticket, but Mr. Clark said it is a question whether he is paying enough for it. He also said that the commission felt it was not either fair or wise to place the entire increase on the

freight rates without any increase on passenger rates because that might have made the freight rates so high as to tend to reduce traffic. Senator Townsend asked whether the increase in passenger fares had actually resulted in an increase in revenue, and Chairman Clark produced the figures to show that while in September, 1919, the passenger earnings were \$110,000,000, in September, 1920, they were \$129,000,000, and whereas in October, 1919, they were \$99,000,000, in October, 1920, they were \$114,000,000.

S. W. Brookhart, representing the Iowa division of the Farmers Educational and Cooperative Union, appeared before the committee to urge that Section 10 of the Clayton law be kept in effect, that is, that no effort be made to pass the existing bill over the President's veto. He said the railroads should be held strictly to the provisions of the Clayton law, but he had no suggestions to make as to whether it should be amended.

Glenn E. Plumb, representing the organized railway employees, read a long statement to the committee, in which he cited examples of so-called interlocking directors, in support of his contention that both the railroads and the supply companies are controlled by the great financial interests. He commended the suggestions for an amendment of the Clayton law proposed by the Interstate Commerce Commission, but declared that neither the Frelinghuysen bill nor the Clayton law is sufficient to reach what he considered to be the real evil in the situation. He said the law was intended to regulate transactions between companies which have common directors or officers, but that the bills do not get at the situation where the directors and officers of a railroad and of an equipment company or banking institution are separate, but are appointed by the same financial power. He said that while the railroads are regulated, the locomotive companies are not, and when the financial interests cannot get enough profit from the railroads they take it out of the locomotive companies by charging the railroads excessive prices. Mr. Plumb said the Frelinghuysen bill contains so many exceptions as to permit it to be wholly evaded by a selfish board of directors.

Exchange Surcharge on Shipments Between U. S. and Canada

THE BOARD OF RAILWAY COMMISSIONERS FOR CANADA has issued a general order by which the railway companies subject to its jurisdiction are permitted to publish and file tariffs, effective January 22, providing for an exchange surcharge on international shipments, other than coal and coke; to be added to the total through charges including advanced charges payable to United States carriers, when payable and collected in Canada, as follows:

1. A surcharge of 60 per cent of the rate of exchange, arrived at in accordance with the provisions of this tariff, will be added to the total through charges, including advanced charges payable to United States carriers, on all shipments between Canada and the United States, in both directions, when such charges are payable and collected in Canada. When all charges are paid at United States points in United States funds, this surcharge will not be added.
2. On shipments from Canada, the surcharge must be collected at the rate governing on the date of the bill of lading; and on shipments to Canada, at the rate governing on the date of advice note of arrival at the Canadian destination. Such surcharge will accrue entirely to the Canadian carrier.
3. Telegraphic advice will be sent to railway agents in Canada on the last day of each month, specifying the surcharge to be collected from the first to the fourteenth (inclusive) of the following month; and on the fourteenth day of each month, specifying the surcharge to be collected from the fifteenth to the last day (inclusive) of such month. Agents must file such telegraphic advice with this tariff. The surcharge must be shown as a separate item on all bills of lading and waybills for outbound shipments and on all freight expense bills.

Exception.—This tariff does not apply to export and import traffic from or to points of origin or destination in the United States via Canadian ports, on which all charges must be collected in United States currency or its equivalent.

Note.—In arriving at the surcharge, the rate of exchange quoted for New York funds by the Bank of Montreal at noon in Montreal on the last day of each month will govern from the first to the fourteenth (inclusive) of the following month; similarly, such quotation at noon on the fourteenth will govern from the fifteenth to the last day (inclusive) of such month. Should the governing date fall on a Sunday or Canadian or United States legal holiday, the noon quotation of the preceding day will govern.

In determining the surcharge, fractions less than one-half will be disregarded and fractions of one-half or over will be counted as one per cent.

The rate of exchange quoted for New York funds by the Bank of Montreal at noon, in Montreal, on the 21st January, will govern from the 22nd to the 31st, inclusive.

The board further orders that, until otherwise ordered, the companies make monthly returns to the board showing the amount of surcharges collected.

About a year ago, complaints were made to the board, by exporters to the United States, that they had been prevented by the Canadian railway companies from prepaying the freight through to the point of destination in the United States in Canadian money. A hearing was held at Ottawa on March 16, 1920, at which practically all exporters were represented, and it was stated that, before the rate of exchange between the two countries became abnormal, practically all the commodities exported had gone forward collect. The board held that, under the railway act, a Canadian railway company could not be compelled to accept prepayment of freight.

Shortly thereafter, the American railways began demanding the prepayment of international freight to Canada, the result being that, with very few exceptions, the freight on all international traffic between the two countries was paid in the United States in United States funds, and the Canadian importers began pressing for relief.

At first the exporters demanded the right to prepay the whole rate in Canadian funds, which would give them an advantage in that they would be able to pay the American end of the haul in Canadian funds, which were then as now worth less than the American dollar. Shortly thereafter, however, the demand from all classes of business men was that the Canadian end of the haul should be paid in Canadian funds. This was vigorously opposed by the railway association and the railway companies on the ground that shippers both ways would naturally forward their goods by that route the longest possible portion of which would be in Canada. In other words, the American roads would be short-hauled in practically every international transaction in Canada, excepting possibly exports from the greater portion of the Maritime provinces, and, while this would be good business from the standpoint of the Canadian railways, it was argued that, in a very short time, it would result in complete disruption of the whole international rate structure which has been laboriously built up during the past 35 or 40 years.

On December 21 last, the railway companies were told that a solution of some kind must be found for the difficulty, and one which would in the end practically amount to paying the Canadian end of the haul in Canadian funds. On January 6, at a conference with representatives of the railway companies of Canada, a proposal was made which was accepted in principle, and on January 11 a written statement was furnished the board by the Railway Association of Canada, which was the result of extended negotiations between that body and the Board, proposing the plan which has just been approved.

This arrangement will also apply to the American roads, which, while not compelled to send their freight forward collect, have given assurance that they will do so because they will hold the Canadian railways responsible to repay them their share in "American funds, and arrangements are now

being made by the Canadian roads to have the goods forwarded collect, thus giving both the Canadian importer and exporter the right to pay the whole freight rate on international business in Canadian funds.

"It is quite evident that the Canadian road which has a short Canadian haul and a long American one is at a disadvantage," says Chief Commissioner F. B. Carvell, in a report on the subject, "whereas the road which possesses a long Canadian haul as compared with the short American one has a distinct advantage in this arrangement, but it was frankly admitted both by the railway companies and the board that whatever was done must be on the broad principle of averages, and, therefore, some roads as well as communities must be benefited to a greater extent than others.

"Without going into details we found, after a very careful consideration of the total international traffic carried by the railway companies of Canada, based upon their respective divisions with American connections, that the traffic on the Canadian Pacific would be more nearly divided equally between Canadian and American hauls respectively than any other of the large systems, and their figures showed the American end to be somewhat larger than the Canadian. The Canadian National figures showed a slightly increased Canadian haul on an average over the Canadian Pacific, but the Grand Trunk showed quite a large percentage of the American haul greater than the Canadian. Putting together the business of the Canadian National and Grand Trunk systems, they average practically the same as the Canadian Pacific business. When we come, however, to roads such as the Quebec, Montreal & Southern and the Toronto, Hamilton & Buffalo, there we find that from two-thirds to three-quarters of their international business is on the United States end, the Toronto, Hamilton & Buffalo showing about 72 per cent, and, of course, as they will only receive a surcharge of 50 per cent, they will lose to quite an extent on all international traffic. However, as before stated, I have concluded that the principle of average is the only feasible method under present conditions by which this difficult problem can be solved at the present time, and, therefore, think that a surcharge of 60 per cent of the total rate of exchange is the figure which will on an average place the Canadian roads in a position to pay the American connections in American funds and yet leave them Canadian funds for their own portion of the haul.

"It will be observed that this arrangement does not apply to the rate on coke and coal, the reason being that these commodities move practically altogether on local rates breaking at the border, and, as the Canadian importers have since May last been allowed to pay the Canadian end of this business in Canadian funds, no change is necessary.

"Neither does it apply to export and import traffic from or to points of origin or destination in the United States via Canadian ports, which still must be paid in United States currency, because, were this allowed to be paid in Canadian funds, it would practically mean that goods originating in the United States, exported through Canadian ports, would pay a less freight rate than if exported from American ports. This would be discriminatory as against the American railroads and would break up parity of export rates between Canadian and United States ports now in existence.

"While these arrangements are not perfect, yet, in my opinion, it is the best solution of the problem so far advanced by any person, and I feel sure it will grant a great measure of relief to the business interests of Canada."

EXTRA SLEEPING CARS required on the Pennsylvania Railroad for the movement of passengers in the week of December 17-24 numbered 322, the largest demand on any one day being for 161 cars. During the same week the loading of mail-storage cars—cars loaded solid with mail—increased by 537 per cent.

Service Tests of a Substitute Tie

THE FACT THAT CONSIDERABLE attention has been given of late to the study of substitute ties and to estimates of the available supplies of timber in our forests lends interest to the service record of a substitute crosstie that has been subjected to tests under actual service conditions in a heavy traffic main line for a period of four and one-half years. Based on the results secured with this installation, various other railroads of this country have contracted for crossties of this type, one installation of three-quarters of a mile having been recently placed in service.

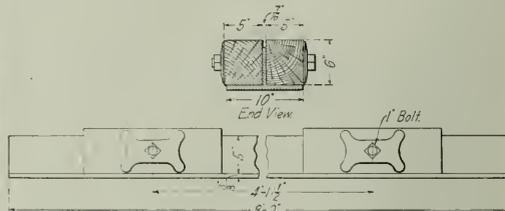
This tie comprises a combination of steel and wood known as the "Peerless" steel tie manufactured by the Tri-City

structural steel portion of these ties is of uniform section throughout its length, but the ties may be had with portions of the base cut away between the rail bearings with a view to obviating possible center binding. The rail bearing consists of a pair of treated timber blocks resting on the base and clamped on either side of the stem. These blocks are 6 in. by 5 in. by 18 in. and are held securely in place by a one-inch bolt equipped with forged steel plate washers with large bearing areas. With the use of treated timber, an estimated life for these blocks equal to or better than the demonstrated life of treated ties is considered conservative, but whenever renewals of these blocks are required for any reason, such renewals may be made at an expense of time and labor that is insignificant compared with the operations involved in renewing a crosstie of the ordinary type. Owing to the greater bearing area of these substitute ties as



Inspection Party Examining an Installation of Steel Ties Near Parkesburg, Pa.

Steel Company, St. Louis, Mo. The principal advantages to which attention has been drawn with respect to this design of crosstie, in addition to provision for adequate strength and ample bearing surface on the ballast, include: A rail bearing of wood affording positive insulation, the employment of ordinary cut and screw spikes for the rail fastening, simplicity of design and ease with which the wooden portions of the tie may be replaced when necessary. The tie consists of a rolled T-section placed in track with the stem up. The base is 10 in. wide by $\frac{3}{8}$ in. thick and the stem is 5 in. high by $\frac{7}{16}$ in. thick. The length is ordinarily 8 ft. but may be varied as desired. As a rule the



Typical Details for a "Peerless" Steel Tie

compared with the usual size of wooden ties some saving could be accomplished by the use of a smaller number of the ties in track.

The original installation of these ties was made on the Chicago & Alton in May, 1916, when one of the tracks across the Robey street subway, at Chicago, was equipped with them. Subsequently 250 more of these ties were placed on the subway at Twenty-second street and Canal street, both of these subways being ballasted structures. Special observations have been made of these installations from time to time and recent inspections disclose no appreciable deterioration of any kind and no expenditures have been made for line and surface on the portions of the track equipped with these ties during the period of service. A more recent installation of the ties embraces three-quarters of a mile of track on the Pennsylvania system low-grade freight line, near Parkesburg, Pa., about 40 miles west of Philadelphia.

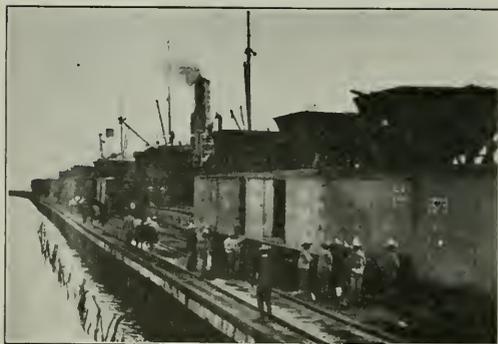


Photo copyright by Underwood & Underwood, N. Y.

Docks and Railroad Terminal at Tampico



Photo from Keystone View Co., Inc., N. Y.

Wheat Field on the Huancayo Line of the Central of Peru

General News Department

The Louisville & Nashville, according to a statement credited to R. R. Hobbs, superintendent of telegraph, has bought wireless telegraph apparatus to be installed at Louisville, Ky.; New Orleans, La.; Mobile, Ala., and Pensacola, Fla.

The session of the Telegraph and Telephone section of the American Railway Association which was to have been held at Atlanta, Ga., on March 22, has been cancelled in the interest of economy. The section will hold no committee meetings until April 1.

President Obregon, of Mexico, according to a press despatch, has decided, following a conference with his cabinet, to appoint a commission to investigate the general railroad problem, with a view to formulating propositions for the return of the railways, by the government, to their owners.

The Associated General Contractors of America will hold their second National Conference at New Orleans, La., on January 25, 26 and 27. In order that the various types of construction may be fully covered, the papers and subsequent discussion will be carried on simultaneously in four groups—building, highway, public work and railroad.

The Eastern Railroad Association announces that E. N. Bessing has been elected secretary in place of D. G. Stuart, deceased; and that on March 1 Melvin H. Coulston, who now is first assistant commissioner of patents, will become assistant counsel of the association; headquarters, of both secretary and counsel, 614 F street, N. W., Washington, D. C.

The House committee on interstate and foreign commerce has announced a hearing, to begin January 20, on the bill introduced by Representative Esch to amend the railroad valuation act by striking out the provision requiring the Interstate Commerce Commission to ascertain and report the cost of acquisition of land in addition to its original cost or present value.

Baltimore & Ohio Safety Rallies

Twenty-four safety rallies are being held by the Baltimore & Ohio, in 24 different cities, beginning with New York (St. George, Staten Island), on January 17 and ending at Jenkins, Ky., on February 24. John T. Broderick, superintendent of the Safety Department of the road, makes the principal address at each meeting, and large halls are utilized in each place. Employees are invited to bring their wives and sons and daughters, and Marcus A. Dow's motion picture "Bulletin 70," is shown. Musical entertainment is provided.

Presentation to R. C. Richards

One thousand safety workers on the Chicago & North Western, members of 83 safety committees of the road, gathered at luncheon on January 15 in Chicago, to honor R. C. Richards, general claim agent, and chairman of the Central Supply Committee of that road. Mr. Richards, who is 66 years old, is the pioneer in "safety first" on American railways, having inaugurated safety work on the Chicago & North Western in 1910. He has since taken a leading part in safety work on American railways. At the luncheon Mr. Richards was presented with a silver service by his associates.

Resume Separate Operation

The Boston & Maine and the Central Vermont have resumed the separate operation of their single-track lines between Brattleboro, Vt., and East Northfield, Mass., ten miles. Under government operation these two lines were operated together as a double track railroad; but business is now

light, and the Boston & Maine, which carries the larger part of the business, believes it will be more economical to keep its trains on its own line.

The New York, New Haven & Hartford now runs freight trains over its line from Northampton, Mass., northward to Turners Falls, 20 miles. This line, which is parallel to the Boston & Maine, was closed during federal operation.

Safety Appliances for Cars of Special Construction

The Interstate Commerce Commission at a conference held on December 6 adopted the following ruling regarding the application of safety appliances on cars of special construction:

Cars of special construction, as contemplated by the commission's order of March 13, 1911, are cars which can not be equipped with safety appliances as prescribed in the order for any specified classes enumerated therein. In the construction of new equipment which does not conform to the specified classes designated in the order, plans shall be submitted to the commission prior to construction of such cars for the purpose of determining the location and application thereto of all safety appliances required by statute and the order of the commission of March 13, 1911.

Accident Bulletin No. 76

The Inter-state Commerce Commission has issued Accident Bulletin No. 76, dated December 7, 1920, containing statistics of railway accidents in the United States during April, May and June, 1920.

Twenty-nine passengers, 93 employees and six other persons were killed in train accidents during this quarter and 1,271 passengers, 690 employees and 23 other persons were injured; a total of 128 persons killed and 1,984 injured. Adding casualties in train service accidents—1,323 killed and 12,383 injured; and those in non-train accidents—112 killed and 25,398 injured—we have a total for the quarter of 1,563 persons killed and 39,765 injured.

The number of collisions reported in this quarter was 2,189 and of derailments 4,952. Adding miscellaneous accidents to trains we have a total of 7,883 accidents with total damage to cars and roadway of \$7,762,500.

The Pullman Company Wage Reduction

Conflicting reports resulting from an account of a so-called voluntary wage cut of 20 per cent by employees of the Pullman Company at Chicago, have simmered down to two or three authoritative outstanding facts.

In the first place, the suggestion of a wage cut was made by J. B. Weaver, vice-president in charge of construction of the Pullman Company, who advised the employees at the Pullman Car Works, which is an open shop employing 9,000 men, that a decrease in their pay was necessary. The matter of reductions in pay at the Pullman repair shop, which is unionized, has not yet been brought up.

At present, the company is restoring its men at the Pullman repair shop to the basis of a nine-hour day, as against the eight-hour day under which they have been working. The nine-hour day will apply five days a week, with a five-hour day on Saturday.

Automatic Train Control

The Interstate Commerce Commission has issued a notice to the press that in the administration of Section 26 of the Interstate Commerce law, the commission has invited the cooperation of the American Railway Association, and that a joint committee on automatic train control has been appointed by the association.

The Bureau of Safety and the A. R. A. committee have

taken preliminary steps, with a view of conducting more extended service tests of automatic train control devices than have heretofore been made under official supervision, for the purpose of determining the relative merits of various types of devices, as well as the availability for general practical use of selected devices. Locations for test installations are now under consideration, and specifications and requirements are in course of preparation. Announcement of the locations selected and of the specifications and requirements applying to each of such locations will be made in due course.

The selection of devices for these test installations will be made in each case by the A. R. A. committee and the railroad company on whose line the installation is to be made, subject to approval by the Interstate Commerce Commission. These selections will be made upon the basis of plans filed with the Bureau of Safety, Interstate Commerce Commission. All meritorious devices which have heretofore been considered, or which may hereafter be submitted, will be given due consideration. With respect to devices heretofore considered, it is important that accurate and up-to-date plans should be on file for consideration.

Bertrand's Cab Indicator

Among numerous cab signal experiments now being tried on French railroads—all of the companies having been informed that the government desires decisive action in this direction—is an apparatus which was devised by U. Bertrand, formerly principal overseer on the Paris, Lyons & Mediterranean and is described in a recent number of *Genie Civil*.

In a box fixed in the cab and connected by a transmitting mechanism with an axle of the locomotive, is a speed indicator actuating a pointer on a dial, and also controlling a movable diagram of the road, showing the location of every roadside signal. This is printed on a ribbon, sections of which are successively brought before a glass-covered opening as the locomotive proceeds.

On beginning a trip, the engineman sets the apparatus at a prescribed starting point (corresponding to the actual starting point of the train) so that a bell, connected with the indicator, will be sounded at the proper time to warn him of his approach to the next fixed signal. The movement of the pointer on the dial, the sounding of the bell and the appearance of the signal location on the movable diagram (at the proper point under the glass, for the engineman's eye) are produced in unison.

After passing a signal the engineman must reset the apparatus for the repetition of the same operation in relation to the signal next to be encountered.

The inventor proposes that the apparatus be used for other purposes; as, for example, by an engineman not well acquainted with the line to give him warning, at the proper time, of his approach to a steep grade, or to a curve where speed must be slackened.

The descriptive account, reprinted in the Bulletin of the International Railway Association for November, page 799, gives no indication as to the extent to which this apparatus has been used or tested.

The Proposed Hudson River Bridge at New York City

The Hudson River Bridge Corporation has been organized, in New York, and incorporation papers were filed in Albany on January 18. The capital, for the present, is \$251,000, and the directors are George A. Post, R. A. C. Smith, John H. Love, Henry D. Walbridge, Thomas H. Simpson, Fulton MacMahon, W. J. Amend, George T. Smith and George F. D. Trask. The corporation has been organized to promote the construction of a bridge from the design, familiar to our readers, which has been made by Gustav Lindenthal, designer of the Hell Gate bridge. An organization committee of 85 members has been formed, with a view to securing the co-operation of capitalists. The entire plan, which includes terminals in Manhattan and large railroad yards in New Jersey, it is estimated will cost \$200,000,000. Among members of the organization committee are T. DeWitt Cuyler, Julius Kruttschnitt, L. F. Loree, Ira A. Place, Ralph Peters, George A. Post, Samuel Rea, John F. Wallace and Roberts Walker.

The proposed bridge would accommodate both railroad and highway traffic; it would have 14 tracks and a capacity equal to that of 20 tunnels, while its estimated cost is less than one half as much as the cost of that number of tunnels.

The announcement which is now issued gives a brief history of the proposal for a bridge across the Hudson, which, it is said, has been seriously contemplated for 30 years. But for the panic of 1893, the recent World War, and other unavoidable obstacles, it is declared that a bridge would in all probability have been built long before now.

The proposed site of the bridge is about opposite 59th street, Manhattan, and the plans show a main span which in the center would be 165 feet above the water. Its estimated capacity would be 600,000 persons an hour, as compared with 700,000 aggregate capacity of all four of the present bridges across the East river.

Cleveland Over-and-Short Bureau

At Cleveland, Ohio, the seven principal railroads have established an over-and-short bureau, to which all local freight agents of the city are to report, and where freight astray on one road can be connected with way bills containing "short" items on other roads. The bureau is in charge of the car service committee, H. F. Dunkle, chairman. At Pittsburgh, Pa., a bureau of this kind is said to have found way bills for about three-fourths of all of the "over" shipments reported.

Retrenchment on the Pennsylvania; 20 Per Cent

The Pennsylvania Railroad, which made extensive reductions of forces in November, throughout the System, intended to equal 10 per cent, whenever possible, has this week ordered a further reduction of the same extent, and the "lay-off" will be enforced in clerical and official departments, as well as others, wherever practicable. President Samuel Rea on Wednesday issued a statement saying:

"There is no arbitrary rule adopted. The principle on which the reduction will be made is to secure the utmost economy consistent with safety and efficiency. The vice-presidents, however, have been directed that in carrying out these instructions they should do so in the manner best adapted to avoid, so far as possible, unnecessary disruption of the organization, or individual hardships.

"It is to be hoped that the deduction in business will continue for only a brief period. The management sincerely regrets that uninterrupted employment cannot be assured to every faithful man on its payroll. But the situation is a practical one and no way has as yet been devised in such circumstances as those now existing to avoid a reduction in expenses and working forces.

"The Pennsylvania Railroad system now has on its lines 58,000 idle freight cars, which is about 20 per cent of the number owned, and the idle cars are increasing daily. Freight traffic has declined 20 to 22 per cent, as compared with the early fall, and all available information as to the prevailing conditions in the productive industries and general commerce indicate that a further slowing down in the freight movement must be anticipated before recovery can be reasonably expected. * * *

Plans are being considered at Pittsburgh for effecting the necessary reduction in expenses by the adoption of a rule for each employee, in a given department, to lie off one day in each week.

At various points yard switching crews are laid off, storehouses temporarily closed and roundhouse forces reduced.

The Long Island road has within two months laid off about 800 men.

Post Office Needs Additional Appropriation for Railroad Mail Pay

The Postmaster-General has asked Congress for a supplemental appropriation to meet a deficiency of \$35,840,000 in the appropriation for the transportation of the mails by railroad routes for the fiscal year ending June 30, 1921. The item is necessary by reason of the application of the increased rates for mail transportation fixed by the Interstate Commerce Commission in its order No. 6200 of December 23, 1919.

For the June, 1920, quarter, the Postmaster-General says in his letter, the value of the regular service will be approximately \$20,269,557.90, and the emergency service \$2,373,679.21, a total of \$22,643,237.11, or an annual rate of \$90,572,948.44. The annual rate of the service authorized on June 30, 1920, was \$83,731,068.47. Upon this basis the actual payments for the entire service amounted to \$6,841,879.97 (or 8.17 per cent) over and above the annual authorized rate.

"The annual rate authorized September 30, 1920, was \$81,212,343.61," he says. "Increasing this amount by 8.17 per cent we have an estimated annual expenditure for the current fiscal year of \$87,847,392.08, to which should be added 1,250,000 for the transportation of periodical matter by freight; \$800,000 (estimated) for the Air Mail Service, and \$5,830,000 (estimated) for side, terminal, and transfer service. The latter item is based upon an estimate of \$253.50 for each of the 23,000 points, approximately, where the department must provide for the handling of the mails between railroad stations and post offices under the commission's order. The foregoing items aggregate \$95,727,392.08, or \$35,840,570.08 over and above the current appropriation of \$59,886,822. It is therefore recommended that an additional appropriation of \$35,840,000 be asked of Congress to pay for the transportation of the mails by railroads for the fiscal year ending June 30, 1921."

A deficiency of \$94,700 will also be created with regard to the appropriation for the transportation of the mails by electric and cable cars for the fiscal year ending June 30, 1921, as an effect of the Interstate Commerce Commission's order of August 7, 1920, fixing the rates for the transportation of the mails by urban and interurban electric railway common carriers, which order became effective December 1, 1920. The authorized annual rate on December 1 was \$561,542.86. The estimated annual rate for the performance of side, terminal, and transfer service is \$145,950. The combined annual rate is therefore \$707,492.86, or \$162,492.86 over and above the current appropriation of \$545,000. It is therefore recommended that an additional appropriation of \$94,700 be granted to pay the increased compensation for this service for the seven months from December 1, 1920, to June 30, 1921.

The Long Island and Its Patrons

The Long Island Railroad, "to promote a better understanding of local and general railroad problems among patrons and employees," issues periodically an information bulletin, in the last number of which is a very terse, lucid and illuminating explanation of why the railroads must raise fares and freight rates. Some of the salient points of this manifesto follow:

The year 1920, with all its hopes, difficulties, disappointments and experiences, is now behind us. It was a prosperous year for the employees of the Long Island Railroad, the United States Railroad Labor Board having added over three million dollars per annum to the payrolls. Judging by statistics, Long Island generally had a prosperous year. The railroad carried approximately 73,000,000 people in 1920, an increase of about 9,000,000 over the previous year. Of the 73,000,000 passengers commuters numbered 33,563,000, and paid fares at the average rate of 0.74c. per mile. The average rate per mile paid by each passenger (all passengers), was 1.5 cents, while the actual cost to handle each passenger was 1.8 cents per mile. Both the freight tonnage and volume of passenger traffic increased very satisfactorily, and from this standpoint, the management is pleased, because a growing, prosperous territory is what it is striving for at all times. The financial results from operation, however, were highly disappointing. The gross earnings were \$25,913,000; operating expenses were \$25,116,000, leaving net revenue from railway operations \$797,000. After paying taxes, car hire and miscellaneous charges there was a deficit in railway operating income of \$833,000. Other income (non-operating) aggregated \$800,000, leaving a net loss from operation of \$33,000, while fixed charges amount to \$3,800,000, and six per cent return on capital stock amounts to \$2,040,000.

The United States Government assumed the losses up to September 1, 1920, so that the actual results to the corporation for the year 1920 will be a deficit in meeting all obligations, of about \$750,000. The present basis of rates will not enable the company to pay its way and rigid economy will necessarily have to be employed in all departments, and many little conveniences will have to be curtailed for the time being.

* * * * *

If it had not been for the war and the abnormal conditions affecting cost of operation which came from the war, the Long Island road today would be a paying proposition, and could command new capital necessary to keep ahead of the growth in population.

The management, while temporarily discouraged and in a

quandary as to where money can be secured to pay interest on the road's debts, nevertheless is not disheartened as to the future. The public bodies who hold in their hands the destinies of the transportation facilities of the country, will be compelled to act. While we shall be compelled to slow down and economize for a few months, eventually the rates will be increased, improvements will go on, the railroad will earn a return on the money invested in it, and then prosperity will abound on Long Island. * * * * *

Testimonial to Chairman Cuyler

The meeting of the Association of Railway Executives which was held in New York City on January 7 was followed by the presentation to Thomas DeWitt Cuyler, chairman of the association of an Old English silver salver; and with it a letter saying, on behalf of his associates:

"More than two years have now elapsed since you became chairman of this association. The future of rail transportation in America was enveloped in grave doubt and uncertainty. The railroads were confronted by many special embarrassments and complications; notably by—

A substantial conflict of public opinion as to private ownership or government ownership; a system of regulatory legislation which contained provisions for repression and restraint, but little of encouragement or support; the diverse and unco-ordinated policies and powers of many regulating authorities, State and Federal; impaired and inadequate credit growing out of the uncertainty in the minds of the investing public as to the future policies of the Federal and State governments * * * ; and the constant menace of labor disturbances.

It was in these circumstances that you undertook your responsible duties. The problems pressing for immediate solution were perhaps the gravest which ever arose in respect to any industry, and, in magnitude, were second only to the problems of the war. The government having, as a war measure, taken possession and control of the railroads, it was necessary:

To negotiate a standard form of contract, fixing the compensation of the carriers and providing for the preservation and upkeep during, and for the orderly return after, Federal control of the carrier properties, and for a due accounting between the parties;

To oppose the effort of the railroad administration to extend Federal control for an additional period of five years;

To place at the disposal of Congress and the public the results of the experience and thought of the railway executives of the country to the end that legislation should be adopted providing for the return of the properties to their owners, with adequate guarantees during the reconstruction period, and introducing into the system of governmental regulation constructive principles of protection and support;

To present to the Interstate Commerce Commission and the public the then existing financial conditions and tendencies of the railroad industry to the end that there should be established a system of rates sufficient to provide a credit basis for adequate and efficient transportation facilities;

To effect by the general voluntary action of the various individual managements that degree of harmonious co-operation and co-ordination of the instrumentalities of transportation necessary to provide adequate and efficient service for the public;

To establish and promote a relationship of mutual helpfulness, confidence and understanding between the carriers and the departments of government charged with the duties of regulation; and

To promote the development of a more co-operative spirit between the managements and employees of the railroads.

Under your leadership, a measure of success, in respect to the accomplishment of these and other essential purposes, has been attained, which constitutes a new and creditable chapter in the economic history of our country, furnishing encouragement and hope to those who believe that the progress and welfare of mankind are promoted best by keeping the door of opportunity open to private enterprise and effort."

The committee arranging the gift consisted of Howard Elliott, (N.P.); S. M. Felton, (C. G. W.); Hale Holden, President, (C. B. & Q.); R. S. Lovett, (U. P.); C. H. Markham, (I.C.); Samuel Rea, President, (Penn.); Alfred P. Thom, General Counsel, Association of Railway Executives; W. H., Truesdale, (D. L. & W.); H. Walters, (A. C. L.), and Daniel Willard, (B. & O.).

Traffic News

C. A. Cairns, passenger traffic manager of the Chicago & North Western, has been elected chairman of the Western Passenger Association, succeeding L. M. Allen, vice-president and passenger traffic manager of the Chicago, Rock Island & Pacific.

The Effingham, a vessel of the United States Shipping Board, has sailed from Vancouver, British Columbia, with grain for Europe, a cargo of 2,000 tons of No. 1 Northern wheat. A further shipment of 5,000 tons of wheat for the United States Government and 3,000 tons for Havre will be made soon.

Commercial travelers, claiming to represent 700,000 traveling men, appeared before the general passenger agents of the railroads at Chicago, on January 7, to ask for the introduction of an interchangeable mileage ticket at a reduction of 20 per cent under the regular fares. They said that the present high fares were taking men off the road and consequently the railroads as well as the commercial interests were losing in freight and business.

Five general division officers of the Baltimore & Ohio are spending two weeks in an intensive course of getting acquainted with shippers and other patrons in Youngstown, Ohio, and vicinity, at the same time inspecting all of the railroad company's facilities in that region. These officers are O. S. Lewis, general freight agent; E. A. Peck, general superintendent; C. M. Gosnell, industrial agent; D. F. Stevens, superintendent, and A. L. Doggett, division freight agent.

The Shipping Board has adopted a resolution calling for the appointment of a joint committee made up of three members of the Shipping Board and three members of the Interstate Commerce Commission for the purpose of considering various provisions of the Transportation Act, 1920, as well as rates, regulations and other practices. The members appointed from the Shipping Board were J. N. Teal (chairman), F. I. Thompson and Guy D. Goff. The members from the Interstate Commerce Commission are C. C. McChord, Henry C. Hall and Mark W. Potter.

The Interstate Commerce Commission has vacated, as of January 15, its Service Order No. 19, which gave priority for certain coal commandeered by the Navy. The President, by the Secretary of the Navy, has certified to the commission that in view of the adequate coal car supply prevailing at present in Pennsylvania and Maryland fields, it is believed that the interests of the government no longer require preference and priority in transportation of coal commandeered by the Navy from mines located in those fields as required by Service Order No. 19, entered October 1, 1920.

The Southeastern Express Company

Express business over the lines of the Southern Railway and the Mobile & Ohio is to be handled, after March 1, by the Southeastern Express Company. This new company has been organized under the laws of Alabama for the purpose of conducting an express business in the Southeastern states. It will have a capital of \$1,000,000, owned by Southern business men, and will have headquarters in Atlanta, Ga. John B. Hockaday, formerly vice-president and general manager of the old Southern Express Company, will be president. Officers of the Southern Railway believe that the South should have an express company of its own, engaged primarily in handling business originating or terminating in the South. The new company will establish offices at all stations on the Southern and the Mobile & Ohio and will operate on about 10,000 miles of railway.

Mr. Hockaday has had over 40 years' experience in express service in the South. He was located in Savannah for 10 years as superintendent of the Florida division of the Southern Express Company and later was in Atlanta 10 years.

Commission and Court News

Interstate Commerce Commission

John E. Benton, solicitor for the National Association of Railway and Utilities Commissioners, has filed a motion with the commission for a reargument and an order setting aside the recent decision of the commission approving the continued consolidation of the transportation interests of the express companies into the American Railway Express Company.

The Interstate Commerce Commission has suspended from January 13 until May 13, 1921, proposed cancellation of the existing proportional rates of 14 and 15½ cents per 100 pounds on grain to Louisville, Ky., and Cincinnati, Ohio, respectively, from St. Louis, Mo., in instances where such shipments do not consist of grain originating at stations in Missouri within the 100 mile zone, and only when the inbound rate to East St. Louis, Ill., exceeds the rate to St. Louis, Mo., and on grain originating at such stations when handled under transit rules and regulations lawfully on file with the commission.

The commission has considered with the United States Shipping Board the question as to the application to import and export rates in connection with the provisions of section 28 of the merchant marine act of the well established principle that under the interstate commerce act a rate upon a given shipment cannot be changed while the shipment is in transit, and the common understanding has been reached that in the event the provisions of section 28 of the merchant marine act should become effective they will not apply to import shipments which, prior to that effective date have completed their ocean voyage and been turned over to the rail carriers, and will not affect export shipments which, prior to that effective date, have been delivered to, and received for, by the rail lines.

The commission has issued a notice saying that information received by the commission indicates a lack of uniformity by carriers in accounting for certain interroad items pertaining to the guaranty period with respect to the rendition and settlement of bills and other accounts as between carriers which accepted the provisions of section 209 of the Transportation Act, 1920. Some roads apparently have proceeded on the assumption that the preparation of certain interroad accounts and corrections pertaining thereto is unnecessary in view of the fact that the net effect to the government will be the same, as between roads accepting the guaranty whether or not interroad settlements are effected.

No instructions have been issued by the commission which would warrant such an interpretation and in the interest of uniformity and continuity of the accounts it is the intent that interroad bills and accounts and corrections thereof—with the exception of those covering per diem reclaims and per diem discrepancy claims between carriers accepting the guaranty provisions—shall be prepared and settled between all roads in the usual manner, whether or not the carriers are subject to the guaranty provisions of the statute.

United States Supreme Court

Mail Cranes—Danger from Them Obvious

Action was brought against the Southern Pacific for the death of an engineman who had been struck by the end of a mail crane, or a mail sack, that had been placed on it to be picked up by a following train. The crane stood at the same distance as all the others along the road, and its end, when elevated, was 14 in. from the train. It was supposed that the engineman was looking out of the side window to look at the main driving pin, which had been getting hot. The question was whether the railroad was liable under the federal Employers' Liability Act, or whether it is consistent with its duty to employees to erect cranes so near the track. The Texas courts found the railroad liable. The Supreme Court of the United States reverses the judgment for the plaintiff, saying:

"It is impracticable to require railroads to have no structures so near to their tracks as to endanger people who lean from the windows. Most passengers are familiar with cautions against putting out heads or arms. The farthest point at which a bag could be picked up is 29 in., and it requires a less distance than that to be sure of getting the bag. In short, it would be impossible to use the contrivance with absolute certainty that no accident would happen if a man put his head out at the wrong moment. It equally is impossible to condemn railroads as wrongdoers simply for adopting the device with the conditions imposed by the Post Office Department. When a railroad is built it is practically certain that some deaths will ensue, but the builders are not murderers on that account when the foreseen comes to pass. The adoption of an improvement in the public interest does not throw the risk of all incidental damage upon those who adopted it, however fair it may be to put the expenses of insurance upon those who use it. * * *

It was to be presumed that the engineer perfectly well knew of the existence and location of the crane. Confining itself to the case of postal cranes, the court was of opinion that to allow the jury to find a verdict for the plaintiff was to allow them to substitute sympathy for evidence and to impose a standard of conduct that had no warrant in the common law.—*Southern Pacific v. Berkshire*. Decided January 3, 1921. Opinion by Mr. Justice Holmes. Mr. Justice Clarke dissents.

Limitation of Initial Carrier's Liability

On June 10, 1918, a shipper delivered to the San Antonio & Aransas Pass, at Ingleside, Tex., a carload of vegetables consigned to himself at Dallas, a point off its lines. He accepted a bill of lading having printed on its face "For use only between points within the state of Texas." The car moved to Waco and then over the M., K. & T. to Dallas, whence, on the shipper's request, the M., K. & T. forwarded it to Kansas City over its own lines, took up the original bill of lading and issued a new one acknowledging receipt of the vegetables at Dallas. When the car reached Kansas City the contents were in bad condition and the shipper sued the San Antonio & Aransas as the initial carrier, claiming a right to recover damages under the Carmack Amendment. The court below held that the provisions in interstate tariffs permitting reconignment or change of destination did not apply, that the railroad only agreed to transport to Dallas and was not liable for damage sustained beyond that point.

The Supreme Court of the United States affirms this decision for the reason that the railroad's contract related only to a movement between points in the same state. It had no notice or reason to suppose that the freight would pass beyond the destination specified. Neither shipper nor railroad had in contemplation any movement beyond the point specified and the contract between them must be determined from the original bill of lading and the local laws and regulations.—*Bracht v. S. A. & A. P.* Decided January 3, 1921. Opinion by Mr. Justice McReynolds.

A Prohibitive Classification of Freight;

Exclusive Initial Jurisdiction of I. C. C.

Silk, artificial and natural, had been accepted by the railroads of the country for transportation as freight for many years at first class rates, when, on January 21, 1920, the Director General authorized a rule including silk among articles not to be accepted for shipment. The Viscose Company, a manufacturer of artificial silk, obtained an injunction from the Federal District Court in Pennsylvania forbidding the carriers to refuse to accept silk for transportation as freight. On appeal, the Supreme Court held that the District Court did not have jurisdiction to decide the matter. Classification in rate-making practice is held to be grouping. To exclude a commodity from all classes is classification of it. To strike artificial silk from the first class and to include it in the "prohibited list," classifies it and sets it apart in a group subject to special treatment, as much as if it had been changed to the second class. The attempted change of regulation, when challenged by the shipper, presented a question for decision within the exclusive initial jurisdiction of the Interstate Commerce Commission. The importance to the commerce of the country, the court said, of the exclusive initial jurisdiction which Congress has committed to the commission, cannot be overstated.—*Director General of Railroads v. Viscose Company*. Decided January 3, 1921. Opinion by Mr. Justice Clarke.

Foreign Railway News

Central of Brazil to Electrify

Some time during the current month the Central of Brazil will ask for bids for the electrification of its double-tracked line from Rio de Janeiro to Desdoro, a distance of 14 miles, according to reports received by the Bureau of Foreign and Domestic Commerce. Bids for further electrification will be called for later.

Indian Railway Officer Dies

Neville Priestley, of London, England, managing director of the South Indian Railway, died on December 13, at the age of 59. Mr. Priestley was born in India and had been connected with Indian railway affairs all his life. In 1903 he visited this country and made a valuable report for the government of India on the organization and working of American railroads.

Construction on Portuguese Railways

LONDON

The Companhia Sintra-Atlantico, of Lisbon, is proposing the construction of an electric railway from Sintra to Estoril, Vascas, and Boca to Inferno. Bids are being called for the work of laying down the necessary line and for its working during a term of 75 years.

Queensland Railways Inquiring for Rolling Stock

LONDON

The government of Queensland, Australia, is asking for estimates for the supply of thirty-five 12-wheeled locomotives for 42 in. gage, cylinders to be 19 in. by 23 in. The tenders are to have two 4-wheeled trucks each. The approximate weight of the locomotive and truck empty is to be 66 tons, and the maximum length, 49 ft. 3/4 in. The estimates are to be delivered by March 15.

Swiss Mails and Railways to Be Combined

LONDON.

A suggestion has been made in connection with the proposed reconstruction of the Swiss public services calling for the unification of the staff of the state railways with the staff of the federal post and telegraph offices. This means that the station-masters in smaller places would become the heads of the local post and telegraph offices, while the trainmen of local trains would look after the mail bags.

A New Road for Ecuador

A road is projected from the port of Esmeraldas, Ecuador, in the direction of Quito. The proposed line will connect with a road already constructed from Quito to Santo Domingo de los Colorados and will thus open up a short route from Quito to the coast. The projected road will tap a fertile area of some 1,000,000 acres. The railway has been granted by the government a concession of about half of this land. Several valuable water power sites also will be acquired by the company under its concession. All details of this work can be secured from any of the offices of the Bureau of Foreign and Domestic Commerce by reference to file No. 17,821.

Railway Developments in Newfoundland

LONDON.

A plan of railway extension in Newfoundland proposes the construction of a through line from St. John's to Ships' Cove or St. Alban's on the south coast with a junction on the main line at Bishops' Falls or Grand Falls. A concession has been obtained from the government and progress has been made with the organization of a company and, should sufficient financial support be forthcoming, it is thought that the scheme will involve no cost.

to the government. A line of steamers will be instituted from St. Alban's to North Sydney on Cape Breton Island in place of the present service from Port aux Basques, thus enabling Canada and the United States to be reached twelve hours earlier than at present. The proposed scheme also intends to include the Botwood railway which will connect the north and south coasts of the island and thus the inconvenience under which Newfoundland has suffered of having winter ports on the two extreme ends of the island only will be removed. The new line, which will run through a valley for some distance will be much less likely to be blocked up by snow or ice than the main line. The most difficult portion of the main line will be avoided and the rail haul reduced by about 200 miles. It is anticipated that the new branch line will be operated electrically from water power available near the southern terminus.

Receipts and Expenditures of English Railways

LONDON.

The Ministry of Transport has issued a statement regarding the financial results of the working of the railways during the six months ended September 30, 1920. The total revenue earned was \$453,501,111. The total expenditure was \$415,866,636, leaving a balance of revenue earned over expenditure of \$37,634,475. The standard year proportion of net receipts under the given guarantee was \$88,581,500, to which is added for interest on capital works brought into use \$2,026,500. Thus the net government liability for the six months ended September 30, 1920, is \$54,741,928. The traffic revenue earned was distributed roughly as follows: passenger traffic, \$223,982,885; freight traffic, \$247,562,711. For the month of September there was a net government surplus of \$799,697. This is the first surplus shown in any monthly return for the railways of Great Britain. The passenger receipts for September were \$38,923,500, or 17¼ per cent higher than those for the same month of 1919. Freight traffic for the month of September increased 124 per cent as compared with the receipts for the same month of the previous year. Tonnage has increased by about 14 per cent. The coal strike is estimated to have caused a loss in the revenue of the railways of approximately \$28,000,000.

London & North Western Manager Retires

Sir Thomas Williams, general manager of the London & North Western since March, 1919, retired from that position on December 31, and has accepted a seat on the board of directors. Sir Thomas joined the staff of the company mentioned in 1876. After holding railway positions in south and central Wales, he was appointed district goods manager at Warrington. He was appointed traffic superintendent of the metropolitan area in 1907. Four years later he became assistant to the general manager, with headquarters at Euston station to deal with labor questions and the work in connection with conciliation boards. On January 1, 1914, he was appointed chief goods manager. In February, 1917, the directors appointed him acting general manager and, in March, 1919, general manager. In August, 1919, he received the honor of knighthood. He has been a member of the railway executive committee and the railway advisory committee associated with the Ministry of Transport. He was especially successful in connection with labor questions, and took a keen interest in all matters pertaining to the welfare of the staff.

Sir Thomas Williams is succeeded by Arthur Watson, C. B. E., M. Inst. C. E., general manager of the Lancashire & Yorkshire, who now simultaneously fills the position of general manager of both the London & North Western and Lancashire & Yorkshire. Mr. Watson, after being associated with the engineering department of the Lancashire & Yorkshire for a number of years, was appointed, in 1905, chief assistant engineer. Six years later he was appointed superintendent of the line. In April, 1918, he was appointed assistant general manager in combination with the position of superintendent of the line. In January, 1919, the directors of the Lancashire & Yorkshire Railway appointed him general manager. Mr. Watson attended the International Railway Congress at Berne, Switzerland in 1910. He visited the United States and Canada in 1912, and while in this country studied the working of American railroads.

Equipment and Supplies

Locomotives

THE MONTOUR RAILWAY is inquiring for 3 Mikado type locomotives.

THE NORTHWESTERN PACIFIC is inquiring for from 4 to 6 locomotives.

THE PITTSBURGH & WEST VIRGINIA is inquiring for 3, 10-wheel switching type locomotives.

THE NEW YORK, NEW HAVEN & HARTFORD is inquiring for 10, 8-wheel switching locomotives.

RICHMOND, FREDERICKSBURG & POTOMAC is inquiring for one 8-wheel switching type locomotive.

Freight Cars

THE PEKIN-MUKDEN is inquiring through the car builders for 300 or more 44-ton capacity gondola cars.

THE ANGLO-BRAZILIAN COMMERCIAL & AGENCY COMPANY, Rio de Janeiro, Brazil, is inquiring through the car builders for 300 low side freight cars.

Passenger Cars

THE LAKE ERIE & NORTHERN has ordered 3 coaches from the Preston Car & Coach Company, Preston, Ont., Canada.

THE GRAND RIVER RAILWAY has ordered 6 coaches from the Preston Car & Coach Company, Preston, Ont., Canada.

Iron and Steel

THE VIRGINIAN RAILWAY has ordered 8,000 tons of rail from the United States Steel Corporation.

Signaling

THE PENNSYLVANIA has placed an order with the General Railway Signal Company, Rochester, N. Y., for 84 position-light signals, 112 track transformers, and 180 relays, to be installed (by railroad forces) between Downingtown, Pa., and Atglen, 14½ miles.



Photo by International

Railway Station at Point Isabel, Tex., Where President-elect Harding Spent Part of His Vacation

Supply Trade News

John T. Reagan, for several years in the sales department of the P & M Company, has been appointed assistant general sales manager of the **Creep Check Company** with offices in the terminal building, **Hoboken, N. J.**

C. L. Mellor, manager of sales of the **Barco Manufacturing Company**, Chicago, has been elected secretary of this company. Mr. Mellor will continue his duties in charge of sales in addition to his duties as secretary.

R. W. Levenhagen, secretary of the **Sherwin-Williams Company**, Cleveland, Ohio, has been elected vice-president in charge of auxiliaries of the **Glidden Company**, Cleveland.

Mr. Levenhagen has spent the greater part of his life in the paint and varnish industry, having started with the **Sherwin-Williams Company** 25 years ago. He held various positions in the service of the **Sherwin-Williams Company** and rose steadily until he became secretary, which position he held until his recent election as vice-president of the **Glidden Company**. Besides serving as secretary of the **Sherwin-Williams Company**, he was vice-president and general manager of the **Detroit White Lead Works**,

Detroit, Mich., and vice-president of the **Martin-Senour Company**, **Chicago**, for a number of years.

John R. LeVally, formerly sales engineer of the **Locomotive Superheater Company**, at **Chicago**, has been appointed district sales manager of the company at **Pittsburgh, Pa.**, with offices in the **Union Arcade building**.

The **Austin Machinery Corporation**, of **Chicago**, has purchased the plant of the **Fairmont Mining Machinery Company**, at **Fairmont, W. Va.**, and will continue to manufacture this company's line of mining equipment.

The **Whiting Foundry Equipment Company**, **Harvey, Ill.**, has changed its name to **Whiting Corporation**. The **Whiting Corporation** remains under the same management and will make no change in its established operations or policies.

Martin J. Root, formerly of the **Fairbanks Company**, **New York**, has been elected president of the **United States High Speed Steel & Tool Corporation**, which has been reorganized. The headquarters of the company are at **489 Fifth avenue, New York**.

George H. Grundy, for many years connected with the **Crucible Steel Company of America**, as manager of its **New York branch**, is now associated with the **Poldi Steel Corporation of America**, **115 Broadway, New York**, as general sales manager, with headquarters at **New York**.

The **Black & Decker Manufacturing Company**, **Towson Heights, Baltimore, Md.**, has opened a new branch office and service station at **75 Fremont street, San Francisco, Cal.** This office will have jurisdiction of the company's business over the entire **Pacific coast territory** and will be in charge of **M. A. Johnson**.

The **National Railway Appliance Company**, **50 East Forty-second street, New York**, with branch offices in **Boston** and **Washington**, and the **Hegeman-Castle Corporation**, **Chicago**, announce that the selling agency for the **Clapp Fire Resisting Paint Company**, **Bridgeport, Conn.**, has been discontinued, effective **January 14**.

The **Howlett Construction Company**, **Moline, Ill.**, has taken over the selling and contracting end of the **Bay City Foundry & Machine Company's** coating station business. **W. L. Johnson Company**, **St. Paul, Minn.**, will handle the sales in the **Minnesota territory**, while **F. H. Hopkins & Co.** will have charge in the **Montreal, Quec.** district.

F. L. Cook, sales representative, and also in charge of the publicity department of the **Chicago Bridge & Iron Works**, at **Chicago**, is now in charge of the **Pacific Coast territory** of this company, with offices in the **Rialto building, San Francisco, Cal.** **Charles H. Sheldon** is the **Southern California** representative, with headquarters in the **Wright-Callender building, Los Angeles**.

The **Great Western Contracting Company**, **Kansas City, Mo.**, has changed its name to the **Rawlings Industrial Equipment Company**. This organization is sales engineer for various manufacturers of power plant machinery and is the representative of the **Conveyors Corporation of America**, **Chicago**, handling its coal and ash conveyors. The company also represents the **Springfield Boiler Company**, of **Springfield, Illinois**, and the **Cooling Tower Company**, of **New York City**.

On **January 1** the **Chambers Valve Company, Inc.**, of **New York**, was taken over by the **Bradford Draft Gear Company**, with offices at **23 West Forty-third street, New York**; **Munsey building, Washington, D. C.**, and **McCormick building, Chicago**. **Frank H. Clark**, formerly president of the **Chambers Valve Company**, becomes vice-president of the **Bradford Draft Gear Company**, with headquarters at **New York**, while the **Washington office** will be under the direction of **Harry F. Lowman**, vice-president.

Edmund H. Walker, who will be elected president of the **Standard Coupler Company**, **New York**, effective **February 1**, on the retirement of **George A. Post**, as was announced

in the **Railway Age** of **January 14**, has been connected with the company since **February, 1905**, and at present is first vice-president. Previous to his connection with the **Standard Coupler Company** he was engaged in railroad work with the **Great Northern, the Atchison, Topeka & Santa Fe, the Chicago, Burlington & Quincy, and the Minneapolis, St. Paul & Sault Ste. Marie**, in various departments. Mr. Walker was president of the **Railway Supply Manufacturers' Association** for the years **1917, 1918 and 1919**.

At the annual election of the **Union Railway Equipment Company**, **Chicago**, the following officers were elected: **W. B. Hall**, president and treasurer; **G. W. Clark**, controller and secretary; **A. F. O'Connor**, mechanical engineer; **E. S. Jubell**, superintendent; **H. O. Comstock**, sales agent. Mr. Jubell was formerly in charge of the forge department for the **Haskell & Barker Car Company**. The company's new forging plant, located on the **Indiana Harbor Belt, at Hammond, Ind.**, is now in operation.



R. W. Levenhagen



E. H. Walker

American Brake Shoe & Foundry Company

William F. Cutler, president of the Southern Wheel Company, St. Louis, Mo., has been elected vice-president of the American Brake Shoe & Foundry Company, with headquarters at New York, and William B. Given, Jr., assistant vice-president at New York, has also been elected a vice-president, effective January 1.

William F. Cutler was born on March 5, 1888, at Washington, D. C., and was educated at Hill School, Pottstown, Pa., and was in the class of 1909, at Sheffield Scientific School, Yale University. He began railway work as an apprentice in the Altoona (Pa.), shops of the Pennsylvania Railroad, and later served in the shops of the Hale & Kilburn Company, Philadelphia, Pa. In 1912, he entered the service of the American Brake Shoe & Foundry Company, at New York, and subsequently held various positions until 1914, when he went to St. Louis as vice-president of the Southern Wheel Company, a subsidiary of the American Brake Shoe & Foundry Company. In 1917, he was elected president of the Southern Wheel Company, which position he still retains, in addition to his new position as vice-president of the American Brake Shoe & Foundry Company. He is a son of Otis H. Cutler, chairman of the board of the American Brake Shoe & Foundry Company.

William B. Given, Jr., was born on December 7, 1886, at Columbia, Pa., and was educated at Yale University. He has been in the service of the American Brake Shoe & Foundry Company since 1911, with the exception of two years, when he served in the United States Army. He held various positions with the American Brake Shoe & Foundry Company, until 1915, when he was appointed assistant to president. From May, 1917, to May, 1919, he served as a captain of infantry in the Rainbow Division of the United States Army, and then returned to the American Brake Shoe & Foundry Company as assistant vice-president, which position he held until his recent election as vice-president of the same company as above noted.

Obituary

Harry L. Marsh, vice-president of the Thompson-Starrett Company, building construction, New York, died on January 13, at Overlook Hospital, Summit, N. J. Mr. Marsh had been connected with the Thompson-Starrett Company since 1912,

and had been one of its vice-presidents since 1915. He was born on July 23, 1875, at Ithaca, N. Y., and was educated at Cornell University. He began work as a draftsman in an architect's office at Ithaca. He went to Chicago in 1893 and served in the engineering department of the Chicago & North Western. He then served with the architectural firms of Frost & Granger and Holabird & Roche, Chicago, and in this connection was associated with the design and construction of the Rock Island terminal, the Chicago & North Western terminal, and the Chicago & North Western office building, and many other public buildings. In 1912 he joined the staff of the Thompson-Starrett Company, in its New York office as general superintendent, and in 1915 was promoted to vice-president. As such Mr. Marsh was head of the construction department and supervised all the construction work of the Thompson-Starrett Company, including the construction of the Woolworth, Municipal and Equitable buildings, the Hotel McAlpin, in New York, the Hotel Ambassador, at Atlantic City, the passenger station



H. L. Marsh

of the New York, New Haven & Hartford, at New Haven, and other buildings. During the period of the war he directed the work on the construction of Camp Upton, Yaphank, L. I., and the Fox Hills hospital, Grasmere, Staten Island, N. Y. He also acted in an advisory capacity during the construction of the large powder plant for the United States government, known as the United States Explosive plant C, at Nitro, W. Va.

Harry R. Warnock, vice-president in charge of mechanical matters of the Standard Stoker Company, New York, and formerly general superintendent of motive power on the Chicago, Milwaukee & St. Paul, died suddenly of heart failure at Hagerstown, Md., on January 19. He was born at Newcastle, Pa., on July 16, 1870. He began railway work as a freight brakeman with the Pennsylvania Lines West of Pittsburgh in June, 1889, and in the same year went to the Pittsburgh & Lake Erie as a brakeman. In September, 1891, he was promoted to locomotive fireman and later was locomotive engineer, which position he held until May, 1900. From that date until July, 1904, he served consecutively as engine despatcher, roundhouse foreman and general foreman, resigning on the latter date to become master mechanic of the West Side Belt, Pittsburgh, Pa., where he remained until October, 1905, when he became master mechanic of the Monongahela Railroad. He remained in this position until September, 1913, when he was appointed superintendent of motive power of the Western Maryland, which position he held until December 15, 1917, when he was appointed general superintendent of motive power of the Chicago, Milwaukee & St. Paul. In July, 1920, he became associated with the Standard Stoker Company and at the time of his death was vice-president in charge of mechanical matters, as above noted.



H. R. Warnock

Trade Publications

EVERY DAY YOU USE AN EXIDE BATTERY.—The Electric Storage Battery Company, Philadelphia, Pa., has recently issued a 32-page illustrated booklet showing various uses of exide batteries. The object of the pamphlet is to suggest by means of artist's drawings the more important ways in which exide batteries serve in the industrial and social life of the nation.

OSGOOD RAILROAD DITCHERS.—The Osgood Company, Marion, Ohio, has recently issued a 16-page illustrated bulletin descriptive of the railroad ditcher manufactured by this company. The data includes the specifications of the ditcher, both for clamshell bucket and crane work, while line drawings show the principal dimensions, etc. The text is devoted to describing the various parts of the equipment, such as the frame, axles, boiler, hoisting machinery, etc., while illustrations show the completed equipment in operation, as well as the individual parts.

BURROWS DEFECTOSCOPE AND MAGNETIC ANALYZER.—Holz & Co., Inc., New York, has recently issued a 20-page illustrated bulletin—No. 41—describing the use of the Burrows defectoscope for the detection of internal defects in iron and steel. The history and principles of magnetic analysis are discussed in the text, the major portion of which, however, is devoted to the construction of the instrument and the manner in which it is used when making an inspection of steel rails, rods, cables or other iron or steel material. The illustrations are composed of numerous curves, diagrams and photographs covering the results of actual tests, as well as showing the manner in which the instrument is employed.

Railway Construction

CHICAGO, ROCK ISLAND & PACIFIC.—This company has awarded to the Roberts & Schaefer Company, Chicago, a contract for the installation of hoisting equipment in the company's coaling station at Selden, Kan.

MINNEAPOLIS, NORTHFIELD & SOUTHERN.—This company contemplates the construction of a 12-mile extension of its line from Northfield to Faribault, Minn.

MISSOURI, KANSAS & TEXAS.—This company is accepting bids for the construction of a roundhouse at Smithville, Tex.

PERE MARQUETTE.—This company, which was noted in the *Railway Age* of December 17 (page 1089), as receiving bids for the construction of a frame freight and passenger station at Clifford, Mich., has awarded the contract for this work to Spence Brothers, Saginaw, Mich.

TENNESSEE.—The Interstate Commerce Commission has issued a certificate authorizing this company to construct a branch line for a distance of 6 miles from a connection with its main line at the mouth of Beech Fork of New River in Tennessee.

TEXAS & NEW ORLEANS.—This company contemplates the construction of repair shops at Houston, Tex., to replace the buildings destroyed by fire on December 7.

THE CALIFORNIA RAILROAD COMMISSION has granted the Western Pacific permission to abandon that portion of the Tesla Branch lying between Moy and Carnegie.

TORONTO, HAMILTON & BUFFALO.—The Department of Public Highways, Toronto, Ont., is advertising for bids for the construction of a subway under the tracks of this company at Binkley's Corners, Ont.

UNION PACIFIC.—This company contemplates the construction of a roundhouse, blacksmith shop and repair shop at Fremont, Neb.

UNION PACIFIC.—The Interstate Commerce Commission, which on November 13 issued a certificate authorizing the construction of an extension in Scotts Bluff and Goshen Counties, Wyo., with the condition that the construction should be completed on or before December 31, 1921, has issued a further order extending the time to September 30, 1922.

WABASH.—This company contemplates the construction of a station at Macon, Mo., to cost approximately \$31,000.

Railway Financial News

AKRON, CANTON & YOUNGSTOWN.—This company has applied to the Interstate Commerce Commission for a loan of \$356,000, for 15 years, to be expended in the improvement of its facilities.

ANN ARBOR.—The Interstate Commerce Commission has approved a loan of \$250,000 to this company to enable it to provide itself with additions and betterments to way and structures at a total estimated cost of \$500,000. The applicant itself is required to finance \$250,000 to meet the loan of the government.

CHICAGO & EASTERN ILLINOIS.—The Interstate Commerce Commission has announced a hearing before Director W. A. Colston, of its Bureau of Finance at Washington, on January 20, on its application for authority to issue securities for the purpose of acquiring the properties now owned by the Chicago & Eastern Illinois Railroad in reorganization.

CHICAGO & NORTH WESTERN.—This company has applied to the Interstate Commerce Commission for a loan of \$3,000,000, for 10 years, to enable it to complete the purchase of new equipment to the amount of \$9,684,093 through an equipment trust. It is proposed to apply the \$3,000,000 toward the cash payment and to issue \$6,630,000 of equipment trust certificates in accordance with its application filed with the commission on November 29, for permission to issue \$9,630,000 of 7 per cent certificates.

DENVER & RIO GRANDE.—The Stockholders' Protective Committee has appealed to the directors of the company to remove A. R. Baldwin as receiver of the road. The request was made in a letter which read in part as follows: "In view of the fact that Alexander R. Baldwin is vice-president of the Western Pacific Railway Company, and is thereby connected with the Western Pacific interests, which are seeking to wreck and destroy the Denver & Rio Grande Railroad Company, and in view of Mr. Baldwin's refusal to take any steps to protect the interests of the Denver & Rio Grande or its stockholders in this great emergency, the committee believes it to be your plain duty to take immediate steps to cause the removal of Mr. Baldwin as such receiver." Mr. Baldwin was asked by the stockholders to protect their interests, but is alleged to have replied that he had nothing to do with the pleadings in the case.

DIVIDENDS have been declared by the following roads:

Central of New Jersey.—\$2, quarterly, payable February 1 to holders of record January 27.

Huntingdon & Broad Top.—Preferred, 75 cents per share (1½ per cent), payable February 15 to holders of record February 1.

EL PASO & SOUTHWESTERN.—This company has applied to the Interstate Commerce Commission for authority to convert its present authorized capital stock, consisting of 350,000 shares of a par value of \$100, to 1,000,000 shares of stock without par value, of which 750,000 shares are to be exchanged for the \$25,000,000 par value of shares outstanding and 250,000 shares which are to be held in the treasury. The application says that the Transportation Act provides for the distribution of net profits in proportion to the value of the property irrespective of the par value. The general valuation of the railroads by the Interstate Commerce Commission is under way, and the value of the railroad will change from time to time with changing conditions and with additions and betterments. It will be impracticable to allow the outstanding stock issue to conform to these changes, and the issue of stock of no par value will enable the stock issue to conform closely to the actual value as it changes from time to time. It is stated that the company has for many years put large sums of money into the property without issuing stock against it, and it is believed the present par value has no relation to the actual value of the road. The commission has ordered a hearing on the application at Washington on January 24.

GRAND TRUNK.—Dillon, Read & Co., formerly Wm. A. Read & Co., are offering \$12,000,000 15-year 6½ per cent equipment



Photo from Underwood & Underwood, N. Y.

The Metlac Bridge on the Line from Meixco City to Vera Cruz

trust certificates, guaranteed by the Canadian government, at 95.40, yielding 7 per cent. The certificates are to be issued under the Philadelphia plan and will cover equipment costing \$16,000,000. The indenture creating these certificates provides for a sinking fund of \$400,000 annually, beginning the date of issue, which is February 1, 1921, which fund must be used for the purchase of certificates at or under par if obtainable. The balances of the sinking fund instalments not so used must be devoted to the purchase either of certificates of this issue or of Canadian government obligations maturing before the maturity of these certificates.

HOCKING VALLEY.—This company has applied to the Interstate Commerce Commission for an order authorizing the authentication and delivery of \$2,037,000 of its general mortgage bonds and the pledge of \$2,220,000 of its general mortgage bonds to secure a loan of \$1,665,000 from the United States government.

KANSAS, OKLAHOMA & GULF.—This company has been authorized by the Interstate Commerce Commission to issue \$2,744,750.11 of series A 6 per cent bonds, \$82,000 of series B 6 per cent cumulative income bonds, and not exceeding \$6,120,500 of series C 6 per cent cumulative income bonds, not exceeding \$9,120,500 of preferred stock, not exceeding \$729,640 of common stock; \$51,378.50 of 6 per cent equipment trust notes in procurement of equipment furnished by The Barney & Smith Car Company, and \$346,645.71 of 6 per cent equipment trust notes in procurement of equipment furnished by the American Car & Foundry Company.

MAINE CENTRAL.—The Interstate Commerce Commission has approved a loan of \$320,305 to this company to aid the company in meeting its maturing indebtedness. The company itself is required to finance \$80,000 to meet the loan of the government.

MINNEAPOLIS & ST. LOUIS.—This company has been authorized by the Interstate Commerce Commission to issue promissory notes to the amount of \$230,000 in connection with the purchase of five passenger locomotives

MISSOURI PACIFIC.—This company has applied to the Interstate Commerce Commission for a certificate authorizing it to purchase the stock of the Little Rock & Argenta Railway.

SACRAMENTO NORTHERN.—The special committee, which was appointed to consider the offer made by the Western Pacific to purchase the road, has recommended against the terms of the sale, holding that the Western Pacific price was inadequate and any better offer could not be obtained.

SOUTHERN.—This company has applied to the Interstate Commerce Commission for authority to issue and sell \$950,000 of its first consolidated mortgage 5 per cent gold bonds, payable July 1, 1994, to provide funds for the redemption of a like amount of serial mortgage 5 per cent, Series D, bonds of the Virginia Midland, maturing March 1.

THE TREASURY DEPARTMENT has announced the payment of loans of \$3,759,000 to the Chesapeake & Ohio, \$500,000 to the Wheeling & Lake Erie, and \$5,200,000 to the National Railway Service Corporation from the \$300,000,000 revolving fund, on certificates of the Interstate Commerce Commission, since the issuance of the list published in the *Railway Age* last week. These bring the total of loans actually made up to \$175,904,937.

WESTERN MARYLAND.—The Interstate Commerce Commission has approved a loan of \$622,800 to this company to enable the carrier to provide itself with additions and betterments to ways and structures.

WICHITA FALLS & NORTHWESTERN.—This company has applied to the Interstate Commerce Commission for a loan of \$684,000 to be used in putting its track in condition, and also for authority to issue \$855,000 of first mortgage bonds to be pledged as collateral for the loan.

WILMINGTON, BRUNSWICK & SOUTHERN.—The Interstate Commerce Commission has approved a loan of \$90,000 to this company to aid in meeting its maturing indebtedness and providing itself with additions and betterments to way and structures at a total estimated cost of \$125,000. The carrier itself is required to finance about \$35,000.

Railway Officers

Executive

E. S. Taylor, assistant to the president of the Pullman Company, has been appointed director of purchases in addition to his regular duties, with headquarters at Chicago, effective January 14.

L. E. Johnson, who retired on January 1 as chairman of the board of directors of the Norfolk & Western, was born at Aurora, Ill. He first entered railway service in 1866 as a

locomotive fireman on the Chicago, Burlington & Quincy, and remained with the mechanical department of that company until 1886, having held various positions, including that of master mechanic at Aurora. In 1886 he was appointed superintendent of the St. Louis division and two years later was transferred to the Chicago division in the same capacity. In 1890 he went to the Montana Central (now a part of the Great Northern), as superintendent. Three years later he became superintendent of the Michigan division of the Lake Shore & Michigan Southern. In 1897 he went to the Norfolk & Western as general superintendent. In 1902 he was elected vice-president and general manager, and in 1904 president and general manager. Mr. Johnson was elected chairman of the board in 1918.



L. E. Johnson

locomotive fireman on the Chicago, Burlington & Quincy, and remained with the mechanical department of that company until 1886, having held various positions, including that of master mechanic at Aurora. In 1886 he was appointed superintendent of the St. Louis division and two years later was transferred to the Chicago division in the same capacity. In 1890 he went to the Montana Central (now a part of the Great Northern), as superintendent. Three years later he became superintendent of the Michigan division of the Lake Shore & Michigan Southern. In 1897 he went to the Norfolk & Western as general superintendent. In 1902 he was elected vice-president and general manager, and in 1904 president and general manager. Mr. Johnson was elected chairman of the board in 1918.

Operating

George W. Holdrege, whose portrait is published herewith, retired as general manager of the Chicago, Burlington & Quincy—lines west of the Missouri river—with head-

quarters at Omaha, on January 1, as announced in our issue of December 24. A short sketch of Mr. Holdrege's railway career was published in the issue mentioned. As stated then, he retired after fifty-one years of continuous service with this one road. The mere chronological details of Mr. Holdrege's career do not, however, give an adequate idea of his railroad life. He had an important part in the early construction of the Burlington lines west of the river. It was throughout his long career his policy



G. W. Holdrege

to encourage by all legitimate means every industry on the road, especially agriculture, and to his efforts were largely attributable the growth of the road's traffic. It is a notable fact that the work of constructing the Burlington's western lines, of which Mr. Holdrege was in charge, was never

abandoned, even during the hard times of the nineties, and that between 1892 and 1894, a period of general suspension of railroad building, the line from Nebraska to Billings, Mont., was built. In the years when the railways were active participants in politics he was a great political power in Nebraska. Mr. Holdrege's first position with the Burlington was as a paymaster and storekeeper in the office of the Burlington & Missouri River Railway at Plattsmouth, Neb., which position he took in 1869. A year later he was transferred to the offices of the company at Burlington, Iowa, and afterward entered the train service, serving for one year as a conductor. He was then made superintendent of construction of the Chariton branch westward from Chariton, Iowa. In 1872 he was made trainmaster at Burlington, and the next year assistant superintendent at Plattsmouth. He became general superintendent of the lines west of the river in 1878, assistant general manager in 1882, general manager of the Burlington & Missouri River railway in 1884, and general manager of the Chicago, Burlington & Quincy lines west of the river in 1903.

W. L. White, whose appointment as general manager of the Yosemite Valley was announced in the *Railway Age* of December 31 (page 1183), was born in Bevier, Mo., on December 8, 1885, and entered railway service in 1905 with the Chicago & Eastern Illinois. In 1907 he left the service of the Chicago & Eastern Illinois to accept a position in the operating department of the Chicago, Rock Island & Pacific, where he served until 1909, when he took service with the Northern Pacific, also in the operating department. In 1911 he was employed in the traffic department of the Oregon Short Line, and after two years' service with that company, he entered the traffic department of the Southern Pacific. In 1915, after a year of service with the Sierra Railroad of California, Mr. White was appointed traveling freight agent on the Salt Lake & Utah. He was promoted to general freight and passenger agent of that road in 1917 and in 1920 he was made assistant general manager of the Yosemite Valley, with headquarters at Merced, Cal., the position which he held at the time of his recent promotion.

Financial, Legal and Accounting

J. H. Howard, general claim agent of the Chicago & Alton, with headquarters at Chicago, has been appointed assistant controller on the Chicago, Milwaukee & St. Paul, effective

January 20. Mr. Howard was born at Cincinnati, O., in 1879, and entered railroad service in the accounting department of the Cincinnati, New Orleans & Texas Pacific, now a part of the Southern Railway System. In 1898, he entered the service of the Chicago & Alton, being employed in the accounting department of that road in Chicago. During the next 10 years he was made station agent, traveling auditor, freight auditor, freight claim agent and general claim agent. In 1908, he left the service

of the Chicago & Alton to take a position on the Chicago Great Western at St. Paul. He remained with that road for five years and in 1913, returned to the Chicago & Alton as general claim agent. During the war Mr. Howard was called to Washington as manager of the Claims and Property Protection Section of the United States Railroad Administration. He returned to the Chicago & Alton as general claim agent in March, 1920, and was serving in that position at the time of his recent appointment.

C. F. Clement, treasurer of the Minneapolis, St. Paul & Sault Ste. Marie, with headquarters at Minneapolis, Minn., has retired after 34 years of service with the Soo Line, effective January 1. H. M. Paist, assistant treasurer, has been elected treasurer, succeeding Mr. Clement.

Frank Nay, vice-president and controller of the Chicago, Rock Island & Pacific, with headquarters at Chicago, has resigned to become controller of the Allied Chemical & Dye



Frank Nay

Corporation, of New York, effective February 1. Mr. Nay was born on April 19, 1861, near Columbus, Ohio, and entered railway service in April, 1883, as a statistical clerk in the office of the general auditor of the Missouri Pacific. From April, 1884, to April, 1887, he was employed as a clerk in the accounting department of the Texas & St. Louis, now the St. Louis Southwestern. On the latter date he was made traveling auditor on the same road, a position which he held until January, 1889, when he

was made chief clerk in the general auditor's office. He was appointed auditor on the Minneapolis & St. Louis in April, 1889, and in April, 1902, he was made auditor on the Iowa Central, in addition to his duties with the Minneapolis & St. Louis. Mr. Nay was appointed assistant controller on the Rock Island in April, 1903, and after a year and a half in this position he was made general auditor. He served as general auditor until December, 1909, when he was appointed controller. He was elected vice-president and controller in May, 1919. As chairman of the rate committee of the Association of Railway Executives, Mr. Nay had charge of securing statistical data furnished Congress during the preparation and discussion of the Esch-Cummins Bill.

Traffic

Homer Cain has been appointed general agent for the Nashville, Chattanooga & St. Louis, with headquarters at Kansas City, Mo.

C. W. Brosius has been appointed general freight agent on the Texas & Pacific, with headquarters at New Orleans, La., effective January 1.

F. G. Stebbins has been appointed district freight agent on the Baltimore & Ohio with headquarters at Dallas, Tex., and C. W. Browder has been appointed district freight agent with headquarters at Kansas City, Mo.

W. M. Knapp has been appointed general freight agent of the Central of Georgia in charge of freight traffic agencies, with headquarters at Savannah, Ga. C. D. Chancellor has been appointed assistant general freight agent, with the same headquarters. These appointments were effective January 1.

W. R. Callaway, passenger traffic manager of the Minneapolis, St. Paul & Sault Ste. Marie, with headquarters at Minneapolis, Minn., has retired, effective January 1. H. M. Lewis, general passenger agent, has taken over the duties of the passenger traffic manager, that office having been discontinued.

F. E. Lewis has been appointed assistant general freight agent on the New York Central, with headquarters at Detroit, Mich., with jurisdiction over the city of Detroit and the Detroit branch to and including Wyandotte, Mich. The office of general agent at Detroit has been abolished. E. G. Howard has been appointed division freight agent on the New York Central with headquarters at Hillsdale, Mich.



J. H. Howard

R. R. Hollinger, general agent on the Texas & Pacific, with headquarters at Pittsburgh, Pa., has been transferred to New York, succeeding C. W. Brosius, who has been promoted to general freight agent, with headquarters at New Orleans, La. G. C. Whitney, general agent, with headquarters at Kansas City, Mo., succeeds Mr. Hollinger. O. I. Shannon succeeds Mr. Whitney. H. A. Lowry, general agent, with headquarters at Birmingham, Ala., has been transferred to New Orleans, La., succeeding J. L. Hogan, who has been promoted to foreign freight agent, with the same headquarters. T. C. Taylor succeeds Mr. Lowry. The appointments and changes were effective January 1.

W. H. Wharton, general northern agent of the Nashville, Chattanooga & St. Louis, with headquarters at Chicago, has been promoted to assistant general freight agent, with headquarters at Nashville, Tenn., effective January 1. Mr. Wharton entered the service of the Nashville, Chattanooga & St. Louis in 1900 as a stenographer in the offices of the company in Nashville, and has spent his entire railroad career with this road. After being made soliciting agent, he was promoted to traveling freight agent and in 1907 became commercial agent with headquarters at Chicago. During the war Mr. Wharton was commissioned a lieutenant in the Ordnance Reserve Corps. E. J. Stegner, general agent, with headquarters at Kansas City, Mo., succeeds Mr. Wharton at Chicago.

Mechanical

J. W. Chandler has been appointed master mechanic of the Kansas City Southern, at Pittsburg, Kan., effective January 1, succeeding C. J. Burkholder, resigned to enter the service of another company. C. L. Adair succeeds Mr. Chandler as master mechanic at Shreveport, La.

W. L. Robinson, master mechanic of the Baltimore & Ohio with headquarters at Washington, Ind., has been appointed superintendent fuel and locomotive performance with headquarters at Baltimore, Md., succeeding E. E. Ramey, who has been assigned to other duties.

F. N. Pease, chief chemist of the Pennsylvania, with headquarters at Altoona, Pa., retired from active service on January 1, in accordance with the pension regulations of that company. Dr. Pease has been succeeded by M. E. McDonnell, who was assistant chief chemist, and T. W. Fisber has succeeded Dr. McDonnell as assistant chief chemist.

Engineering, Maintenance of Way and Signaling

D. Fairchild has been appointed acting supervisor of bridges and buildings on the Puget Sound division of the Northern Pacific, with headquarters at Seattle, Wash., succeeding W. E. Bradley, who has been granted a leave of absence, effective December 1, 1920.

Railroad Administration

J. G. Code has been appointed staff officer of the Railroad Administration, vice W. J. Harahan, resigned to become president of the Chesapeake & Ohio. R. J. Turnbull and C. T. O'Neal have been appointed assistants to the staff officer. The staff officer with his assistants will, in addition to the general matters heretofore handled by that office, adjust all claims remaining unadjusted by Railway Adjustment Boards Numbers 2 and 3 after January 10.

Purchasing and Stores

Edmund T. Burnett, whose retirement as general purchasing agent of the Norfolk & Western was announced in the *Railway Age* of December 24 (page 1138), was born in Philadelphia, Pa., and was educated at Saunders Institute. He was engaged in mercantile pursuits for several years after he had completed his schooling and first entered railway service in 1882 as chief clerk to the purchasing agent of the Norfolk & Western. In 1891 Mr. Burnett was appointed assistant purchasing agent, with headquarters at Roanoke, Va. In 1893 he was promoted to purchasing agent with headquarters

at Philadelphia. When the road was reorganized in 1896 Mr. Burnett transferred his headquarters to Roanoke. When the government assumed the operation of the railroads Mr. Burnett was appointed, first, an associate member of the Eastern Regional Purchasing Committee and, later, regional purchasing agent for the Pocahontas region. When the roads were returned to their owners Mr. Burnett was appointed general purchasing agent of the Norfolk & Western.

Obituary

David L. Bush, assistant to the vice-president of the Chicago, Milwaukee & St. Paul, with headquarters at Chicago, whose death was announced in the *Railway Age* of December



D. L. Bush

31 (page 1184), had been in the service of the St. Paul for more than 45 years. Mr. Bush was born on July 31, 1855, at Sharon, Wis., and entered railway service in December, 1872, as a night operator on the Western Union Railroad, now a part of the St. Paul system. In 1875 he was made chief operator in the train despatcher's office at Racine, Wis., and served there until January, 1877, when he was made train despatcher. On May 1, 1877, in addition to his other duties, Mr. Bush was made superintendent of the Western Union and the Sabula, Ackley & Dakota Railroad, which has also been taken over by the St. Paul. In September, 1880, he was made superintendent of the Racine and Southwestern division of the Chicago, Milwaukee & St. Paul, and continued to serve in that capacity until July, 1887, when he was transferred to the James River division. In February, 1888, Mr. Bush was made superintendent of the Southern Minnesota division, in 1890 he was transferred to the Hastings and Dakota division, and in 1894 he became superintendent of the River division, with headquarters at St. Paul, Minn. In April, 1898, Mr. Bush was promoted to assistant general superintendent, with headquarters at Milwaukee, Wis., and three years later he became general superintendent. He served as general superintendent until October 1, 1909, when he was promoted to general manager, with headquarters at Chicago, and in January, 1913, he was elected vice-president in charge of operation. During the period of federal control, Mr. Bush served as assistant to the federal manager of the St. Paul, having been appointed to that position in August, 1918. In March, 1920, he was made assistant to the vice-president, and was serving in that position at the time of his death.

WESTERN PROGRESSIVISM and eastern conservatism are said to have clashed sharply at the annual convention of the American Economic Association in Atlantic City, N. J., on December 27. C. O. Ruggles, professor in the University of Iowa, took issue with Prof. Frank H. Dixon, of Princeton University, who declared that the nation had been carried dangerously near paternalism through some features of the Transportation Act, 1920. "We have reached a point in the line of inquisitorial supervision where we may well stop and take account of stock. If we insist upon carrying regulation to a point where capital rebels, then there will be a decline in the character of service." "We have not gone even half way to the danger point of regulation," replied Prof. Ruggles. "We shall not get the right kind of service until terminals are controlled by one terminal corporation. It is about time to apply the law of eminent domain in clearing up that situation. Do this and we may eliminate the problem of government ownership."

EDITORIAL

Railway Age

EDITORIAL

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The divisional form of organization presumes an adequate degree of supervision by the system officers to insure uniformity of practices on the several divisions. In the maintenance of way department this implies the employment of staff officers possessing thorough familiarity with the physical conditions of the entire system, whose duty it is to supervise and inspect the work being done on the various divisions. That the value of this supplemental supervision is recognized is demonstrated by its adoption in one form or another by practically all roads committed to the divisional organization. Such supervision was never more important than at present when the greatest economy must be practiced. Steps to curtail expenditures always meet with direct or indirect opposition from the divisional or subdivisional officer who brings forth every evidence to demonstrate the dire need of his own territory in an effort to obtain some measure of relief from the operation of the orders for retrenchment. It is only through a detailed knowledge of the entire property by staff officers with special training and time to look after such matters that the management can be enabled to enforce a uniform practice of economy on the entire system.

As stated elsewhere in this issue, the plans for the convention of the American Railway Engineering Association are nearing completion. The convention will be held in Chicago during the third week in March according to the precedent established by this organization during the 22 years of its existence. By the same token the officers of the National Railway Appliances Association are perfecting all arrangements for the exhibit which will be held at the Coliseum and annex simultaneously with the association convention. The fact that the Signal division of the American Railway Association has decided to abandon its one-day stated meeting scheduled for March 14 will in no way affect the plans of the other two organizations for "Engineering Week" at Chicago. Officers of the American Railway Engineering Association have stated that there is absolutely no ground for the rumors that this association has planned to abandon its three-day meeting scheduled for March 15-17, inclusive, while the records of the National Railway Appliances Association show that the members have already contracted for nearly all of the display space available.

During the past few weeks several railroads have sent out inquiries regarding substantial lists of railroad shop equipment, particularly machine tools, and this fact indicates a growing appreciation of the urgent need for such new equipment. There is little question as to the placing of large orders when the financial situation clears at Washington and the railroads are enabled to obtain partial payments on their guaranteed returns. Pending the installation of new machinery, however, much can be accomplished to increase the

efficiency and output of railroad repair shops by making better use of present equipment. The output of many heavy repair shops is limited by the capacities of the respective machine departments and it is here that a little attention will pay the largest returns. Many old machine tools are too hopelessly out of date to be renovated or modernized, but in some cases desirable results can be secured by providing a more powerful drive, increasing the speed or feed range, or possibly strengthening the machine at a weak point. In any case, it is advisable to develop in every shop a competent repair gang charged with the duty of carefully and periodically inspecting all machines and keeping them keyed up for maximum production. In this way weak points in the machinery will be discovered and many breakdowns, with their resultant delays, prevented. Perhaps the most prolific source of increased machinery output with present equipment is in the design and application of time-saving jigs and fixtures. Careful attention to the individual job will show what operation consumes the most time and in many cases a little ingenuity will suggest some simple jig or fixture capable of reducing the time required for the operation by fifty per cent or more. In this connection a word of warning should be uttered against the man who would spend all his time designing time-saving devices. Common sense will show where to draw the line between efficient devices and complicated ones which cost more than they save.

No opposition developed at the hearing in Washington on Monday on the application of the El Paso & Southwestern Company to the Interstate Commerce Commission for permission to increase the company's authorized capital stock from 350,000 shares of \$100 par value to 1,000,000 shares of no par value, and to issue of the latter stock without par value 750,000 shares in exchange for the 250,000 shares of stock of \$100 par value now outstanding. The novelty of the plan proposed will undoubtedly attract no small amount of attention. The use of stock without par value is a new development as far as railroads are concerned. A number of industrial companies have issued such stock. The Federal Securities Commission of 1910 endorsed the idea in its report and gave extensive reasons for its endorsement. The reason given in the railroad's application was briefly that inasmuch as the value of the road is changing from time to time, as additions and betterments are made, etc., if the outstanding stock is without par value, it will conform more closely to the actual value of the road at all times. The application, however, did not state any particular reason the company may have had in mind for taking its proposed action at this particular time. The El Paso & Southwestern Company is controlled by the Phelps-Dodge interests. It is a holding company and owns directly or through subsidiaries or leases the lines which make up the El Paso & Southwestern system. The stock of the El Paso & Southwestern Company outstanding is \$25,000,000; it has no bonded debt, although there are bonds outstanding of various of the subsidiary companies. The investment in road and equipment as of December 31, 1919, is given as \$712,471,500, the invest-

ment in affiliated companies as \$34,156,431 and other investments, \$1,423,990, a total of \$42,705,136. On December 31, 1919, there was a corporate surplus of \$16,327,599. A perusal of these various facts fails to show what the company may have in mind, unless it be to capitalize its surplus as the Burlington and Lackawanna are proposing to do. That, however, will probably be brought out in later developments as well as some interesting discussion, no doubt, on the idea of railroads issuing stock without par value.

The series of articles by J. P. Risque on the railways of Chile which began in the *Railway Age* of two weeks ago has proved more timely than was perhaps expected. Press despatches from Chile this week are authority for the statement that the Chilean government is renewing its attempt to place a loan for \$25,000,000 to be used principally for additions and betterments to the state railways. The Minister of Finance is quoted as saying that the loan will bear interest at not more than 8 per cent and will be repaid by a fund created by setting aside 15 per cent of the gross revenues of the state railways. He is also quoted as saying that negotiations are going on in Europe as well as in New York and that the loan will be placed, naturally, in the place where the best terms are offered. The Chilean government has had this loan in mind for some time, and its progress or rather lack of it has been watched with interest. The friendship of the Chilean railway men for American railroad methods is well known and has been already pointed out in Mr. Risque's articles. The placing of the loan, however, is perhaps a more substantial factor, for it is generally the case that orders for equipment and supplies go to the country which supplies the funds. There can be little doubt, in other words, that if the Chileans can come to terms with the New York financial interests, there will be compensating orders for American railway material. Conversely if the loan is placed in Europe the Chilean requirements will presumably not be placed in this country despite the underlying friendship for American ways of railroading.

A year or two ago when the people of the various States authorized enormous bond issues for highway construction no little anxiety was felt by many railway engineering executives in anticipation of the depletion of their staffs in consequence of the opening up of such a large field of employment for engineers. Fortunately for the railroads, this competition has not materialized. Subsequent developments have resulted in delaying the full force of the wholesale highway construction but facts more recently brought to light are most illuminating in disclosing the real reason why railway engineers as a class have not been attracted to highway construction. The answer is an old one—inadequate compensation. This has been brought out emphatically in a bulletin issued by the American Association of Engineers calling attention to the fact that the salaries being paid by the various State highway commissions to their engineering employees and officers are woefully out of proportion to the responsibilities of the positions. A study of tables showing salaries paid in the various States shows that the rates are appreciably below those paid by most of the railroads for corresponding positions. This is particularly the case with the executive officers. The average salary paid to chief highway engineers in the 48 states is \$5,372, with a maximum of \$10,000 and a minimum of \$3,000. Bridge engineers in

only four States are paid in excess of \$4,000. Construction engineers receive from \$2,400 to \$5,000, and district engineers from \$1,800 to \$5,000. But even in the lower positions of inspector and instrumentman the scale is generally below that of the railroads. While these facts will be pleasing to the railway managements, they offer no excuse for an attitude of complacent assurance. The present rates paid the engineering staffs on railroads are in large measure the result of circumstances obtaining during the period of government control and with the present period of reduced construction activities, there will be an unquestioned tendency to reduce the average compensation to the engineering forces. A pursuance of this policy would soon wipe out the differential between railway and highway work and result in harm that would far exceed the saving in salaries.

The Port of New York — A National Problem

GENERALLY STATED the great majority of the American people are unaware of the bearing which the Port of New York has upon their affairs either in a business or a personal way. Fully one-half or more of the import and export traffic of the entire country passes through this port—a port where freight handling costs are manifestly too great. The problem is essentially a national one. Any solution that will reduce operating and freight handling costs will not only benefit the people in the immediate locality and the twelve large railroads entering the port, but will eventually benefit industry the country over.

The railroads in this district are actually losing money on the freight handled by car ferries or lighters. According to the studies of the New York-New Jersey Port and Harbor Development Commission, whose report is abstracted elsewhere in this issue, the average terminal allowance at New York is from 60 cents to 80 cents per ton while it actually costs from \$2.25 to over \$3 per ton to handle freight from the New Jersey yards to Manhattan piers. While the present system does move the freight in a fashion it is far from satisfactory or economic. The realization of this was one of the causes underlying the appointment of the Commission in 1917 to study the situation and to report a plan to remedy it. The system proposed by the Commission after three years of study and field work has many strong points, besides the fact that it can be built and placed in operation without any disturbance of existing methods. Under its operation the present average of 3½ days per car from the New Jersey yards to Manhattan and return will be reduced to 36 hours or less, an estimated saving of about one and one-half million car days under present traffic conditions. Better use of cars will result from the use of the joint yard to be built in New Jersey, while the movement of empty cars across the river—about 25 per cent of the total cars moved—will be automatically obviated. There are also other advantages that should have a marked bearing on the adoption of the plan. On the other hand, the greatest difficulty probably is that it will be necessary to overcome that of gathering together all of the loose strings of municipal authority scattered throughout the New York-New Jersey port district into one centralized directing management or port authority as the Commission calls it. Politics and petty municipal jealousies have undermined many other plans and it is probable that they will be once more at work in this instance. Yet this difficulty does not appear insurmountable by any means in this case for the legislatures of the two states seem to have realized at last that something vital must be done and done soon.

For the physical plan, certainly one feature, that of the

automatic-electric subway system, will receive its share of comment, discussion and, no doubt, disparagement. While a radical departure in port methods, it is not entirely new. In London, England, the post office department is now completing a similar installation, 6¾ miles long, to operate at speeds up to 35 miles an hour and for which equipment is now being purchased. The studies and tests for this London project extended over a period of ten years before it was finally adopted. The Commission in evolving its plan received the advice and assistance of the leading electrical engineers, transportation and conveyor men of the country as well as the indorsement of leading electrical manufacturing companies as to its practicability. While an innovation it is exceedingly well planned out, its cost is lower than any of the other proposed systems, and its capacity in tonnage is far greater. It is easily capable of expansion and offers numerous possibilities for the efficient rearrangement of present steamship facilities and distributing centers. It is independent of weather, harbor strikes, and, to a far greater degree than ever before, to labor difficulties in general. Taken altogether it is worthy of the closest study and consideration for it is the most comprehensive plan that has as yet been evolved.

One Reason Why Railway Expenses Are So Enormous

WHILE THE RAILWAYS are fighting before the Railroad Labor Board against continuance of the efficiency destroying national agreements made by the Railroad Administration with certain labor brotherhoods, the Interstate Commerce Commission has made public some statistics which would have been issued in the ordinary course of events but which have a very direct bearing upon the matters immediately in issue before the Labor Board.

The statistics of the commission show, for one thing, that in the first eleven months of 1920 the railways spent \$813,500,000 more for the maintenance of their locomotives and cars than in the same months of 1917. The cost of maintenance of equipment in the first eleven months of 1917 was \$630,000,000, while in the first eleven months of 1920 it was \$1,443,500,000, or 130 per cent more. Almost simultaneously the commission made public statistics showing that in March, 1920, the Class 1 railways had 2,009,948 employees, or 277,012 more than in 1917.

What bearing have these figures upon the subject of national agreements? In the first place, witnesses for the railways before the Labor Board have shown that under the operation of the rules of the national shop crafts agreement they are being compelled to pay employees in the shops many millions of dollars annually for work which is not done. This partly accounts for the enormous increase in the cost of maintaining locomotives and cars. In the second place, witnesses for the railways in every section of the country have been showing for a week how the abolition of piece work in the shops, and the substitution of the hourly basis of pay which the national agreements would continue, has resulted in reductions in the amount of work done per employee of from 10 to 50 per cent.

Some of the facts regarding the reduction in the efficiency of labor which followed the abolition of piece work which have been given in the testimony before the Railroad Labor Board are positively startling. It has been testified, on the basis of careful statistical studies, that in the shops of the Chesapeake & Ohio the output per man declined from 11 to 40 per cent. In the main shops of the Union Pacific it declined from 21 to 29 per cent. In the shops of the New York Central, between 1917 and 1920, the number of hours of work for which the railway paid increased 53 per cent.

while the total output of the men who did the work increased only 14 per cent. The time required to perform certain operations in the locomotive erecting shop and foundry of the Baltimore & Ohio at Newark, Ohio, and in its shops at Baltimore, Md., increased from 6.7 to 200 per cent. In the shops of the Pennsylvania the abolition of piece work has reduced the average output per man almost 27 per cent. In the car repair shops of the Chicago & North Western the decline in efficiency was 36 per cent.

The necessary effect of the establishment of the eight-hour day and decline in the efficiency of labor was to cause a large increase in the number of men who had to be employed to do the same amount of work. It is not, therefore, surprising to find from the statistics of the commission that while in 1917 the railways had 264,586 machinists, boiler makers, blacksmiths, painters and upholsterers, electricians, air brake men, car inspectors, car repairers, and machinists' helpers and apprentices, in March, 1920, they had 378,238 of these classes of employees, an increase since 1917 of 113,652. The percentage of increase in all the employees of the railways between 1917 and 1920 was 16 per cent, while the percentage of increase in the number of shop employees of the classes just mentioned was 43 per cent.

Here, then, are the facts briefly summarized. The employees in the shops in 1917 were working on a ten-hour basis, while in 1920 they were working on an eight-hour basis. For working on an eight-hour basis they are now receiving 72 per cent higher average monthly wages than they received in 1917 on a ten-hour basis. The abolition of piece work has resulted in a heavy reduction in the average work done per man, not only per day, but per hour; and because of this and the eight-hour day the railways are being obliged, or were when business was heavy, to employ 43 per cent more men in their shops than in 1917. Nor is this all. In spite of the great increase in the number of men employed in the shops, the railways were unable in 1920 to do in their own shops all the repair work on locomotives and cars required, and consequently had to send a substantial part of their equipment requiring heavy repairs to outside plants, which further greatly increased the expense of maintenance of equipment.

Is it any wonder, in view of such facts as the foregoing, that the cost of maintenance of equipment increased 130 per cent within three years? Largely because of this increase in the cost of maintaining equipment the public is today paying higher freight and passenger rates than ever before, and yet the railways are failing to earn the average return of 6 per cent on their valuation which the Interstate Commerce Commission has held they need. The public caused the railways to be returned to private operation because it believed that under private management they would be more economically operated than under government management, but the railways cannot be more economically operated under private than under government management unless they are given the opportunity to adopt the methods which are absolutely essential to increasing economy and efficiency. The national agreements, by forcing the railways to pay out many millions of dollars for work which is not done, by preventing them from establishing piece work in their shops, and by interposing other formidable obstacles in the way of increasing efficiency, are among the things which thus far have rendered it impossible for the managements to effect the large economies which they ought to effect, and are seeking to effect, not only in their own interest but in the interest of the public which pays the passenger and freight rates.

The railroads in this matter really are fighting the battle of the public, because unless operating expenses can be reduced it will be impossible for freight and passenger rates to be reduced, and they may have to be increased. In this fight, therefore, the railways ought to have the backing of an aroused and effective public sentiment.

Supreme Court on the Paterson Crossing Case

THE SUPREME COURT of the United States, in its decision holding that the Erie Railroad must obey the order of the New Jersey Public Utility Commission to elevate its tracks in Paterson at great expense to cross fourteen streets, says that intelligent self-interest should lead the state to consider carefully what the road is able to do without ruin; but that this is not a constitutional duty. The court below approved the conclusion of the public utility commissioners that the expense would not be ruinous. "It is difficult to avoid the apprehension that the officers of the state hardly gave due weight to the situation of the company as a whole," but they did not exceed their constitutional powers, says the court. For delicate shadings of opinion, this wording would be hard to beat. The state puts a very large special financial burden on the railroad company, at a time when, because of state-limited fares and freight rates, its every-day expenses are abnormally burdensome, and the only comfort our nine impartial arbitrators can offer to the railroad is that the state is not bound by the constitution to exercise intelligent self-interest! The authorities of the state must know that the people need the railroad, but there is no obligation resting on them to refrain from starving it to death. It is difficult not to see that the state, in its blindness, has oppressed the railroad; but there is no law to remedy matters.

This decision comes very near paralleling the colloquialism that there is no law forbidding a man to make a fool of himself. It would be interesting to be able to put in words the thoughts of the three minority judges—who dissented without saying why they did. The "apprehension" that the state had been unreasonable with the railroad company evidently was, in their minds, very well-defined. It is a familiar fact that a good many public servants—congressmen, for example—consistently follow the theory that full justice will be done by giving the railroads a little real nourishment after it has become indubitably apparent, to the blindest person in America, that they are actually starving to death—not merely threatened with death. This has been the case for years. The disturbing fact today is that, in spite of the enlightening experiences of the past three years, the exponents of this theory often manifest as vigorous a life as ever they did in the past; and that our democratic constitutional ideals, as expounded by our court of last resort, seem to afford no relief. General Grant said that, to get rid of a bad law, enforce it—often a very slow process. To get rid of a fault in the constitution is still slower.

What Is the Service of Supply?

IT IS WITHIN the recollection of many that the purchase and distribution of supplies required by the railroads was entrusted to the departments who made use of the materials. The stores department was then the logical outcome of an attempt to specialize on the distribution of supplies and as railway purchases grew to enormous proportions the purchasing department became an obvious necessity. But to assign to them merely these routine functions is to lose sight of one of the most potent possibilities for improving the management of our railroads. This lies in the execution of a policy that will insure the full utilization of every single item of material. The purchase of an article at the lowest price quoted and its delivery to any point on the railroad with the least expense is a comparatively simple matter to which good judgment, good organization and scientific methods all contribute. But to know that this article is actually needed, that it will be used to the best advantage

within a short interval after it is purchased and that there is not a surplus of the same article at some other point on the railroad that will obviate the necessity for purchase, calls for broader and more comprehensive action.

It may be argued that the department which uses the material is best qualified to estimate its future requirements. But is this a fact? Today, it is almost impossible to find a large railroad on which there are not quantities of materials which will last for months or years that the mechanical, the engineering or some other department *thought* they would need at once. These departments are not to blame; they were expected to have all the supplies they needed and they invariably ordered enough to be on the safe side. Now they are not expected to order anything and eventually the scarcity of many materials will become as deplorable as the present surplus. The truth is that few railroads analyze their local conditions and base their estimate of future needs upon careful study of fundamental conditions rather than upon a temperamental Wall street. The growing boy who receives a new suit of clothes during every interval in which he gains a few inches in height is fortunate but the "feller" who is showered with clothes only when his dad has a lot of surplus cash "needs a friend."

It should be somebody's business to study the recurring needs of every railroad and to map out a program for material purchases that is based on the actual growing needs of the property rather than upon earnings. The supply department through its extensive organization should be able to gage the future needs of every railroad just as the traveling salesmen of some of many progressive mercantile concerns estimate and report upon the consuming capacity of territory with which they are intimately acquainted. The purchasing department through its knowledge of market conditions should know when and how the railroad can buy to the best advantage. Hence the service of both of these departments is indispensable to a logical determination of the material requirements of a railroad. It is only by the association of these two departments presided over by a chief supply officer that a real service of supply can be established. It would be impossible to describe the service of supply to better advantage than outlined in the article on "The Service of Supply as a Business Institution," appearing elsewhere in this issue.

New Books

Proceedings of the American Society for Testing Materials for 1920. Two volumes 6 in. by 9 in., 1,360 pages. Bound in cloth. Published by the American Society for Testing Materials, 1315 Spruce Street, Philadelphia, Pa.

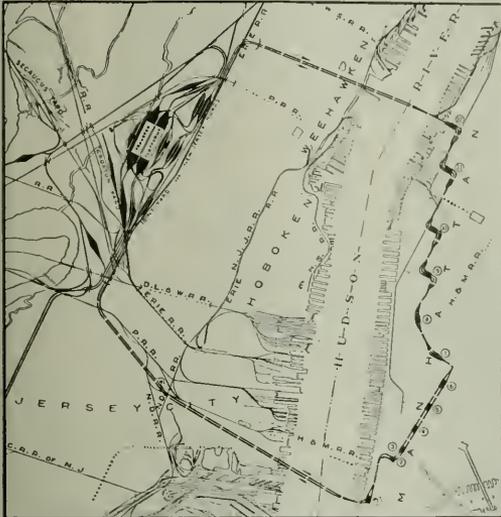
These volumes contain the proceedings of the twenty-third annual meeting which was held at Asbury Park, N. J., on June 22-25, 1920. The first volume contains the committee reports and tentative standards. Among the reports of particular interest to railway men are those on the Proposed Revisions in Standards and Tentative Standards for Steel, Corrosion of Iron and Steel, Cement, Reinforced Concrete, Concrete and Concrete Aggregate, Preservative Coatings for Structural Material, Methods of Sampling and Analysis of Coal, and Shipping Containers. Among the tentative standards incorporated in this volume are those for steel, tie plates, boiler and firebox steel for stationary service, carbon tool steel, low carbon steel track bolts, non-ferrous alloys for railway equipment, bronze bearing metals for turntables and movable railroad bridges, and babbitt metal. The second volume contains the technical papers presented before the convention, including one on The Shattered Zone in Certain Steel Rails with Notes on the Interior Origin of Transverse Fissures by J. E. Howard and another on the Effect of Hydrated Lime.

Proposed Reorganization of the Port of New York

Special Automatic-Electric Subway System Feature of the New York-New Jersey Commission Report

AFTER MORE THAN THREE YEARS' intensive study and planning the New York-New Jersey Port and Harbor Development Commission has completed its plan for the reorganization of the Port of New York and has submitted it to the state legislatures. The report covers not only the plan recommended but also contains the results of studies relative to possible solutions to the problem by means of overhead and underground systems connecting New York and New Jersey for the use of standard equipment; motor truck service; cableway truck conveyor service and improved

and New York belt systems, at first by car ferry and ultimately by tunnel under the Upper Bay; operating all of these lines jointly and operating jointly, through new joint railroad terminals, all railroad marine service not replaced by other service; and building an underground railroad system carrying special electrically operated cars, connecting with all of the railroads of the port, serving virtually all of Manhattan and enabling the railroads to discontinue their pier stations and consequently release the waterfront to other uses.



Initial Development of the Automatic-Electric System

water transfer service, all of which however were found unsuitable.

The New York-New Jersey Port and Harbor Development Commission consists of William R. Willcox, chairman; J. Spencer Smith, vice-chairman; Eugenius H. Outerbridge, DeWitt Van Buskirk, Murray Hulbert and Frank R. Ford. Major-General George W. Goethals is consulting engineer; B. F. Cresson, Jr., chief engineer; Julius Henry Cohen, counsel; William Leary, secretary, and C. A. Ruhlmann, assistant secretary.

The Comprehensive Physical Plan

A complete reorganization of the railroad terminal system is the most fundamental physical need, such a reorganization involving new methods of handling freight from the break-up yards of the railroads. The plan recommended calls for improving and opening up for joint use the existing belt-line links in New Jersey and constructing other belt lines along navigable New Jersey waters and farther inland; building similar marginal railroads along navigable waters adjacent to Brooklyn, Queens, Staten Island and the Bronx and utilizing with them the Long Island and the New York Connecting Railroad to form a belt-line system in New York; connecting the New Jersey

Present Railroad Operations

Twelve railroads, exclusive of purely local enterprises, come to the Port of New York. Nine of these enter the district from New Jersey, and are referred to as the New Jersey railroads. The remaining three enter from New York, terminate in New York and are referred to as the New York railroads.

The commission's analysis, which it believes to be more accurate than any previously attempted by any agency, gives the following figures for operating costs in 1914: For goods handled at Manhattan car-float pier stations or inland rail stations, \$1.60 per ton; for goods handled at Brooklyn, Harlem or Bronx stations, \$1.48 per ton; for goods lightered, \$2.14 per ton.

On the basis of 1918 prices, which are obviously much higher than those of 1914, the commission estimated that the total terminal costs to the railroads were about \$2.25 per ton for freight handled to or from Manhattan stations, \$2.08 for that handled to or from Brooklyn, Harlem or Bronx stations and \$3.01 for freight lightered. Considering the tonnage at the Manhattan stations alone, which amounted in round numbers in 1918 to 8,500,000 tons, the cost of the terminal operations at \$2.25 per ton was about \$19,125,000. Assuming an average terminal allowance for this freight of 75 cents per ton, the total allowance would be \$6,375,000 and the deficiency of the terminal charge in the single year on the one class of freight would be \$12,750,000.

Initial Development of Automatic-Electric System

In the initial development it is proposed to link up the New Jersey railroads by a belt line along the eastern margin of the Hackensack Meadows and build a joint railroad yard in New Jersey east of the Croxton yard of the Erie. The automatic-electric tracks will start from this joint yard in New Jersey, pass under Bergen Hill and the Hudson River to a point in Manhattan at about Forty-seventh street, thence turn southerly and pass under certain streets suitable for the location of convenient terminals, turning back to the joint yard via another set of tunnels in the vicinity of Battery Place.

A consignment of freight for one of the Manhattan terminals, coming in a train with freight for other parts of the port district, will enter the existing break-up yard of the railroad company. Here the standard railroad cars will be classified as at present, and the car containing this shipment together with others containing other freight for Manhattan will be delivered to the public or private company operating the terminal system at the intersection of its belt line with the railroad company's line. The standard railroad cars will be hauled to the joint yard and placed in a

receiving yard, whence they will be switched to tracks alongside the inbound ends of long transfer platforms.

Each of these platforms, 24 in number, will have a standard-equipment track on one side and an automatic-electric track on the other side. The freight will be unloaded from the standard railroad car upon trailers about 3 ft. by 6 ft., and the trailers will then be hauled by tractors or by hand along the platform and placed upon one of the automatic-electric cars, which will hold 12 trailers. The standard railroad car will be pushed along the platform to the outbound end and reloaded with outgoing freight from other trucks, whence it will pass into an advance yard and be despatched to the railroad from which it came, or to any other railroad to which it is to be delivered.

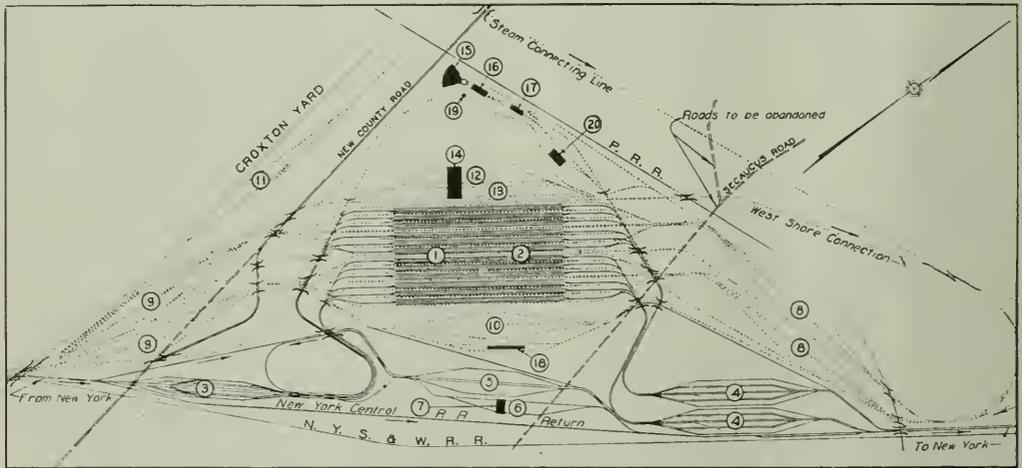
The consignment of freight will meanwhile have been loaded upon one of the special electric cars—a car somewhat larger than the ordinary box car, with a roof to protect its contents, but roll sides to permit trailer trucks to be wheeled upon it at any point.

This car, controlled from alongside by a switch on the car within reach of an operator on the transfer platform or

each car will remain alongside the platform a minimum of 12 minutes, affording ample time for the wheeling off of the trailer trucks and the wheeling on of empty trucks. The consignment will be placed on the platform to be called for, as at the ordinary freight house, or removed to storage if the consignee fails to call for it within the free time limit.

The automatic-electric cars, having discharged their loads and received empty trailers, will be advanced one by one to a second elevator, which will lower them one floor to the outbound platform at the basement level. Here the cars, after having again at least 12 minutes in which to unload their empty trailers and receive loaded trailers with outbound freight, each car receiving freight for a single railroad, will proceed back to the original elevator shaft. The cars will then be run upon the first elevator and be lowered to the track level, this elevator having meanwhile made several trips and brought other cars to the inbound level.

Running off the elevator at the side-track level, the automatic-electric cars will be held until eight have accumulated, when they will be coupled and despatched as a train by exactly the same process as from the New Jersey yard, an



General Plan of Steam and Electric Joint Yard in New Jersey

Nos. (1) and (2) designate inbound and outbound transfer platforms; (3) outbound electric receiving yard; (4) inbound electric forwarding yards; (8) inbound steam receiving yards; (9) outbound forwarding yards; (10) electrified storage yard.

on the ground, will move from the platform at a low rate of speed (from 2.2 to 6.6 miles per hour) and be switched to a track assigned to the particular terminal to which the freight is destined, freight for only one terminal having been placed on the car. When sufficient automatic-electric cars have been accumulated, eight will be coupled together and despatched in a train. This train, with no other manual direction than the throwing of the track switch, will be accelerated to a speed of 1,200 ft. per min. (13.2 miles per hour) and take its place at not less than an established distance behind another train probably destined for a different terminal. The train will bear a distinctly visible indication of its destination, and when it reaches the entrance of its terminal an operator will throw a switch and divert it to a siding, where brakes will automatically be applied and it will come to a stop.

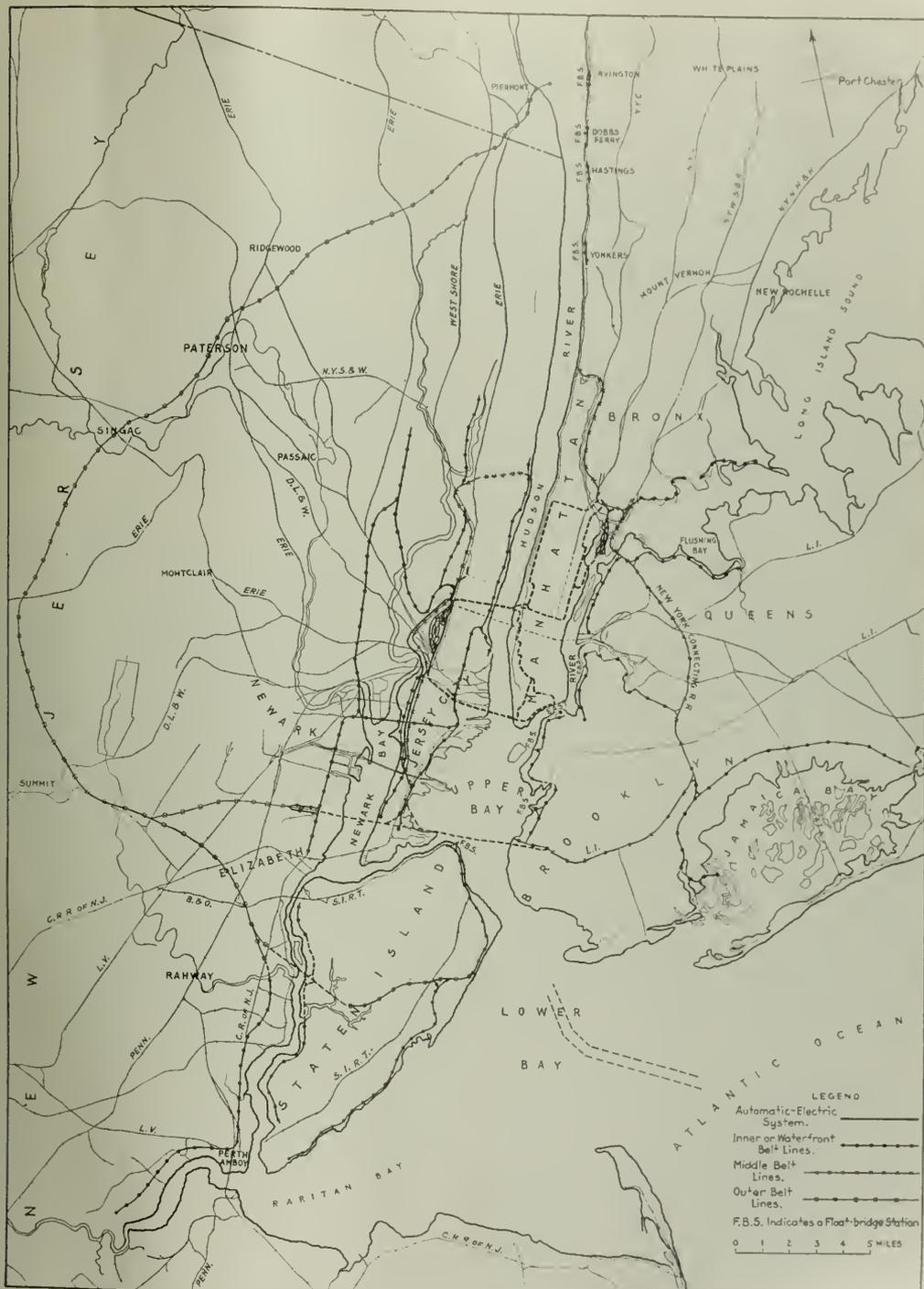
From this siding the automatic-electric cars will be run singly at slow speed upon an elevator. The elevator will raise the cars one at a time to an inbound platform at the street level and the cars will be run off under their own power. This platform will be the length of several cars, and

interlocking signal system controlling the time when the train shall enter the main-line system.

Arriving at the joint yard, the train will be switched to one of the tracks of a receiving yard, where it will be brought to a stop automatically as before. Here the automatic-electric cars will be cut off one at a time, and started by an operator walking alongside, the cars moving at a speed of 2.2 miles per hour. They will proceed over a series of switches and crossovers, controlled from a central tower, by which they will be diverted to the proper tracks at the transfer station.

The cars will be stopped at the outbound ends of the transfer platforms. The loaded trailers will be removed and transferred to standard freight cars, other trailers previously emptied will be hauled by tractors along the platform to the inbound end of the platforms, the empty automatic-electric cars will be advanced to the inbound section of the transfer station to receive new loads, and the cycle will have been completed.

An important feature of the automatic-electric system is the contemplated trailing dead section of track, which will



make it impossible for one train to come closer than a certain safe distance from the train preceding.

A special connection is required in the initial development to accommodate the New York Central. It is proposed to establish at the New York Central's Sixtieth Street yard a transfer station similar in character to that in New Jersey, from which will be constructed a double-track connection to the main loop.

Incoming New York Central trains of automatic-electric cars will enter the main system at this junction and pass south into the terminal system in the same direction and in the same manner as New Jersey automatic-electric trains until they reach the desired terminal. Outgoing New York Central automatic-electric trains will continue south, follow the south tunnels to New Jersey, be detoured around the joint yard, come back upon the main system at the north end of the joint yard, move east through the main system and be switched to the spur running to the Sixtieth Street yard.

Inasmuch as the Manhattan terminals and main line of the proposed automatic-electric system are to be located inland from the waterfront, and the New Jersey belt line and joint yard will be on ground at present unoccupied in the Hackensack Meadows, the initial development of the automatic-electric system as outlined in the preceding paragraphs can be constructed, equipped and placed in operation without in any way hampering the operation of present facilities. The importance of this feature will be realized when it is considered that the estimated period required for the construction of this system under the most favorable circumstances is three years.

The Manhattan Terminals

Twelve Manhattan terminals will be required immediately. Five more, it is estimated, can subsequently be added before the terminal capacity reaches the capacity of the joint yard and main tracks. Much depends upon the design of the terminals in Manhattan. Abundant driveway and platform space have been provided, inbound and outbound freight will be handled at different levels, and the arrangement of the driveways is such that there will be no conflict of trucks coming to the terminal for different purposes, the traffic on certain of the adjacent streets being restricted to one-way operation. To provide ample space for holding inbound freight awaiting consignee, and storage space as well for spare trailer trucks, it is proposed to build a floor above the inbound level as a part of each terminal. Above that it is proposed to build two additional stories for warehouse purposes, and it is estimated that the revenues that can be obtained from these additional floors will contribute materially to a reduction of the fixed charges against the system. Besides the two warehouse floors incorporated in the design, estimates have been made of the extra cost of and revenues obtainable from two additional floors per terminal for loft, manufacturing or office purposes.

Assurance against complete suspension of service through accidents is important in a system such as the automatic-electric. This is provided in large measure by the division of the plant into two separate and parallel systems. There are two main tracks, each with its own tunnels, each with its terminals complete as to sidings, elevators and platforms.

The New Jersey Joint Yard

There will be three principal elements in the New Jersey joint yard: A steam section for standard railroad equipment, an electric section for the automatic-electric cars, and a series of platforms for the transfer of freight by trailer or otherwise between the two kinds of cars. Standard freight cars handled by yard locomotives will be put through the steam section from north to south without back-up movement, first discharging their freight and then reloading, while the automatic-electric cars will pass through in the opposite direction, also without back-up movement. Grade

crossings of steam and electric tracks will be avoided by the elevation of the electric tracks at the crossing points beyond the ends of the platforms.

The steam section of the yard will have three main units—a group of inbound receiving yards, a transfer-platform unit and a group of outbound forwarding yards—in addition to which there will be miscellaneous facilities incidental to most large railroad yards.

The electric section of the yard will also consist of three main units—an outbound receiving yard, transfer-platform tracks and inbound forwarding yards—in addition to which there will be miscellaneous facilities within the yard proper, and bypass tracks alongside the yard for New York Central outbound trains. The automatic-electric cars will have to be classified twice, once to reach the proper platforms for discharging their outbound loads, and once after receiving inbound loads to be made into trains.

Comparative Capacities and Costs

With twelve Manhattan terminals the initial development of the automatic-electric system, normally operated ten hours a day, has an estimated capacity of 10,000,000 tons yearly, the tonnage expected in 1929. The estimated yearly capacity of the steam belt line, joint yard and Hudson River

TABLE 1—ESTIMATED MAXIMUM CAPACITY

	Tons of Freight per Year	
Automatic-electric system	14,260,000	
Present car float-pier station system	8,000,000	
Added capacity	6,260,000	77.8 per cent
Standard-equipment elevated system	6,115,000	
Standard-equipment underground system	6,115,000	

tunnels is 14,260,000 tons, and the capacity of the entire system can be brought to that figure by building five additional terminals. The capacity of the present facilities is indeterminate, but the congestion at times indicates that it is not in excess of the present peak loads. Table 1 compares the capacities of the recommended system and the present facilities, the capacity of the latter being assumed as that of the maximum short-period traffic found by the clockings sustained for a year.

The capacities of the elevated and subway systems for

TABLE 2—ESTIMATED COST OF CONSTRUCTION AND EQUIPMENT AT 1918 PRICES

Automatic-electric system	\$201,190,000
Standard-equipment elevated system	241,131,000
Standard-equipment underground system	255,009,000

standard equipment which were studied by the commission but rejected, are also shown for comparison. They, moreover, are based on operation for 24-hour days.

Table 2 shows for comparison the estimated costs of construction and equipment, ready to operate, of the automatic-electric, the standard-equipment elevated and the standard-equipment underground systems. The automatic-electric figure covers 12 Manhattan terminals. All three figures

TABLE 3—ESTIMATED COST OF MOVING 10,000,000 TONS OF FREIGHT FROM BREAK-UP YARDS TO MANHATTAN STATIONS AT 1918 PRICES

	Per Ton	Ten Million Tons
Present car float-pier station system	\$2.25	\$22,500,000
Automatic-electric system	1.82	18,200,000
Saving, automatic-electric system	\$0.43	\$4,300,000
Standard-equipment elevated system	\$3.47	\$34,700,000
Standard-equipment underground system	3.66	36,600,000

are based on 1918 prices, which the Commission deems as nearly normal for the future as can be obtained. Amortization of the entire investment in 50 years is provided in all of the automatic-electric estimates that follow, but not in those for the other systems.

Table 3 shows the estimated cost per ton of operating

each plant, and the costs at those rates for moving 10,000,000 tons of freight per year. The automatic-electric system alone has a 10,000,000-ton capacity, but to show the other systems as favorably as possible this fact is disregarded. Expanding them to the desired capacity would require much new construction, entailing additional fixed charges that would undoubtedly keep the unit costs of operation, which include both direct costs and fixed charges, at least up to the figures recorded.

Thus the advantage of the automatic-electric system over either standard-equipment system is overwhelming in capacity and cost of operation, with less capital investment, and consequently the standard-equipment system can be excluded from further consideration.

Expansion of System

The initial development of the automatic-electric system described in the foregoing paragraphs solves the West Side problem south of Fifty-ninth street and gives adequate relief where it is most necessary. It leaves to be provided for by expansion of the system the inclusion of the New York, New Haven & Hartford and the Long Island and the removal of the New York Central tracks through Riverside Park. The comprehensive plan recommended by the Commission meets both of these points by means of an additional loop in upper Manhattan connecting with the initial development and also with a second joint yard on the East River to serve the three New York railroads. This expanded system, with a line on the West Side, another on the East Side, and a third auxiliary loop on the lower East Side, makes it possible to build additional stations in territory not now served by rail, at the same time admitting the New Haven and Long Island railroads and giving all railroads equal opportunity at all stations.

The amplified plan offers the one full solution of the problem of the New York Central's West Side tracks from Spuyten Duyvil south. The plan contemplates bringing the New York Central's general-merchandise freight, perishable foodstuffs and express business along the Harlem river from Spuyten Duyvil on additional tracks to the proposed East River yard. Any other classes of New York Central's freight can then be handled either over the West Shore system or at a new waterfront yard east of the Hudson.

The additional tracks between Spuyten Duyvil and the proposed East River yard should be built as a part of the comprehensive plan, and should be available on equitable terms to all railroads of the port.

The Proposed Belt-Line Railroad System

The plan of service calls for the use of the Long Island and the New York Connecting Railroad from Bay Ridge to the Bronx by all railroads on equitable terms, and by marginal lines, not necessarily continuous but reached by float bridges or by spurs from the Bay Ridge-Hell Gate line, from which spurs are to run to Jamaica Bay and Flushing Bay. Marginal lines are to skirt the Harlem and East rivers in the Bronx from Spuyten Duyvil to Throgs Neck, and other lines are virtually to encircle Staten Island. Yonkers and the communities north are to be served by joint-car-float stations reached from Piermont. For some time to come connections between New Jersey and the Long Island belt system can be afforded by a car-float line from the Bayonne section to Bay Ridge. Running between two fixed points, with full loads at all times, such a ferry will not be expensive to operate. Ultimately, when the traffic warrants, the ferries can be replaced by a tunnel under the Upper bay.

In New Jersey the commission recommended that there be three classes of belt lines, designated as inner, middle and outer belt lines—all joined in a comprehensive and flexible whole.—Nuclei for two inner belt lines already exist—one the fragmentary Brooklyn marginal railroad, the

other the National Docks Railway, the New Jersey Junction Railroad and the Erie Terminals Railroad, which collectively extend along the east base of Bergen Ridge and the Palisades from Bayonne to Edgewater.

There should be one middle belt line on each side of the Hudson. The Long Island-New York Connecting Railroad and the line recommended along the Harlem River from Spuyten Duyvil to the East River will constitute the middle belt line for New York. That for New Jersey will have to be built, and should extend along the east side of the Hackensack Meadows as shown on the comprehensive plan, connecting with all of the railroads. The primary purpose of the middle belt lines is to afford a means for the direct interchange of cars between railroads and a throughfare for all of the railroads of the port to and from joint car-float and joint lighterage stations. Because these cars almost invariably require classification at the break-up yards, the proposed belt line in New Jersey is located wherever possible just east of those yards.

The third class of belt line, the outer belt, is at first required for New Jersey only. It should encircle the entire western half of the port, from tidewater on New York Bay to tidewater well up the Hudson River, passing outside of the break-up yards. The line as located will begin at Piermont, N. Y., on the Hudson River, pass southwesterly to the west of Paterson, N. J., and the Orange Mountains, come through the Orange range near Summit and continue in a generally easterly direction of termini on deep water, reached by short branches.

Steamship terminals will naturally be built at each of the southern termini, and a Barge Canal terminal at Piermont. A large classification yard will be required on this outer belt line, probably in the vicinity of Newark Bay, and the middle and inner belt systems should be connected with the outer belt near that yard. In a relatively short time the railroads will need to add to their break-up yard facilities, and the additions will presumably be built at the junctions of their lines with the outer belt. These additions will enable the outer belt to serve more and more as a relief to the middle belt. All of the new belt lines will open up new territory for industrial development, and should in time handle a large amount of local industrial traffic.

Consolidation of Railroad Marine Operations

Consolidation of fleets is recommended, to make it possible to operate with a much smaller total of boats at a higher load factor. Joint car-float and joint lighterage receiving stations, separated to avoid congestion, should be built at new railheads on shallow waters not suited to shipping, thereby releasing the present railhead occupancy for steamship terminal development and at the same time giving steamship companies and private terminal companies throughout the port the great advantage of receiving and delivering their railroad goods at possibly six points instead of nearly twenty.

Measures for Immediate Relief

While the automatic-electric system, the belt-line system and the joint car-float stations and lighterage stations can all be built and put into operation without interfering with present operations, several years will be required to do this. Meanwhile two steps can be taken at once to bring about partial relief in the face of the growing congestion. One of these is the consolidation of marine equipment, the other is the inauguration of "voluntary store-door delivery."

Consolidation of marine equipment need not await consolidation of terminals at any point. The advantages of a single large fleet of tugs, car floats and lighters in place of a number of independent fleets can be realized immediately.

"Voluntary store-door delivery" offers a still better opportunity for relief. Investigation has shown that probably

30 per cent of the railroad business of Manhattan is in car-load lots, and a considerable amount of that of the other sections of the port is in large consignments. To avoid rehandling of the freight there should be a considerable number of detachable truck bodies with a comparatively small number of chassis, so that goods could be transferred from the car to the truck body at the transfer platform and delivered direct to the consignee. These measures for immediate relief involve no expenditures not utilized in the ultimate plan other than the construction of a few transfer platforms—for the motor-truck chassis, detachable bodies and voluntary store-door delivery should remain as auxiliaries to the automatic-electric stations.

Railway Mail Pay

WASHINGTON, D. C.

A GOOD MANY PEOPLE, in Washington and doubtless elsewhere, have been expressing some curiosity as to why, after the Interstate Commerce Commission last January announced an increase in the rates which the Post Office Department must pay the railroads for the transportation of the mails, effective on March 1, 1920, and a readjustment retroactive to November 1, 1916, the Post Office Department has not found it necessary to ask Congress for an appropriation for the money. It was estimated at the time that the increase in mail pay for the future would amount to about \$35,000,000 a year, and that the retroactive payments would amount to nearly \$95,000,000. Possibly some who read Postmaster General Burleson's annual report for the fiscal year ending June 30, 1920, in which he attributed part of a deficit of \$17,000,000 for the year to the commission's decision, thought he had done very well under the circumstances, which perhaps is what they were intended to think. The report, however, mentioned no such large sum as had been estimated for the retroactive payments, although it did mention \$14,633,607 as having been paid for the transportation of mail in prior years.

Congressman Steenerson of Minnesota is one of those who have been curious as to how the \$95,000,000 has been taken care of, or if not why it has not been provided for. In a recent speech in the House he presented some evidence on the subject which indicates that unless something is done before March 4 the next Republican postmaster general is likely to have a very large deficit to account for.

It will be remembered that on July 28, 1916, Congress passed a law fixing tentative rates for the transportation of the mails, on the space basis, but directed the Interstate Commerce Commission to investigate the matter and prescribe the rates and the basis for the future, as well as a readjustment of the rates back to the date when the tentative rates were put into effect, November 1, 1916. The commission not only found the rates too low and ordered considerable increases for the period November 1, 1916, to December 31, 1917, but a further increase of 25 per cent effective January 1, 1918, because of the increased cost of operation after the government took over the roads. That meant that the increase from November 1, 1916, to December 31, 1917, would go to the railroad companies, that for the 26 months of federal control would go to the Railroad Administration, and the railroads after March 1, 1920, would be paid the new rates.

The Railroad Administration put an estimate in its January, 1920, income account of \$54,000,000 for increased mail pay, which incidentally represents nearly all the net operating income which the railroads had for 1920, but when it came time for the Post Office Department to ask for its appropriation for the year ending June 30, 1921, it asked for nothing on account of the increased pay to the railroads on the ground that it had applied to the Interstate Commerce Commission for a rehearing and expected to have the rates

reduced. Later it did apply for a deficiency appropriation for \$8,000,000 to cover the increase for the balance of the fiscal year ending June 30, 1920, and recently it has asked for another appropriation of \$35,000,000 to represent the increase for the present fiscal year ending June 30, 1921, but it has continued to say nothing publicly about any need for money to make the readjustment for the three years and four months since November 1, 1916, although at the time the \$8,000,000 was asked it was suggested that the department, "at the suggestion of the Railroad Administration," had under consideration the settlement of the increased amounts due the administration during the period of government control "by a transfer of funds."

By inquiry at the Railroad Administration, Congressman Steenerson got a copy of a letter written by Postmaster General Burleson to John Barton Payne, director general of railroads, which stated that an understanding had been reached between the Post Office Department and the Railroad Administration that the approximate amount due the Railroad Administration for the 26 months from January 1, 1918, to February 29, 1920, is \$65,575,832. Mr. Burleson suggested that "fiscal credit may appropriately be taken in the amount of \$65,575,832.03 (should that sum be agreed upon finally) as being the balance due the Railroad Administration" and that all accounts be closed on that basis, in other words that the amount be taken care of by a book entry. In support of this suggestion Mr. Burleson quoted a statement by Chairman Good of the House appropriations committee that as the money does not go to the railroad companies it should not go to the Railroad Administration because it had already received its appropriation for all it needed. Swagar Sherley, director of the Division of Finance of the Railroad Administration, replied to this letter pointing out that the appropriation which was made to the Railroad Administration was made upon an estimate which carried as a collectible asset the moneys due it from the various departments and that the other departments had obtained appropriations from Congress and settled in cash. He suggested that the Post Office Department should make its own request for a deficiency appropriation. He also added that the Railroad Administration had also estimated that some \$4,000,000 was due it from the Post Office for side and terminal service, in addition to the \$65,000,000, but that the amount had not yet been agreed to by the Post Office Department. Congressman Steenerson also read another letter from E. M. Alvard, assistant to the director general, dated December 30, 1920, saying that Chairman Good had misunderstood the situation and that the Railroad Administration appropriation was estimated on the assumption that the Post Office would ask for the \$65,000,000 as a deficiency appropriation and pay it to the Railroad Administration as has been done by the War Department in similar cases. "If the Post Office Department does not ask for this appropriation and pay the Railroad Administration," he said, "then the latter will probably be compelled at some time in the future to ask for additional appropriations to cover that amount."

Mr. Sherley's letter had suggested that the dispute as to the amount for side and terminal service be settled before asking for the appropriation, but the expiration of the present Congress is only about a month away and the request for the appropriation has not yet been made. Mr. Steenerson also said that the testimony of the Post Office Department officials showed that a sum of \$16,000,000 had been settled upon as due the railroad companies for the period from November 1, 1916, to December 31, 1917, and that it had been stated a deficiency appropriation would be asked for that amount. Whether this sum has yet been paid to the railroads does not clearly appear, but at any rate there has been no appropriation for it nor for the \$69,000,000 due the Railroad Administration.

Is the Railroad Problem Really Being Solved?*

Reduction of Expenses to Enable Net Earnings of Six Per Cent Requires Readjustment of Wage Scales

By Samuel O. Dunn
Editor of the *Railway Age*

A I LEAST ONCE in each year every well managed business concern takes an inventory. It does so to find out exactly what stocks it has on hand and what is its financial position. Inventories have been very important this year. Most of the business concerns of this country which recently have taken them have found that their stocks of goods have greatly depreciated in value and that their financial position has changed greatly for the worse since a year ago.

It is almost a year since the railways were returned to private operation. Many changes have occurred since then. It is time that a comprehensive inventory should be taken to find out whether as a result of these changes the situation of the railroads has been made better or worse. I do not mean by this merely an inventory of the stocks in the storehouses. The business condition of a merchant is determined largely by what his inventory shows regarding the amount and value of the stocks of goods he has on hand. An inventory of the railroads to determine what their situation is involves the taking of stock regarding many things, including the condition of their physical properties, the morale of their officers and employees, their present and prospective traffic, their present and prospective earnings and expenses, the regulation to which they are subjected and the attitude of the public and public men towards them.

It would be impossible in a short address to take stock regarding all these matters. It is, however, possible to present briefly certain important concrete facts relative to them and to draw the conclusions suggested by these facts. If the facts are truly stated and the conclusions drawn are correct some light will be thrown on the question whether any progress is being made in solving the railroad problem.

Present Situation Shows Many Improvements

A partial statement of developments within the last year could be made which would imply that the present situation and future prospects of the railways are very happy. They have been returned to private operation. The physical condition of the properties has been substantially improved. The morale and efficiency of the organizations have been somewhat bettered. The efficiency with which locomotives, cars and other facilities are used has been increased, and it has been shown that the carriers can handle more traffic than ever before. Legislation has been enacted requiring the Interstate Commerce Commission in regulating rates to give due consideration to the country's need for the adequate development of its transportation facilities, and to let the railways earn for two years an average return of 5½ or 6 per cent, and subsequently such return, assuming economical management, as they may need to provide adequate service. Under this legislation the Interstate Commerce Commission has authorized the fixing of rates which it estimated would yield a return of 6 per cent on a valuation of \$18,900,000,000. A Railroad Labor Board has been established to which all controversies arising between the railways and their employees which might lead to an interruption of transportation must be referred. The Board is authorized to

determine reasonable wages, giving due consideration to the cost of living, conditions of employment and other pertinent matters, and it has awarded the largest advance in wages ever made at one time to the obvious satisfaction of railway employees.

Situation Worse Than Ever in Other Respects

Surely these developments indicate that the railroad problem is being solved. And yet it is no exaggeration to say that seldom has the railroad situation been worse in many respects than now. Several months ago the railway executives started to reduce the number of freight cars in bad order to 4 per cent of the total, but it still exceeds 7 per cent. They started to put their locomotives in good condition, but an ominously large part of them are still in bad condition. One of the principal causes of the unpopularity of government operation was that under it a large deficit was incurred which had to be paid from taxes. During the first six months of private operation, when the government's guarantees of net return to the companies were continued, a further large deficit was incurred which the taxpayers must pay, and which has not tended to heighten the popularity of private operation. The government still owes the companies about \$400,000,000 on account of this deficit, no part of which apparently will be promptly paid to them unless special legislation is enacted by Congress. The inability of the companies to get this money has caused them to accumulate a vast current liability to concerns from which they have bought equipment and materials and has brought many railways face to face with a very acute financial situation.

Roads Not Earning Six Per Cent

To have put their net operating income on an annual basis of 6 per cent on their valuation the railways should have earned in September \$109,220,000, in October \$112,709,000 and in November \$99,598,000, a total of \$321,000,000. The net operating income actually earned in these months was: September \$75,310,000, October \$86,456,000, and November \$57,741,000, a total of only \$219,507,000, or but 67 per cent of the return expected. At this rate the railways would earn only 4 per cent annually on their valuation, instead of 6 per cent, and these were months of large business. Their freight traffic has declined 30 per cent since October, and on January 1, instead of a large shortage of cars, such as had prevailed so long, they had a net surplus of 257,000 cars.

It was claimed that the advances in rates granted by the Interstate Commerce Commission would cause an increase in prices and in the cost of living. They were speedily followed, however, by unprecedented general declines in prices, and in spite of the fact that the new rates are not yielding to the railways anywhere near the net return expected loud complaints regarding them have begun to be made, especially by farmers and other classes of persons who are suffering from the declines in prices which have occurred. Therefore, although the railways in 1920 handled a record-breaking business with an efficiency which in many respects was unprecedented, and although the advances in rates did not

*A paper read before the meeting of the New York Railroad Club on January 21.

cause any increase in the cost of living, it is obvious to every student of public opinion that, because of the large deficit incurred before the advance in rates was made, and because of the large advances in freight and passenger rates granted private management of railroads is not as popular in this country now as it was a year ago. Perhaps it is largely due to this that the spokesmen of the railroad labor brotherhoods have considered the present an opportune time to send broadcast wholesale charges of mismanagement and waste against the railway companies in connection with repairs made to locomotives and cars outside of their own shops.

Difficult to Reach Conclusion That

Problem Is Really Being Solved

When one surveys and weighs facts such as these I have just mentioned he is likely to have difficulty in reaching the conclusion that the railway problem is really being solved at the present time.

If we regard the situation from the standpoint merely of the legislation which has been enacted we are likely to draw conclusions which are too optimistic. Legislation and the decisions and orders of regulating bodies are mere "scraps of paper" until they have actually been given effect.

On the other hand, if we consider only the poor showing of earnings that the railroads have made under the new rates, the enormous decline of traffic which has recently occurred, the attacks upon the railway companies which have been made by spokesmen of the labor brotherhoods, and the slight but easily perceptible and unfavorable change in public opinion which has occurred, we shall draw conclusions that are too pessimistic.

The railroad problem was acute before this country entered the war. Our participation in the war and government operation caused many important developments affecting the railroads adversely which greatly increased the difficulty of the problem. They made it a problem of tremendous complexity and difficulty. Therefore, there is no occasion for great surprise and disappointment because the final solution of it is still far off. It cannot be solved unless the public and public men can be made to understand what the problem is at present and why it is what it is. Therefore, it is our duty not to repine or grumble because faster progress has not been made, but to state the problem and its causes clearly over and over again until the public and public men do understand it and its causes. It does not seem unreasonable to believe that once they have got a correct understanding of it and its cause they will act fairly and wisely.

I need hardly recall to you that even before we entered the war the development of the railroads had been practically stopped by adverse regulation and that they had become unable even then to handle satisfactorily the commerce of the country. In the years 1914 and 1915 the average net return earned by them had declined to only about 4 per cent on their property investment. Suddenly, late in 1915, there came a great increase of traffic with the result that for about a year and a half before we entered the war there were constant congestions and shortages of cars. In the years 1916 and 1917 earnings were very large and the companies made unprecedented expenditures for maintenance. In consequence when at the end of 1917 government control was adopted the companies turned over to the government a plant which, while it was inadequate to the demands of business, was probably in the best condition it ever was.

President Wilson's Proclamation

It was a momentous event in the history of the railroads and in the history of the country when on December 26, 1917, President Wilson issued his proclamation announcing the adoption of government control. It is important to recall what the President said at that time because it has a direct

and important bearing on subsequent developments and the present situation. The President said:

Investors in railway securities may rest assured that their rights and interests will be as scrupulously looked after by the government as they could be by the directors of the several railway systems. Immediately upon the assembling of Congress I shall recommend that these definite guarantees be given:

First—Of course that the railway properties will be maintained during the period of federal control in as good repair and as complete equipment as when taken over by the government.

Second—That the railroads shall receive a net operating income equal in each case to the average net operating income of the three years preceding June 30, 1917, and I am entirely confident that the Congress will be disposed in this case as in others to see that justice is done and full security assured to the owners and creditors of the great systems which the government must now use under its own direction or else suffer serious embarrassment.

Solemn Obligation to Railroad Owners Not Kept

There can be no doubt that President Wilson desired and intended that the solemn obligation to the owners of the railroads, to which he committed the government under powers vested in him by Congress, should be kept. He recommended and Congress passed legislation designed and appropriate to fulfilling these obligations. It is, however, susceptible of proof that this solemn obligation on the part of the government has not up to the present time been fulfilled, and it is largely because it has not been fulfilled that our railroad problem is what it is today. The government did not "maintain the railroads in as good repair and as complete equipment as when taken over." For example, it did not put in their tracks anywhere near the number of new ties and rails necessary to maintain them in accordance with its obligation. Even in the year 1919, after the war was over, it placed in their tracks the smallest number of tons of new rail that had been laid for 22 years. It bought in the 26 months of government control only as many freight cars as the companies had actually scrapped and retired from service annually during the preceding five years. It bought no passenger cars at all. It repaired and maintained their locomotives and cars so inadequately that when the railways were returned to private operation their equipment was in the worst condition ever known.

Nor did the government keep its promise to investors in railway securities that "Their rights and interests would be as scrupulously looked after by the government as they could be by the directors of the several railway systems." The year before the government took over the railroads they earned a net operating income of \$975,000,000. To have fulfilled its obligations to investors the government should not only have guaranteed to them the same return as had been earned in the three years ending June 30, 1917, but it should have returned their properties with the same relationship existing between earnings and expenses as existed when they were taken. On the contrary, enormous increases in expenses occurred, corresponding advances in rates were not made, and when the properties were handed back the net operating income had been absolutely wiped out. The complete destruction of the net operating income had caused a decline in the value of railway securities which meant a loss of billions of dollars to those who held them.

In Striking Contrast to Other Industries

While the government did not adequately maintain the properties as it had obligated itself to do, it did pay war prices which, of course, were unprecedentedly high prices, for all the additional facilities it provided. Many of these additional facilities were provided to further the Director General's scheme of permanently "unifying" all the railroads—a plan absolutely inconsistent with the obligations to the

owners of the properties into which President Wilson had solemnly entered on behalf of the government. Since government control was a war measure, and since many of the capital expenditures made under it were made to carry out a scheme of unification to which the owners of the railways had never consented and to which they were opposed, it would have been only fair for the government to have assumed and written off as one of the costs of the war a large part of the capital expenditures it made, just as it assumed a large part of the capital expenditures made in many other industries for war purposes. On the contrary, the Railroad Administration has sought throughout to compel the railway companies to assume the entire burden of all this class of war expenditures and to add them to their capital accounts, on which a return must be earned and paid in perpetuity.

The government's treatment of the railroads in these respects is in striking contrast to its treatment of other industries. Whatever else may be said of government control, it cannot be said that under it the railways failed to render the service for which they were taken. They handled every soldier and every ton of freight for which transportation was needed in order to win the war.

No "Railroad Millionaires"

The government, however, paid to the railway companies for the use of their properties a rental equal only to the returns they had earned before the war. There was no profiteering by the railways. The war made no "Railroad Millionaires."

In the coal industry, on the other hand, the government fixed prices which enabled producers and dealers to make profits surpassing the wildest dreams they had ever had.

It spent hundreds of millions of dollars for aeroplanes which never flew. Those who made these aeroplanes derived large profits from making them, and they have got their money.

It spent hundreds of millions of dollars for ordnance which never fired a shot. Those who made this ordnance derived large profits from making it, and they have got their money.

It spent hundreds of millions of dollars for millions of tons of shipping which never carried a pound of freight during the war. Those who built these ships made large profits, and they have got their money.

Deficit in First Six Months of 1920

an Aftermath of Government Control

The railroads, as I have said, rendered all the service for which they were taken and their owners during government control and during the first six months of private operation following government control were guaranteed only the same return that actually had been earned during the three years before the war; and yet today the government owes their owners \$400,000,000 which is almost five months overdue. The companies are in dire need of this money, and yet the Treasury Department and one federal court have held that no railway company can get any part of its share of what remains due it until it has made a complete settlement with the government, which in most cases will take months. It may be said in extenuation of the government's course in delaying payment of this part of its indebtedness to the railways that it was not incurred under government control but is due to a deficit incurred under private operation. That is true, but it is easily demonstrated that the deficit incurred in the first six months of private operation was the direct aftermath of government control. It was due to the following facts:

First—Under government control the net operating income of the companies was wiped out by increases in expenses.

Second—The government failed to make the advances in

rates which were needed to restore the net operating income to its former basis.

Third—The government did not adequately maintain the properties, which rendered it necessary for the companies after the railways were returned to them largely to increase maintenance expenditures. It was this condition which forced them to give large amounts of repair work to outside plants.

Fourth—The Railroad Administration left pending huge demands for advances in wages, which a government body, the Railroad Labor Board, met by awarding advances amounting to \$620,000,000 a year.

These things made it inevitable that unless a large advance in rates was granted by the Interstate Commerce Commission immediately after the railways were returned to private operation a huge deficit would be incurred, and no advance in rates was granted until after six months of private operation.

A Breach of Faith to Withhold Payments of Guarantee

The government in the exercise of its war powers treated other essential industries not only fairly but generously. The railways, one of the most essential of all industries, it did not treat generously or even fairly during the war and it is now adding another wrong and injury to those it already has done them by withholding from them the large amount of money due them. It would be another breach of faith on its part for it to continue to withhold this money any longer than is absolutely necessary.

If this money should be paid to the companies in the near future it would relieve their present pressing necessities. It would also relieve the pressing necessities of the many concerns to which they owe many millions of dollars. It would enable the railways to begin making the larger purchases which they ought to make to put their facilities in better condition. But while it would relieve the present situation it would not by any means solve the acute railroad problem now confronting us.

Net Returns Not Sufficient Under New Rates

The Interstate Commerce Commission has recognized the principle that the railways must earn 6 per cent on a valuation of \$18,900,000,000 to enable them to raise enough capital to expand their facilities sufficiently to give the public adequate service. The commission and most other students of the subject believed that the advances in freight and passenger rates granted about five months ago would enable the railways to earn 6 per cent. The time has come when we should squarely face the manifest fact that the railways cannot with existing rates and existing wages and other costs earn 6 per cent. As I have shown, they earned at the rate of only 4 per cent in the months of September, October and November, when they handled more business than ever before in those months. Their failure to earn the return expected is partly due to the fact that in many states advances have not been made in state rates corresponding to those made in interstate rates. But, it is evident that even if all rates were advanced as much as the Interstate Commerce Commission held was necessary the railways could not earn the return estimated by the commission. The commission recognized, however, that if they did not earn 6 per cent they could not raise the capital required adequately to enlarge their facilities. If they cannot do this they cannot provide good and sufficient service for the public. We should not allow ourselves to be in the least deceived by the fact that the demands of traffic are at present not equal to the capacity of the railways. We have had many commercial depressions and declines of traffic before, and they have always been followed by periods of industrial and commercial activity in which the traffic offered has exceeded

anything ever known before. We shall see history repeat itself in this respect.

Reduction of Expenses Only Alternative

The net operating income of the railways can be made sufficient by further advancing their rates or by reducing their expenses. Undoubtedly the public would strongly oppose a further advance in rates under present conditions, when the prices of most commodities, especially of farm products, are declining. The only alternative is to reduce operating expenses. The large items of operating expense are roughly divisible into three classes—cost of fuel, cost of material and supplies, and cost of labor. Prices of fuel and of materials and supplies have been extremely high, but developments are occurring which are reducing them and undoubtedly should and will reduce them further in a short time. The present very high operating expenses of the railroads are, however, chiefly due to their enormous payroll. This enormous payroll is due to the granting of the eight-hour day under government control, which has caused a large increase in the number of employees; to the fact that the efficiency of labor is much lower than before the war; and to the large advances in wages made by the Railroad Administration and by the Railroad Labor Board last July. The operating expenses of the railways are now running at the rate of about \$5,950,000,000 a year, or over \$3,100,000,000 a year more than in 1917. Of this increase in expenses since 1917 almost \$2,000,000,000 is due to increases in the payroll.

Reduction of Payroll Necessary for Reduction of Expenses

It seems evident that no sufficient reduction of expenses can be secured without a reduction of the payroll.

The advance of \$620,000,000 a year in wages awarded last July by the Railroad Labor Board was made when the cost of living was the highest ever known, being 104.5 per cent more than in 1914. Since then the cost of living has declined, and is estimated by the National Industrial Conference Board to be now only 90 per cent more than in 1914. The present annual average wage of railroad employees for working eight hours a day is 125 per cent greater than it was in 1914 for working ten hours a day. The employees have benefited both by a substantial reduction in their working hours and by large advances in their average wages, and under the national agreements made by the Director General of Railroads with various organizations of employees many millions of dollars are being paid them annually for work that is not done. In 1914 the railways had 1,700,000 employees and paid them \$1,337,000,000. In 1917, although they handled a very much larger traffic, they had about the same number of employees and paid them \$1,740,000,000. Today, because of the establishment of the eight-hour day and the advances in wages which have been granted they have about 1,950,000 employees who are being paid about \$3,600,000,000 a year. While the increase in the average annual wage per employee since 1914 has been about 125 per cent, the increase in the total payroll has been about 170 per cent.

The Attitude of Farmers and Business Men

The farmers and business men of the country recently have lost many hundreds of millions of dollars because of declines in prices. Wages already have been reduced in many industries. The Railroad Labor Board in granting the advance in wages last July based it largely upon the high cost of living prevailing at that time. No injustice would be done railway employees by making some reduction of their wages at this time. In view of developments since the present wages were fixed a rehearing of the wage case

should be held and wages fixed which will be more in harmony with existing conditions.

As I have already remarked there is much complaint from many sources regarding the present freight and passenger rates. The necessity for the present rates is created chiefly by present wages and unless there is a great increase in the efficiency of railway employees, which their organizations are not only not trying to promote but by opposing piece work and other efficiency methods are actually trying to prevent, either wages must be reduced or freight and passenger rates must be further advanced. The farmers, shippers and consumers are all deeply interested in the question of railroad costs because the cost is what makes the rates which all the public have to pay directly or indirectly, and the railway payroll at present constitutes 60 per cent of all operating expenses. All present railway costs should be reduced, but the payroll is so large a part of total operating expenses that no substantial relief to the railways, which are not earning an adequate net return, or to the public, which has to pay present freight and passenger rates, probably can be obtained without a substantial reduction in wages.

With Care and Discrimination

Any reduction in wages which is made should be made with care and discrimination. It should be made with due regard to the cost of living and to the value of the service actually rendered by different classes of employees. It should recognize the fact that most supervisory officers were paid too little as compared with most classes of employees before the recent advances were made and that the advances granted to them have been relatively less than those given to the employees. Therefore, it is very doubtful if any reduction in the compensation of supervisory officers should be made. Account should be taken of the fact that many unfair relations between the wages of different classes of employees exist and that therefore while some classes of employees could in fairness have their wages sharply reduced some other classes, such as section foremen and signalmen, should have theirs reduced much less, if at all. But, it has become manifest that the railroad payroll, in the aggregate, should and must be substantially reduced, and steps in this direction should be taken in the near future.

Inability to Earn Proper Return Creates a Serious Situation

The demonstrated inability of the railways to earn the return provided by the Transportation Act, even when handling a maximum traffic, and the tremendous decline of traffic which has occurred, are creating a serious situation to which not only railway managers, but business men, the Railroad Labor Board and the Interstate Commerce Commission and Congress should give early attention.

The return of the railways to their owners was made in obedience to a public sentiment which unmistakably favored private ownership and management. The passage of the Transportation Act was a long step toward the solution of the railroad problem under private ownership and public regulation, provided it is to be treated not merely as a "scrap of paper," but is to be carried out in the spirit of a constructive measure designed and intended to enable the railways to be rehabilitated and expanded to meet the social, commercial and industrial needs of the country. Because it has not yet produced all the beneficial results which its advocates and authors expected is no reason for saying that it is not adapted to solving the railroad problem.

But neither it nor any other piece of legislation, however skillfully designed and constructed, will accomplish its purpose unless it is fully carried out in the spirit in which it is drafted and enacted.

The Transportation Act imposes upon the managers of the railways the duty of operating and developing them as economically and as efficiently as they can. It imposes upon the Railroad Labor Board, in case of a controversy between the companies and the employees that may interrupt transportation, the duty of establishing working conditions and wages which will be fair to the employees, but which at the same time will be such that the companies can operate and develop the properties efficiently and economically. It imposes upon the Interstate Commerce Commission the duty of seeing that the railways are efficiently and economically managed and developed, and of fixing rates which will be fair to the public, but which at the same time will be sufficient to enable the railways to provide adequate service.

The failure of the government thus far to make good on its guarantee of standard return during the first six months of private operation has created an extremely embarrassing and critical situation, but the good faith of the government is pledged to remedy this condition promptly, and doubtless it will do so. The railway managers, the Railroad Labor Board and the Interstate Commerce Commission thus far undoubtedly have tried to meet the obligations and perform

the duties imposed upon them by the Transportation Act. That their united efforts have thus far failed to advance the solution of the railroad problem as much as was hoped is due mainly to the complexity and difficulty of the problem and to conditions beyond their control. The complexity and difficulty of the problem are still as great as ever, but today the problem should be better understood by those who are wrestling with it than it was a year ago.

We do not know as yet whether it is really being solved, but we soon shall know. We shall soon know whether the railway managers, the Railroad Labor Board, the Interstate Commerce Commission and Congress have the intelligence, the ability and the courage squarely to face the facts, and to do the things in their several spheres which the facts clearly indicate they must do if the plain spirit and intent of the provisions of the Transportation Act regarding the wages and conditions of work of the employees, the regulation of rates and the development of the facilities of the railways are to be carried out. If the plain spirit and intent of the provisions of the Transportation Act regarding all these matters are carried out, I have no doubt we shall be able to decide that the railroad problem is being solved.

The Service of Supply as a Business Institution*

Conservation of Material by Application of Business Principles Is Essential to the Railroads

By H. C. Pearce

General Purchasing Agent, Seaboard Air Line

THE REAL PURPOSE of the service of supply is to provide needed materials for the economical maintenance and operation of the railroad, where they are wanted, of the most suitable quality for the purpose for which they are required, and at the lowest net cost to the railroad. The supply officer is charged with the responsibility of expending monies for materials and supplies for the railroad as carefully as he would for a mercantile establishment, with this difference, a merchant buys to sell, the supply officer buys to use.

Principles of Organization

The first underlying principle of an organization to carry out the real purpose of the service of supply is the means of knowing accurately, at all times, that the need exists, what the resources are to meet the demands, and the monies available. It will be admitted without question, that every organization must have one directing mind to co-ordinate the different elements which must enter into a department of a railroad. There is undeniably an inseparable connection between the officer that procures the material and the officer that distributes and accounts for it.

An organization is not so much a matter of titles as of purpose and the understanding of its responsibilities. An organization must be built for the purpose, and not to fit around the individual. The ideal supply organization would have as its head a chief supply officer, with whatever title conditions and individual opinions may determine. This officer should have entire charge of the service of supply, and as many officers reporting to him as the extent of the property may require. Broadly speaking the organization would consist of a chief supply officer, purchasing agent,

general storekeeper, tie and timber agent, fuel agent, engineer of tests, supply train storekeeper, district division and local storekeepers. It will be apparent that under this broad plan of organization there are many properties where the purchasing agent, general storekeeper or storekeeper can assume the duties of chief supply officer and carry out the full purpose of the organization.

Policies Governing Purchases

Many splendid businesses have been wrecked by injudicious buying; the difference between a purchase and an order means the difference between success and failure, and when we consider the enormous sums of money which our railways expend annually, it must be apparent that next to the need, the expenditures of these monies is of primary importance.

Materials should be arranged for before they are needed, for obvious reasons. I am a strong believer in the plan, known generally as the "Thorne" system, introduced by the late W. V. S. Thorne, and carried out most successfully on the Harriman lines. The plan is simple; the first requirement being to definitely determine what is the most desirable material to purchase, based on service, source of supply and price. This having been definitely determined, a "running agreement" is made for the requirements, subject to cancellation by either party giving 30, 60 or 90 days' notice. This ensures a fixed source of supply, a quality of material that is best suited for the requirement, and enables the manufacturer to produce it at the lowest cost. It eliminates the expense and delay incidental to the sending out of inquiries, receiving proposals, tabulating bids, etc. Each day's delay between the time the need develops and the delivery is made represents a loss, either in interest on capital (as stock must be maintained to provide for all lost motion)

*From an address on "The Service of Supply" delivered before the New England Railroad Club on January 11.

or a loss through lack of delivery, due to the time used in negotiating the purchase. The purchasing agent must be responsible for deliveries of materials to the railroads, and this is a very important factor in determining the inseparable connection between the procuring and the disbursement officers.

One of the very important duties of the purchasing agent, and one which is not nearly as well understood as it should be, is the disposition of salvage, not merely of scrap, but of all second hand, obsolete and unneeded materials and equipment that is acquired for any reason. The experience and acquaintance of the purchasing agent together with the machinery of his office, should be utilized by the management of our railroads to the fullest extent in the sale of all unneeded materials, tools and equipment.

Specifications Are Vital

Broadly speaking, all material should be bought to specifications. I know it will be contended that this is not always practical. Manufacturers' agents who wish to sell some special brand, or mechanics and others who prefer to criticize the quality of something, rather than write a specification, will not approve the plan. Our technical officers should be able and should be required to put all their knowledge of what is required into a specification. Three factors should be taken into consideration in preparing a specification—(a) the service required, (b) the source of supply, (c) the cost. If representatives of each of these factors, i. e., the user, the manufacturer and the buyer, were consulted in their preparation, more than 90 per cent of the materials used on our railroads could be covered by practical and economical specifications.

Specifications without tests are worthless; and how is any buyer to know what he is getting unless the material he received is tested, and how can it be tested unless it is built to a specification? It is the only practical plan either for the manufacturer or buyer. It is to be hoped that the minimum specifications will be adopted by the American Railway Association. With minimum specifications the manufacturers have a base to work to; any railroads or service requiring something better than the minimum specification can procure it at the lowest cost, because there is a base to work to. It is the only way to obtain honest and necessary competition. Because railroads have not followed generally the plan of buying material to specifications in competition, is one of the principal reasons why we have been saddled with Section 10 of the Clayton anti-trust act.

The engineer of tests should report to the chief supply officer, for the reason that it is desirable that materials should be arranged for in advance of the need. The engineer of tests on our railroads should be investigating, developing and reporting on the requirements, source of supply, conditions, and facilities of manufacturers at all times; if this were done, as it should be, there would be very little inspection required at destination, and none of the long, tedious and expensive delays due to receiving material that fails to conform to the specifications being held up and determined upon by long and many times useless correspondence.

It will be said that the engineer of tests should either be an independent department, or report to the using departments, on the ground that they are responsible for the kind of material that is used. My answer to this statement is that the using departments are responsible for the specifications, and the supply department is responsible for furnishing material to the specifications.

The Distribution of Materials

The distribution of materials to the users is easily one of the most important functions of the service of supply.

Material has no value, either to the railway company as capital, or to the using departments as service, until it reaches the points where it is needed to be used. It is essential, therefore, to determine upon methods which will best enable the railway company to conserve its assets and make them available where wanted in the least possible time. Material must be first assembled and maintained at as few points as possible for distribution, for the reason that it represents money which must be as closely guarded and conserved as if it were in the bank. The desirability of this practice is based principally upon the following facts:

(1) Generally there is only one place on a railroad where there is sufficient organization for the thorough inspection, test, check and care of materials.

(2) That materials can be inventoried, guarded, cared for and disposed of, if necessary, more readily where centralized.

(3) By restricting the number of places where stock is carried, a smaller fixed investment will be found sufficient to adequately protect the general needs of all departments.

The shops, representing the largest users of classes, if not values of materials, must first be considered and a practical plan is for the stores department to deliver material to the users in the shops. This keeps high priced mechanics at their work and their machines in operation during a period which otherwise would cause them to be absent securing needed materials and it enables the supervising forces to keep in touch with the progress of the work and the actual needs of the mechanics.

The shop delivery system assures accuracy in accounting by requiring that all material orders be revised and the proper description entered thereon by the store delivery supervisor before they are delivered to the office. It provides the means for obtaining a material order for all material issued; it enables the store department employees to observe the use of material by coming in personal touch with the men who are actually using it, and it provides a method by which they can intelligently anticipate and provide for the needs and satisfy themselves that the material will be utilized as intended. Moreover, it results in delivering material to points required in less time than other systems now in effect and at less expense. It also ensures an opportunity for locating and returning to stock, materials drawn for use and not applied; it ensures proper supervision over the manufacture of materials and the return of the finished or repaired product to the stores when completed. It encourages the use of serviceable second hand and repaired material in lieu of new and, by co-operation, provides for the disposition of shop worn material in proper sequence, thus avoiding the inadverted disarrangement of stock.

Merits of the Shop Delivery Plan

The plan is very simple; it merely consists in establishing certain stations in the shops and grounds where material requisitions are received and materials delivered; usually a box marked in some specific manner, with a small shelf. These stations should, of course, be located as conveniently to the work as circumstances and conditions will permit. Material requisitions are prepared by the man who wishes to use the material, and either signed by him or by the foreman, as may be determined by the using departments. They are placed in the box and the material is delivered where directed by the delivery forces. The force consists of a store delivery foreman and as many men and boys as are necessary to give prompt and efficient service, which, of course, must be measured by the location of the material, facilities for delivery, distances, volume of work, etc.

The piece work basis for the delivery of material is not satisfactory, for the reason that it places a premium on getting material out of the store, whereas the object should

be to deliver only what is actually needed and to return whatever is not needed for any reason. As the mechanic and deliveryman should work together with the object of utilizing what is available by substitution and otherwise, this requires both intelligent and close co-operation between the section storekeeper and the mechanic.

The saving which can be made by applying this plan to its fullest degree of usefulness is obvious, and by improving the system by the introduction of automobile trucks and trailers, under an intelligent dispatching and supervising system, the cost of delivering materials can be tremendously reduced. But the real merit of the plan is not in the actual difference in the cost of delivering material; it rests upon the fundamental fact that the storekeeper must have some means of knowing accurately, at all times, what is needed, that nothing is available that can be used, that the material furnished is giving the best service, that the demands are met, and that nothing is wasted. The store delivery system is a link in the service of supply, and is based on the theory that supply officers must know what is needed before they invest the railway company's money.

Origin and Purpose of the Supply Train

The supply train serves the same purpose for the line that the store delivery does for the shops, and in precisely the same way. It places the representatives of the stores department in personal connection with the users on the line; it places the storehouse at the disposal of the men on the line that use the material; it establishes the closest relations between the two, which, when coupled with a thorough inspection by the supervisory officers, as it should, furnishes the ideal method of distributing material on the line.

The supply train is the outgrowth of the supply car, it is the only economical and systematic method of distributing supplies to sections, agencies, signal towers, etc. A supply train should make about one freight division of 110 miles in 8 hours; it offers the only practical and economical method of making a thorough inspection of all the smaller stations and junction points; it is the only way that division officers can come into personal contact regularly with such officers as agents, signal maintainers, section foremen, etc. The average cost of delivery, based on the issues, is 11 per cent, but service of this kind cannot be measured by costs; its economy consists in providing a plan whereby all outside points may be reached at regular intervals, and the actual demands determined and cared for. The supply train affords a systematic means of keeping the road clean of surplus, obsolete and scrap materials; it offers the only means by which general and division officers can and will make a thorough inspection and come in personal contact with agents, section foremen, signal maintainers, etc.

The reason why the supply train has not been generally adopted on our railroads is due to the fact that there has not been a sufficiently broad conception of what the service of supply should embrace. The supply, or what is commonly known as the stores department, has been looked upon as merely the depot where supplies should be procured when ordered by the users, and the storekeeper in charge merely as the man who hands them out over the counter. It has occurred to few that the service of supply must be based on broad enough lines so that its agents should know what is actually needed; what gives the best service for the purpose, and have means at their disposal whereby they can come in personal contact with the users on the ground. The supply department is responsible not merely for having materials, but also the quantity and quality, and must also dispose and market the salvage.

A supply train may consist of from 15 to 30 cars, according to the size and location of the division. The train is made up of an office, dining and cook car, where the sup-

ply train crew lives and does its work and where the train crew eats; a stationery car fitted up with compartments for each standard form used, with drawers and apartments for all other stationery supplies; a miscellaneous supply car with station, operators and signal supplies; a bulk car for package and extra supplies, a tool car for track tools; an oil car with tanks sufficient to take care of the requirements of lubricating and illuminating oils; one or more tank cars with gasoline; one or more cars with frogs, switches, spikes, bolts, etc., one car for trucks, wheel barrows, and material of this character, and as many other side boarded flats as may be necessary to take care of the serviceable second hand and scrap materials picked up.

How the Supply Train Operates

The crew should consist of a supply train storekeeper, in entire charge, except of the movement of the train, which is, of course, in charge of the conductor; about three assistants, one in charge of miscellaneous supplies, one in charge of stationery and one in charge of track tools and roadway materials. The train moves on a schedule, prepared at least a month in advance by the superintendent and general storekeeper. While the purpose is to change the schedule as little as possible, it is necessary to change it at different seasons of the year, in order to take advantage of traffic conditions by using light power.

Everything is prepared between stations, that is, requisitions for agent's supplies are checked and the material got ready to deliver; stationery is got out in the same manner, oil cans filled and everything made ready to issue promptly when the train stops. The supply train storekeeper and the conductor know the location of each station and where the stops will be made. Usually the first stop is made with the miscellaneous supply car, tool car and track material opposite the tool house. The man in charge of the miscellaneous supply car with the section foreman, delivers the tools and supplies required; at the same time the stationery clerk is delivering the stationery, the man in charge of the oil car is delivering the oils and drawing off the gasoline. The section crew is unloading frogs, switches and other heavy material; exchange tools for repairs are checked and delivered into the tool car; surplus, second hand and scrap material is loaded and classified; stationery is checked and such as is required delivered, whatever is on hand that should not be for any reason, is taken up and returned. In the meantime a thorough inspection is being made of all station buildings and grounds by the superintendent, division engineer and division storekeeper; investigations are made on the ground regarding the service of tools and supplies; if additional supplies are needed that are not called for by the requisition, they are delivered and the requisition approved by the ranking officer on the ground. Items not needed are eliminated. A memorandum has been prepared in advance by the section foreman of second hand tools requiring repairs. The weight of the different classes of scrap is estimated, receipts exchanged, and the work completed on the ground. It is astonishing how quickly all this work can be accomplished when properly organized.

Distribution Through Division Stores

Generally speaking, material can be moved from the general to division stores in car loads on sailing dates or schedules; that is, there should be a specific time each month for the requisitions to come to the general store, they are made up in sections, the cars are marked as per schedule, loaded and shipped on regular dates. In a well organized general store, requisitions for material on hand should be shipped in not to exceed 24 hours from the time they are received. Deliveries to local stores, round houses, junction points, etc., should be made from the division stores via

local freights and be directed and controlled by the division storekeeper.

Materials should preferably be moved in car loads in through freight trains, but recognizing the need of having fast service, it is recommended that a certain number of baggage cars be assigned, operating between the general store and the various division stores; where baggage cars for this service are not available, then baggage cars on the regular trains can be used, but special service is recommended.

The principal inspection points and terminals should be provided for through the division stores, although there are many railroads where this is not practical, and provision can be made from the general store. The reason why it is more desirable to protect these points through the division stores is that the division storekeeper is and should be in closer touch with the division officers.

A Broad Conception of Reclamation

Reclamation in its broadest sense has been largely misrepresented and misunderstood. Reclamation means the reclaiming or making useful that which has been discarded. The reclamation of material on a large and systematic scale by the supply department was first introduced by the Santa Fe about 10 years ago. The fundamental principle underlying reclamation is that nothing must be reclaimed that will not be needed for future use or that cannot be reclaimed at a saving, and in order to guard against losses or incorrect conclusions, an accurate record must be kept covering each operation, from which a monthly statement should be compiled showing the net results (savings or loss) on each item of material reclaimed.

The salvage department on a railroad should be organized for the purpose of salvaging discarded and worn out material of all kinds, including equipment. This department should be in direct charge of the general storekeeper, reporting to the chief supply officer; this is based on the principle that the chief supply officer is responsible for providing suitable materials at the lowest net cost, and must have at his command an organization capable of following material from the time it is ordered until it is salvaged and disposed of.

There is one feature of this work which operating and maintenance officers seem to lose sight of, and that is that the supply department is not taking over any of the functions of the maintenance department in salvaging materials, they are taking over this work after the using departments have finished with it. The using departments are expected and should be required to get the utmost service out of their materials and tools, and not permit them to be turned over as scrap to be salvaged until they have performed their full service. Materials which cannot be recovered, reclaimed, or repaired must then be classified into what is commonly known as scrap, according to the official classification, for the purpose of obtaining the highest market prices. The following outstanding features of this work must appeal to all practical men:

(1) That the supply department is organized for the purpose of supplying materials, and the reclaiming of materials is one of its sources of supply.

(2) That the work of dismantling, disposing, and sale of all materials, including released equipment, is one of the duties of the supply department.

(3) That this work can be done more economically in conjunction with the handling and marketing of scrap, of which it is a part.

Very great savings can be effected on our railroads by organizing and operating a large well equipped reclamation plant, for the broad purpose of thoroughly inspecting, recovering, reclaiming, repairing, sorting and disposing of all salvage.

Conclusion

All primary accounting should be done at the division stores and consolidated at the general stores. In no other place can basic accounting be done as economically and accurately as at the storehouse. All materials must be received and checked by the storekeeper; the same material must then be priced and either invoiced to the using department or charged direct to the primary accounts. In no other way can the storekeeper keep control of the stock and control his business. The supply officer is the fiscal agent of the company. The money invested in material is enormous, every dollar tied up unnecessarily in materials and supplies is unliquid and unworking capital. The railway storehouse is not a reservoir for material, but a bank; material is not junk, but cash, and must be as safely guarded and controlled as cash in the treasury.

Amendment of Valuation Act Proposed

WASHINGTON, D. C.

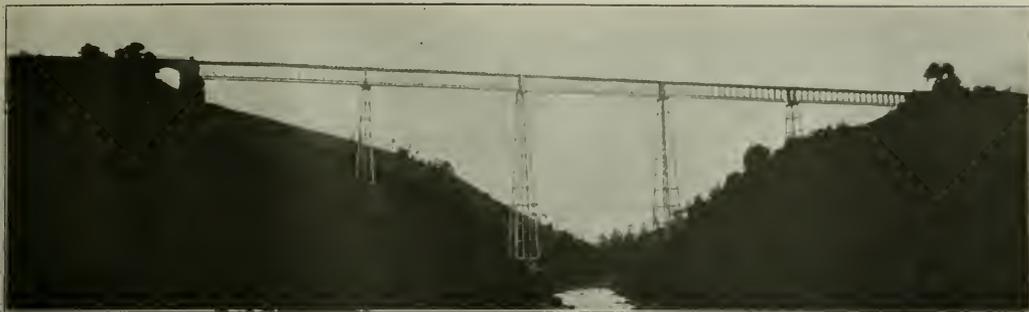
AN AMENDMENT to the valuation act of 1913 by striking out the words instructing the Interstate Commerce Commission to ascertain and report the original and present cost of acquisition of railroad land was advocated before the House committee on interstate and foreign commerce on January 20 by P. J. Farrell, chief counsel for the Interstate Commerce Commission, and John E. Benton, general solicitor of the National Association of Railway and Utilities Commissioners, at a hearing on the bill introduced by Representative Esch. The bill would also make the provision of the act requiring the commission to report the cost of reproduction new apply only to property other than land.

Mr. Farrell said that since the decision of the Supreme Court in the Kansas City Southern case the commission's Bureau of Valuation has undertaken to find out what the carriers have had to pay in the past in order to get some estimate of what it would cost to re-acquire the land, but it believes that the estimate would not be worth anything when made. "The commission is doing its best to perform an impossible task," Mr. Farrell said, "but no man on earth can do anything but make a guess and he might just as well stay in Washington and guess as to incur traveling expenses and make his guess in the field." He said there is no basis for an assumption of what proportion of the land would have to be acquired by purchase or by condemnation or how much would be donated, and that unless the law is amended so it will not be necessary to make an estimate it will result in a farce because the commission would be driven to use a multiple.



Photo by International

The Lost Balloonists on Their Return to Rockaway



Malleco Viaduct on the Central Sur South of Concepcion

The Chilean State Railways Are an Open Market

Part III—Conclusion of a Discussion of Chile as a Prospective Purchaser of Railway Supplies

By John P. Risque

THE FIRST TWO PARTS of this article were devoted principally to a description of the Chilean government lines already in operation. This part of the discussion deals primarily with projects for new railways which are now under discussion in Chile.

As set forth previously, it is the intention to restrict this account of the Chilean railways to the state owned and

nels, more than 100 bridges and a string of snow sheds mark this stretch of track, the costs of operation of which frequently exceed the revenue. Passengers constitute the main traffic. Most of the freight traffic between Chile and Argentina is carried in ships south through the Straits of Magellan.

Southern Chile's winter months of June and July almost invariably shut the "Transandino" down with a snow-fall sufficiently heavy to obliterate the railway, snow sheds and all, and travelers' plans for crossing from Chile to Argentina via this line should always provide for these conditions.

If the picturesque scenery along the entire route from the quaint junction at Llai-Llai and the excitement attendant upon the departure of trains at Llai-Llai in three different



Combined Rack and Rail Locomotive on the Chilean Transandine

operated lines, but any reference at all to Chile's railways which omitted a description, however brief, of the Transandine Railway, famous all over the world, would possibly bring forth comment on the omission.

It is just as natural to open up a reference to a privately owned and operated line in South America with the statement that it is English as it is to buy a ticket before getting on a train, for, with few exceptions, such is the situation. The Chilean Transandine is British up one side, and its extension, the Argentine Transandine, is British down the other side. Both of them are of meter gage and contain frequent and long stretches of rack rail. The Chilean Transandine starts at Los Andes, the terminal of the 28 mile, broad gage branch of the Central Sur from Llai-Llai, between Valparaiso and Santiago, and runs 43 miles to the Argentine frontier, at an elevation of 10,459 ft. It is said that the grade of the last 7 miles of the climb averages 8 per cent. The rise is more than 3,000 ft. Twenty-five tun-



Transandine Train at Paradero Vilcuya, Chile

directions—all at about the same time—could be turned into revenue, the Transandine could sit back and take it easy; for of all the tourist's delights on a South American trip the novelties of this Transandine ride are the most enjoyable. Arriving at Llai-Llai from either Santiago or Valparaiso, the passenger is greeted by an array of women fruit sellers in white uniforms, lined up behind high banks of Chile's various delicious fruits, among which grapes figure prominently. In the pleasant excitement of rushing around to load up with fruit, it is quite possible to miss a train in

spite of repeated warnings from a hurried brakeman who claps his hands vigorously as he walks up and down the platform. When he has "clapped" the passengers all on board, the conductor acknowledges the fact by a shrill note from his pocket whistle. The engineer then climbs aboard and contributes his foot—and the stage is all set for the departure which duly follows.

The ride to Los Andes is generally made in the evening. Rolling stock on that branch consists of three or four of the broad gage day coaches from the Santiago and Valparaiso trains and an inside connected British 0-6-0 type locomotive, the rather high drivers of which were found to be too strong for work as a switcher. At Los Andes, where the gage changes from 5 ft. 6 in. to meter, there is a warm welcome for the tired traveler, who is, by necessity, going to patronize the hotel in an enforced lay-over for the night.

At seven the next morning he will be on his way in diminutive meter gage cars, with seats on which the upholstery is so rigid that the traveler will be quite stiff and weary upon his arrival at Mendoza in the Argentine foothills of the Andes at the end of the day. The cars in use on this road resemble large trolley cars such as are in

extension of the engine's frame. Two sets of single expansion engines drive the machine, the one in front propelling 3 outside cranks, in the center of the axles of which, between the frames, are mounted the pinions referred to. The rear engine of six coupled drivers is an ordinary rail engine. But the combination looks like a miniature Mallet in action—that is, when both engines are running. But when the locomotive is traversing sections devoid of rack rail, the front engine is stationary; while the rear set of pistons, rods and wheels are running fast and the railroader will probably look twice at a new species of Mallet, the like of which he never saw before—and probably will never see again.

Other Proposed Transandine Routes

Due to the difficulties of this Transandine Railway all of the way across, the change of gage from 5 ft. 6 in. to meter in Chile and back to the former in Argentina, together with the understanding that it would require a million and a half dollars to put the road in a position to earn money, of which about \$650,000 would have to be spent upon the Chilean section alone to provide additional protection from snow-slides as well as for additional rolling stock,



Yards on the Central Sur South of Valparaiso

service on suburban lines in this country; some have entrances at one end only and the absence of foot plates on platforms over the couplers makes passage from one car to another an undertaking worthy of some deliberation. The magnificence of the scenery is indescribable—particularly in the vicinity of Juncal where the actual origin of the Mendoza river of the Argentine can be seen in the melting snows of mountain peaks which seem miles above the car window. Perhaps the prominence of this line in travelers' minds has been attained by the glowing descriptions of the ride from friends who have taken it.

An American railroader with his neck out of the window along with the rest of the crowd will sense a slight halt, like "taking up slack," as the train arrives at the foot of a section of rack rail. This precaution attends the engagement of the pinions on the axles between the frames of the rack rail engine, with the teeth in the rack rail in the middle of the track. At a station, an inspection of the locomotive on the head end of the train will reveal some interesting novelties among which will be noted the side-tank feature for water, so tenaciously adhered to by the Briton in his locomotive designs. The coal bin, as is usual in these side-tank types will have been built on behind the cab over an

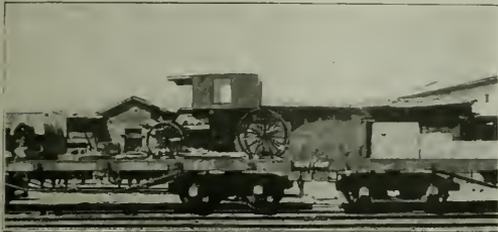
sidings, and shops, considerable interest has manifested itself for years in proposed new Transandine routes.

About fifteen of these projects have come to light at one time or another. Most of them are planned to lie south of the present transcontinental line. The nearest actual approach to such a competitor is the San Martin line in the far south. This line runs from Colillefu, east of Valdina, on the Central Sur, to Huidif, 19 miles inland. From there a highway transportation service is operated for 6 miles to Rinahue. Thence transportation is effected by steamer across Lake Rinahue, 19 miles, 27 more miles by road to Lake Llacar, 30 miles across that lake to San Martin in Argentina. All of this route in the intentions of the company will be served eventually by a railway.

Informed Chileans, however, believe that the first practical solution of a successful new Transandine project will make its appearance in the extension of a line to the Buenos Aires Great Southern's line which is in operation from Bahia Blanca on the Atlantic coast bay of that name to Neuquen, which lies on the boundary between the Argentine province of Rio Negro and Neuquen. This line is already built out to Zapala which is within 50 miles of the Chilean frontier. An extension westward through the Lonquimay

Pass would reach Curacautin on the eastern end of a branch line from the station of Pua on the Central Sur. The connecting of the gap between the latter point and Los Sauces will then provide an all rail transcontinental route from Bahia Blanca to the Port of Lebu, using the existing line from Los Sauces to the latter point. Considerable interest was manifested in the activities of the Buenos Aires Great Southern in the shipment of construction materials to Neuquen last March.

In the extreme north another important project is a subject of much discussion in the town of Antofagasta, where the citizens seem to be very earnestly behind a move to in-



Typical Chilean Flat Cars Typically Loaded

duce the Chilean congress to aid them in their ambitions to build a new line from Salta, Argentina, to either Antofagasta or the nearby superior harbor of Mejillones, 43 miles north. This proposed new transcontinental line has much to recommend it, particularly since it would permit the transportation of food and livestock from Argentina to the barren nitrate fields of northern Chile. The possibilities of such an undertaking have appealed to the president of Argentina, who has asked his congress to consider the proposition of extending the state railways from Salta west to the Chilean border to connect with the line which the Chileans propose to extend to meet it. The nearest port by



On a Rack Rail Section of the Transandine Near Juncal

rail from Salta is Santa Fe, 300 miles north of Buenos Aires, on the Paranaun river, and incidentally the administrative center of the Argentine Government Railways which radiate from that point in all directions but east.

The new line is estimated to bring Salta within 350 miles of a Chilean port and save the 350 miles of railroad haul from Santa Fe. The latter city is approximately 6,300 miles from New York; Antofagasta is 4,370 miles from the same point, thus offering a saving in the water haul of about 1,930 miles. New York freight for Santa Fe is at present routed to Rosario, where trans-shipment to smaller boats is

necessary. The time required for the run from New York to Rosario is in the neighborhood of 24 days; from Rosario north to Argentine Andean points, including the Salta district, consumes from three to four days more. Cargo boats, on the other hand, from New York to Antofagasta, make the distance in 16 days. Adding two more days for the estimated time from the latter port to the Salta district, brings that region within 18 days of New York, thus cutting the time nearly in half.

The region in northern Argentina which will most benefit by the proposed new railway is said to contain an abundance of untouched natural resources including copper, gold, silver, alum, sulphur and soda, while the soil in this part of the country is rich, aided by a semi-tropical climate, tempered with varying degrees of altitude and suited to the easy cultivation of nearly all agricultural products. Fruits, vegetables, meats and sugar, the production of which is expected to be increased by the advent of the line, are some of the principal agricultural products of the territory referred to.

The total cost of the project is estimated at \$25,000,000 and various plans for financing the line are under discussion, including interesting arguments relating to the gage to be used and the most suitable point for crossing the



Rio Blanco Station on the Transandine

Andes. The consensus of opinion favors meter gage and this is considered logical, due to the fact that that gage is used by the Argentine government lines as well as by most of the roads in the district of Antofagasta. Gossip among the interested ones in northern Chile frequently refers to an alleged objection to the building of the line by the southern Chilean farmers who claim to see in its construction a loss in their present shipments of cattle and food products by steamer from their rich fields in the south to Antofagasta and the nitrate regions beyond.

THE MAINE CENTRAL is giving service at less than cost. When the revenues received fail to cover necessary costs, a railroad cannot continue to give good service and cannot expand to meet the growing needs of the public. Increases in expenses in 1920 over 1917 amount to \$9,000,000 for wages, \$2,174,000 for coal and for other operating expenses in proportion. These increased costs have not been wholly covered by the increase in rates granted by the Federal and State commissions. The Maine Central has a low capitalization, all representing cash paid in, dollar for dollar. The Government appraisal of the property will show a value greater than the capitalization. The railroad is honestly and efficiently operated. The company is making and will continue to make every effort to increase efficiency and reduce the cost of operation, but it is evident that we cannot continue to give service below cost and live. This situation is against the interest of the people of Maine.—From Maine Central Time Table signed by Morris McDonald, president

New York Public Service Commission—Annual Report

THE PUBLIC SERVICE COMMISSION of New York, second district, has sent to the Legislature its fourteenth annual report, which is for the calendar year 1920. The first subject discussed is the action of the Interstate Commerce Commission in ordering an increase of passenger fares to 3.6 cents a mile, generally throughout the state, for intrastate travel, to correspond with the rate allowed for interstate fares. Reviewing the litigation by which the state has taken action in the courts to contest the federal orders, the present report says that the Transportation Act passed by Congress fixes a basis of rate-making for the railroads which is inconsistent with the standard of New York law, which contemplates rates based on what is just and reasonable in each particular case; and the state commission argues that passenger fares should not be uniform throughout the state; this for the reason that the service is not uniform.

"The fixing of such rates rests upon the assumption that the quality of the intrastate service, taken as a whole, is equal to the quality of the interstate service. Such is not the fact. The passenger service on the branch lines penetrating all parts of the state is notoriously not of the same quality as to speed, or wholesomeness, or comfort, or reliability, or value to the passenger. On these lines the freight traffic is too often given preference over passenger trains. The order of the federal commission compels the great mass of intrastate passengers to pay a first-class rate for a second-class or a third-class service."

The Commission does not wish to enter a contest with the federal government, but deems it its duty to have this issue settled by the courts. It proposes also to test in court the power of the federal government to regulate the issue of capital by the railroads, in disregard of the laws and the powers of the State of New York.

The police power of the Commission has not been affected by federal legislation and under this head the Commission has investigated automatic train control; and at the invitation of the New York Central it has created a joint committee of representatives of the Commission and of the railroad company to report on available devices and as to

the selection of a section of road where devices can be tested. The Commission has recommended that some form of apparatus be installed on 50 miles of the main line of the New York Central, including all of the passenger locomotives on such section and 25 freight locomotives. It is hoped to report conclusively on train control before the end of 1921.

Grade crossing elimination has proceeded slowly because of unsettled financial conditions; but in Watertown and Rochester further appropriations are recommended; for important work has been begun and should not be dropped.

Inspection of railroads has shown serious problems in connection with deferred maintenance.

The number of accidents at highway grade crossings has increased, but the number of casualties resulting therefrom has decreased. Considering the vast number of automobiles using the highways during the summer, it is deemed remarkable that the number of accidents is so small. Increased protection has been ordered at certain crossings. The audible-visible signal is regarded as particularly well adapted to important highways in outlying districts. More extended use of this type is making motorists more familiar with them, so that they are observed and respected. Such signals are not infallible, but it is believed that the fact that they give practically continuous service, and that the times when they are out of service are infrequent and relatively short, makes such a signal highly desirable on main thoroughfares carrying a relatively dense traffic. The report is signed by the five commissioners, Charles B. Hill, Frank Irvine, John A. Barhite, Joseph A. Kellogg and George R. Van Name.

Freight Car Loading

WASHINGTON, D. C.

THE NUMBER OF CARS of revenue freight loaded during the week ending January 15 as compiled by the Car Service Division of the American Railway Association shows an increase of over 3,000 as compared with the previous week, but is still considerably lower than for the corresponding weeks of the past two years. The total was 709,888, as compared with 840,524 in 1920, 758,609 in 1919 and 612,576 in 1918. The report follows:

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

Summary—All Districts, Comparison of Totals This Year, Last Year, Two Years Ago. For Week Ended Saturday, January 15, 1921

Districts	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Mdse. L. C. L.	Miscellaneous	Total revenue freight loaded			Received from connections			
										This year 1921	Corresponding year 1920	Corresponding year 1919	This year 1921	Corresponding year 1920	Corresponding year 1919	
Eastern	1921	5,892	4,437	45,605	1,479	7,655	1,360	41,463	53,751	161,642	.....	.....	.....	188,192	.....	.....
	1920	5,641	4,380	53,978	4,170	7,915	1,309	32,707	91,879	.....	201,979	178,631	.....	225,559	203,981	.....
	1921	2,411	4,290	54,833	6,252	3,419	2,991	31,507	43,571	149,274	.....	.....	.....	120,843	.....	.....
	1920	2,871	3,840	54,920	3,840	3,979	1,771	38,254	61,108	.....	170,583	166,375	.....	121,549	149,719	.....
Potomac	1921	137	112	21,761	.....	.....	.....	1,935	4,787	30,272	.....	.....	.....	13,225	.....	.....
	1920	196	108	21,463	644	2,098	340	149	9,265	.....	.....	.....	.....	20,029	17,603	.....
Southern	1921	3,852	2,162	26,391	708	12,147	1,866	33,777	27,785	108,688	.....	.....	.....	59,086	.....	.....
	1920	3,696	3,015	28,955	163	17,582	2,460	19,358	53,990	.....	131,219	109,720	.....	77,983	62,570	.....
Northwestern	1921	13,862	10,158	7,027	1,560	12,794	1,200	23,201	25,306	94,908	.....	.....	.....	42,074	.....	.....
	1920	12,764	11,146	14,030	1,206	16,303	1,698	19,408	40,190	.....	116,745	112,714	.....	63,622	72,382	.....
Central Western	1921	13,722	11,952	22,161	300	2,804	1,564	27,071	29,695	109,269	.....	.....	.....	44,781	.....	.....
	1920	11,553	13,394	25,942	426	4,995	2,589	21,456	44,620	.....	124,975	107,564	.....	66,644	59,991	.....
Southwestern	1921	4,985	2,014	5,450	94	5,241	540	14,546	22,965	55,835	.....	.....	.....	41,503	.....	.....
	1920	4,099	2,815	8,573	196	6,142	578	14,162	24,195	.....	60,760	52,757	.....	51,907	43,014	.....
Total all roads	1921	44,861	35,125	183,228	10,485	45,241	9,590	173,500	207,860	709,888	.....	.....	.....	509,708	.....	.....
	1920	40,830	38,698	207,861	10,645	59,014	10,745	145,494	327,247	.....	840,524	.....	.....	627,293	.....	.....
	1919	45,538	42,715	190,691	.....	51,904	14,766	.....	142,995	.....	.....	758,609	.....	.....	609,260	.....
Increase compared	1920	4,041	.....	.....	.....	.....	.....	28,006	.....	.....	.....	.....	.....	.....	.....	.....
Decrease compared	1920	.....	3,573	24,633	162	13,773	1,155	.....	119,387	130,636	.....	.....	.....	117,585	.....	.....
Increase compared	1919	.....	.....	.....	.....	10,483	.....	173,500	.....	.....	.....	.....	.....	.....	.....	.....
Decrease compared	1919	677	7,590	7,463	.....	6,663	5,176	.....	205,135	48,721	.....	.....	.....	99,552	.....	.....
January 8	.....	39,690	31,494	190,284	11,479	42,982	10,717	169,093	210,674	706,413	830,673	723,801	492,817	596,859	543,265	.....
January 1	.....	30,998	23,590	170,224	10,550	32,635	8,340	144,657	178,451	598,905	745,446	612,741	453,537	591,437	525,055	.....
December 25	.....	29,147	19,814	177,308	10,956	39,314	9,497	138,918	194,321	639,275	684,784	549,975	516,363	588,644	562,602	.....
December 18	.....	35,505	30,870	223,153	12,750	48,626	14,127	186,997	245,230	796,855	806,734	796,116	587,099	576,770	672,533	.....

L. C. L. merchandise loading figures for 1921 and 1920 are not comparable, as some roads are not able to separate their L. C. L. freight and miscellaneous of 1920. Add merchandise and miscellaneous columns to get a fair comparison.

How to Increase the Average Loading of Cars

Pertinent Suggestions from Railway Officers Who Have Given
This Subject Close Study

MAXIMUM CAR LOADING is a matter of dire necessity during periods of car shortage. It is also an essential to the economical conduct of transportation. Although the necessity for conserving cars has been temporarily decreased, the requirement of economy is now more imperative than at any time in the last 12 months. Therefore, the suggestions offered by railway officers and others who contributed articles in a contest on "Means of Increasing the Average Loading of Cars" should be of distinct value to the railway managements in the herculean efforts which they are now making to conduct the operations of their properties with utmost economy.

The 25 papers received in this contest were referred to a committee of judges consisting of L. W. Baldwin, vice-president, Illinois Central, Chicago; F. T. Bentley, traffic manager, Illinois Steel Company, Chicago, and C. E. Spens, vice-president, Chicago, Burlington & Quincy, Chicago. These judges awarded the first prize to the paper submitted by G. D. Brooke, superintendent of transportation, Baltimore & Ohio, Cincinnati, Ohio, and the second prize to the paper prepared by O. C. Castle, superintendent of transportation, Southern Pacific Lines, Houston, Tex. Other papers received which merit special attention are those submitted by C. F. Balch, assistant general auditor, Chicago & North Western, Chicago; P. W. Coyle, traffic commissioner, St. Louis Chamber of Commerce, St. Louis, Mo.; E. H. Shaughnessy, American Petroleum Institute, New York; C. W. Hoisington, San Francisco, Cal.; J. L. Coss, train dispatcher, Chicago, Rock Island & Pacific, Haileyville, Okla., and D. J. Stevens, division superintendent, Baltimore & Ohio, New Castle, Pa. The prize winning papers and three others are presented below:

First Prize—Use Large Capacity Cars in Heavy Loading Service

By G. D. Brooke

Superintendent of Transportation, Baltimore & Ohio, Cincinnati, Ohio

It is of prime importance that the marked capacity of each car be the highest consistent with the requirements of safe operation. General practice permits the loading of cars 10 per cent in excess of the marked capacity. There are great possibilities in the utilization of this margin, for with many classes of loading advantage can be taken of it to gain one car in every ten and to increase the average carload correspondingly.

With the cars properly rated the next step towards increasing the average loading is to distribute the equipment so that cars of high capacity will be used for long haul traffic and where practicable loaded in both directions. If we can add to these two conditions of service, that of prompt loading and unloading, a maximum efficiency will be obtained. A familiar example of such utilization is the placing of high capacity coal cars in the lake coal and ore service. Light capacity cars should be used for moving coal from the mines to inland points close by the mining districts. High capacity box cars can be used to good advantage in the long haul movement of heavy commodities, such as grain and lumber, while the light capacity cars are assigned to the movement of light bulk freight, like straw, paper stock, etc., and to short haul business, trap-car load-

ing, inter-terminal movements, package locals and similar service to which are attached inherent delays and slow movements.

Certain kinds of freight are peculiarly adapted to heavy loading both on account of the great weight per unit of volume and the large quantities offered for shipment. Ores, pig iron, mill products, stone, gravel and sand are good examples. With these and other similar freight the problem of maximum loading is simple. With bituminous coal skillful loading is required in order to take advantage to the fullest extent of the cubical capacity of the cars. Coke should be loaded to the full cubical capacity of the car and a generous crown added to compensate for the shaking down of the load when the car is set in motion.

The railroads load a large number of cars daily with their own forces. This loading can be divided broadly into two general classes—company material and commercial l.c.l. freight loaded at freight houses. The former consists both of c.l. and l.c.l. freight and the same general methods of loading are applicable as with commercial business. Commercial l.c.l. freight requires for its movement a very considerable percentage of the available box cars. Taken on the whole it is of light weight and the load of the average l.c.l. car is doubtless considerably under eight tons. This freight is for the most part loaded by the railroads themselves and the opportunities for increasing the car load are many. With proper care in stowing, the loading of merchandise cars to the full cubical capacity of the car should not increase the breakage and other damage and any delays to freight in holding it for full carloads are overcome by through movement when the car is started. When the tonnage for a single destination is not of sufficient volume for a daily car then resort can be had to such expedients as bi-weekly, tri-weekly and other periodic cars, loading cars to two or more destinations and loading on transfer stations. It is important to establish a minimum weight limit for carloads to apply unless the cubical capacity of the car determines the load.

The multiplicity of activities on a great railroad system is such that specialists are often required to direct the efforts of officers and employees in obtaining certain desired results. This applies to increasing the car load. For unless some individual or bureau is charged with the responsibility of keeping the question alive it will be lost sight of from time to time and much progress which has been made will be lost. A bureau consisting of a small office force and two or three traveling inspectors or instructors, in charge of an officer of suitable experience, can accomplish much in increasing the carload. The traveling instructors should visit large shippers and stations, instill and foster interest in heavy loading, assist in instructing employees and offer helpful suggestions regarding methods of loading. The office force should obtain such records as to enable it to compare the monthly performance of the various stations and of industries, including railroad store houses and other plants where the loading is heavy.

Suitable statements embodying these comparisons when placed in the hands of the superintendent will show him what progress is being made at the stations and industries on his division and will enable him to take steps to correct backward tendencies and to offer encouragement where the showing is good.

The chief duties of the bureau are to maintain interest

in the campaign for increased loading, to establish for the several divisions standards adapted to their loading conditions, and to see that the same general methods are used over the system. But the brunt of the campaign must of necessity be borne by the operating and traffic officers, the agents and other employees—the rank and file of the division organization. The superintendent who takes an active interest in the carload will infuse his entire organization with a like interest by discussions at staff meetings, by personal talks with officers and agents and by suitable written instructions. He should not fail to take advantage of the experience and ability of the personnel of the traffic department in dealing with the public but should lean heavily on that arm of the service in placing the problem before the shippers. The agent has a most important part to play in applying the cars at his station where best adapted to the loading offered, in watching his l.c.l. loading, and in obtaining the co-operation and assistance of the shippers with whom he comes in daily contact. The assistant superintendent, the train master, division engineer, master mechanic, yard master, all division officers, have their parts to play in direct supervision, in instruction of their employees and in their relations with the shipping public. Thus the concerted efforts of the officers, of a large number of employees and of many shippers are brought to bear on the problem, not to the exclusion of but in conjunction with the other important phases of efficient transportation, and there can be no results other than the attainment of creditable car loads.

Second Prize—Keep a Close Watch on the Loading

By O. C. Castle

Superintendent of Transportation, Southern Pacific, Texas Lines, Houston, Texas

A celebrated statesman once said "The way to resume is to resume," and in connection with the campaign for increased efficiency we may well paraphrase this and say "the way to secure heavier car loading is to load cars heavier." Like the "miles per car per day" problem the solution depends largely on the co-operation of the public. The public, divided generally into two parts, forms with the railroad a triangle, the three sides of which are:

(A) the carrier, (B) the consignor and (C) the consignee.

To follow the geometrical figure, we may call our triangle a right angled triangle with the consignee the hypotenuse, the square of which is equal to the square of the other two sides. To elucidate: In general the consignor is as much interested in loading to capacity as is the carrier. It is safe to assume that his gains are related to the volume of his shipments. The consignee, on the other hand, may have

therefore, be disregarded or at least deferred in the consideration of means for accomplishing immediate results.

Turning then to practical and practicable plans, the problem reduces itself into one of supervision over actual loading of the individual car under existing conditions. For this purpose, the first essential is a system of complete and accurate reports. Loading stations should compile weekly reports showing their car loading in detail, the following items being suggested as a basis: Date, car initial and number, destination, contents, car capacity, weight of contents and remarks. Station reports should be assembled currently and checked in division and general transportation offices. Examination of these reports will develop instances of light loading, or the use of cars of greater capacity than necessary for particular commodities. Attention of loading agents and car distribution forces should be called currently to such instances. Monthly compilations should be made of car loading reports; averages of tons per car and per cent of capacity utilized being extended, separated by principal commodities and for operating divisions. Comparisons with previous periods should also be shown. These statements should be sent to interested officers, who should be required to study the performance and concentrate on the weak spots as developed by the statistics. The following form is suggested.

From the general office, letters and circulars should be issued from time to time outlining the performance. Good results may be secured by the use of graphic charts indicating the standing of the divisions in order to introduce the competitive feature.

The selection of a particular commodity, one which moves in large volume, during a certain period, and an analysis of the conditions surrounding its handling can be made productive of results. Experiments should be made in intensive loading of such a commodity and the method of loading demonstrated to be the most economical, reduced to charts or blueprints, for circulation among those interested. Where marketing conditions or commercial units affect the size of the load, conferences should be held with individuals, firms or associations interested in the particular commodity in an effort to secure co-operation in improved loading.

But while much may be achieved in the handling in wholesale, the real effective work must be done in the retail realm. Constant supervision over the loading of the individual car, and close following of shipping points must be supplemented by missionary work directed at the consignee whose light order is often responsible for a light load. For this purpose, a report should be required from destination points, showing all cars received with loads that do not utilize either the weight or space capacity of the car. These reports should give the name of shipper and consignee as well as the point of origin, and destination. They should

Divisions and commodities	CARS LOADED AT STATIONS												Sheet No. _____
	Cars loaded		Freight Capacity of cars—tons		M. nth of		Weight of contents—tons				Percentage of contents to capacity		
	191— 2	191— 3	Total 191— 4	Average per car 191— 5	Average per car 191— 6	191— 7	Total 191— 8	Average per car 191— 9	Average per car 191— 10	191— 11	Percentage of contents to capacity 191— 12	191— 13	
1													

many reasons for purchasing in small quantities, and his attitude toward the heavy car load is, therefore, in natural opposition to that of the carrier and the consignor. The most logical and simple expedient to correct this tendency on the part of the consignee is a proper adjustment of car load minima. Some progress is being made along this line, but it requires time to correct iniquitous practices that have developed over long periods. This direct method must,

also show the commodity, car capacity, weight of shipment and per cent of capacity utilized (both weight and space). The supervisory officer may then handle by correspondence or otherwise, with either the shipper or consignee for an increase in the weight of future shipments.

There are many commodities, the nature of which will permit of "double loading" by which is meant the consolidation in a single car at point of origin of two minimum car

load shipments for different destinations or consignees. Such loading should be limited to shipments moving in the same general direction, and the handling should be covered by special instructions to avoid delays and mixing of shipments. Checking of such reports with car distributors daily will suggest means for inducing a better utilization of cars through regulation of the supply.

Contests between loading stations with cash prizes for excellence in car loading is an effective means of stimulating interest. To insure fairness and to give the widest possible range to the contest, the prizes should be fixed by commodities with possibly an additional prize for the best record in loading all classes of freight.

While the shipper and consignee are the partners of the carriers in loading of car load freight, the carriers have within their control, a large item in the merchandise loading, which by its nature makes for light loading. This traffic constitutes possibly 10 per cent of the loading on many large roads. To supervise this item properly, the transportation office in conjunction with the traffic department should carefully analyze the merchandise traffic and establish l. c. l. schedules, scheduled cars should be run regularly, and loading stations prohibited from running unauthorized cars. Daily reports of tonnage should be required, the figures tabulated and carefully analyzed to detect schedules which are not justified by the traffic offered, or to indicate where schedules may be changed to the advantage of the service.

If a program based on the methods suggested in the foregoing is undertaken by the transportation organization, with the co-operation of the traffic department and the support of the management, and if intensive supervision is applied to the fulfillment of the program, a marked improvement in loading is almost certain to follow.

Watch the Loading at Every Angle

By J. L. Coss

Train Dispatcher, Chicago, Rock Island & Pacific, Hailville, Okla.

The railroads and shippers should take measures to induce the Interstate Commerce Commission to authorize general increases of minimum car load weights and no effort should be spared to increase the loading of less than car load freight. A vigorous campaign should be waged by the representatives of the railroads among the shippers through the different shippers' associations, chambers of commerce and also through the newspapers.

Every time a railroad representative, regardless of his position, is within reach of a gathering of business men he should take advantage of any possible opportunity to talk on the subject of loading cars to capacity, or rather—10 per cent above capacity. He should also make it a point to enlist the attention and kindly feeling of the draymen, truckers and others who actually load the cars in such a way as will cause them to take a personal interest in this important matter. It is the fellow that does the actual work who can sometimes help out in more ways than one.

Articles by recognized authorities on transportation appearing from time to time in the leading newspapers will have a tendency to encourage shippers and railway men toward the loading of cars to capacity. The magazines published by the railroads should contain articles on heavier car loading together with statements showing tonnages loaded in cars for a certain period. The agent obtaining the best record in car loading should be very strongly commended in the magazine. The managements should take the employees into their confidence, telling them of the results secured, thus creating in them an interest in the matter.

The station agent is one of the most important factors in

the matter of producing the capacity loading of cars and he should be dealt with in a way that will insure such loading of all cars from his station. At transfer points he can work miracles by looking after the cars which are interchanged. By exercising a little diplomacy he will gain the good will of the shippers who will be more than glad to assist him in making his record for full car loading complete. The "sailing day" plan for handling merchandise should be adhered to; this makes for a larger amount of l. c. l. merchandise loading per car. However, with this practice in effect too many local merchandise cars leave the terminal each morning in the local freights; many of these cars could have been consolidated into a less number.

At all staff meetings general talks on the subject of car capacity loading will have a tendency to stimulate the employees in general and especially agents and local trainmen whereby they would be induced to watch the matter closely.

Conductors should be appealed to in the matter of setting out cars for loading and especially at blind sidings and set out the kind of car applicable to the commodity to be loaded and obtain a capacity load. Chief dispatchers and car distributors should familiarize themselves with the class of loading at different points on their divisions and give conductors such information as will be of benefit to them in furnishing the cars which can be utilized to advantage in securing heavier loading. If a small car is ordered for a station it should be furnished instead of a large one, because the larger car can better be used somewhere else. This is a matter which should be watched closely by all supervisors when making trips over the road.

At small stations, where beginners in the station service are generally placed, and some of the larger stations as well, the agent as a rule does not look personally after the loading of cars but leaves it to the shipper and the latter generally leaves it to the drayman. Where such conditions exist the trainmasters and other supervisors can do some good missionary work both with the agents and the shippers. But this must be done in a diplomatic way.

Trainmasters and other supervisors should spend more of their time visiting stations in the interest of heavier car loading, and they should by no means miss the blind sidings where considerable loading is done at certain times of the year by farmers and teamsters who do not appreciate what capacity loading means. Here is where the supervisors can make a good showing by teaching these men what is desired and how to get it.

Co-operation among the shippers and their forces and the representatives of the railroads will do more to produce capacity loading than anything else. However, when good results have been reached do not allow empty cars to stand idle on the side tracks under the eyes of the shippers who have been urged to load cars to capacity.

At coal mines, rock quarries, lumber mills, and similar places, where there are no track scales for weighing cars, many cars go out light loaded. If such industries cannot be prevailed upon to install scales it would pay the railroad company many times over to put them in.

It is impossible, in many cases, to load lump and nut coal to capacity in the ordinary coal car because the sides of the car are not high enough. In order to secure capacity loading of this commodity the railroads should equip such cars with side boards six or eight inches high with hinges and stakes.

At points where bulky freight such as furniture and similar commodities are loaded special care should be exercised by agents and yardmasters and engine foremen to see that the proper sized cars are set which will admit of loading as near as possible to capacity and the shippers prevailed upon to load every pound they can in the cars. Many times the shippers can be induced to knock down bulky freight, with a very little labor on their part, thereby loading more

in the car and at the same time secure a reduction in rate as against the rate they would pay for the freight in a set up condition. Here is where the station agent and the traffic man can use his influence to advantage with the shipper.

Organize a Car Loading Bureau

By C. F. Balch

Assistant General Auditor, Chicago & North Western,
Chicago

The fundamental principle upon which we are to proceed is that in order to secure heavier loading, we must solicit the interest and effort of the man who is loading the car. This man is the shipper, so far as all c. l. traffic is concerned, and the freight house force, so far as the l. c. l. traffic is concerned.

The l. c. l. traffic is a large factor inasmuch as on the average railroad, possibly one-half or more of all box cars are engaged continuously in this traffic. The l. c. l. freight originates in the principal cities and distributing points, and in a general way, moves opposite to the general direction of traffic. Many cars, if not used in l. c. l. traffic, would move empty to the points where car load traffic originates.

This consideration has probably had much to do with the light loading of merchandise traffic, inasmuch as the loaded car moving considerably more promptly than the empty car, finds itself out of the large city where it is needed for car load loading, and the movement of the car to this point is more to be desired than to secure a maximum load of l. c. l. freight. Therefore, a large portion of l. c. l. freight traffic, principally that which is local, originating and terminating on the one line, is excluded from interest. It does not, however, apply to freight traffic destined to points on connecting lines unless it is desired to secure a movement of foreign empties to points of destination.

As c. l. freight is loaded by the shipper, it is necessary to interest him in the question of increasing the loading. When cars are scarce the shipper should load a maximum load whenever he secures a car for the transportation of his commodity. At such times, minimums are ignored, and are not a governing factor. A little intelligent propaganda placed in the hands of shippers will have a very large influence in securing their interest in a maximum load. Shippers, however, are confronted always with the difficulty of receiving from their customers orders for a maximum car load, because by loading a minimum car load, they can secure a car load rate. The only way to overcome this tendency of the shipper is to *increase the minimum*.

The United States Railroad Administration did much to help this situation, but with the return to private control, and the restored authority of the state commissions there have come into being many minimum weights and rates applying to intra-state freight traffic, which should be raised to the standard set by the Railroad Administration.

Freight traffic includes certain commodities which cannot well be loaded heavier than at present. The livestock traffic is an example of this, the nature of the commodity forbidding heavier loading. Certain other commodities are being loaded as heavy as practicable, and yet are far below the average load of all cars. Coal and ore are examples of commodities which are already being loaded to the maximum capacity. It is, therefore, necessary to direct special attention to those commodities which are susceptible to heavier loading, and which may well respond to an intelligent effort.

A study of commercial conditions which have been governing factors in determining the practicable minimums heretofore, would disclose opportunities for raising many of the low minimums which now exist.

This subject is worthy the entire attention of a special staff, and it is suggested that a heavier loading bureau be

established either in the office of the superintendent of transportation, or the chief operating officer, as may be deemed advisable. The duties of this bureau would be to study the subject and assemble and disseminate such information as is necessary to carry on an intelligent propaganda.

Emphasis is here placed upon the necessity of showing the loss of revenue to the carriers which results from underloading. To illustrate: A car loaded with 20 tons of freight, moving at 15 cents per cwt., would aggregate revenue of \$60. If loaded to capacity of 40 tons (presuming the capacity of the car is 80,000 lb.) it would yield revenue of \$120. The loss of revenue in this case is \$60. This fact, brought to the attention of the agent, or the shipper, would impress on him that if he desires low freight rates, he must co-operate with the railway to produce the largest revenue from the use of each unit of equipment.

It is suggested that an examination be made of way bills when received by the auditor of freight accounts; that comparisons be made between the actual load and the capacity of the car, and wherever the car is underloaded, a record be taken showing the description of the load and the facts which will indicate the underloading. This information should be used by the officer of the car loading bureau to direct the attention of the agent to the fact of underloading and to point out to him the loss of revenue accruing to the carrier through that condition.

Take Photo-Records of Light Loads

By D. J. Stevens

Division Superintendent, Baltimore & Ohio, New Castle, Pa.

The success which any railway division secures in increasing car loading is largely controlled by the amount of effort that the division superintendent puts into the work, in planning a campaign for his staff, and outlining a policy which is workable and practicable. The methods employed vary largely with the commodity to be loaded. For example, I have found in the coal fields that a camera is an extremely helpful instrument in increasing the tons per car. My method has been to have a man with a kodak go through the mine districts periodically to take pictures of any cars which do not show full loading. These pictures, with the name of the mine, date and car number written on the face, are shown the mine owner or operator personally or are sent him with a letter. His attention is directed to the empty space in the car, and to the fact that his light loading of the car is depriving him of the additional loading space.

Careful records maintained daily of our ore loading at the docks, making comparison with the loading for the previous month and same month previous year, and placing these figures in the hands of the superintendents of the docks, as well as their superior officers, has resulted in a net gain of approximately 20 per cent.

The two remaining items which I have dealt with have been that of persuading the big industry and the small individual car loader to increase his load per car. Frankly, I have found that the big industry is not only desirous of assisting but has co-operated even more than I expected.

My staff officers and myself, in going over the division, stop and visit the officers of the industries having charge of this phase of the plant operation, discuss with them the car situation, call to their attention how many more cars are available for their loading by increasing their load per car, and we have asked them to have their salesmen co-operate to the extent of asking the consignees to buy in car-load lots. The real hard job in the campaign has been with the men who load two or three cars a week. They have not grasped the idea as quickly as have the big shippers and we have not made the gain with them up to the present time that we have with the big shipper.

Outside Repairs to Railway Equipment Justified

Statements of Various Railroad Executives Prove That Conditions Warranted Repairs by Contract

FACTS CONCERNING THE LETTING of contracts for repairs to railway rolling stock to outside concerns, which have been made public in statements of several railway executives, prove conclusively the fallacy of the contention of W. Jett Lauck of the International Association of Machinists that the big railroads "are closing their repair shops and giving repair work at extortionate rates to large private equipment companies." These charges are being investigated by the Interstate Commerce Commission.

Mr. Lauck attempted to show by figures of his own compilation that the average cost of repairs made by private equipment companies was considerably higher than repairs made in the railroads' own shops. He did not, it is pointed out by several of the executives, take into consideration that the repairs made under contract were of much greater extent than those taken care of in the railway shops nor did he allow for overhead charges in his estimates of costs for repairs in railway shops. The executives draw attention to the fact that the overhead costs are included in the charges made by equipment companies for these repairs. They also show that the severe congestion of traffic last year, resulting in heavy losses to business, made it imperative that all available equipment be put into service as rapidly as possible. They feel that this fact alone would seem to justify almost any step taken by the railroads to relieve the situation.

How the Traffic Congestion Was Met

A statement given out by T. DeWitt Cuyler, chairman of the Association of Railway Executives, is quoted herewith in part:

"In the inquiry before the Interstate Commerce Commission the railroads are prepared to show:

"1. That on the return of the railroads on March 1, 1920, there was an abnormal number of locomotives and cars in bad order requiring repair and an abnormal number of locomotives then in operation which would nevertheless require 'shopping' at an early date.

"2. That it was impossible to take care of all of these repairs, immediate and prospective, within any reasonable length of time in railway companies' shops.

"3. That at the time most of this equipment was sent to outside shops for repairs there was one of the worst traffic congestions in the history of the country, and that the railway companies were properly under the pressure of the Interstate Commerce Commission, the Car Service Division of the American Railway Association, and of their shippers, to use any and every available means to restore this equipment to service at the earliest possible date.

"4. That generally when equipment was sent outside it was to the company which had originally constructed it, for the obvious reason that the original manufacturer had the patterns, extra parts and machinery which would enable him to effect these repairs more promptly than could be done elsewhere; that if for any reason the original manufacturer could not accept such cars, then the nearest available shop having adequate plant and available capacity was chosen; and that these were the considerations which controlled the choice of outside shops, and not any alleged dual interest between equipment and railroad companies.

Non-Comparable Figures Compared

"5. That with regard to cost, the comparative figures given are entirely misleading, as so-called cost figures in

railway shops cover substantially only cost of material and labor, most of the expense—overhead, supervision and maintenance—being carried in other railway accounts, and being further misleading because cost in outside shops necessarily includes a reasonable profit.

"6. Furthermore, that the comparisons of cost given are erroneous and misleading because in many cases the equipment sent outside required the heaviest kind of repairs, sometimes amounting to substantial rebuilding, frequently including additional improvements, and in general not being comparable to the normal classified repairs in a railway company's shop.

"7. That, as additional proof that the companies had no ulterior purpose in sending this equipment to outside shops for repair, the companies were merely carrying on the practice of following the precedent established by the United States Railroad Administration during similar but lesser emergencies.

Employees' Responsibility for Situation

"8. That certain organizations of railroad employees, through the Shopcraft Agreement signed by them with the United States Railroad Administration, are themselves in part responsible for the inability of the railway managements to expand the capacity of railways' shops. Reference will be made particularly to Rule 153 of the National Agreement with the Shopcrafts, by which the railroads are precluded from employing upon the repair of cars any men who have either not served an apprenticeship or have not had four years' previous employment in car repair work. Under this provision the railway companies at the time of their greatest need were prevented from adding to their forces competent and available painters, carpenters, machinists, blacksmiths and others necessary to increase the capacity of their car repair plants.

"9. That the equipment sent to outside shops constituted only a small part of the equipment in need of repairs.

"10. That nevertheless the value of the equipment imperatively demanding repair and beyond the capacity of railway companies' shops in the spring of 1920, represented an investment of many millions of dollars, and that the contention that this equipment should have been held out of service for months or even a year until it could be repaired in railway shops, is a proposition in violation of all respect for the public's right to service and of good business and sound management.

"The truth is that the effect of the rules and working conditions still controlling the repair of equipment in railway shops has been disastrous to efficiency and output, and is in itself one of the causes of the abnormal number of cars and locomotives out of repair.

"Insofar as the organizations of railway repair employees have helped to produce a situation in which all of the railway repair work could not be taken care of in railway plants, or where outside plants can now do the work more economically and speedily than railway shops, they have only themselves to blame.

The Public's Own Stake in the Case

"The real point of public concern at the present time is not the measures taken by the railway companies for the repair of cars and locomotives in 1920, but is the question now before the United States Railroad Labor Board at Chi-

Chicago, as to rules and working conditions in railway companies' shops.

"This involves millions upon millions of dollars, which, in the last analysis, are a charge to be paid by the public for its railroad service. These costs, often for work not even performed, result from unjust and burdensome regulations, which the railroads are seeking to have changed."

Mr. Cuyler in connection with his statement included the following quotations from letters of several executives.

H. E. Byram, president, Chicago, Milwaukee & St. Paul, said:

"Work done on twenty locomotives at Baldwin Works was not ordinary repair work, but complete rebuilding of locomotives and converting them from compound to simple type. This involved almost as much work as building a new locomotive. The converting of these engines from one type to another involved a class of work which could not be done as economically in our own shops as at shops of Baldwin Works, where these locomotives originally were built and where the necessary facilities were available for rebuilding them in most economical manner. These locomotives were obsolete type, several of which had not been used for several years, and when turned out of shops were practically new engines and cost less than one-half the price of new locomotives."

Relative to work done in outside shops for the Chicago, Burlington & Quincy, President Hale Holden said:

"The only arrangements of this character made by this company were with Baldwin Locomotive for seven and with Davenport Locomotive Works for seventeen. It was after careful survey of our power. Situation indicated that during previous two years the condition of engines was below normal and so many required overhauling we would be unable with our own facilities, and considering limitations as to employing machinists provided by schedules with labor organizations made during Federal control, to have sufficient power to satisfactorily handle the heavy traffic through winter months."

W. H. Finley, president, Chicago & North Western, is quoted as follows:

"At the beginning of Federal control we had 175 engines out of service for repair. At the end of Federal control there were 386 engines out of service, and the number of engines that were good for but sixty to eighty days' more service was as much greater at the end of Federal control than at the beginning as the number actually out of service.

"Have had repairs made by American Locomotive Company. The first locomotives so repaired were sent to outsiders during Federal control by Railroad Administration. The company has continued sending locomotives at same cost. Railroad Administration sent thirty-five. Company has sent thirty."

Lacked Capacity to Do Work in Own Shops

The following statement was made by J. R. Kenly, president of the Atlantic Coast Line:

The Atlantic Coast Line has been mentioned as one of the roads having equipment repaired in outside shops, with the intimation that some of its officers or directors were personally interested in such outside shops. The Baldwin Locomotive Works has practically rebuilt 20 A. C. L. locomotives and is rebuilding 10 more. Two were sent to the American Locomotive Works for repairs. The contract for the first 10 was made during federal control, with the full concurrence of the regional director, and the work upon them was begun before the end of federal control. No cars have been repaired at outside shops.

We estimate that the efficiency of the A. C. L. shops was decreased not less than 30 per cent during the period of federal control by the reduction of the work day from 10 to 8 hours, by the forced abandonment of piece work, by the forced obligation of the closed shop, and by successive federal interpretations of the rules and regulations governing shop control and operations.

It was the result of these conditions which made the regional director recognize the necessity for this outside work.

Bids for rebuilding were requested from the Baldwin and from the American Locomotive companies and the contract made with the lowest bidder.

No director or other officer of the A. C. L. has any direct or indirect interest in either the Baldwin or the American Locomotive companies.

When the federal government took over the railroads on December 31, 1917, there were 112 engines out of service requiring

repairs. At the end of federal control on March 1, 1920, there were 202. A locomotive is supposed to be near the time of shopping for major repairs when it has made 100,000 miles. On December 31, 1917, the following was part of the locomotive record:

Locomotives having made less than 40,000 miles..... 297
Locomotives having made more than 100,000 miles..... 93

On March 1, 1920, when the railroads were returned to their stockholders:

Locomotives having made less than 40,000 miles..... 246
Locomotives having made more than 100,000 miles..... 118

Add to this condition a decreased shop capacity of not less than 30 per cent and you have the reason why the Atlantic Coast Line was forced to employ outside shops if it was to meet the demands of the public for transportation service.

It is true that it costs a railroad company more to have its locomotives repaired outside than in its own shops.

A locomotive builder must make a profit which is not included in the cost of a home shop.

It is, however, untrue that the Atlantic Coast Line is paying for repairs or rebuilding in outside shops four or five times what it would cost to repair or rebuild at home.

The difficulty in the case of the Atlantic Coast Line was that it could not rebuild at any cost these 30 locomotives in its own shops for the reasons stated.

Since federal control ended the Atlantic Coast Line has ordered over \$1,000,000 of modern shop tools and machinery and has increased its motive power organization and it hopes to be able under changing conditions to meet future repair and rebuilding equipment requirements without the assistance of outside shops.

The Lehigh Valley

E. Loomis, president of the Lehigh Valley, in a statement issued to the press, lays the necessity for resort to outside help in repairing cars at the door of the Railroad Administration because of its failure to maintain a sufficient number of cars in repair and, moreover, because of reduced shop efficiency resulting from the abolition of piece work and the enforced continuance of the national wage agreements which were entered into by the Administration.

Returned in Condition to Make

Outside Repairs Necessary

J. M. Kurn, president of the St. Louis-San Francisco, likewise blames the Railroad Administration for returning the rolling stock to the roads in such condition that outside repairs were made necessary. He states further that "work done in the contract shops has cost and is costing less than similar work" in the company's shops. He calls attention to the apparent policy of some of metal craft unions to curtail production, thus making necessary resort to outside shops in order that a high percentage of equipment be kept in service.

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Photo by International

Indians at the Tehuantepec, Mexico, Station Awaiting with Their Wares the Arrival of a Passenger Train

Cause of the Present Condition of Freight Cars*

Pooling, Deferred Retirements, Labor Conditions and Abuse in Service; the Remedies Suggested

By J. C. Fritts

Master Car Builder, Delaware, Lackawanna & Western, Scranton, Pa.

WHEN A BAD CONDITION is found an effort should first be made to find the cause and then work out some method by which the evil can be combated. So much has been said in regard to tightening nuts, opening cotter keys, measuring piston travel, etc., that I thought we might pass that part of car maintenance tonight, assuming that it was being well taken care of, and go a little deeper, with a view of suggesting something constructive.

In order to properly analyze the present unsatisfactory condition of freight cars, it will be necessary to go back two or three years and ascertain what has occurred during that period that would contribute to the present situation. If this can be determined with any degree of accuracy, then we should be able to suggest something that will give us relief.

Effect of Pooled Equipment

Formerly it was common practice to maintain the majority of cars on home lines, but during the war the pooling of freight cars was deemed necessary, and cars on home rails in many instances were reduced to ten per cent of the equipment owned. It does not seem at present that we are going to get back to previous conditions in this respect for some time to come, if ever. The result has been, and still is, that a very large percentage of cars in bad order are of foreign ownership, for which the handling line does not carry in stock standard material, except a few M. C. B. parts. Therefore, in lieu of repairing in kind, improper and temporary repairs have been made in order to return the cars to service.

All railroads throughout the country have been repairing cars in this manner. It was the best they could do under existing conditions. Such methods are responsible in a very great measure for the condition of freight car equipment at this time.

A check and inspection of system cars received home at interchange points developed that a very large percentage were in need of extensive repairs and a large number had defects that could have been repaired by using standard material. This would seem to indicate that returning equipment to owners only when it has become unserviceable is being practiced to a very great extent.

Imagine what is going to happen with 75 per cent or more of all cars in the country on other than owning lines with conditions of this kind existing. I do not mean to say that there has been willful neglect on the part of railroads in general, but an analysis of the situation shows that these things have been forced upon them by the scarcity and mixing or pooling of equipment.

Repairs to cars have been retarded:

First, because the car department forces have not been familiar with the class of cars they have been required to repair and necessarily have consumed more time than was customary on home line equipment.

Second, it was formerly customary to manufacture parts for system cars in large numbers which were placed in stock and could be used as needed. They were made with standard patterns, formers, dies and other labor saving devices, at the minimum of time and expense, but with foreign

cars in the majority on shop tracks this practice could not be continued, as there was not a sufficient number of system cars received to warrant the manufacture of various parts in any great amount. Practically all such parts for cars of foreign ownership require special operations through the manufacturing section of our shops, thereby losing the benefits of the labor saving devices that were previously in use. This has resulted not only in reducing the shop output, but has greatly increased the cost of production.

Old Cars the "Weakest Link"

Train tonnage is being increased from day to day; heavier locomotives are built with greater drawbar pull, and two or more are coupled together on heavy grades, or where it may be necessary to maintain fixed tonnage; heavy rails with rock ballast have been laid; new and stronger bridges have been constructed and all modern appliances for transportation have been adopted. The freight car from 15 to 20 years old is expected to take its place in this line of modern improvements and successfully perform service that is two or three times greater than was originally intended when the car was built. It is unreasonable to expect the old freight car to function efficiently against such odds.

If we were handling the same train tonnage with the same locomotives that were used when the cars that are failing were built less trouble would be experienced. The sooner railroads strengthen the weakest link in transportation, which is the car, the quicker results will be obtained. Many of these cars are of old and weak construction and their failure not only results in damage to themselves, but frequently causes serious damage to other good cars that are being handled with them. The majority of these cars are repaired in kind instead of being dismantled, as was formerly the practice.

Cars with short draft timbers, extending from end sills to body transoms, of which there are many thousands in service, cannot be handled with any degree of success with present transportation methods. Cars of this construction that have had new sills and ends applied and generally repaired, in many instances have them torn out and destroyed within a few miles of the shop where repairs were made. A number of railroads, however, have started to apply reinforcements, some of which are of substantial construction, while others are little improvement, if any, over repairing in kind, and seem to have been contrived to reduce the expense of application rather than to give service. The result of such a practice is, that the expense of upkeep, not considering service, will soon equal the cost of proper reinforcements and the weak cars will still be on your hands. This is false economy, and it would seem that the design of reinforcements for freight equipment is not being given the thought its importance deserves.

If this is true, and we all know it is, then surely something should be done to eliminate or prevent repairs of this character.

The labor situation has also contributed very largely to present conditions. Many of the old employees have worked faithfully and endeavored to produce an honest day's work, but as a whole they have not manifested the same interest or

*Presented before the Western Railway Club, Chicago, January 17, 1921.

given the same loyal support as was formerly their practice. There seems to have been a spirit of getting by with the least possible amount of work and indifference as to the quality as well.

Effect of Labor Conditions

The leveling of rates for all mechanics in the carmen's craft has reduced shop output instead of increasing the production, as was expected by some of the advocates of this system. All men are not of the same ability, and the highly skilled mechanic feels that he should not produce more than one of lesser skill because he is receiving the same rate of pay. This is human nature, and we cannot expect a change in these principles until a different method of compensation has been inaugurated.

Railroad shops are among the very few manufacturing plants throughout the country where all mechanics are placed in one class regardless of skill, and where the thrifty and industrious employee is supposed to produce a sufficient amount of work without extra compensation as compared with the man with a shiftless and lazy nature. Such a system is wrong, as it not only works an injustice and hardship upon the employee, but the employer as well. The right of every man to earn in accordance with his skill and ambition to produce, should not be denied him. It is one of the fundamentals upon which the Constitution of our country is based.

Rules and regulations that required years to work out and establish for the other crafts, were put into operation at once in car department forces, with the result that there was a lot of confusion which finally was adjusted with not enough men in the country with the experience required by the rules, to cover the work then on hand. There was no method of creating more until three years had elapsed, and then only through the helper apprentice system. The duties of carmen are so varied and cover so many distinct lines of work that rules which govern blacksmiths, machinists and some of the other crafts cannot be applied to carmen in so short a period and meet all of the various conditions of car work.

The rules insofar as they refer to supplying carmen are not workable because they have closed the door on increasing the number of men that can be employed at this work. On account of the centralizing of authority, the former close personal contact between the employee and those in charge has ceased to exist; supervisors are not free to settle questions that may come up from time to time, but must be governed by decisions handed down by men who are many hundred miles away and who perhaps never have been on the grounds and certainly are not familiar with the local conditions. Ability cannot be considered and is not a factor in promotion at this time. Seniority governs in all cases, at least to the extent of a trial, with the result that there are entirely too many trials and very little production in the meantime. All of these things and perhaps many others that could be mentioned have all had a tendency toward a general lowering of the employees' morale.

The effect of such a condition is reflected in the present condition of freight car equipment. These restrictions have affected shop operations to such an extent that it has been found impossible to maintain bad order cars within a reasonable percentage.

The Misuse of Equipment

We hear much in regard to speeding up and increasing efficiency in operation; that more cars must be loaded and carry a greater tonnage; that the miles per car per day should be increased. But those in charge seem to have lost sight of the fact that a great factor in bringing about these results is keeping the greatest possible number of cars in service, and that this in a great measure depends upon the

manner in which they are handled. Very little, if any, attention or consideration is given to the misuse of equipment. The only thought seems to be of delivery and loading or unloading, and if damaging or mutilating the car would in any way assist in this operation, there is no hesitancy in doing so. It is not uncommon, however, to receive complaints about the large number of cars it becomes necessary to bad order after receiving usage of this nature.

These destructive methods have been gradually on the increase for the last two or three years, and have not been confined to hump and classification yards. At piers and wharves, and in fact, at all loading and unloading points, the abuse of cars is always in evidence. It has become almost impossible to maintain cross ties, brake staffs and wheels, where clamshell unloaders are in use, notwithstanding the fact that these must all be replaced before the car can be returned to service.

Roofs, doors, door tracks and fixtures, flooring, lining, and in fact any part of the car that might affect the unloading operation, are torn off and destroyed, apparently without the least thought of the important position the freight car holds in relation to moving the country's traffic.

Many thousands of cars are thus damaged and sent to shop tracks daily, which otherwise could be loaded again without repairs, not only reducing the cars out of service on account of bad order but greatly assisting in increasing car mileage and the number of cars loaded.

Material Shortage

While the material situation has improved during the last two or three months, it has contributed its share in full measure to the difficulties that have been experienced in properly maintaining cars in serviceable condition. Manufacturers have received orders in excess of their capacity to produce, and when finished, the scarcity of cars very often prevented prompt shipment of the material. This and embargoes placed on company material from time to time made proper and prompt repairs impossible even though other facilities were adequate.

With all of these conditions existing, is it any wonder that we find freight cars run down and worn out and need those in charge of car maintenance feel that they have fallen short in the performance of their duties? I believe you will all agree with me in stating that they have done well, all things considered.

What Are the Remedies?

The following suggestions will assist in relieving the present unsatisfactory condition of freight cars throughout the country.

When possible from a traffic standpoint, cars should be returned to owning lines where repairs can be made. The old and light constructed cars could then be dismantled or assigned to special home line service and those that warrant being continued in service should receive substantial reinforcements that would be in keeping with the service they are required to perform.

All railroads are under moral obligations to do this, because they expect such cars to be accepted and handled in through line traffic by other railroads. Under the present system of pooling equipment through Commission orders, etc., a railroad that builds and reinforces in line with good practice will receive very little benefit from so doing, unless all other roads do likewise, because the exchange of cars between railroads has increased to an extent that 75 per cent of equipment on line is of foreign ownership and cars that receive extensive repairs today will probably leave the home line tomorrow and not return for several years. Therefore, there should be some agency established between rail-

roads that will prevent the application of reinforcements or the perpetuating and offering of cars in interchange traffic that are unfit from a standpoint of strength for general service.

All railroads have had sufficient experience to indicate to them that cars with short draft arms extending from end sill to body bolster cannot be handled with any degree of success, especially on trunk lines in heavy tonnage trains, and after a reasonable length of time has been given, they should be refused in interchange regardless of type or capacity. A very large percentage of the present bad order equipment can be confined to approximately 400,000 cars in the United States. All that the majority of these cars need to make them serviceable for many years to come is the application of proper reinforcements.

If the pooling of cars is to continue and it becomes impossible to return them to home rails, then so far as it may be practical, certain common standards applicable to the most of this equipment should be adopted. These should be applied regardless of where the cars may be. This would not only hasten placing them in proper, serviceable condition, but would very materially assist in their future maintenance.

The General Committee of the mechanical division of the A. R. A. should appoint a committee for this purpose, and work out a system that would enable all railroads to reinforce such cars when placed on shop tracks for extensive repairs, regardless of ownership.

The condition of many cars received home shows that repairs for which standard material could have been used have not been made, indicating that cars of foreign ownership are not receiving the attention that present conditions would warrant or permit.

Under the present arrangement a railroad should, so far as possible, give the same consideration to foreign cars that it does to its own cars, and the failure to do so will react against the proper maintenance of freight equipment as a whole.

It has been stated that the writer is in favor of no labor unions and low wages, and that in saying so, he has voiced the sentiments of the "higher-ups." Nothing could be further from the facts. I believe in labor organizations that are conducted on just and moral principles, and that every man is entitled to fair and just treatment and his day in court. No superior of mine has ever suggested or even intimated to me what my views should be on this subject. Employees are entitled to safe and sanitary working conditions and regardless of the class of work a man performs, if he is willing to produce an honest day's work, he is entitled to a good living wage—by that I mean, enough for himself and family to live comfortably, to educate his children and, without extravagance, to lay away something besides. And treating this as a basis, every man should be paid according to his ability and willingness to produce. It is the only fair and just method of compensation, and a system that would make this possible should be inaugurated.

Rules that have been found to be unworkable and those that have inflicted unjust and unreasonable penalties on employers should be replaced with others that will equitably and fairly meet the conditions they are intended to cover. Men who are thoroughly familiar with their class of work should be placed in charge. They should understand human nature and the difficulties under which employees must at many times perform their work; men that will keep in close personal contact with those under their charge and who are quick to see and correct a wrong, regardless of where it may exist. No man feels satisfied to perform his duties from day to day without some recognition from his superior outside of the salary he may receive. Every faithful employee is entitled to this consideration. It not only creates a relation-

ship of good will and loyalty, but inspires the employee to do better and more efficient work.

Supervisory officers of this type with proper authority ought to be able to meet and settle questions that may arise from time to time without the necessity of referring them to higher authority. If this is done, we should get back the morale and co-operation of our employees, which is very necessary in order to build up our production to a normal output.

So many cars are being damaged through carelessness, in many instances bordering on malice, that something should be done to prevent the destruction of company property by the misuse of equipment. I am somewhat at a loss for a proper and effective solution of this problem, but some sort of a campaign is necessary, because in many instances those in charge appear to give this very important question no more thought than the employees they supervise. Much money could be saved if it could be instilled in the minds of those handling them, including some transportation officers as well as dock foremen and yardmasters, that cars are constructed, not to be damaged and mutilated, but to perform a very important service in connection with the life of our nation.

In view of the fact that a very large percentage of the damage to freight cars is caused by shock, draft gear maintenance is worthy of serious consideration at this time. The question of type or style of gear must be left open for further tests and investigation, but I believe that we should get the best out of whatever type we have in service. They perform more work and receive harder usage than any other device on a car, and it is the only one for the inspection and maintenance of which there are no specific rules laid down.

The function of a draft gear is primarily to keep down the pressure in the car underframe when under impact, which is done by increasing the length of time the forces are distributed through the car during such impact—in other words, by draft gear travel. It should always be remembered that none of the forces resulting from impact or collision are destroyed, but all remain in the car underframe to be disposed of or dissipated in one way or the other. Any wear or broken part that causes slack, reducing the effective travel of the gear, hastens the closing point, after which the pressure in car sills or underframe increases very rapidly.

If the function of the draft gear is as important as I believe we will all admit, then surely some systematic method of inspection and repairs should be installed on all railroads. We find that this is necessary in the maintenance of air brakes, wheels, and couplers. The cost to make such inspection or adjustments would not necessarily be greater than the expense of cleaning and repairing the air brakes, which the law compels railroads to do at least once a year, and I feel sure that the saving would be many times greater than the cost.

A periodical inspection should be arranged for and the dates should be stenciled on the car in a manner similar to the present practice with respect to air brakes.

Discussion

The paper drew forth a discussion on a wide range of subjects pertaining to the maintenance of freight cars. Several speakers referred to the frequency with which draft gears and attachments and box car ends were damaged and the suggestion of the writer of the paper that standard repairs generally applicable to all old equipment be developed by the mechanical division of the American Railway Association was favorably received, particularly as to standard car ends and draft reinforcements.

Several speakers called attention to the extent to which old cars with wood draft arms extending only as far back as the body bolster are receiving extensive repairs, as much

as \$1,200 being expended on heavy repairs to such cars, which are liable to fail immediately on being placed in service. Although the retirement of such cars was advocated several times during the discussion, it is evident that Rule 120 of the interchange rules has not accomplished its purpose.

C. N. Swanson (Atchison, Topeka & Santa Fe) strongly advocated fixing the A. R. A. prices for labor and material so high that owners would be forced to take proper care of their own equipment and that when cars are repaired on foreign lines the repairing road would be able to do the work at a profit.

C. J. Wymer (C. & E. I.) also advocated the policy of setting A. R. A. prices high enough to include a profit. In this connection Mr. Wymer also advocated making all defects owner's defects and balancing this with a rental charge high enough to reimburse the owner for the upkeep of the equipment.

The effect of the present condition of freight cars on operating costs was touched on by D. I. Bergin (Wabash), who stated that hot boxes and bad orders created enroute were prolific causes of excessive fuel consumption and crew overtime. He called attention to the fact that all a railroad has to offer in competition is the service it can render; weak equipment which causes delays in the movement of traffic seriously affects the quality of this service.

In closing, Mr. Fritts called attention to the 40-ton cars with short draft timbers, many of which are in service, as needing equally as much attention as the 30-ton cars frequently referred to in the discussion. These cars, from the very fact that they are permitted to carry heavier loads, may be even a greater menace than the similar cars of lighter capacity.

Plans for Helping New England Roads Considered

WASHINGTON, D. C.

HEARINGS on the application of the New England railroads for an order by the Interstate Commerce Commission giving to the lines east of the Hudson river large divisions of the through rates to and from New England were resumed at Washington on January 24. At the same time a renewed effort on the part of the commission to induce the railroads to reach an agreement among themselves which would make it unnecessary for the commission to prescribe the divisions made by Chairman Clark, who called to Washington for a conference the committee of executives representing the New England, the Trunk Line and the Central Freight Association roads which was appointed at the suggestion of the commission before the hearings were begun, to try to work out a basis for a voluntary agreement. Chairman Clark strongly urged upon the executives that they should settle this case themselves, pointing out that Congress and the commission have been trying to deal with the railroad problem in a broad way and that here was an opportunity for the railroads themselves to do something in a spirit of co-operation in the general interest. He also took the position that the railroads ought to be able to handle the matter in a practical way which would lead to more satisfactory results than a determination by the commission. Chairman Clark had made similar statements at an informal conference held to consider the New England situation on November 23 when the executives' committee was appointed to try to reach a solution without allowing the case on the formal complaint of the New England roads to come to trial. The committee held several meetings but failed to accomplish anything. The commission had also suggested that the railroads try to reach an agreement on divisions which would

give some relief to the New England lines, in its decision in the general rate advance case, after the New England roads had suggested that they be placed in a rate district separate from the Eastern lines generally, because of their needs.

Commissioner Eastman also was present at the conference. After hearing Mr. Clark the executives conferred among themselves for an hour or more and then adjourned for another meeting at which it is understood that a plan was tentatively agreed upon which was to be put up to the trunk line executives at a meeting in New York early next week.

While members of the committee declined to talk for publication, it is reported that the committee agreed to recommend that the trunk lines give the New England roads about \$15,000,000 a year. An offer of \$12,000,000 had previously been made and refused and it is understood that the representatives of the New England roads have not definitely agreed to accept \$15,000,000 but have shown more disposition to accept a compromise than they did when the lower figure was suggested. It is also understood that one of the plans proposed contemplated a voluntary assessment of a percentage of the freight earnings of the eastern roads outside of New England to constitute a pool which would be divided in some way among the New England lines without readjusting the divisions.

The New England lines have taken the position that the trunk lines received approximately \$25,000,000 a year from the rate decision by the inclusion of the New England lines in the Eastern group, which was allowed a 40 per cent advance in freight rates. The trunk lines, while recognizing the needs of the New England carriers, have taken the position that they have made out a better case for an advance in their local rates than they have for increased divisions, also that the results of the rate advance to the Eastern lines were disappointing and that they cannot afford to give up any of their revenue to the New England roads. Some of the executives have taken the position that even if they were willing to do so they should not be asked voluntarily to give up money belonging to their stockholders without an order from the commission. It is understood that some sort of a pooling arrangement has been considered.

Robert C. Wright, general traffic manager of the Pennsylvania, was the first witness for the trunk lines when the hearing was resumed on Monday. Mr. Wright insisted that the New England roads had received generous treatment at the hands of the trunk lines in the fixing of divisions and he presented a series of exhibits to show that the New England lines receive a larger percentage of the through rates than if the divisions were fixed on a mileage proportion calculated by 50 mile blocks, with an allowance of 50 constructive miles for terminals. He said every traffic man east of the New England junctions has always considered the percentages high and he characterized the suggestion for a 15 per cent increase in the arbitraries accruing to the New England roads as a "hold-up." He was cross-examined by Charles F. Choate, counsel for the New England lines, who endeavored to bring out that the divisions, many of which were fixed 40 or 50 years ago, do not take into consideration the increase in terminal costs.

D. T. Lawrence, general freight agent of the Delaware, Lackawanna & Western, also cited many examples of the methods of fixing the divisions which accrue to the New England lines on traffic to and from his line. He said the New England roads are already getting much more than a mileage prorata and more than they should expect and that the Lackawanna for several years has been endeavoring to get better divisions from the New Haven.

Similar testimony was given by Henry Adams, general freight agent of the Erie; W. G. Story, general freight agent of the Delaware & Hudson; A. J. Anderson, general freight agent of the Baltimore & Ohio, and W. S. Kallman, assistant to the president of the New York Central.

Results of the Abolition of Piece Work Pay

The Hourly Rate in Railroad Shops Has Decreased Efficiency and Output and Increased Operating Costs

PAYING RAILWAY SHOP EMPLOYEES solely according to the number of hours worked, instead of on the piece work basis according to the class and amount of work done has resulted in greatly reducing the efficiency of the individual shop worker and consequently in increasing the number of men that must be employed, decreasing the possible output of the carriers' existing shop facilities and greatly increasing their expenses, according to the testimony which has been presented to the Railroad Labor Board on behalf of the railroads during the past week. Proof of this contention, in the form of detailed statistical studies, was presented to the board by representatives of several of the larger carriers. This evidence constitutes part of the railroads' presentation in opposition to the employees' demand for the continuation of national agreements, one of which, the shop crafts agreement, on which the Board has been holding hearings since January 10, prohibits paying shop employees on a piece work basis.

The decrease in the efficiency of the individual shop worker, after he began to be paid by the hour, varied between 10 and 50 per cent. The actual production of the shops cited in this testimony decreased from 5 to 30 per cent following the abolition of the piece work system of pay, in spite of the fact that more men were employed.

The progress of the hearings on national agreements has been reported in the *Railway Age* of January 10 (page 199) and of January 21 (page 243). On January 18, E. T. Whiter, chairman of the Conference Committee of Managers of the Association of Railway Executives, completed his presentation in opposition to the shop crafts agreement. The following day officers of the motive power and car departments of several of the larger trunk lines began the presentation of wage, time and production studies made in the shops of their respective lines. It is not practicable to present all of the testimony given but the following conclusions drawn from the various studies, indicate the manner in which the substitution of hourly rates of pay for piece work rates has affected the cost of maintaining equipment and consequently the amount necessary to pay operating expenses.

Some Chesapeake & Ohio Examples

The same freight car repairers doing the same work in the Huntington (W. Va.) shops of the Chesapeake & Ohio during the last four months of 1918—when they had a guaranteed hourly wage—did 41.4 per cent less work than in the corresponding period of 1917, when they were on an exclusively piece work basis. This was due to the fact that, although nominally piece work was continued, the hourly wage had been raised so high that the incentive to obtain a higher wage under the piece work rates was destroyed because of the slight difference between the guaranteed rate and the rate which might have been earned by increased efficiency.

At the Russell (Ky.) shops of the same road, freight car repairers—the same men doing the same work under the same piece work rates—did 35.3 per cent less work the last four months of 1918, when they were guaranteed an hourly minimum, than they did during the corresponding period of 1917.

Again, at the Silver Grove (Ky.) shops of the same road, the car repairers did 29.5 per cent less work than in the same period of the previous year.

During the same two periods air brake repairers employed

by the Chesapeake & Ohio at Huntington and Silver Grove did respectively 32.4 per cent and 33.4 per cent less work on the guaranteed hourly basis than they did in the corresponding period of the previous year solely on piece work.

Similarly, passenger car painters at Huntington did 25.07 per cent less and engine painters 15.33 per cent less per hour than they had when the difference between the hourly rates and the piece work rates was such as to provide an incentive to increase production.

Chesapeake & Ohio employees in the brass foundry at Huntington, during the months of March, April, May, June, July and August, 1917, under piece work rates earned an average of 45.15 cents per hour. If the same piece work rate had been applied to the work done by the same men in the corresponding period of 1920, after the guaranteed hourly rate was established, they would have earned an average hourly rate of but 40.27 cents. This represented a decrease in efficiency of 10.8 per cent due entirely to the substitution of the hourly basis of pay for the piece work basis of pay.

During the months of April, May, June, July and August, 1917, employees in the Huntington brass foundry bored 3,016 car brasses during each 48-hour period, or one brass per minute under the piece work rates. At present the same employees are boring but 2,996 car brasses during each 52 hours, taking one and a half minutes for each operation. This represents an increase of 50 per cent in the time required to perform this particular operation by the same men working under hourly rates over the time required when the same men were working under piece rates.

The average number of man hours (a man hour is equivalent to one man working one hour) required to paint a passenger car in 1917 under piece work rates was 237.04. At the present time the average number of man hours required to paint a car has increased to 264.93, or an average increase per car of 27.89 man hours.

In the Chesapeake & Ohio's tin shop at Huntington during the months of April, May, June, July and August, 1917, under piece work rates, 94 7-in. smoke jackets were manufactured in 52 hours, or at the rate of 33 minutes per piece.

During the same period in 1920, under the hourly rate, it took 85 hours to manufacture 96 similar smoke jackets, or at the rate of 53 minutes per piece. The percentage of increase in the time required for this particular operation over 1917 is 60.6 per cent.

During the months of April, May, June, July and August, 1917, the average number of wheels bored per hour in the wheel rooms of the Chesapeake & Ohio's Huntington shops was 8.78. During the same period of 1920 the efficiency of the individual workers had so declined that but 4.65 wheels were bored each hour, a decrease of 47 per cent in the shop's production.

Time Required Increased 6.7 to 200 Per Cent on B.&O.

The time required to perform certain operations in the locomotive erecting shop and foundry of the Baltimore & Ohio at Newark, Ohio, and in the shops at Baltimore, Md., increased by from 6.7 per cent to 200 per cent after the piece work system of pay was abolished and the hourly wage system substituted. Of 52 operations in these shops not one requires the same or less time than was required under piece work rates.

In the Union Pacific's main shops at Omaha, Neb., and Denver, Colo., comparing periods when piece work rates were

in effect with periods when hourly rates were in effect, the total average increase in man hours—representing the longer time required to perform the same operations—was 36 per cent. Simultaneously the output at these shops decreased 26.5 per cent. This represents in general the detrimental effect of the change from the piece work basis of pay to the hourly basis.

Union Pacific

The man hours in the Union Pacific's boiler shop at Omaha have increased 31.4 per cent while the output has decreased 23.9 per cent; the man hours in the blacksmith shop at Omaha have increased 35.5 per cent while the output has decreased 26.2 per cent; the man hours in the wheel shop at Omaha have increased 31.9 per cent while the output has decreased 24.2 per cent; the man hours in the wheel shop at Denver have increased 40.5 per cent while the output has decreased 28.6 per cent; the man hours in the paint shop at Omaha have increased 42.4 per cent while the output has decreased 29.8 per cent; the man hours in the passenger repair shop at Omaha have increased 32.5 per cent while the output has decreased 24.6 per cent; the man hours in the freight car repair shop at Omaha have increased 26.4 per cent while the output has decreased 20.9 per cent; and the man hours in the coach cleaning yard at Denver have increased 38.6 per cent while the output has decreased 27.9 per cent.

Decreased Efficiency in New York Central Shops

Comparing a seven months' period in 1917 in which locomotive repairs were paid by the piece with similar periods in 1918 and 1919 when they were paid by the hour, it was found that in the locomotive repair shops of the New York Central the man hours in 1919 increased 26 per cent over 1917 whereas the actual number of engines repaired decreased 11.9 per cent. Again, in 1920 the man hours increased 52.9 per cent over 1917, but despite this large increase the number of engines repaired increased but 13.7 per cent. Comparing similar periods in 1919 and 1918, the man hours were increased 5.9 per cent while the production decreased 26.6 per cent. Again, comparing 1920 with 1918 the man hours increased 28.6 per cent and production decreased.

The average total number of hours spent in repairing a locomotive in 1917 on the New York Central was 2,185 hours and in 1918, 2,165 hours. This was under the piece work basis of pay. In 1919 under the hourly system of pay the average total number of hours expended upon the repair of a locomotive had increased to 3,129 hours. In 1920 the average was 2,938 hours. This increase in the number of hours spent on repairing a locomotive, 30 per cent in 1919 and 26 per cent in 1920, is due wholly to the decreased efficiency of the individual locomotive repairmen, which is due to the absence of an incentive to work efficiently.

When piece work rates were paid on the New York Central a pump was repaired in 4 hours and 50 minutes. Now that the shopmen are paid solely by the hour it takes the same men 11 hours to repair a pump. Similarly, when piece work rates prevailed, a driving box was bored and faced in 46 minutes; now under hourly rates it takes 1 hour and 25 minutes to perform the same operation.

The Pennsylvania's Experience

On July 25, 1918, shop employees were granted an hourly guarantee which was near the average hourly wage which the efficient piece workers had been making. This resulted in an immediate drop in the productiveness of the piece work repairmen. For instance, on the Pennsylvania 3,159 car repairers employed from July 1 to July 15, 1918, earned under the piece work rates \$0.501 per hour. From August 1 to August 15, 1918, the same men did only enough work to have earned \$0.443 per hour under the same piece rates. In other words their efficiency in terms of output per hour,

decreased 11.6 per cent when the basis of pay was changed. During the period from January 15 to January 31, 1919, their efficiency had further decreased to 26.7 per cent below the period from July 1 to July 15, 1918.

The average earnings under piece work rates of car repairmen on the eastern lines of the Pennsylvania from August 31, 1917, to July 31, 1918, was \$0.48 per hour. From August 1, 1918, to January 31, 1919, these men, paid on the guaranteed hourly basis, performed only sufficient work to have earned \$0.372 per hour at piece work. In other words, the average individual efficiency, as shown by the hourly output, decreased 22.5 per cent after the abolition of the piece work.

Computed in a similar manner the average efficiency of air brake repairers employed by the Pennsylvania decreased 7.4 per cent in the period from August 1 to 15, 1918, and 23.2 per cent in the period from January 15 to 31, 1919, as compared with their efficiency from July 1 to 15, 1918.

The efficiency of the locomotive repairmen employed by the Pennsylvania at its shops at Renovo, Trenton, Wilmington, Altoona, Columbus, Terre Haute, Olean, Verona, South Pittsburgh, and Fort Wayne has decreased 35 per cent on the basis of their average hourly output before and after the substitution of the hourly basis of pay. Where their average earnings under the piece work rates were \$0.524, they would now earn under the same rates but \$0.341.

Likewise the efficiency of molders in the Pennsylvania's South Altoona foundry has decreased 14.1 per cent. In August, 1918, under piece work rates they actually earned \$0.616. If they had been paid the same rates in August, 1920, they would have earned but \$0.529.

Norfolk & Western Car Repairers

Freight car repairers on the Norfolk & Western have so decreased in productive efficiency that the number of cars repaired per employee decreased 43 per cent in the last six months of 1919 as compared with the corresponding period of 1917. During this period in 1917, 92.9 man hours were expended for each car repaired. During the corresponding period of 1919, 163.1 man hours were expended per car.

Other Roads

As a result of the abolition of piece work the efficiency of the freight car repairers of the Chicago & North Western has decreased 35.6 per cent per hour. Similarly the efficiency of passenger car repairers per hour had decreased from 20 to 40 per cent, of cabinet workers from 20 to 23 per cent, of planing mill workers from 27 to 29 and of blacksmiths 44.

The efficiency of individual mechanics on the Chicago, Burlington & Quincy as indicated by their output decreased from 36.2 to 46.7 per cent after they were paid by the hour instead of by the piece. The efficiency of mechanics in the West Burlington, Iowa, shops decreased 36.2 per cent, that of mechanics in the Hannibal, Missouri, shops 46.7 per cent, of locomotive mechanics in the Aurora, Illinois, shops 37.1 per cent, of mechanics in the Havelock, Nebraska, shops 46.4 per cent and of blacksmiths and boiler makers 39.7 per cent.

The Louisville & Nashville

Following the abolition of piece work in the shops of the Louisville & Nashville the time required to manufacture certain articles increased from 6.7 to 50 per cent. For example, under the piece work system of wages an iron slab was made in 10 minutes. Under the hourly basis of pay, on the other hand, it took 15 minutes to make the same slab, an increase of 50 per cent. Likewise, under the piece work system, iron axles were made in 45 minutes, while after wages were put on the hourly basis the same work required 60 minutes, an increase of 33.3 per cent in the time required.

Besides the railroads mentioned, testimony showing similar reductions in the output of workmen, due to the abolition of piece work, has been given for the Chesapeake & Ohio, the

Union Pacific, the New York Central, the Baltimore & Ohio and the Norfolk & Western. This testimony regarding conditions in the shops of railways in every section of the country shows a reduction in the productive efficiency of employees, due to the abolition of piece work, of from 10 to 50 per cent.

The specific examples cited are but a few picked at random from the volumes of statistical studies presented to the Board. However, they show in general the effect that has been produced by the action of Director General McAdoo and the Railroad Administration in abolishing the piece work method of fixing employees' compensation and substituting therefor the hourly wage regardless of the class and work done.

The Chesapeake & Ohio presentation was made by E. V. Ratcliff, general car foreman; the Union Pacific by W. I. Langford, assistant general time and work inspector; the New York Central by W. L. Hazzard, supervisor of the routing system, and E. J. Thill, assistant to the general superintendent of rolling stock; the Pennsylvania by A. C. Davis, superintendent of motive power, and R. L. Kleine, assistant chief of motive power (car); the Norfolk & Western by J. M. Thomas, mechanical inspector; the Baltimore & Ohio by E. P. Poole, supervisor of shops, and F. H. Lee, supervisor of freight car maintenance; and the Chicago & North Western by G. E. Collins, supervisor of car repairs.

Following the completion of testimony regarding the detrimental effects of the abolition of the piece work system of pay, Mr. Whiter resumed his presentation on behalf of the carriers, taking up the agreement made during federal control with the maintenance of way employees. This testimony will be outlined in the next issue of the *Railway Age*.

Annual Meeting of the American Society of Civil Engineers

THE SIXTY-EIGHTH ANNUAL MEETING of the American Society of Civil Engineers was held on January 19 and 20 at the headquarters of that society at 33 West Thirty-Ninth street, New York. Of the business before the meeting the annual election of the officers for 1921 held the interest and attention of the members most, for an opposition or second ticket had been nominated and presented. The results of the election gave a majority to the original ticket out of a total vote counted of 7,008. The officers elected and the votes cast for them are as follows: President, George S. Webster, Philadelphia, Pa., 4,036; vice-presidents, Andrew M. Hunt, New York, 3,947, and Edward E. Wall, St. Louis, Mo., 4,003; treasurer, O. E. Hovey, New York, 4,093; for directors, Dist. 1, J. P. Hogan, 6,243, and Ira W. McConnell, New York, 4,052; Dist. 4, R. L. Humphrey, Philadelphia, Pa., 4,001; Dist. 9, B. L. Brown, St. Louis, Mo., 3,883; Dist. 10, F. T. Darrow, Lincoln, Neb., 6,689, and Dist. 11, G. G. Anderson, Los Angeles, Cal., 4,046.

The committee on Stresses in Track presented only a progress report stating that the committee had been engaged in a series of tests, experiments, etc., on the effect of curvature on the stress in the rail as compared with tangents. Though the greater part of the work had been done, the data as yet had not been collected and worked up in its final form. The work has been conducted chiefly on the Illinois Central, the Lackawanna and the Santa Fe, using various types of engines and varying degrees of track curvature. Other special committees also presented reports varying in degree from work just started to work ready for release.

The question of external relations was discussed to some extent, the general opinion being that in the future the board of direction should act as a committee on this question, appointing local chairmen and committees throughout the various districts in order to coordinate the work properly and without undue expense. Under this arrangement the board will keep in close touch with other organizations, as, for

instance, the Federated American Engineering Societies, keeping itself informed as to any work under way of interest to engineers as a whole or to the society.

The committee on amendments reported that the amendments under consideration were similar to those defeated previously and recommended the ones under consideration be sent out with an adverse report. It was voted that still more recent amendments also on similar lines be referred to this committee and that they be sent out to letter ballot with an adverse report.

How the Interstate Commerce Commission Fixed the Valuation

WASHINGTON, D. C.

THE METHODS by which the Interstate Commerce Commission arrived at the figure of \$18,900,000,000 as the aggregate value of the railroad property of the United States for the purposes of the 1920 general rate advance case were outlined by Chairman Clark of the Interstate Commerce Commission in connection with his testimony last week before the Senate committee on manufactures, which is holding hearings on a bill to regulate the coal industry.

"Stocks and bonds were not considered at all," said Mr. Clark in reply to questions. "The question of capitalization was not thought of. It is the fair value as closely as could be estimated and approximated at that time of the physical property which was devoted to the transportation service. We had a mass of information gathered in our valuation work, which is not in complete form to be given out in the form of reports and findings, and the transportation act specifically authorized us to avail ourselves of that information. We availed ourselves of all the information we could."

"Does that \$18,900,000,000 include the percentage arising from the increase in the value of materials and property in recent years, since the roads were constructed?" asked Senator Jones of New Mexico.

"No, it does not attempt to equate the values," said Mr. Clark. "The principal figures that we used in our value are as of 1913 and 1914. We fixed the price units on a given railroad valuation as of June 30, 1914. Those price units we think were accurate, and they were based on experience of a series of years in the past up to that date, and the prices then prevailing, for the determination of what was up to that time the normal price for fixing the value of a box car, a piece of track or anything else. If, on a given railroad, we had made our figures on the basis of the valuation established, say, of June 30, 1913, we then computed the value of what the railroad had at that time. All that had been put in since that time, added, has been computed on its cost."

"Then the valuation which you have put upon the railroads is based more largely on cost than on present value, is it not?" asked Senator Jones of New Mexico.

"Yes, sir," replied Mr. Clark. "It is based on three different values that we determined. First, the cost of reproduction as of the date of valuation, then upon the cost of reproduction less depreciation, which represents the depreciated condition of the property as of that date, and then the actual cost to date."

Commissioner Clark said that it would be idle to talk of making rates that would yield a return of 5½ or 6 per cent on a valuation of \$40,000,000,000 because the traffic would not bear such rates. If the value of the roads in 1915 had been \$20,000,000,000 and prices increased 100 per cent between that date and 1920, the value on the roads would be \$40,000,000,000.

"We did not have any mathematical rule in getting the valuation," he added. "We made every human effort by investigating carefully through a series of years prior to 1914 to arrive at a fair, normal value in normal times."

General News Department

The thirty-fifth annual meeting of the Engineering Institute of Canada will be held in Toronto on February 1, 2 and 3.

The Chicago, Milwaukee & St. Paul has posted framed notices in stations on its system advocating the "ship now" policy. The public is advised that for the first time in five years the railroads are able to handle more freight than is offered.

The directors of the American Railway Association have denied the request, presented by certain railroads, that action be taken looking to the temporary reduction (or even suspension), of the charge of one dollar per car per day for freight cars interchanged.

The rate of premium to be used in computing freight bills when paid in Canada on shipments to or from the United States has been fixed by the Canadian Board of Railway Commissioners, for the first half of February at 13.75 per cent, and the surcharge on freight bills will be 8 per cent.

The Signal Section of the American Railway Association will hold no meeting in March. This decision was reached by the directors of the association last week. For the annual meeting of the section, the date has been tentatively fixed for Monday, June 6, the meeting to continue through three days.

The Senate Committee on interstate commerce has held several meetings to consider the Frelinghuysen bill, which is a substitute for Section 10 of the Clayton law, and it was expected to order a favorable report on Thursday on the bill as amended in accordance with the suggestions made by the Interstate Commerce Commission. Chairman Clark has conferred with the committee and it has also considered some suggestions made by Senator Cummins.

The House Committee on interstate and foreign commerce has submitted a favorable report on the bill introduced by Representative Winslow to specifically authorize the Secretary of the Treasury to honor certificates of the Interstate Commerce Commission for partial payments to the railroads on account of their guaranty for the six-months' period following the termination of federal control. A minority report was filed by Representative Sims.

The Veteran Employees' Association of the Philadelphia & Reading held its thirteenth annual banquet at Philadelphia on Saturday evening, January 22, about 1,400 members being present. This association, composed of employees who have been in the service 25 years, now numbers about 1,900 members. The president for the ensuing year is W. U. Barr, assistant trainmaster at Reading. The retiring president, H. S. Fisher, was presented with a grandfather's clock.

The United States Civil Service Commission advertises for candidates for the position of chief statistician for the United States Railroad Labor Board, Chicago; also for a schedule expert, class A, and a schedule expert, class B, for the same board, the salaries for the three places being respectively \$4,300, \$4,200 and \$3,600. Applicants must be between 25 and 60 years of age and must have had extensive experience in work on railroad wage schedules. Applications will be received until March 1.

Alaska, its geography and resources, with particular relation to the influence of the government railway, now nearing completion, was the subject of an address presented before the Western Society of Engineers at Chicago on January 20 by Colonel Frederick Mears, chairman and chief engineer of the Alaskan Engineering Commission, which is responsible for the construction of the railway. The talk was illustrated by slides and motion pictures illustrating the mining and

agricultural developments, and also the progress in the construction of the railway. The views also brought out the physical features of the country through which the railroad is being built and indicated the wide variety of engineering problems encountered.

The Pennsylvania will not coerce any of its employees to join, or not to join, against their will, any organization whatever. This is the salient point in a bulletin which has been posted by General W. W. Atterbury, vice-president in charge of operation, because of communications received by some of the employees in certain departments to the effect that the road proposes to reduce the rates of pay of all employees who are not members of a labor organization and that those who desire to retain their present rate of pay must join labor organizations. "If anyone tells you that your present rate of pay depends on membership in a labor organization, or that the company proposes to pay a different rate to members and non-members, deny it," says the bulletin. The employee's present position with its rate of pay or the exercising of seniority rights in no manner depends on membership or non-membership in any association or organization.

Prices to Be Printed on Pennsylvania Railroad Tickets

Printing the price on the face of tickets is now the regular practice on the Pennsylvania Railroad, and as fast as the present supply of tickets is exhausted, new tickets will show the amount of the fare. One of the first of the new forms is for transportation between Elmira, N. Y., and Altoona, Pa. At the bottom of each ticket is printed, "(Fare, \$6.08; War Tax, \$0.49)." Where necessary, because of changes in tariffs, the tickets on hand will be stamped with the new price, and agents will be instructed to show passengers the tariffs in the event that the new charge is questioned.

Robbers Increasingly Bold

Automobile bandits held up an automobile coming up-town from the Union Station at Toledo, Ohio, at noon on January 17, and seized \$10,000 in ticket office receipts belonging to the New York Central. Two railroad patrolmen who resisted the highwaymen were killed and the robbers escaped with the money.

At Chicago, about two o'clock on the morning of January 18, four robbers held up railway employees and two post office men who were unloading a mail truck at the Union Station, and carried off a wagonload of mail. Holding these men at the point of their guns, the robbers entered the truck, seized registered mail sacks, deposited them in a waiting automobile, and got away. Numbers of persons witnessed the transfer of the bags, not realizing that it was a robbery.

The June Conventions

The Railway Supply Manufacturers' Association on January 10 sent out its official circular No. 1 extending the invitation to railway supply concerns to exhibit at the Atlantic City conventions in June. The date of the convention of the American Railroad Association, Division V—Mechanical, is June 15 to 22, American Railroad Association, Division VI—Purchases and Stores, will meet June 20-22. The circular gives the preliminary details concerning the exhibit and with it were enclosed space diagrams and forms for application for space. It is noted that the space will be assigned by the exhibit committee at the office of the Railway Supply Manufacturers at Pittsburgh on March 1.

The circular says: "Our annual convention in June, 1920, as generally known, was unusually successful and from the interest shown at this early date, it is expected to have even

a more successful convention this year, and with that in view a greater area of exhibit space has been provided. It is suggested that applicants for exhibit space request the minimum amount of square feet to meet their actual needs."

The address of J. D. Conway, secretary of the Railway Supply Manufacturers' Association, is 1841 Oliver building, Pittsburgh.

Railway Revenues and Expenses for November

The Interstate Commerce Commission has issued the following summary of revenues and expenses for 187 Class I roads and 15 switching and terminal companies for November:

Item	November		Eleven Months	
	1920	1919	1920	1919
1. Average number of miles operated.....	235,394.87	234,405.51	235,251.49	234,194.41
Revenues:				
2. Freight	\$437,007,964	\$303,489,474	\$3,937,234,790	\$3,251,802,951
3. Passenger	106,829,660	92,475,222	1,173,385,680	1,079,654,919
4. Mail	8,536,089	4,283,363	141,383,863	47,731,158
5. Express	10,890,721	14,756,277	133,826,976	111,633,334
6. All other transportation.....	15,622,527	10,843,071	148,619,234	115,259,063
7. Incidental	12,740,573	11,855,109	136,934,898	118,560,811
8. Joint facility—Cr.....	720,406	585,975	7,092,838	6,266,333
9. Joint facility—Dr.....	217,222	185,274	2,103,904	1,968,276
10. Railway operating revenues.....	592,130,728	438,105,217	5,672,374,375	4,728,939,293
Expenses:				
11. Maintenance of way and structures.....	81,358,609	66,670,888	961,624,407	713,997,432
12. Maintenance of equipment.....	139,203,191	112,211,521	1,443,448,099	1,115,488,463
13. Traffic	6,197,612	4,000,139	66,081,139	42,872,861
14. Transportation	263,306,365	192,403,904	2,639,757,880	1,978,245,455
15. Miscellaneous operations	5,017,852	4,378,915	56,480,320	44,021,073
16. General	15,524,873	10,706,520	154,791,261	114,152,007
17. Transportation for investment—Cr.....	707,150	480,937	4,778,401	5,424,304
18. Railway operating expenses.....	510,501,352	389,890,950	5,317,404,705	4,003,353,077
19. Net revenue from railway operations.....	81,629,376	48,214,267	354,969,670	725,586,216
20. Railway tax accruals.....	22,561,753	18,679,783	250,922,303	177,450,924
21. Uncollectible railway revenues.....	56,668	143,505	925,207	809,861
22. Railway operating income.....	59,010,955	29,390,979	103,122,160	547,325,431
23. Equipment rents (Dr. bal.).....	3,427,515	5,955,762	30,644,809	30,849,928
24. Joint facility rent (Dr. bal.).....	1,239,647	1,405,410	17,242,682	13,984,006
25. Net of items 22, 23 and 24.....	54,243,793	22,025,807	55,234,669	502,491,497
26. Ratio of operating expenses to operating revenues, %.....		88.99	93.74	84.66

NOTE: (a) Federal lap-over items settled during the month are included in the above compilations for those roads that have indicated that estimates were not included for substantially all unaudited corporate items.

(b) The amount of war taxes included in November, 1920, is \$2,033,600 and for period, March to November, 1920, \$28,380,348.

(c) Report of the Duluth, Winnipeg & Pacific Ry. Co. not received.

c Credit item. d Debit item.

Employees' Service and Compensation for First Quarter of 1920

The Interstate Commerce Commission has issued a statistical summary giving the number of employees in service, the number of hours or days worked, the total compensation and the average compensation per day or hour for Class I roads for the first three months of 1920. This represents the effect of the wages in effect at the time of the award made by the Railroad Labor Board in July. For January the number of employees in service at the middle of the month was 2,000,105, for February 1,970,525 and for March 2,009,948, making an average for the quarter of 1,993,524. The total compensation for the quarter was \$795,616,330.

For engineers and trainmen the summary gives the number of hours on duty, the miles run and the average compensation per mile.

The Tie Supply of the Future

"The Tie Supply of the Future" was the subject of an address given before the Western Society of Engineers on Friday evening, January 14, by John Foley, forester, Pennsylvania System. This meeting constituted the initial step in the tour being made by the members of the American Wood-Preservers' Association on their way to the convention of that association, which will be held in San Francisco on January 25, 26 and 27. The meeting was attended by a considerable number of the members of this association. Mr. Foley's paper covered the relation of timber supply to timber consumption and voiced the opinion that while great inroads have been made in the original forest resources in this country, the perpetuation of reasonable timber supplies is a matter

of conservative and prudent use rather than the development of substitutes. Following this line of thought he pointed to opportunities for development in timber preservation and in the care, use and purchase of ties by the railroads.

Railroad Retrenchment

The Erie Railroad, on January 22, issued a general order for reductions in the operating forces similar to that of the Pennsylvania which was noted in our last issue. The Erie order says that as far as possible forces shall be worked five days a week except where the safety of property may necessitate an exception to the rule. This is done with a view to

meeting the situation in a more humane way than to lay off large numbers of employees.

The Baltimore & Ohio has furloughed between 7,000 and 8,000 shopmen with the expectation, however, that the suspension of work will not be of long duration.

The Pennsylvania this week has discontinued 15 long-distance trains which have been run exclusively for express matter, and 18 local passenger trains to and from Pittsburgh. At Northumberland, Pa., suspension of work on this road last Sunday was almost complete, passenger trains and freights carrying perishable goods being the only ones attended to.

The Lehigh Valley has reduced by about 16 per cent the forces in its shops at Sayre, Pa., and the men who work will report only five days a week.

The Norfolk & Western has laid off about 2,000 employees, mostly shopmen.

The Louisville & Nashville has suspended the movement of coal from mines on the Owensboro & Nashville branch with which it has fuel contracts, and consequently seven mines in this district have laid off about 800 miners.

I. C. C. Getting Data as to Cost

of Repairs in Outside Shops

The Interstate Commerce Commission has sent to all carriers a questionnaire on which the railroads are required to furnish detailed information by March 1 regarding all their contracts for the construction and repair of cars and locomotives in outside shops since March 1, 1920, for the use of the commission in connection with its investigation which was instigated by the charges made by the machinists' union that the railroads have been paying excessive prices for work done in outside shops. The infor-

mation called for by the commission includes the terms of the contracts, the cost in outside shops in comparison with what it would have been if the work had been done in railroad shops, whether the costs shown include an allowance for supervision, depreciation, interest on investment and other overhead expenses, the proportion of the number of cars repaired under contract in outside shops, specific information as to the conditions which required the company to have repairs made at outside shops, a statement as to whether the facilities of the railroad plants had been utilized to full capacity, and the average number of men employed in the car departments each month. The questionnaire states that the commission is desirous of securing full information regarding these matters as well as the reasons actuating carriers in entering into these arrangements and the benefits to be derived therefrom.

Prizes for Reducing the Accident Record

The Chicago Great Western is to award prizes to the divisions of the road making the best record in its accident prevention campaign. Two banners, a flag and a silver cup will be presented for the best performances in 1921, on the following basis:

- (1) To the division having the lowest number of reportable train and train service casualties per 100,000 engine miles, a banner.
- (2) To the division having the lowest number of reportable industrial casualties per 1,000,000 man hours (excluding shop accidents), a banner.
- (3) To the division having the lowest number of reportable casualties per 1,000,000 man hours in shop accidents (Oelwein shop to rate as a division), a flag.
- (4) To the division (excluding Oelwein terminal and shop) having the lowest number of days lost per 1,000 man hours, due to all classes of reportable casualties, a silver cup.

The records are to be kept and prizes awarded by a committee selected by the general safety committee; and each month the committee will issue a bulletin announcing the standing of the contestants.

Forest Products Section to Be Formed by American Society of Mechanical Engineers

Mechanical engineers interested in the engineering branches of forest products, and organizations and individuals in the woodworking industries have begun a movement to establish a Forest Products Section of the American Society of Mechanical Engineers.

The consideration of various aspects of the woodworking industry especially in relation to the engineering applications of wood and to engineering methods of preparing wood for use in the industries at the symposium held at the recent convention of the society in New York focused the attention of prominent members of the society on the value a Forest Products Section would be to the woodworking industries.

The society's Committee on Professional Sections, which supervises such professional groups developed within the main organization, has looked with favor upon the establishment of the section, and it is planned to make it available as soon as possible.

Plans for Engineering Convention and Exhibit at Chicago Nearing Completion

While the signal division of the American Railway Association has decided to abandon its one day stated meeting in Chicago on March 14, no changes will be effected in the arrangements for the convention of the American Railway Engineering Association at the Congress hotel on March 15-17, inclusive, and for the simultaneous exhibit of the National Railway Appliances Association at the Coliseum. With reports of practically all committees of the A. R. E. A. in the hands of the secretary, the bulletins of technical information to be presented at the March convention will soon be sent to the members for study. C. W. Kelly, secretary of the National Railway Appliances Association, reports that 5,500 square feet of additional space has been made available for the exhibits this year and that all but 12 spaces of the total display area available have been contracted for by the members of the association. In view of the number of applicants for the remaining space it is anticipated that the entire exhibit area will be taken up within the next week.

Traffic News

The Royal Mail Steam Packet Company is going to give a monthly service from Vancouver, B. C., and the Pacific coast to Europe, and will use ships fitted with 3,000 tons of space refrigerated.

An increasing movement of grain has been noted on several western roads within the past few weeks. Pressure by the banks has compelled the liquidation of grain by the farmers, and the resulting movement has caused a demand for grain cars. The Burlington and the Chicago, Milwaukee & St. Paul report that while a large surplus of other equipment exists, there is an actual shortage of grain cars.

The Dominion Express Company, which operates on the lines of the Canadian Pacific, announces that in conjunction with Aircraft Transport and Travel, Limited, it has inaugurated a continental aerial service, twice daily between London and Paris and daily between London and Amsterdam. The fare charged on both lines is £10 10s. single, or £18 18s. return, including motor car service at both ends. Parcels are taken at the following rates: Shipments up to 10 lb. 2s. per lb., over 10 lb. 1s. 3d. per lb. The express company has arranged for this service a special insurance—life and accident—to cover risks up to £5,000. Parcels for Canada from Paris can leave Paris by airplane a day before the steamer leaves Liverpool.

Coal Production

Production of soft coal continued to decline during the week ended January 15, according to the weekly bulletin of the Geological Survey. The total production is estimated at 9,937,000 tons. The bulletin says that labor and car supply were sufficient and the chief factor limiting output was lack of orders.

Anthracite Shipments in December

The shipments of anthracite in December, as reported to the Anthracite Bureau of Information, amounted to 6,436,320 gross tons, against 5,765,347 tons in November, an increase of 670,973 tons; 24 working days; average daily shipment, 268,180 tons; November daily average, 274,540 tons, with 21 days worked.

Shipments by originating carriers were as follows:

	December, 1920	November, 1920
Philadelphia & Reading.....	1,324,004	1,238,994
Lehigh Valley.....	1,161,305	1,002,329
Central of New Jersey.....	497,735	453,139
Delaware, Lackawanna & Western	940,515	792,157
Delaware & Hudson.....	896,475	814,167
Pennsylvania.....	437,242	424,745
New York, Ontario & Western...	164,557	175,074
Erie.....	675,979	603,766
Lehigh & N. E.....	318,508	260,976
Total	6,436,320	5,765,347

"Building Demand Accumulates"

The Universal Portland Cement Company has issued a circular entitled, "Building Demand Accumulates," which cautions users of cement against waiting to come into the market when transportation demands are at a maximum. Attention is called to the fact that the supplying of this product is not a question of manufacturing capacity, but of the available car supply and general business conditions. Thus the most cement ever used in the country in any year was about 94 million barrels, in 1916, or approximately 470,000 carloads; on the other hand, a conservative estimate of the productive yearly capacity for all cement mills in the country is 125 million barrels, or approximately 625,000 carloads. "If everybody wants cement," the circular goes on to say, "and the farmer turns loose his grain, and business in general quickens, all at the same time, a lot of people are going to be disappointed by delays in their work."

Commission and Court News

Interstate Commerce Commission

The commission has issued its decision in the Iowa and Montana passenger rate cases ordering the railroads to increase their intrastate fares and charges by the amount of the increase applied on interstate traffic. The commission has also issued a decision ordering increases in the passenger and baggage charges and the rates on milk and cream applicable between points in Ohio by the amount of the increases applied to interstate traffic.

The commission has denied the motions for a reconsideration and reargument on the application for a consolidation of the express companies, which was recently authorized by the Interstate Commerce Commission. The motions were filed by John E. Benton, general solicitor of the National Association of Railway & Utilities Commissioners, and Charles E. Cotterill, representing the Southern Traffic League.

State Commissions

In the Federal Court at Detroit, Mich., on January 24, at the suit of thirteen railroads, the Michigan Public Utilities Commission was permanently enjoined from reducing railroad passenger fares below three cents a mile.

Suit was filed in the United States District Court at Chicago on January 26 by E. J. Brundage, attorney-general of Illinois, to have an order issued by the Interstate Commerce Commission giving Illinois railroads permission to advance passenger rates to 3.6 cents a mile, set aside on grounds of unconstitutionality of certain provisions of the Esch-Cummins Law. The suit seeks to determine whether the Commission has power under the Esch-Cummins Law to advance fares in Illinois.

The order of the New Jersey Board of Public Utilities, requiring the Erie Railroad to eliminate fifteen grade crossings in Paterson, has been held valid by the Supreme Court of the United States. The order of the board affected also "any telegraph, telephone, gas, electricity, water and other property," which would have to be altered as a result of the elimination of the crossings. The Passaic Water Company, Western Union Telegraph Company, the Public Service Railway Company and several private concerns joined with the railroad in appeals from lower court decisions, which decisions are now sustained.

Court News

Securing Railroad Employment by Fraud, Bars Recovery for Injury

In a recent action by a brakeman for personal injury, a special plea of the railroad company presented, as Judge Dayton of the federal district court for the Northern District of West Virginia said, such an extraordinary statement of facts as to render the legal questions involved in the plaintiff's motion to strike out the plea extremely perplexing. The defendant, the Baltimore & Ohio, had established certain rules governing employment of brakemen. They had to undergo a physical examination to show them physically fit for their duties. Plaintiff, the company alleged, being over the required age and physically unfit, got another man to assume his name and be examined and secure the medical examiner's report, on which plaintiff got the employment of brakeman, in which employment, fraudulently obtained, he was injured. The court considered the question a new one, that of a man over (not under) age, charged to be physically incompetent under the company's rules, securing by the fraudulent personation of another a service of danger and responsibility, and, notwithstanding his fraud and deceit,

seeking to hold the defrauded company responsible for an injury sustained by him in a place where he had no legal or other right to be. The plaintiff's motion to reject the plea was overruled. Following the filing of this opinion the case was dismissed on plaintiff's motion and at his costs—Stafford v. Baltimore & Ohio, 262 Fed. 807.

United States Supreme Court

Railroads Not Bound to Operate at a Loss

In an action seeking prohibition of an order of a Florida state court confirming a sale at foreclosure of the Ocklawaha Valley for the purpose of being dismantled by the purchaser, judgment granting the prohibition being affirmed on another ground, Mr. Justice Holmes said: "Apart from statute or express contract people who have put their money into a railroad are not bound to go on with it at a loss if there is no reasonable prospect of profitable operation in the future. (Brooks-Scanlon Co. v. Railroad Commission of Louisiana, 251 U. S. 396). No implied contract that they will do so can be elicited from the mere fact that they have accepted a charter from the state and have been allowed to exercise the power of eminent domain. Suppose that a railroad company should find that its road was a failure, it could not make the state a party to a proceeding for leave to stop, and whether the state would proceed would be for the state to decide. The only remedy of the company would be to stop, and that it would have the right to do without the consent of the state if the facts were as supposed. Purchasers of the road by foreclosure would have the same right."

The state court's judgment was affirmed because the prohibition excluding from the decree the words purporting to authorize dismantling the road did not cut down the future purchaser's rights, any more than did the presence of those words enlarge them. Therefore the action of the State Supreme Court was not open to objection under the federal constitution, although it may be that it hardly would have been taken if the authority to dismantle had not sounded more absolute than it could be in fact, considering the nature of the proceeding. Without previous statute or contract to compel the company to keep on at a loss would be an unconstitutional taking of its property. But the prohibition did not compel the company to keep on; it simply excluded a form of authority from the decree that gave the illusion of a power to turn the property to other uses that could not be settled in that case.—Bullock v. State of Florida. Decided January 17, 1921.

State Power to Abolish Grade Crossings

The Supreme Court of the United States has affirmed judgments of the New Jersey Supreme Court and Court of Errors and Appeals (89 N. J. L. 57, 90 N. J. L. 672), sustaining an order of the Board of Public Utility Commissioners of New Jersey, of April 20, 1915, directing a change in 15 places in the city of Paterson, where the Erie now crosses streets at grade, by carrying 14 of the crossings under, and one, at Madison avenue, over the railroad, at the railroad's expense.

"Grade crossings" the court says, "call for a necessary adjustment of two conflicting interests—(a) that of the public using the streets and (b) that of the railroads and the public using the railroads. Generically the streets represent the more important interest of the two. There can be no doubt that they did when these railroads were laid out, or that the advent of automobiles has given them an additional claim to consideration. They always are the necessity of the whole public, which the railroads, vital as they are, hardly can be called to the same extent. * * * It is said that if the same requirement were made for the other grade crossings the company would soon be bankrupt. That the states might be so foolish as to kill a goose that lays golden eggs for them, has no bearing on their constitutional rights. If it reasonably can be said that safety requires the change, it is for them to say whether they will insist upon it, and neither prospective bankruptcy nor engagement in interstate commerce can take away this fundamental right of the sovereign of the soil. To engage in interstate commerce the railroad must get on to

Foreign Railway News

China to Buy Cars and Locomotives

Twenty-seven Chinese banks have agreed to loan \$6,000,000 Mexican to the Ministry of Communications for the purchase of cars and locomotives, according to a cablegram received from Commercial Attache Julean Arnold at Peking. The Chinese banks will control expenditures and will make cash payments to the manufacturers of the equipment. Bids will be called for in about three months.

New Road from Black Sea to Baltic

The construction of a new railway from the Baltic to the Black Sea will be financed by the Baldwin Locomotive Company, according to a press despatch from Warsaw. Agreement for the building of the line was reached at a conference attended by Premier Stamboulini of Bulgaria, President Pilsudski of Poland and representatives of the Baldwin company and the Morgan firm. It is said that the formal contract will be signed within a month and the actual construction will be undertaken by the close of the year. The proposed line will open up the great oil fields of Eastern Galicia and Bessarabia.

November Export of Cars

Exports of cars in November show the same reduction over the large shipments of previous months as did the totals for October. Only 3 passenger cars, valued at \$30,000, were exported. Freight car exports totaled 949, valued at \$1,608,474, and car parts exported were valued at \$478,617. The detailed report by countries as compiled by the Bureau of Foreign and Domestic Commerce follows:

Countries	Passenger, freight and other		Parts of cars	
	Number	Dollars	Number	Dollars
France	320	600,530	2,874	1,571
Italy	..	..	..	6,943
Norway	..	..	..	38,629
Spain	..	..	..	8,372
Sweden	10	31,000	..	113,198
England	..	..	..	1,320
Canada	1	10,000	29	85,432
Guatemala	..	..	..	486
Honduras	..	..	3	11,163
Nicaragua	..	..	..	..
Fanama	..	..	..	1,394
Salvador	..	..	..	20
Mexico	2	20,000	131	171,523
Newfoundland, etc.	..	..	..	4,050
Trinidad and Tobago	..	..	..	150
Cuba	420	679,606	..	118,879
Haiti	..	..	..	725
Dominican Republic	..	..	..	15,651
Argentina	..	..	..	13,635
Bolivia	..	..	..	2,583
Brazil	..	..	36	29,220
Chile	..	..	..	411
Colombia	..	..	..	11,277
Ecuador	..	..	..	5,901
Peru	..	..	..	478
China	..	..	..	5,841
British India	..	..	..	9,251
Dutch East Indies	..	..	..	8,928
Hongkong	..	..	..	796
Japan	..	..	..	51,797
Philippine Islands	..	..	..	26,175
British South Africa	..	..	..	4,902
Total	3	30,000	949	1,608,474
				478,617

Track Material Shortage Postpones

Construction in South Africa

The South African Railways had, on March 31 last, 1,700 locomotives, with 104 still on order in foreign countries. The acquisitions for the year ending on that date totaled 95. There were also 122 main line coaches, 77 suburban coaches, 996 freight cars with trucks and 1,326 four-wheeled freight cars on order from overseas concerns on that date. These totals are in addition to some 174 passenger cars and 927 freight cars which were under construction in the company shops. The administration has had to abandon any

the land, and to get on to it must comply with the conditions imposed by the state for the safety of its citizens. Contracts made by the road are made subject to the possible exercise of the sovereign right. If the burdens imposed are so great that the road cannot be run at a profit it can stop, whatever the misfortunes the stopping may produce. Intelligent self-interest should lead to a careful consideration of what the road is able to do without ruin, but this is not a constitutional duty. In the opinion of the courts below the evidence justified the conclusion of the board that the expense would not be ruinous. * * * If we could see that the evidence plainly did not warrant a finding that the particular crossings were dangerous, there might be room for the argument that the order was so unreasonable as to be void. The number of accidents shown was small, and if we went upon that alone we well might hesitate. But the situation is one that always is dangerous. The board must be supposed to have known the locality. * * * Upon the whole matter, while it is difficult to avoid the apprehension that the state officers hardly gave due weight to the situation of the company as a whole in their anxiety for the well being of the state, we are of opinion that they did not exceed their constitutional powers."—*Erie v. Board of Public Utility Commissioners*. Decided January 3, 1921. Opinion by Mr. Justice Holmes. The Chief Justice, Mr. Justice Van Devanter and Mr. Justice McReynolds dissent.

Order Requiring Restoration of

Train Service Held Invalid

The St. Louis-San Francisco main line extends from St. Louis to Memphis—305 miles. As originally constructed it turned sharply southeastward at Hayti, Missouri—220 miles from St. Louis—ran thence seven miles to Caruthersville, a city of 4,000 people, thence northwestward nine miles to Grassy Bayou and thence south. A cut-off between Hayti and Grassy Bayou—six miles—became part of the main line in 1904 and thereafter through freight and freight-passenger trains passed that way. The through day passenger trains—Nos. 801 and 802—continued to move along the old line until August, 1913, when they were routed over the cut-off. At the same time two new daily passenger trains were put on and operated between Blytheville, Ark., and Cape Girardeau, Mo., by way of Caruthersville. The Missouri Public Service Commission directed the railroad to restore trains 801 and 802 to the route followed prior to 1913 and the State Supreme Court approved this action. The Supreme Court of the United States was asked by the railroad to declare the order invalid because it unduly burdens interstate commerce. The court considers the point well taken.

Fourteen local daily passenger trains move in and out of Caruthersville—seven each way. Some of these make close connections with all through trains at Hayti. The cars in these locals are not of the highest class, but apparently the trains afford fair facilities for reaching and leaving Caruthersville without serious delay or great inconvenience. But if service is deficient there is an easy remedy by means other than detours of the through trains. Applying the well established principles announced in *C. B. & Q. v. Wisconsin*, 237 U. S. 220, 226, to these facts, the Supreme Court considers that the fourteen trains meet the reasonable requirements of Caruthersville and that the commission's order unduly burdens interstate commerce. Compliance with it would require the railroad to maintain sixteen more miles of track at the high standard essential for the through trains, and to move these trains ten miles further. The burden certainly would not be less serious than those which were condemned in some if not all of the following cases, in which the United States Supreme Court has made a similar decision: *Gladson v. Minnesota*, 166 U. S. 427; *Lake Shore v. Ohio*, 173 U. S. 285; *A. C. Line v. N. C.*, 206 U. S. 1; *Mo. Pacific v. Kansas*, 216 U. S. 262; *Cleveland, C. C. & St. L. v. Illinois*, 177 U. S. 514; *Mississippi R. R. Com. v. I. C.*, 203 U. S. 335; *A. C. L. v. Wharton*, 207 U. S. 328. The judgment of the lower court was therefore reversed. Mr. Justice Pitney and Mr. Justice Clarke dissented, without opinion.—*S. L. & S. F. v. Mo. P. S. Co.* Decided January 17, 1921. Opinion by Mr. Justice McReynolds.

comprehensive plans for new construction of any considerable importance in the immediate future because of the impossibility of getting materials, particularly rails and ties.

November Exports of Steam Locomotives

The figures for the exports of steam locomotives in 1920 are available for only eleven months, but these totals exceed those of any previous year. The exports for November were 116, valued at \$2,909,204. Cuba was the destination of a large part of these shipments. The total of exports to that country was 47 locomotives valued at \$1,275,830. The next largest shipments were to Brazil, to which country 28 locomotives valued at \$786,529 were consigned. The detailed figures as compiled by the Bureau of Foreign and Domestic Commerce are as follows:

Country	Number	Value
Canada	8	\$115,359
Nicaragua	1	7,400
Mexico	1	7,500
Cuba	47	1,275,830
Dutch West Indies	1	3,114
Argentina	1	13,850
Brazil	28	786,529
Chile	2	60,089
Peru	2	14,551
Dutch East Indies	5	37,600
Japan	1	6,150
Philippine Islands	6	33,840
Egypt	13	547,392
Total	116	\$2,909,204

November Exports of Track Material

Exports of spikes in November exceeded in weight and value the totals for any other month in 1920 with the exception of March. Exports of rails and miscellaneous track material were well above the totals for any other month in 1920. The weight of the spikes exported was 3,979,631 lb. and their value \$175,459. The rail shipments totaled 67,708 tons valued at \$4,088,626. The value of the miscellaneous track material shipped was \$1,279,047. The detailed figures by countries as compiled by the Bureau of Foreign and Domestic Commerce follow:

Country	Spikes		Steel rails		Switches, frogs, splice bars, etc.
	Pounds	Dollars	Tons	Dollars	Dollars
Belgium			375	25,517	3,383
Denmark			1,529	56,826	3,117
Netherlands			324	16,799	.....
Norway			98	7,202	6,972
Portugal			.....	.....	19
Rumania			.....	.....	23
Russia in Europe			.....	.....	472,828
Spain			951	59,879	155
Sweden	63,942	2,698	2,722	193,406	17,450
England			926	52,865	2,534
Scotland			1,800	74,368	1,097
Ireland			.....	.....	6,726
Canada	40,180	2,185	373	16,359	55,988
Costa Rica	2,800	277	44	2,300	534
Honduras	38,900	1,499	1,641	104,219	6,151
Nicaragua	34,000	2,212	.....	.....	.....
Panama	25,600	1,384	150	9,358	2,007
Salvador	1,200	88	.....	.....	324
Mexico	335,510	20,094	673	41,223	9,970
Newfoundland			.....	.....	377
Barbados			.....	.....	1,415
Jamaica	18,000	2,200	283	19,737	840
Other Brit. West Indies			16,256	812,513	647
Cuba	1,017,751	46,009	16,238	816,513	173,143
French West Indies	1,040	73	.....	.....	.....
Haiti	5,200	289	.....	.....	.....
Dominican Republic	66,400	3,425	699	44,871	42,409
Argentina	29,400	1,282	7,663	524,588	16,049
Bolivia			.....	.....	4,735
Brazil	792,570	33,823	10,182	668,846	78,584
Chile	10,624	722	674	43,509	8,708
Colombia	120,100	5,609	3,401	223,045	14,233
Ecuador			.....	.....	489
British Guiana	63,668	2,691	.....	.....	.....
French Guiana	2,600	234	.....	.....	2,029
Peru	78,600	4,246	1,812	113,927	27,312
Uruguay			50	3,572	10,000
Venezuela	12,600	820	261	19,585	995
China	305,690	13,036	6	816	3,248
Kwantung			40	2,865	.....
British India			.....	.....	2,416
Strait Settlements			155	10,480	337
Dutch East Indies	14,000	1,106	8,140	535,729	115,597
Japan	150,270	7,821	1,817	114,446	26,174
Australia			20	1,409	19,473
New Zealand			112	8,084	7,733
Other British Oceania	200	30	.....	.....	.....
Philippine Islands	113,860	5,168	2,745	163,372	64,490
British South Africa			1,734	112,911	598
Portuguese Africa	634,926	16,438	.....	.....	66,358
Spanish Africa			.....	.....	1,275
Total	3,979,631	175,459	67,708	4,088,626	1,279,047

Equipment and Supplies

Locomotives

THE CUBA RAILROAD is having 10, 10-wheel locomotives rebuilt at the Eddystone plant of the Baldwin Locomotive Works.

THE COLUMBIAN NORTHERN (South America) is inquiring, through the locomotive builders, for 1 or 2, 2-3-2 type locomotives.

THE BELGIAN STATE RAILWAYS are inquiring, through the locomotive builders, for 100 Consolidation type locomotives.

THE ALABAMA & VICKSBURG is contemplating the purchase of new motive power, including 2 Pacific, 4 Santa Fe and some Mikado and switching locomotives.

CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA has ordered six Mikado type locomotives and four 6-wheel switching locomotives from the American Locomotive Company.

Freight Cars

THE LOUISVILLE & NASHVILLE is inquiring for 100 caboose cars.

THE NORFOLK & WESTERN is having 600 gondola cars rebuilt at the shops of the Ralston Steel Car Company.

THE CHINESE GOVERNMENT RAILROADS are inquiring, through the car builders, for from 500 to 1,500 freight cars.

THE BERTHA COAL COMPANY, Pittsburgh, Pa., is inquiring for 100, 55-ton steel high side gondola cars and for 100, 55-ton hopper cars.

THE TIENSIN-PUKOW will be in the market soon, through a New York Japanese export house, for 300 gondola cars of 40 tons capacity.

Passenger Cars

THE PENNSYLVANIA EQUIPMENT COMPANY, 1420 Chestnut street, Philadelphia, Pa., is in the market for 6 second-hand passenger coaches, to be used in workmen's train.

Iron and Steel

THE TOLEDO, ST. LOUIS & WESTERN has ordered 2,000 tons of rail from the United States Steel Corporation.

Miscellaneous

SUZUKI & COMPANY, 220 Broadway, New York, has ordered 1,000 tons of track accessories consisting of splice bars, bolts and nuts, also spikes, from the U. S. Steel Products Company, for use on the South Manchurian Railway.



Photo by International

Supply Trade News

The Chipman Chemical Engineering Company, Inc., has removed its offices from 95 Liberty to 136 Liberty street, New York.

Ralph Lane has been appointed manager of the eastern office, at 3636 Grand Central Terminal building, New York, of the Mummert Lumber & Tie Company, Chicago.

The Atlas Valve Company, Newark, N. J., has secured the sole patents and rights to manufacture the Ideal automatic pump governor, by purchase from the Ideal Automatic Manufacturing Company, New York.

Robert M. Eames, export manager of the Bryant Electric Company, Bridgeport, Conn., has been appointed general sales manager, with headquarters at Bridgeport, succeeding Frank V. Burton, resigned.

The Roller-Smith Company, New York, has appointed the J. E. Dilworth Company, 493 South Main street, Memphis, Tenn., as its representative in the western half of Tennessee, the eastern half of Arkansas and the northern half of Mississippi.

Frank Conrad, consulting engineer of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has been appointed assistant chief engineer. Mr. Conrad has been connected with the Westinghouse Company for almost 30 years, having joined the company when it was in its first location at Garrison Alley. He began with laboratory work in connection with measuring instruments and became associated with arc lamp design. While working on alternating-current measuring instruments a feeding mechanism requirement for an a-c arc lamp led Mr. Conrad to the idea of using an induction type or eddy current operated disk for an arc lamp feed. This led directly

to the original conception of the disk type induction indicating a-c voltmeters and ammeters and subsequently to the original round type Westinghouse watt-hour meter, which he designed and brought out in 1897. The radio apparatus developed by Mr. Conrad during the war was a great factor in the success of the activities of the Navy and War departments.

Albert M. Wolf and Lawrence M. Harper have become associated under the firm name of Wolf & Harper, Engineers, in order to conduct a general engineering business with offices at 7 W. Madison street, Chicago. Mr. Wolf has, for the past 10 years, been connected with the Condron Company, Engineers, Chicago, as principal assistant engineer in charge of design for five years and as engineer and secretary of the company for two years. He has also served in the engineering department of the Chicago, Milwaukee & St. Paul and the Wisconsin Central. Mr. Harper has been engaged in mechanical and structural engineering for the past 12 years, having in that time served as mechanical engineer for the Condron Company, the Arnold Company and the Northwestern Engineering Company; as engineer in charge of construction with the Foundation Company; and as structural engineer for Herman J. Esser, architects, Milwaukee, Wis.



F. Conrad

The new firm will specialize in the complete design of commercial and industrial buildings and structures, power plants, the valuation and appraisal of properties, and the preparation of engineering reports.

George A. Post

George A. Post, whose retirement from the presidency of the Standard Coupler Company, New York, on January 31, was announced in the *Railway Age* of January 14, was elected president of the Hudson River Bridge Corporation on January 21. This corporation has been organized by a large number of prominent citizens of New York City and New Jersey, to promote the building of a bridge across the Hudson river from Fifty-Seventh street, New York City, to the high ground in New Jersey west of Weehawken, and to establish certain related improvements for passenger and freight traffic at the port of New York. The advocates of the project feel that with the growth of automobile traffic and the rapid increase of population and industry, the need of a bridge grows daily more apparent.

The offices of the Bridge company will be established at 5 and 7 Dey street, New York. Mr. Post will retain his connections with the railway supply business, with which he has been so long identified through the George A. Post Company, in which his son, George A. Post, Jr., will be associated with him. This company will deal in a selected line of railway materials and supplies, with offices in New York.

George A. Post was born at Cuba, N. Y., on September 1, 1854. He was educated in the public schools and the academy and normal school at Oswego, N. Y. He served with the freight department of the Erie Railroad and in 1872 was assistant to the superintendent of motive power. Mr. Post studied law at night and was admitted to the bar. He was in editorial work for about eight years, from 1883 to 1891. In 1894 he became president of the Standard Coupler Company, New York, from which position he has just resigned. In 1904, he served as chairman of the executive committee of the Railway Supply Manufacturers, and was chairman of the American Railway Appliance Exhibition held in connection with the International Railway Congress in Washington, D. C., in 1905. He organized the Railway Business Association of the United States and served as president of that association from its organization, in 1909, to 1918.

Mr. Post resigned from the Railway Business Association early in 1918, and the *Railway Age*, in its issue of April 12, 1918, in commenting editorially on the work of Mr. Post as head of the association, said the following:

"Mr. Post was the father of the association. He has been president of it ever since its organization. Its principal purpose in the past has been to promote good relations between the railways and the railway supply companies, and to educate public opinion and public officials regarding the railway question. For the leadership of the association, while seeking to accomplish these purposes, Mr. Post has shown that he possesses an excellent equipment. He is a public speaker of rare ability. He is a diplomatist of consummate tact. While always willing to lead, he has always been equally willing, and even anxious, to take counsel with and be guided by the judgment of his associates. The association, under his presidency, has done well the things it set out to do. Recently new conditions have developed in both the railway and railway supply business. The railway supply business has been



G. A. Post

confronted by entirely new problems. Mr. Post has never rendered such able and valuable service to it as he has within recent weeks in presenting the point of view, the rights and the problems of its members, to Director General McAdoo, and other officers of the Railroad Administration at Washington."

He is chairman of the Railway Committee, Chamber of Commerce of the United States, and has devoted much time to this service in connection with the Esch-Cummins bill, having furnished a large amount of information to the Congressional committees. He served as a member of Congress from the Fifteenth district of Pennsylvania, from 1883 to 1885.

Edison Storage Battery Company

Frank D. Fagan has been elected vice-president and general manager of the Edison Storage Battery Company, Orange, N. J., and E. M. Cutting, has been appointed assistant to general manager, both with headquarters at Orange.



F. D. Fagan

Mr. Fagan was born in California and was in the electrical business in San Francisco for a number of years. He then served as manager of the lamp department of the General Electric Company on the Pacific coast, with headquarters at San Francisco, Cal., for over 12 years and now becomes vice-president and general manager of the Edison Storage Battery Company.

Mr. Cutting began railway work in 1888, in the signal department

of the Southern Pacific. In 1898, he was appointed supervisor of signals for the Western division and in 1902, in addition to his duties in the signal department, he was given charge of electric train lighting. In 1908, he became engineer of train lighting, heating and ventilation, resigning in 1912 to become Pacific coast manager for the Edison Storage Battery Company, with headquarters at San Francisco, Cal. He remained in that position until September, 1919, when he was appointed manager of the railroad department, with office at Orange, N. J., from which position he subsequently resigned, and now returns to the service of the Edison Storage Battery Company as assistant to general manager, as above noted.



E. M. Cutting

A. D. Graves, manager trade sales of Pratt & Lambert, Inc., Buffalo, N. Y., has been appointed general manager of the company. This position was formerly held by President J. H. McNulty. C. D. Sproule, sales manager, western division, at Chicago, has been appointed resident manager with office at Chicago; J. R. Mickle, railway sales representative at New York, has been appointed sales manager at New York, and H. M. Guisey, assistant resident manager at Buffalo, has been appointed assistant sales manager at New York. The company held a convention from January 10 to

13 in a publicity building recently completed by the company, in Buffalo, N. Y. At this meeting there were a number of interesting addresses made by officers of the company and many papers were presented by the salesmen.

Obituary

John J. Flynn, district manager of the railway sales department, at Chicago, of the Texas Company, Houston, Texas, died suddenly at Rochester, Minn., on January 3. Mr. Flynn was born at Paducah, Ky., on June 16, 1866. He began railroad work on the Illinois Central in 1884, and subsequently served consecutively as clerk, yardmaster, and trainmaster, until 1902, when he was appointed superintendent. From 1907 to 1909, he was superintendent on the Trinity & Brazos Valley, at Teague, Texas, and then to 1915 was general manager of the Houston Belt & Terminal Railroad, at Houston, Texas. Since 1916 he has served as district manager of the railway sales department for the Texas Company, at Chicago.

Joseph E. Nelson, president of Joseph E. Nelson & Sons, railroad contractors, with offices in Chicago and Kansas City, died suddenly on Friday, January 14, while making a final inspection of the freight and passenger terminal of the Illinois Central at Centralia, Ill. Mr. Nelson was born in New Jersey on January 17, 1857, and came to Chicago in 1869 and grew up in that city. He entered railroad and building construction as a young man and was actively engaged in this work throughout his entire life. In the early eighties he was engaged as construction superintendent on the extension of the Chicago & North Western in Nebraska. In 1889 he served as general superintendent on the construction of the first buildings for the University of Chicago and later served as superintendent for the William Grace Company on the construction of World's Fair buildings in Chicago. Following the completion of this work in 1893, he entered general building contracting on his own account and a year later began specializing in railroad structures. During the late nineties he was engaged in extensive work on the Chicago & Alton and the Atchison, Topeka & Santa Fe and during the last 20 years carried on building construction for practically all of the middle western railroads. In 1908 he organized the contracting firm of Joseph E. Nelson & Sons, and was actively engaged in the management of this contracting firm up to the time of his death.



J. E. Nelson

Trade Publications

TRAIN OPERATION BY SIGNAL INDICATION.—Bulletin No. 3 of the series bearing this title has been issued by Henry M. Sperry, 347 Madison avenue, New York City. It contains the two articles by Mr. Sperry, published in the *Railway Age* of June 4 and June 11, comparing the time interval method with the space interval method of running trains, and giving numerous historical notes on train despatching and various schemes for economizing train time and facilitating the dispatcher's work. Bulletin No. 1, of this series, described the practice on the Susquehanna division of the Erie, and No. 2 gave data on the saving in time accomplished by the use of automatic block signals. These bulletins are issued in the interest of the four principal signal manufacturing companies—the Union Switch & Signal Company; the General Railway Signal Company, the Federal Signal Company and the Hall Switch & Signal Company.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company is accepting bids for the construction of a frame blacksmith shop with dimensions 40 ft. by 72 ft. at Newton, Kan., to cost about \$10,000.

ATCHISON, TOPEKA & SANTA FE.—This company, which was noted in the *Railway Age* of December 14 (page 218), as accepting bids for the construction of a one-story brick addition to its machine shop at Argentine, Kan., has awarded the contract for this work to Jerome Moss, Chicago, at an approximate cost of \$45,000. The dimensions of the addition will be 102 ft. by 115 ft., and the improvements to be undertaken include the construction of an office, tool room, engine pits and drop pits.

CHICAGO & ALTON.—This company contemplates the construction of a roundhouse at Ridgely Yards, Springfield, Ill.

CHICAGO UNION STATION.—This company is accepting bids and plans to begin operations about February 2 on the work of wrecking the old Chicago & Alton freight house at Harrison street and the Chicago river, Chicago. This work will form the first step toward the construction of the new Chicago mail terminal on which the Union Station Company plans to begin work this spring.

COON BAYOU & ARKANSAS CITY.—The Interstate Commerce Commission has denied this company's application for a certificate authorizing the construction and operation of a line two miles in length from a connection with the Missouri Pacific in McArthur, Ark., to lease an existing line about 1.3 miles in length, and to acquire trackage rights over the Missouri Pacific for a distance of 23.6 miles.

DELAWARE, LACKAWANNA & WESTERN.—This company will, according to present indications, undertake within the next few months separation of grades at East Orange, N. J., to cost in the neighborhood of \$4,500,000.

GREAT NORTHERN.—This company is accepting bids for the erection of a 500-ton frame coaling station at Troy, Montana.

GULF COAST LINES.—This company will build a new freight depot at McAllen, Tex., at a cost of approximately \$20,000, and will make track rearrangements necessary to serve the new station properly.

KANSAS & OKLAHOMA.—This company has awarded a contract to Strickland & Smedley, Forgan, Okla., for the construction of a line between Forgan, and Liberal, Kan., a distance of 25½ miles, at a cost of approximately \$300,000. The company contemplates extending its line to Trinidad, Colo., and has voted a bond issue to help defray the cost of this work.

LOUISVILLE & NASHVILLE.—This company is building yard facilities near Typo, Ky., which will be called Crawford Yard. The company is also constructing approximately 5 miles of second track on the Cumberland Valley division.

UINTAH RAILWAY.—This company has applied to the Interstate Commerce Commission for a certificate authorizing the construction of four branch lines in Uintah County, Utah, respectively 19.36, 3.01, 1.4 and 1.19 miles in length.

TWENTY-FIVE CARS OF EGGS, from Japan and China, started from Vancouver, B. C., on January 8 for the Atlantic Coast. The eggs, with the exception of 1,500 cases for London, England, and 1,000 cases for Montreal, were all consigned to New York, which took approximately 17,500 cases of 30 and 36 dozen each, or about 6,500,000; more than an egg for every man, woman and child in the city.

CASTING LOCOMOTIVE FRAMES IN SMALL UNITS.—In order to overcome the difficulties of casting locomotive frames of unusual length and other long sections, the Metal & Thermit Corporation, New York, recommends that these be cast in shorter units and these units Thermit welded together. By using this method small foundries can undertake the work. The number of parts to be welded will depend on the size of the foundry and available mold and pattern facilities.

Railway Financial News

ALABAMA, TENNESSEE & NORTHERN.—This company has applied to the Interstate Commerce Commission for a loan of \$290,000 for five years from the revolving fund, of which \$90,000 is to meet pressing maturities and \$200,000 is to pay 40 per cent of the cost of 200 freight cars and 7 locomotives which it is proposed to purchase through a car trust.

BALTIMORE & OHIO.—This company has been authorized by the Interstate Commerce Commission to issue \$3,000,000 of refunding and general mortgage bonds, series B, to exchange them for an equivalent amount of refunding and general mortgage bonds, series A, and to pledge \$3,000,000 of the series A bonds and \$10,000,000 of series B bonds with the director general of railroads as security for its promissory note for \$9,000,000, representing a general balance of \$9,000,000 due to the United States, growing out of federal control, to be funded for 10 years.

This company has applied to the Interstate Commerce Commission for authority to pledge from time to time certain securities now held in its treasury, nominally issued, as security for short-term notes permitted to be made by the law without the assent of the commission.

CENTRAL OF GEORGIA.—The Interstate Commerce Commission has approved a loan of \$237,900 to this company to aid the carrier in providing itself with locomotives. The applicant itself is required to finance about \$238,000 to meet the loan of the government.

The commission had previously approved a loan of \$815,000 to this company which was not perfected because of the requirement that it finance the balance of its requirements at not exceeding 7 per cent. The company at that time had ordered 7 mountain type locomotives and 17 passenger cars and was negotiating for 800 freight cars. The company now states that it does not contemplate the purchase of new equipment, except the 7 locomotives and the 17 passenger cars, which it proposes to finance by an issue of \$650,000 of equipment trust certificates and the loan of \$237,900, which it asks the commission to substitute for the original loan.

The Central of Georgia has been authorized by the Interstate Commerce Commission to procure the authentication and delivery of \$998,000 of its refunding and general mortgage 6 per cent bonds and to pledge or repledge from time to time part or all of the bonds as security for advances under section 209 of the transportation act, or for loans under section 210, or for notes.

CHICAGO, MILWAUKEE & ST. PAUL.—John D. Ryan, president of the Anaconda Copper Mining Company, has resigned as a director of this road. Mr. Ryan's resignation was in compliance with Section 10 of the Clayton Act, prohibiting interlocking directorates. He is a director and a large stockholder of the Montana Power Company, which supplies power to the Chicago, Milwaukee & St. Paul.

CHICAGO & WESTERN INDIANA.—This company has applied to the Interstate Commerce Commission for authority to issue \$329,000 of its 4 per cent consolidated mortgage bonds for the purpose of retiring and refunding a like amount of general mortgage bonds.

HUNTINGTON & BROAD TOP RAILROAD & COAL COMPANY.—The directors have declared a dividend of 75 cents per share (1½ per cent) on the preferred stock, payable February 15 to holders of record February 1. This is the first dividend paid on the preferred stock since January 25, 1908, when a distribution of 3½ per cent was made. President Carl M. Gage says: "The earnings are exceptionally good. We are getting along very comfortably and have a considerable surplus. There is no unpaid indebtedness outside of funded debt, and altogether the company is in a much better position than for several years."

INDIANA HARBOR BELT.—This company has applied to the Interstate Commerce Commission for authority to issue a one-year

promissory note at 6 per cent for \$23,020 to Walter E. Meyn in connection with the purchase of some land; also for authority to assume liability in respect of \$354,000 of 7 per cent equipment trust certificates.

LEHIGH VALLEY.—The segregation of this company's coal properties has caused the withdrawal of E. E. Loomis, president of the railroad; E. T. Stotesbury, D. G. Reid and W. H. Moore, as directors of the Lehigh Valley Coal Company. The board of the latter now comprises: F. M. Chase, president; F. W. Wheaton, vice-president; E. D. Kenna, W. H. Conningham, Theodore S. Barber and Samuel McCraen.

Harry E. Trexler, of Allentown, Pa., has been elected a director of the Lehigh Valley Railroad, succeeding Dr. Henry S. Drinker.

MISSOURI PACIFIC.—The Interstate Commerce Commission has approved a loan of \$1,200,000 to this company to aid it in acquiring 25 Mikado freight locomotives, and 15 six-wheel switching locomotives at a total estimated cost of about \$2,400,000. The company itself is required to finance about \$1,800,000, including the entire cost of five Mountain type and five Pacific type passenger locomotives, at a total estimated cost of about \$680,000.

This company has applied to the Interstate Commerce Commission for authority to issue \$1,836,000 of 6½ per cent equipment trust certificates representing 60 per cent of the cost of 50 locomotives, the balance to be financed from the loan of \$1,200,000, which has been approved by the commission. The certificates have been subscribed for by Kuhn, Loeb & Co. at 96.

PENNSYLVANIA.—Requests for proxies for the annual meeting of the stockholders, which will be held in Philadelphia on March 8, were mailed on January 25. Accompanying each proxy is a circular letter from President Samuel Rea, with reference to the subjects to be acted upon at the meeting. As previously noted in this column, January 14, these include:

(a) Ratification of long-term leases of 16 railroad properties now constituting portions of the Pennsylvania System and controlled through ownership of all or practically all of their capital stock—the most important being the Pittsburgh, Cincinnati, Chicago & St. Louis (the "Panhandle"), the Grand Rapids & Indiana, and the New York, Philadelphia & Norfolk.

(b) Authorization of an increase in the company's indebtedness of \$100,000,000.

(c) Changes in the dates of the annual meeting and the annual election, which are now held, respectively, on the second and fourth Tuesdays of March, so that they will be held hereafter on the second and fourth Tuesdays in April.

In his letter, President Rea says concerning the financial matters:

"Authority to increase the indebtedness of the Pennsylvania Railroad Company to the extent of \$100,000,000 is, in the judgment of your management, necessary; for while a balance of \$64,000,000 of former authority remains unused, your management must be in a position to assist its subsidiaries in their financing, especially as a large part of this year's maturing obligations are those of the Pennsylvania Company. In order, therefore, that your company may be able, in its own behalf, and to assist its subsidiaries, should assistance be found necessary, to provide for maturing obligations; the settlement of accounts with the United States Government for expenditures upon the property and for equipment during federal control; and for such additional equipment and facilities as may be essential to further promote the development and economical management of the property; you will be asked to authorize the above increase to be made in such amount, and at such times as your board of directors may deem necessary, through the issue of bonds or other evidences of indebtedness, in such form as may be found best for the interests of the company."

As a two-thirds vote of the stockholders, now numbering over 133,000, is required by various state laws on the proposals relating to the leases and the changes in dates of the annual meeting and election, unusual efforts will be made this year to obtain the necessary proxies. For this reason Mr. Rea, in his circular letter, urges all stockholders who are unable to attend the meeting in person not to fail to send in their proxies.

SOUTHERN.—The Interstate Commerce Commission has approved a loan of \$3,625,000 to this company to aid the carrier in providing itself with new equipment. The applicant itself is required to finance \$8,925,000 to meet the loan of the government.

DIVIDENDS DECLARED

Bellefonte Central—50 cents, payable February 15 to holders of record January 25.

Chicago, St. Paul, Minneapolis & Omaha—Common, 2½ per cent semi-annually; preferred 3½ per cent semi-annually; payable February 21 to holders of record February 1.

New Orleans, Texas & Mexico—Common, 1½ per cent, quarterly, payable March 1 to holders of record February 18.

Fulton Company—\$2, quarterly, payable February 15 to holders of record January 21.

Reading Company—Preferred, 1 per cent, quarterly, payable March 10 to holders of record February 18.

Railway Officers

Executive

W. M. Wardrop, general superintendent on the Pennsylvania, with headquarters at Grand Rapids, Mich., has been elected vice-president of the Grand Rapids & Indiana, with the same headquarters, effective January 18. Mr. Wardrop will retain his former duties as general superintendent.

C. D. Mackay, assistant to the vice-president of the High Point, Randleman, Asheboro & Southern, Yadkin, Carolina & Northwestern, Tallulah Falls, Hartwell, Danville & Western and Blue Ridge (all subsidiaries of the Southern), has been appointed vice-president of these lines and general agent for the receiver of the Hawkinsville & Florida Southern.

Financial, Legal and Accounting

E. F. Morgan has been appointed assistant auditor on the Chicago, Burlington & Quincy, with headquarters at Chicago, effective January 1. He will have jurisdiction over valuation accounts.

W. H. Burns, general auditor of the Chicago, Rock Island & Pacific, has been placed in charge of the accounting department following the resignation of F. Nay, vice-president and comptroller.

A. L. Parmelee, general division accountant on the Pennsylvania, with headquarters at Grand Rapids, Mich., has been appointed secretary and auditor of the Grand Rapids & Indiana, with the same headquarters, effective January 18. Mr. Parmelee will retain his former duties as general division accountant.

Operating

W. C. Barnwell, chief dispatcher of the Southern at Macon, Ga., has been promoted to trainmaster with headquarters at Valdosta, Ga.

A. E. Marsh, trainmaster on the Southern, with headquarters at Macon, Ga., has been promoted to superintendent of the Jacksonville terminal.

A. McFatrige, freight claim adjuster of the Southern, has been appointed chief dispatcher of the St. Louis division with headquarters at Princeton, Ind.

F. S. Rossiter has been appointed assistant superintendent of the Chapeau division of the Canadian Pacific, with headquarters at Chapeau, Ont., effective January 16, succeeding W. R. Boucher, resigned.

George Masten, superintendent of the Norfolk & Portsmouth Belt Line, has been appointed superintendent of the Norfolk division of the Virginian with headquarters at Victoria, Va., succeeding W. A. Gore, who has been transferred to Princeton, W. Va., as superintendent of the New River division.

J. K. McNeillie, superintendent of the Susquehanna division of the Delaware & Hudson with headquarters at Oneonta, N. Y., has been detailed to the office of the general manager at Albany, N. Y., effective January 15. **M. F. Leamy**, superintendent of the Champlain division, with headquarters at Plattsburg, N. Y., has succeeded Mr. McNeillie at Oneonta. **H. M. Gargan** has succeeded Mr. Leamy as superintendent of the Champlain division.

J. G. Clements, who has been appointed superintendent of the Southern with headquarters at Somerset, Ky., was born at Decatur, Ill., December 13, 1879. He entered the service of the Wabash in 1894 as a brakeman and switchman and resigned the following year to become a brakeman on the

Chicago & Alton. He went to the Illinois Central in 1896 as a brakeman and served subsequently as a switchman, yardmaster and conductor. In 1906 he entered the service of the Cincinnati, New Orleans and Texas Pacific as a conductor. The same year he was appointed general yardmaster of the Chattanooga terminal. The following year he was appointed trainmaster, which position he held until his appointment as superintendent of the Cincinnati, New Orleans & Texas Pacific division of the Southern.

Traffic

T. W. Brahan has been appointed commercial agent on the Southern, with headquarters at Hattiesburg, Miss.

L. W. Gent has been appointed commercial agent on the Louisiana & Arkansas, with headquarters at Kansas City, Mo.

M. P. Cunningham has been appointed commercial agent of the Grand Trunk with headquarters at New Haven, Conn., effective January 17.

A. M. Farrell has been appointed general freight and passenger agent of the Chicago, Ottawa & Peoria, with headquarters at Joliet, Ill.

H. E. Dickinson has been appointed general agent on the San Francisco-Sacramento, with headquarters at Chicago, effective January 15.

T. B. Montgomery has been appointed general freight agent of the Northern Pacific, with headquarters at St. Paul, Minn., effective January 1.

D. W. Vaughan has been appointed northwestern traffic agent of the Central of Georgia with headquarters at Chicago, Ill., effective January 20.

L. J. Trexler has been appointed general freight and passenger agent of the Kalamazoo, Lake Shore & Chicago, with headquarters at Lawton, Mich., effective January 1.

E. M. Lane, assistant to the general freight agent of the Southern with headquarters at Cincinnati, Ohio, has been appointed assistant to the freight traffic manager with the same headquarters.

W. C. Cathcart has been appointed general freight and passenger agent of the Maryland & Pennsylvania, with headquarters at Baltimore, Md., succeeding W. A. Johnson, resigned to accept service elsewhere.

Mechanical

J. W. Sasser, superintendent of motive power of the Norfolk Southern, has resigned to become superintendent of motive power of the Virginian with headquarters at Princeton, W. Va., effective January 1, succeeding R. E. Jackson, resigned.

A. Sturrock, whose promotion to assistant superintendent of motive power on the Canadian Pacific, with headquarters at Winnipeg, Man., was announced in the *Railway Age* of January 7 (page 174), was born on July 27, 1883, at Dundas, Ont. He entered railway service in 1901 as a machinist in the Stratford, Ont., shops of the Grand Trunk. After a year's service with the Grand Trunk, Mr. Sturrock came to the United States and was employed as a machinist, first on the Atchison, Topeka & Santa Fe, and later on the Denver & Rio Grande. His service with the Canadian Pacific began in July, 1904, when he was employed as a machinist in the company's shops at Winnipeg. He was promoted to locomotive foreman in 1911, with headquarters at Fort William, Ont., a position which he held until 1913, when he was transferred to Vancouver, B. C. In April, 1914, he was again promoted, being made general locomotive foreman of the shops of the Canadian Pacific at Ogden, Alta. A year and a half later Mr. Sturrock was made division master mechanic, with headquarters at Cranbrook, B. C., and in January, 1915, he was promoted to general master mechanic of the Alberta district, with headquarters at Calgary, Alta. At the time of

his recent promotion he was serving as general master mechanic of the British Columbia district, with headquarters at Vancouver, where he had been transferred in April, 1915.

Engineering, Maintenance of Way and Signaling

C. Duckworth, who was appointed division engineer on the eastern division of the Western Pacific, with headquarters at Elko, Nev., has resumed his position as roadmaster, with the same headquarters, effective January 1, the position of division engineer having been abolished throughout the Western Pacific system.

H. F. McFarland, Jr., whose appointment as chief engineer of the Wichita Falls & Southern, with headquarters at Graham, Tex., was announced in the *Railway Age* of December 10 (page 1048), was born on April 2, 1885, at Corsicana, Tex. He was educated at Washington University and entered railway service in 1908 as an inspector of bridge and masonry construction on the St. Louis & San Francisco. In July, 1909, he was made senior draftsman in the office of the engineer of bridges, and in December, 1912, he was promoted to assistant engineer with jurisdiction over the general design of steel and concrete structures. Mr. McFarland enlisted in the army in June, 1918, being commissioned lieutenant and assigned to the Twelfth Engineers. He was later promoted to captain and served in France until June, 1919. In July, 1919, upon his return to civil life, Mr. McFarland accepted an appointment as chief engineer of the Wichita Falls, Ranger & Fort Worth, taking direct charge of the location and construction of that road from Dublin, Tex., to Breckinridge. His recent appointment has given him supervision of the construction of the Wichita Falls & Southern from Newcastle, Tex., to Breckinridge.

Purchasing and Stores

J. E. Wharton, division storekeeper on the Pennsylvania, with headquarters at Toledo, O., has been appointed storekeeper, maintenance of equipment department, with the same headquarters, effective January 15. The position of division storekeeper has been abolished.

Obituary

Henry F. Houghton, formerly general manager of the Cleveland, Cincinnati, Chicago & St. Louis, died at Indianapolis, on January 10.

Benjamin Thomas, at one time general manager and president of the Chicago & Western Indiana and for a long time chairman of the General Managers' Association, died at his home in Chicago, on January 6.

William M. Coleman, general counsel of the Hudson & Manhattan, committed suicide at Washington on January 21 by jumping from a tenth-story window of the hotel across the street from the Interstate Commerce Commission.

Sydney Williams, formerly assistant to vice-president in charge of purchases of the Union Pacific System, at New York, previous to 1918, died on January 9, at the home of his daughter in Montclair, N. J., at the age of 55. Mr. Williams graduated from the Massachusetts Institute of Technology in 1887, with the degree of civil engineer. From 1895 to 1903 he was controller and general superintendent of the Pennsylvania Coal Company and in the latter year became associated as assistant to W. V. S. Thorne, then director of purchases for the Southern Pacific System, Union Pacific System and other allied Harriman lines. After the separation of the Southern Pacific System and the Union Pacific System in 1913, Mr. Thorne remained with the Union Pacific System and Mr. Williams was retained as his assistant until 1914, when Mr. Thorne resigned. Mr. Williams then became assistant to vice-president in charge of purchases, and he continued in this position for some time after federal control, resigning in December, 1918, to engage in other activities. He did not return to the railroad field at the conclusion of federal control.

EDITORIAL

Railway Age

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In considering plans for reductions in wage scales the railroads should consider very carefully before making any drastic reductions in the rates paid to the foremen of the maintenance of way department. Owing to the isolation of these men along the line, they are placed on their own resources

Take Care of the Foreman

much more than the men holding corresponding positions in the other departments. It is physically impossible for the supervisor to observe their work in detail more than a few minutes each day or two. Consequently, the efficiency and effectiveness of the work performed under the direction of these foremen depends to a greater extent on their qualities of leadership, individual responsibility, industry and intelligence, than is the case with men who are almost constantly under the eye of the supervisory officer. That the railroads have experienced trouble in obtaining an adequate supply of track foremen with qualifications measuring up to these requirements is evidenced by frequent reference to this subject at meetings of the supervisors. There has been too great a contrast between the section foremen of the past, who commanded the respect of all railway employees, excited the ambition of the young men of communities along the line, and the section foremen of the present whose sons aspire to go "braking" or "firing" rather than to follow the footsteps of their father. Advances in rates to these men during the past three years have served to improve this situation. Therefore any adjustment of the scales of compensation now under consideration should be made in such a way as to leave the position of section foreman one that is sufficiently attractive to draw to it men of sufficient calibre to meet the growing responsibilities imposed.

What has happened to the freight traffic of the railways is strikingly indicated by statistics regarding the loading of freight cars within recent weeks. In

Tremendous Decline of Freight

October the number of carloads of freight loaded averaged about one million a week. In the four weeks ending January 22 the average number of cars loaded weekly was 679,551. This represents a decline since the peak was reached in October of almost exactly one-third. As a result of this decline of business the railroads on January 23 had a car surplus of 301,000 cars and this has been steadily increasing. The statistics regarding earnings and expenses in January are not available but the reduction of both total and net earnings which occurred coincidentally with this decline of one-third in freight movement will be shown when the statistics are available to have been very large. The statistics regarding car loadings show clearly that the country is not very generally taking advantage of the surplus railway capacity available to "ship now." For a period of many months there were loud complaints that shippers could not get sufficient cars in which to ship their goods. The railroads might now with equal pertinence complain loudly that they cannot get enough freight with which to load their cars. Car shortages cause heavy losses to the business concerns that cannot ship goods when they want to, but car surpluses likewise cause heavy losses to railroads when they cannot get freight to haul in their cars.

When there is another large shortage of cars, as in course of time there will be, it is to be hoped that those who could cause the shipment of freight now, but who are not doing so because prices or other conditions are unsatisfactory to them, will not forget the present period during which the railways are suffering tremendous losses because of the failure of those who could "ship now" to do so.

A substantial majority of maintenance officers are inclined to consider a maintenance cost and work system, including diagrammatical or charted representation, too complicated and difficult to keep up to date and, therefore, of little value. The truth is that the subject has not been studied sufficiently.

Proof of the Pudding in the Eating

While one plan in all its details will not fit all the conditions on all roads, the underlying principle of the plan is entirely applicable in nine cases out of ten. It is not strange that some maintenance officers consider not only complicated but even unwieldy the comprehensive plan which one road has worked out and put into operation. Yet if the plan has proved successful, it is good proof that the fault is not in the system itself. One large eastern road now has in successful use a method whereby an accurate check is kept on the progress of its foremen, supervisors and division engineers by means of charts made up by the foremen and supervisors and consolidated by the division engineer. These are forwarded at regular intervals to the engineer maintenance of way, who is thus able to know accurately just what has been done on the track, what is being done and what is the best future sequence for the work. The office charts are then brought up to date and the original returned with the comment, criticism or instructions. The time actually consumed is small, for the men concerned are thoroughly familiar with the method and the changes or additions are made promptly. It is the experience on this road that the objections as to complication and time lost are of little importance—the time wasted in searching out and co-ordinating the data for one item or one detail of the work is usually sufficient to keep an entire system to standard for a month. The problem hinges entirely upon the development of a method which is sufficiently simple, comprehensive and applicable, a condition not always easy to meet but certainly worth the effort.

In last week's issue of the *Railway Age* there was some brief comment concerning the hearings before the Interstate Commerce Commission on the application of the El Paso & Southwestern Company to issue stock of no par value.

Feasibility of No Par Value

No attempt was made to discuss the feasibility of the idea. Voice was given to the expectation, however, that the proposal would attract no small amount of attention. It would appear that the idea of issuing of stock without par value has much merit. It would take a four-page article to discuss the advantages and disadvantages in detail and it is intended here to discuss but one small angle of the problem. One of the major faults in railway financing in recent years has been the predominance of bonded indebtedness as compared with the raising

of capital through issues of stock. The opinion has been expressed that the working out of the provisions of the Transportation Act may encourage this tendency, particular reference being made to the manner in which the Interstate Commerce Commission has assisted carriers in meeting maturing indebtedness by means of the \$300,000,000 loan fund. Of course, there can be no criticism of such a commendable use of the revolving fund as that. The difficulty is the lack of ability to use stock issues more than they have been used in recent years. Not the least of the difficulties attendant upon the issuance of stock is the fact that it is hardly feasible to put out such issues at less than par value. This is an objection that does not hold in the case of stock of no par value. Having no par value issues of it may be made at or near the current market value. The argument therefore is that having stock of no par value will permit of raising capital through stock issues where it possibly could not be raised with stock with a par value. The question is not one, of course, that can be decided easily. Nevertheless, it will be borne in mind that one of the chief objections—namely that of inflation—has been removed by the provisions of the Transportation Act giving control over security issues to the Interstate Commerce Commission.

In reducing the personnel under present conditions, mechanical department officers are confronted with a serious dilemma.

Discrimination Needed in Reducing Forces

The amount of work in the average terminal does not fall off in proportion to the decrease in traffic and with the present restrictions on the work of the various crafts, a heavy cut in roundhouse forces will often make it impossible to handle the work properly. On the other hand, the proportion of equipment in need of repairs is very large and the shops should be turning out more locomotives and cars than are needed to care for the present traffic in order to be prepared for an increase in business. The situation calls for sound judgment and the mechanical officer should be left free to keep the proper balance between the two branches of the department. When a situation arises, such as exists at present, there is too often a tendency to reduce the roundhouse forces beyond the economical limit. The operating officer has no accurate index of the results being obtained by the mechanical department and nearly always attaches too much importance to the equipment condition report. If the per cent of bad-order equipment is given undue weight, the shop work is likely to receive more attention than the handling of engines in the terminal. The true function of the mechanical department is not merely to repair equipment. The maintenance of the locomotive at the terminal has a marked effect on its efficiency as an operating machine. There are many large expenses incident to conducting transportation over which the operating department has no control; they are determined entirely by the character of the maintenance of the equipment. Whatever reductions are made in the mechanical department, the roundhouse forces should not be reduced to such an extent that the efficiency of the motive power as an operating machine is impaired. The hidden losses due to poor maintenance may be in many cases greater than the savings made by laying off men. Regardless of the extent to which expenses must be cut, enough men should be kept at the terminals to see that every important part of the locomotive is kept in efficient condition, that boiler tubes and superheaters are cleaned and tight, that the valves are square, that there are no bad pounds in the machinery and no leaks to waste steam. These are absolute essentials that should receive attention even before consideration is given to reducing the number of bad-order locomotives and cars.

It is to be presumed that the Interstate Commerce Commission now has under consideration the decision it will be called upon to make eventually as to the working out of the so-called recapture clause of the Transportation Act. This term is given to the provision relating to the treatment of excess net railway operating income over 6 per cent. It is contained in paragraph 6 of section 15a of the Interstate Commerce Act, or of section 422 of the Transportation Act, and reads in part as follows:

(6) If, under the provisions of this section, any carrier receives for any year a net railway operating income in excess of 6 per centum of the value of the railway property held for and used by it in the service of transportation, one-half of such excess shall be placed in a reserve fund established and maintained by such carrier, and the remaining one-half thereof shall, within the first four months following the close of the period for which such computation is made, be recoverable by and paid to the commission for the purpose of establishing and maintaining a general railroad contingent fund as hereinafter described.

There are many problems which may be expected to arise in the administration of these provisions. One of them is the term to which the clause is to be made to apply. The commission may apparently in its discretion choose the year from September 1, 1920, to August 31, 1921, or it may find it more advisable to take the four months from September 1, 1920, to December 31, 1920, and henceforth to follow the regular calendar and fiscal year. It is certainly to be hoped that it will adopt the latter method. For one thing it will be somewhat confusing and certainly uneconomical to have an overlapping period as would be the case if the September 1 to August 30 period is taken. That it would certainly be much better to have a single accounting period is self-evident. Other questions will arise, no doubt, as to the working out of the clause. It would appear to be most advisable to have them settled at once and not dragged over for nearly another additional eight months or a year. There will be enough uncertainties in the railway business in 1921 without including this particular problem among them.

Will the Labor Board Rise to the Emergency?

THE LABOR COMMITTEE of the Association of Railway Executives, speaking through its chairman, General W. W. Atterbury of the Pennsylvania Railroad, suggested to the Railroad Labor Board on Monday that to meet a great emergency it should set aside at once all rules and working conditions imposed upon the railways since December 31, 1917.

The emergency to meet which it was suggested that this be done is that presented by the present financial condition of the railroads. In the first three months during which the present freight and passenger rates were in effect the railroads handled a record-breaking business. Nevertheless, in these months they earned a net return at the rate of four per cent, and not of six per cent, as estimated by the Interstate Commerce Commission.

Since then there has been a tremendous decline of traffic. The amount of freight being moved has declined one-third since October, and the number of idle freight cars on January 3 was 301,000. This contrasts with a car shortage of about 140,000 cars on September 1.

With earnings inadequate when the traffic was large, and with traffic and earnings declining at the rate these figures indicate, it is idle for spokesmen of railway employees' organizations to answer, as some have, that there is no crisis in the railroad field demanding immediate attention.

The railroad payroll constitutes 60 per cent of railroad earnings. Economies in the use of and in the prices paid for materials and fuel are by no means exhausted, but are

being made energetically every day. But all the other economies that could be effected on many railroads would not save them from disaster under present conditions without a sharp reduction in their payrolls. Many men already have been laid off, but very little study of the statistics regarding current earnings and expenses is necessary to show that all the economies made are not sufficient. The managers of the railroads are, therefore, confronted with the indubitable fact that one of the three following developments must occur:

First: A great increase in the efficiency of employees and a consequent reduction in the number of them to be paid without any general reduction of wages;

Second: A general reduction of wages;

Third: Many railroad bankruptcies.

The railway executives' obligations, not merely to their security owners, but to the public, forbade them to sit by and watch the enormous payroll drive many railroads into bankruptcy. Many hundreds of millions of dollars of the securities of railroads are owned by savings and other banks, by life insurance and other similar fiduciary institutions. Widespread insolvency of the railroads would largely destroy the value of these securities and pull down many of the banks and other institutions which own them. The probable result would be a financial panic and a serious deepening and prolongation of the business depression from which the country already is suffering so greatly.

It was not deemed desirable to demand a general reduction of wages at this time, although the fact that ultimately a reduction of railway wages must come was clearly recognized in General Aterbury's statement.

The only way out left was that suggested to the Railroad Labor Board, namely, the setting aside of the many restrictive rules and working conditions adopted under government control which have been making efficient and economical operation of the railways impossible.

It has been charged that the suggestion made to the Labor Board that it immediately approve the setting aside of all rules and working conditions established since December 31, 1917, was an irregular proceeding and practically asked the Railroad Labor Board to disregard the law which created it. As a matter of fact, the continuance since September 1 of these rules and working conditions has been irregular and not required by the Transportation Act. The Transportation Act specifically required the railroads to continue these rules and working conditions in effect until September 1. Any and every railroad in the country could have legally discontinued them on that date.

Why was this not done? Because the Railroad Labor Board in its decision in the wage case last July asked that the rules and working conditions established under government control should be continued until hearings regarding them could be held. It was because of this request of the Board that they have been kept in effect up to the present time. The Board has exactly the same right to ask the employees at this time to return to the rules and working conditions of December 31, 1917, that it had last July to ask the companies to continue to observe the rules and working conditions established under government control.

What would have happened if on September 1 the companies had restored the rules and working conditions of 1917? The employees undoubtedly would have strenuously objected. If developments had then taken the course obviously contemplated by the Transportation Act, negotiations regarding the matter would have been carried on by representatives of the companies and the employees. If these negotiations had developed into a controversy which threatened to cause an interruption of transportation, it would have been necessary in order to comply with the Transportation Act to have submitted the controversy to the Railroad Labor Board. Meantime, however, the rules and working

conditions of 1917 would have been in effect. The law does not give the Railroad Labor Board actual jurisdiction over any question arising between a railway and its employees until there have been negotiations between them regarding these questions out of which negotiations there has developed a controversy which might lead to an interruption of transportation.

If the Board should now approve the suggestion made by the Labor Committee, it would in effect be merely asking the employees to accept these rules and working conditions of 1917, as last July it asked the railway companies to continue to operate under the rules and working conditions established by the Railroad Administration. Its action in respect to this matter now, like its action in respect to the same matter last July, would be extra-legal. Perhaps the result would be a controversy which would threaten an interruption of transportation. In that event, the whole question would have to be brought before the Board again, but meantime the rules and working conditions in effect would be those of 1917.

Altogether aside from the legal aspects of the questions involved, what the railways have really presented to the Labor Board and the employees is the alternative of a reduction in railroad expenses by a restoration of the rules and working conditions of 1917 or by a general reduction of wages. The restoration of the rules and working conditions of 1917 would enable the railways to make large savings by reducing the number of men they employ, and by eliminating the payment of many millions of dollars a year for work that is not done. If this plan is not adopted, a general reduction of wages will have to be speedily made. The plan the companies have offered would be better in the long run for the companies, the public and the employees than the general and sharp reduction of wages which is the only alternative.

The *Railway Age* repeatedly has pointed out to railroad labor leaders that the only way railway employees could hope to establish a claim to a continuance of the present high wages is by increased efficiency in their work. The labor leaders have done nothing to stimulate increased efficiency of work by the employees. They have devoted themselves to trying to perpetuate rules and conditions of work which make efficiency and economy in operation impossible, and which, by making it impossible, have been rapidly making impossible a continuance of the present scale of wages. The result is the deplorable condition which now exists in the railroad field. Unless the Labor Board promptly approves either drastic changes in working conditions or a sharp reduction of wages it will have to assume a heavy responsibility for very serious consequences.

New Books

The Engineering Index for 1919. Published by the American Society of Mechanical Engineers, 29 West 39th street, New York. 527 pages, 6 in. by 9 in., bound in cloth.

The purpose of the Engineering Index is to provide a convenient and satisfactory guide to engineering literature. The 1919 edition of this index is the most complete and comprehensive work of its kind ever published. It contains over 12,000 references to articles published during the year 1919 in nearly 700 engineering and allied technical publications. The compilation of this index is based upon a review of approximately 1,100 periodicals, reports, and other publications by the engineering staff of the American Society of Mechanical Engineers. These publications are printed in ten different languages and comprise what is probably the most complete collection of scientific and engineering publications in

the world. All of the publications referred to in this index are now a part of the Engineering Societies Library in New York.

The Making, Shaping and Treating of Steel, by J. M. Comp and C. B. Francis, Bureau of Instruction, Carnegie Steel Co. 600 pages, illustrated, 5 in. x 8 in. Bound in cloth. Published by J. M. Comp, Carnegie Building, Pittsburgh, Pa.

The scope included by the title of this work naturally suggests a voluminous treatise. However, the authors have covered the comprehensive subject very well in a book of 600 pages by eliminating all non-essential matter. The book is frankly a description of the steel industry as it exists; it is not written from the viewpoint of the steel expert and comparatively little is said about the future development of the industry. For that reason, any one thoroughly versed in the manufacture of steel might find little that is new in the book. For the railroad officer who desires a thorough knowledge of the steel industry and its most important products, the book is extremely valuable. Designed as a course of instruction for salesmen, this work necessarily includes practically all the information required by those who buy or use steel in any form.

The book is strictly non-technical and opens with a discussion of the fundamentals of physics and chemistry as applied to steel making. The entire process from the ore to the finished product is then outlined in a systematic manner. The various ores, refractories, fuels, fluxes and slags are discussed and the manufacture of coke by the beehive and by-product process is described. In the discussion of the making of pig iron, the construction and operation of the blast furnace and the chemistry of the process are covered. The Bessemer and open-hearth processes are treated in a similar manner, a short history of their development being included. Another chapter is devoted to the manufacture of steel in electric furnaces which is followed by a description of the duplex and triplex processes. The section on the shaping of steel discusses chemical properties, describes the rolling mill and covers in some detail the rolling of blooms, billets, plates, rails and rail joints, the strip and merchant mill products, rolled steel wheels and axles.

The third part of the work treats of the constitution, heat treatment and composition of steel. The solution theory of steel is explained and the theory and practice of heat treatment are discussed with this as a basis. The concluding chapters are devoted to the effect of the common elements on the mechanical properties of carbon steel and a short description of the more usual types of alloy steel.

Ocean Steamship Traffic Management. By G. C. Huebner, 273 pages, 6 in. by 9 in., bound in cloth. Published by D. Appleton & Company, New York.

This book is so written as to be easily intelligible to a student who is entirely unfamiliar with the subject, and yet it is complete enough to be of value to those in the ocean traffic business who wish to learn some of the details of all phases of the work. Shippers, too, and any one whose business calls for contact with steamship traffic departments, will find this work of value. The book covers the entire field thoroughly and includes general descriptions of the various classes of concerns which provide overseas transportation service, the organization of the traffic departments, the classification and duties of the personnel, the fixing of rates, the traffic documents and papers and the classification of commodities. This book is supplementary to a work called "Principles of Ocean Transportation," written by Dr. Huebner in conjunction with Dr. Emory R. Johnson, which appeared in 1918 and which, also, was published by D. Appleton & Co.

Letters to the Editor

Mine Ratings and Car Supply

TO THE EDITOR:

On page 48 of the "Buy Now and Ship Now" issue of the *Railway Age*, January 7, there is this statement: "Viewed from the broad economic standpoint, the proposal to continue rationing cars is indefensible. Studies made in the bituminous coal mining industry show that when the car supply is 75 per cent of the requirements, the cost of production is 16 per cent greater than when all demands for cars are met. If the car supply is one-half normal, the cost of coal is increased 40 per cent."

I can easily appreciate how the writer of this statement may have been misled into making it by the chart which is shown on page 34, but there is an error in the statement which, to my mind, does some injustice to the railroads. To illustrate, let me say that the requirements at the mines for coal cars in time of extreme car shortage are frequently much in excess of their actual ability to load coal. There are some extreme cases where requirements, based, to be sure, on established ratings, are more than 50 per cent above producing and loading ability. It is going pretty far to say that when the railroads furnish but 75 per cent of such highly excessive requirements, the result is an increase of 16 per cent in the mine cost of production. And it is equally erroneous to charge that a 50 per cent car supply, based on mine requirements, would increase production costs 40 per cent.

I understand that the chart which is shown on page 34 was originally published by the Fuel Administration and has more recently been given circulation by the Geological Survey. My understanding, gained from discussion with representatives of the Survey, is that what the chart is really intended to show is the extent to which mining costs are increased by loss of full time operation from any cause whatsoever—transportation disability, mining disability, or anything else. It may be admitted that with a fairly constant overhead expense, mining costs are bound to increase as the percentage of full time operated decreases. The great error is in the assumption that full time operation is represented by the maximum requirements for coal cars when that maximum figure is, as is generally admitted, greatly beyond the current producing and loading ability of the mines.

A. G. GUTHEIM,

Manager Public Relations Section, Car Service Division, American Railway Association.

SIR ROBERT HADFIELD, inventor of manganese steel and a leader in the British steel industry, has been awarded the John Fritz gold medal for notable scientific and industrial achievement. Manganese steel, non-magnetic, was used in the manufacture of millions of helmets worn during the war by American, British and Belgian soldiers. Award of the medal was voted unanimously by the sixteen members of the committee representing the American organizations of civil, mechanical, mining, metallurgical and electrical engineers.

JOHN S. MACDONALD, dining car inspector of the Pennsylvania Railroad at New York City, has received from King Albert of Belgium, an award of the Silver Medal of the Order of Leopold II in recognition of the services rendered to the royal party during the tour of the United States made by King Albert last year. Mr. MacDonald accompanied the royal party on the tour. He has been with the Pennsylvania for 20 years and has had charge of similar trips for President McKinley, President Wilson, the Prince of Wales and other notables.

Container Car in Express Service on N.Y.C. Lines

American Railway Express Company Operates Experimental Car
Between New York and Chicago

THE CONTAINER SYSTEM of transporting materials has been given much attention in the past and considerable progress has been made in development work. These experiments have, however, been made only in freight service in an attempt to relieve the congestion of traffic due to delays in loading or unloading the present type of freight car, particularly when handling less-carload shipments. Many of the same difficulties and delays are also encountered in handling express matter and this has led to the application of the container idea to the railway express service.

A container car designed especially for express service has been placed in operation on the New York Central between New York and Chicago. This car left New York recently in an American Railway Express train and after delivering its cargo of merchandise for leading Chicago department stores at the South Water street terminal of the Michigan

center sill which is supplemented by the construction of the car sides. The superstructure consists of a low steel side framing—about 30 in. high—having side plates of steel which stiffen the car frame and also serve to prevent any sidewise movement of the containers. The sides are connected at each end of the car to a cast steel anti-telescoping end-frame which is approximately the same height and width as a passenger car, having much the same appearance as a blind-end baggage car.

The containers are designed so that they may readily be removed from the car and loaded upon automobile trucks. They are 9 ft. long by 6 ft. wide inside, have an inside clear height of 7 ft. 4 in. and a capacity of 6,000 lb. They are substantially built of structural steel and being entirely of metal will eliminate the losses due to damage from fire. A door is provided in one side of each container through which



New York Central Container Car Designed for Handling Express Matter, Equipped with Passenger Trucks and Buffers and with Air, Steam, and Signal Line for Passenger Train Operation

Central Railroad, was reloaded and made a return trip to New York.

A Nine-Section Express Car

The car is a nine-section express car, its sectional cargo space consisting of nine separate containers or steel boxes firmly secured on the car to prevent shifting during train movement. Each container is removable so that it may be transported by motor truck between stores or factories and the railroad.

This new equipment was built by The Merchants Despatch Transportation Company of East Rochester, N. Y. It consists of a modified low-side gondola car carrying nine containers which may be lifted on or off the car by means of a crane or other type of hoisting apparatus. The car is constructed along the lines of the New York Central standard 60 ft. baggage car and is mounted on two four-wheel trucks of the passenger type. It is equipped with passenger buffers and with air, steam, and signal line connections so that it may be operated in passenger train service. The underframe is of steel construction throughout having a deep

the material is loaded and the door then locked and sealed. The container is then placed upon the car where the side of the car which projects above the base of the door gives additional security to the contents as the door cannot be opened until the container is raised above the top of the side frame. This feature makes the pilfering of goods—now so prevalent—practically impossible. Besides the facility with which the container and its contents may be handled, this method of transportation is expected to eliminate much of the delay caused by the detailed billing and re-checking of small shipments.

On the initial trip of this express car, the handling of the loaded containers was accomplished with surprising speed. With no special station equipment—only a locomotive crane being available—the containers were transferred from motor trucks to their positions on the car in from 30 seconds to two minutes each. Under existing conditions, this nine-section express car could therefore be unloaded and reloaded ready to proceed within 40 minutes. No crew of handlers equipped with trucks could possibly equal this performance.

In addition to the nine-section steel container car now in

passenger train express service, there are at the present time under construction at the plant of the Merchants Despatch Transportation Company other container cars for use in freight train service. These cars, which are 46 ft. long, are provided with steel underframe, wooden sills and floors, and steel sides and ends about 24 inches high for holding the containers in place. The cars will be equipped with standard freight car trucks and will be in every way suited for regular freight train service. The containers now under construction for use with these cars in freight service are 15 ft. long, and 3 containers will be used on each car. They are constructed with steel sides, ends, roofs and floor frames, wooden floors and sheathing and doors in one end only.

Other Container Cars Under Construction

It is expected that this container car system will be expanded by the New York Central to completely co-ordinate the steam railroad, the motor truck and the electric railway.



Empty Container Showing Interior and Door Construction

If it proves to be successful in actual service it will bring about a new system of handling less-carload freight and express matter between large centers of population. The New York Central primarily seeks greater security for shipments in transit, the losses to the railroads through the theft and damage of goods having increased alarmingly in recent years—the aggregate annual loss and damage claims paid by American railroads in 1920 having been increased about 300 per cent since 1914. Several other points of improvement in service are expected from the container car system of transportation. This system provides that the portable containers shall be loaded and locked on the shippers' premises and then conveyed by motor truck and lifted aboard the car. At destination the locked container is carried by motor truck direct to the consignee. All of the intermediate handling and checking processes are done away with.

Another advantage of the new system which is expected to prove most valuable is greatly increased use of rolling stock in actual service. This is particularly important when traffic expands to its "peak" and the prime need is to shorten lay-overs of cars in yards and stations for loading and unloading, and to limit their idleness through misuse for storage purposes. With ample supplies of the removable containers,

which in their several classes will be of uniform size and interchangeable, one carload of the containers may be removed and sent with their loads to consignees, and another set immediately hoisted to their places and the car be ready to proceed within a matter of minutes. The containers may remain on station platforms or on the premises of shippers



Loaded Container Being Lifted from Motor Truck

for loading or unloading at convenience, without tying up rolling stock at points where track capacity is limited.

One of the difficulties that will be encountered in the operation of this system will be the lack of adequate lifting apparatus on the premises of many shippers, which will necessitate the tie-up of a motor truck while the container is unloaded and reloaded. Other difficulties that must be overcome are: the possibility of scattering the containers over



Locomotive Crane Placing a Loaded Container on the Car

too wide a territory and the probable lack of sufficient suitable traffic in one direction. These objections to such a system are, however, vastly outweighed by the advantages.

The performance of this first car in express service will be followed closely and it is expected that in a future issue, the readers of the *Railway Age* will be given some very interesting operating data.

National Agreements Must Be Abrogated At Once

General W. W. Atterbury Predicts Disaster Unless Labor Board
Ends Present Working Rules

THE IMMEDIATE ABROGATION of all national agreements, the remanding of the question of rules and working conditions to negotiation between each carrier and its own employees, the re-establishment of the agreements, rules and working conditions in effect on December 31, 1917, and the right to pay unskilled labor not less than the prevailing rate of wages in the various territories served by any carrier, were requested of the Railroad Labor Board on January 31 by General W. W. Atterbury, vice-president of the Pennsylvania and chairman of the Labor Committee of the Association of Railway Executives. The request was accompanied by a vigorous statement of the present precarious financial position of many of the carriers, General Atterbury predicting bankruptcy for many and a resulting financial panic unless steps are taken immediately to cut needlessly huge wage payments and thus bring operating expenses into proper relation to the operating revenues now accruing under increased freight and passenger rates.

General Atterbury's Statement

The complete text of General Atterbury's statement to the Board follows:

"I have come under a strong sense of duty to lay before you an acute situation. Unless this Board takes prompt action many of the railways of the United States may be forced into insolvency. Many railroads are not now earning, and with present operating costs and traffic have no prospect of earning, even their bare operating expenses, leaving them without any net return and unable to meet their fixed charges. The emergency presented can be met either by an advance in freight and passenger rates, or by a reduction in operating expenses. With declining prices and wages in industry and agriculture the country demands that the solvency of the railroads must be assured by a reduction in operating expenses, and not by a further advance of rates.

"The national agreements, rules and working conditions forced on the railroads as war measures cause gross waste and inefficiency. I estimate that the elimination of this waste would reduce railway operating expenses at least \$300,000,000 per annum. It would be far better to save this sum by restoring conditions of efficient and economical operation than to reduce wages. We believe that as the wages of railroad employees were the last to go up, they should also be the last to come down, but we do insist that for an ample wage, an honest day's work shall be given.

"The public has the right to insist that this must be obtained. The public has also the right to expect that the railway executives, with the co-operation of the regulatory bodies and the employees, will as rapidly as possible reduce the cost of railway operation so as to eventually insure a reduction in rates. Ultimately a readjustment of basic wages will be required. Meantime it is to the interests of all concerned, including labor, that the rules and working conditions shall be made conducive to the highest efficiency in output per man.

"Mr. Whiter and his committee have far from exhausted their evidence on this subject and if required to will of course proceed. But it will be dangerous to continue the consideration of these agreements rule by rule. If the Board follows its present procedure, months will elapse before it can render its decision.

"The urgent financial necessities of the railroads will not permit them to wait any such length of time for relief. Long before the present detailed hearings are concluded the Board

will be flooded by appeals from individual railroads from all parts of the country for reductions in basic wages. It will be impossible for the Board to hear and dispose of these separate cases upon their merits in time to avoid numerous receiverships and the possibility of a national panic.

"When wages have been too low, the harm done has been offset by retroactive increases. Losses of railway net operating income are irreparable. You cannot make retroactive tomorrow the savings that should have been made today. Your Board cannot possibly write the rules and working conditions of every railroad in this country and adjust them equitably to varying geographical, operating and social conditions. It rests entirely with your Board to determine within the next few days whether this whole situation shall drift into chaos and orderly procedure become impossible except at the price of railroad bankruptcy, financial shock and still wider unemployment.

"The Labor Board can prevent this catastrophe by declaring that the national agreements, rules and working conditions coming over from the war period are terminated at once; that the question of reasonable and economical rules and working conditions shall be remanded to negotiation between each carrier and its own employees; and that as the basis for such negotiations, the agreements, rules and working conditions in effect on each railroad as of December 31, 1917, shall be re-established.

"If the Board will do this, the Labor Committee of the Association of Railway Executives will urge upon every railroad company a party to Decision No. 2, that no proposal for the reduction of basic wages shall be made within the next succeeding 90 days. This will afford an opportunity to gauge the economies which can be accomplished through more efficient rules and working conditions.

"It also will afford additional time in which to realize the benefits of a further decline in the cost of living. The course which we are recommending is not only imperative but equitable. When President Wilson issued his proclamation on December 26, 1917, assuming government control of the railroads, he said: 'Investors in railway securities may rest assured that their rights and interests will be as scrupulously looked after as they would be by the directors of the several railway systems.'

"In his address to Congress on January 4, 1918, President Wilson said: 'The common administration will be carried on with as little disturbance of the present operating organizations and personnel of the railways as possible.'

"The War Labor Board declared that the war period was an interregnum to be used by neither the employer nor the employee for the purpose of bettering or impairing the position of either.

"To perpetuate as the normal rules and working conditions on the railroads, the extraordinary provisions of the war period is a distinct violation of all the foregoing promises. The war has now been over more than two years. The time has come when, if the railways are to be efficiently and economically operated, in accordance with the provisions of the Transportation Act, normal conditions of employment and of working conditions must be restored and increased efficiency of labor be secured.

"If your Board adopts the foregoing suggestion, there is but one aspect of the wage question on which we ask immediate action. The basic rates now established by your Board for unskilled labor are from 39 to 48½ cents per hour. Since your decision was made on July 20, 1920, these rates

have fallen materially throughout the United States. For your Board to require the railroads to continue to pay wages to unskilled labor far in excess of those paid by other industries is unfair to those industries, and bears with grave injustice upon the great body of our farmers. Within the next month or six weeks practically all of the railways of the country must recruit their unskilled labor forces. It is desirable that a large part of the work for which these men are necessary be concentrated in periods when the same labor is not needed in harvesting the crops. We therefore ask the immediate permission of your Board to pay for unskilled labor not less than the prevailing rate of wages in the various territories served by any carrier, in accordance with Section 307 of the Transportation Act.

"I regret the urgency of the foregoing presentation. Its informality does not indicate any intention on the part of the railway companies to violate the principle of orderly procedure in such matters. But to sit by and see this situation develop without bringing it promptly and strongly to the attention of this Board would be to sacrifice both the spirit and the letter of the Transportation Act.

"In our judgment, unless the proposed measures be taken promptly by your Board, a situation will shortly develop in which orderly procedure will become entirely impossible. Your Board will be faced with the gravest responsibilities, which it could not possibly successfully perform, in a condition of national confusion, if not of chaos."

At the close of General Atterbury's statement, H. T. Hunt, a member of the public group on the Board, and Judge R. M. Barton, chairman of the Board, suggested that representatives of the railroads and the employees meet to formulate means, if possible, to avert the disaster predicted by General Atterbury. To this suggestion the latter replied that negotiation would be futile because of the dissimilarity of the views of the executives and of the employees and because of the necessity for immediate action.

Chairman Barton then stated that the requests made by General Atterbury would have to be considered in executive session but, in reply to a question of B. M. Jewell, president of the Railway Employees' Department of the American Federation of Labor, he said that representatives of the employees would be heard before any action was taken by the Board. Mr. Jewell and other representatives of the employees present at the hearing declined to reply to Mr. Atterbury's requests or to make any statement at that time. Mr. Jewell, however, stated that he would prepare a reply on behalf of the employees which would be presented to the Board later.

General Atterbury's statement was made after the Labor Committee of the Association of Railway Executives had been in session at Chicago for three days discussing the present labor situation and formulating plans for the restoration of conditions under which an honest day's work for an honest day's pay might be rendered by railway labor.

At the close of the afternoon session of the same day, J. G. Luhrsen, president of the American Train Dispatchers' Association, replied on behalf of his organization to General Atterbury's remarks.

As a representative of the American Train Dispatchers' Association he entered formal protest against the Labor Board's granting General Atterbury's requests. In his protest he stated that the Transportation Act would be violated by permitting carriers to bring before this Board mere theories without following the requirements of the law governing the manner of bringing matters before the Board. He protested the statement of the carriers asking that immediate action be taken by the Board in line with their requests and took issue with the statement that national agreements were forcing the carriers to compensate employees without obtaining from them effective performance of duties. He

charged railway managements with deceptive and inefficient operation and stated that analysis of the operating records of the carriers, particularly the train sheets, would disclose operating inefficiency which if corrected would produce a saving greatly in excess of the waste of \$300,000,000 alleged by General Atterbury as resulting from the national agreements. He stated that the desire of the carriers to reopen negotiations concerning certain agreements with all employees were false, misleading and wholly without merit. He further stated that if the Board is flooded with requests by the railroads for immediate reduction in wages such action will be considered propaganda to interfere with the orderly procedure of the Board.

The right of Mr. Luhrsen to discuss national agreements before the Board was immediately questioned by E. T. Whiter, chairman of the Conference Committee of Managers of the Association of Railway Executives, who stated that Mr. Luhrsen's organization is not a party to such an agreement. Mr. Luhrsen replied that his organization did have a national agreement with the carriers. Mr. Whiter in turn denied this assertion and asked that Mr. Luhrsen's remarks regarding national agreements be stricken from the Board's record. No ruling was made on this request and the Board was adjourned for the day.

Carriers' Opposition to Hourly Wage Summarized

The progress of the hearings on the demand of employees for the continuation of the national agreements formed during federal control has been reported in the *Railway Age* of January 14 (page 199), of January 21 (page 243) and of January 28 (page 297). The railroads' testimony regarding the detrimental effects of the abolition of piece work and the substitution thereof of the hourly wage system of pay was completed on January 25. The following day, Mr. Whiter summarized the carriers' opposition to the hourly system by denouncing the "restrictive rules fastened upon the railroads under government control by the United States Railroad Administration" as productive of great inefficiency and waste in operation. He then requested that the Board "permit the reintroduction into railroad work of methods of paying employees that will offer proper incentive to increased effort and give proper and adequate recognition to skill and industry.

"The public," he said, "pays in freight and passenger rates all the expenses incurred by the railways. The railways, under the Transportation Act, are required to be operated as economically as practicable so that the public will not have to pay excessive rates. The evidence we have introduced regarding the effects of the abolition of piece work in the shops of railways in every section of the country shows that in every case where the system of piece work—that is, the system of paying employees in proportion to the amount of work that they individually do—was abolished, and the system of guaranteeing day wages substituted, there has been a reduction in the average amount of output per employee per hour, and in most cases these reductions have been from 25 to 50 per cent. We have presented detailed studies showing actual results on the Baltimore & Ohio, the New York Central and the Pennsylvania in the east; on the Chesapeake & Ohio, the Louisville & Nashville, the Norfolk & Western in the southeast; on the Chicago & North Western and the Union Pacific in the west. An analysis of these studies comparing the efficiency of employees paid on the merit or piece work basis in 1917 and 1918, and the efficiency of the work done by the same men since then on the day wage basis, conclusively shows serious loss of production in the shops of the railroads when working on day wages as compared with piece work wages, resulting in excessive costs to the railroads and consequently to the public. The abolition of piece work has not only reduced the efficiency

of employees, but has also reduced the amount of output the companies can secure from their shops.

"We submit that this is merely a proof in detail of what practically every man knows from his own daily experience and from common knowledge of human nature. It does not require any figures to prove to any of us that the average man under normal conditions, day in and day out, will exert himself more in production if his work is rewarded in proportion to his efforts, than if he receives a flat daily wage no matter how little work he does.

"When the railways were returned to private operation the public expected an increase in their efficiency and economy of operation. We are seeking the abolition of restrictive rules imposed under government control, such as this one prohibiting piece work, because unless rules and working conditions can be adopted which tend to promote efficiency the managements of the railways cannot secure the increases in efficiency and economy of operation which are necessary to protect the public from excessive costs of transportation, and excessive freight and passenger rates."

Railroads Oppose New Agreement for

Maintenance of Way Workers

On January 31, following General Atterbury's statement, Mr. Whiter, at the request of Chairman Barton, resumed his presentation on behalf of the carriers, discussing their opposition to the national agreement requested by the United Brotherhood of Maintenance of Way Workers and Railway Shop Laborers. In his testimony Mr. Whiter first pointed out that this organization, unlike the Shop Crafts, has asked the Board to sanction a new and more restrictive national agreement instead of asking for the continuation of the one now in effect. The opposition of the railroads against the proposed agreement is based, according to Mr. Whiter's testimony, on seven specific objections. These objections are:

"(1) The proposed rules extend their scope to classes of employees not heretofore represented by this organization; to many who are not employed in the maintenance of way department by all railroads.

"(2) The proposed rules are intended to be applied to officers; or to men who may be represented by other organizations.

"(3) There are vague and conflicting rules.

"(4) Some of the proposed rules are impracticable of application or contain requirements which involve unnecessary work.

"(5) The proposed rules will result in a reduction of efficiency and productivity of the employees.

"(6) The proposed rules would prevent the giving to incapacitated employees employment suited to their capacity.

"(7) The proposed rules effect a further increase in earnings for work performed; also pay for time in which no work is performed."

Atlanta, Birmingham & Atlantic

Asks Wage Reduction

The serious situation outlined by General Atterbury was first disclosed when the Atlanta, Birmingham & Atlantic, through its president, B. L. Bugg, petitioned the Board on January 25 for authority to reduce wages "to a level that would enable the property to keep out of a receiver's hands." Mr. Bugg declared that the road is losing \$100,000 a month despite the fact that its working force has been reduced to the lowest possible point.

Chairman Barton agreed with Mr. Bugg that the case was pressing and after the Board had considered the case in executive session the following order was issued on January 27:

RESOLVED, In case of disputes which have arisen between the Atlanta, Birmingham & Atlantic and its employees by reason of the carrier having given 30 days' notice to employees in the various classes of its service of

certain reductions in their rates of pay, which would be made effective February 1, 1921:

That objection having been made by the employees, and a dispute having arisen in regard to the proposed reduction, and the matter having been brought before the Board, the Board decides that no change of any kind shall be made except by agreement between the parties until the dispute is heard and opportunity given for the board to decide.

The Board will proceed with the further hearing and consideration of the case, and sets February 10 as the date for such further presentation of evidence or argument as the parties may desire to offer.

In the meantime the Board suggests further conference between the parties and an effort on their part to agree on a settlement.

On February 2 and 3 Mr. Whiter continued his presentation on behalf of the carriers, taking up in turn their opposition to the continuation of the national agreements with the Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station Employees, the Brotherhood of Railway Signalmen of America, the International Brotherhood of Stationary Firemen and Oilers, and the Order of Railroad Telegraphers. The testimony regarding these agreements was in general similar to that which has already been presented in regard to the shop crafts agreement. The character of this testimony has been outlined in previous issues of the *Railway Age*.

Various of the "independent" railway organizations have been fighting since the beginning of the present hearings for the right to present their views regarding national agreements independently. On February 2 the Board's decision on their petitions was made public, representatives of these organizations being granted the right to be heard in the present case despite the opposition of the larger brotherhoods who have maintained that the members of the independent organizations are adequately represented by them.

Withholding of Guaranty Declared Injury to Nation's Economic Structure

URGING THAT IMMEDIATE ACTION be taken on pending legislation to authorize the secretary of the treasury to make partial payments on the \$340,000,000 due to the railways from the government, John S. Drum, of San Francisco, president of the American Bankers Association, has presented a memorial to Congress, in which he points out the great injustice of the present situation and indicates how it reacts to the detriment of agriculture, commerce and trade.

Copies of the memorial have been forwarded to Chairman Esch, of the House Interstate and Foreign Commerce Committee, to Senator Cummins, chairman of the Senate Interstate Commerce Committee.

"The American Bankers Association," says the memorial, "urges upon you the immediate need of legislation that will authorize partial payments of amounts due to the carriers from the government under the guaranty provisions of the Transportation Act of 1920 as those amounts are ascertained and certified from time to time by the Interstate Commerce Commission. The Economic Policy Commission of the American Bankers Association, of which Paul M. Warburg, of New York, is chairman, has investigated the situation thoroughly and adopted recently the following resolution:

"That it is the sense of this commission that legislation be urged which would make immediately available the funds which are held by the government for the railroads without the necessity of filing their complete claims."

"Serious injury is being done to the entire banking situation in the United States and therefore to the entire economic structure of the country by reason of the decision of the comptroller of the treasury (which has been sustained by the Supreme Court of the District of Columbia) that under the Transportation Act, as at present constituted, the secretary of the treasury cannot make any payments to the carriers before their entire claims for compensation shall have been audited

and certified to the secretary of the treasury by the Interstate Commerce Commission.

"The refusal of the treasury department, based purely on a technical construction of the Transportation Act, to make partial payments as amounts due to the carriers are certified by the Interstate Commerce Commission from time to time has rendered the railways unable to meet their current obligations from their own funds. They have therefore either been forced to borrow money from the banks to meet these obligations, or by foregoing payment to creditors have forced these creditors to borrow from the banks the money necessary to operate their own business. In either case banking credit in the United States is forced to bear, in addition to the extraordinary demands of business generally, a further burden of about \$340,000,000 which, according to the secretary of the treasury, is the amount due to the railways under the Government guaranty.

"This great burden has put a further strain on banking credit already heavily taxed, and increases their difficulties in supplying facilities urgently required by agriculture, commerce and trade. The purpose of Congress in enacting those provisions of the Transportation Act which provide for compensation to the carriers for deficits incurred under federal control, was to render aid to the railways so that in the interests of the people as a whole, during this period of readjustment, the carriers might as speedily as possible make the additions and betterments necessary to meet properly the requirements of the nation. That purpose is wholly nullified if the carriers are deprived of the use of the money due them until their entire claims have been audited and certified to the treasury department for payment.

"Legislation that would remedy this serious situation, by expressly declaring it to be the intent of Congress to permit partial payments to the carriers as the amounts due them are certified from time to time, has been introduced in Congress. Realizing as it does the disastrous consequences flowing from the wholly avoidable tieup of credit facilities involving hundreds of millions of dollars, the American Bankers Association urges upon you, with all the earnestness it is capable of expressing, to act immediately and favorably upon this legislation for the strength that will be given to the country's credit structure, by the prompt release of this huge sum that is due to the railroads."

Santa Fe Coast Lines

Car Loading Campaign

LAUNCHING ITS CAMPAIGN to promote heavier car-loading and the conservation of equipment with the slogan, "The Gospel of a Good Load," the Coast Lines of the Atchison, Topeka & Santa Fe inaugurated an interesting and comprehensive plan to stimulate action in this important subject on June 1, 1918. The results have been so gratifying that the plan might well be used by other lines.

In the campaign, instructive material and data have been compiled and presented in pamphlet form. The method has been to express by percentages the loading record—a capacity load representing 100 per cent—at the various stations for specific commodities, together with a table setting forth the general standing. The pamphlet is published monthly and every five months a consolidated statement is prepared. Thus from month to month a given station can trace its record and standing while the general progress can be determined from the consolidated tables. Progress or failure, together with reasons therefor, are pointed out by comment and comparison. Each station can find by examination of the detailed statements just where it stands in respect to the records of the others; in other words, "detailed statements, showing the performance by stations and commodities are given so that each agent and other employee or officer interested can familiarize himself with the tonnage moved, compare one station with another and determine in his own mind the best method to adopt to bring the loading of any commodity up to the highest percentage possible." The goal of 100 per cent is maximum tonnage and the records from month to month present in figures the loading history and results obtained.

J. R. Hitchcock, assistant general manager of the Coast Lines, under whose signature the pamphlet is sent to the employees, in concluding his instructions in one of the pamphlets presents the keynote of the campaign in the following statement: "The extent to which we can make full use of such equipment as we are able to secure for loading will be measured by the enthusiasm and energy displayed by our agents and others in preaching the Gospel of a Good Load and getting the loaders to practice it."



Photo by Ewing Gallway, N. Y.

In the New York, Susquehanna & Western Yard at Undercliff, N. J.

Wood Preservers' Association Meets in San Francisco

Annual Convention Afforded Opportunity to Study Timber Production and Treatment Developments

THE AMERICAN WOOD PRESERVERS' ASSOCIATION met in its seventeenth annual convention at the St. Francis Hotel, San Francisco, on January 25-27, inclusive, with over 125 members and guests in attendance. As this was the first meeting of this organization west of the Mississippi river, unusual interest was manifested in the opportunity to study the timber resources of the west and to witness the methods of manufacturing the lumber, which is now coming onto the eastern roads in large quantities.

The officers of the association for the past year were: President, A. R. Joyce, Joyce-Watkins Co., Chicago; first vice-president, C. M. Taylor, Supt. Port Reading Creosoting Plant, C. R. R. of N. J.-P. & R., Port Reading, N. J.; second vice-president, E. B. Fulks, consulting engineer, Chicago; secretary-treasurer, F. J. Angier, Supt. timber preservation, B. & O., Baltimore, Md.

The convention was called to order at 10:30 Tuesday morning. Hon. James Rolfe, mayor of San Francisco, welcomed the organization to the city. The report of the secretary-treasurer showed the election of 81 new members during the year and a total membership of 373 on December 31, 1920, of which 97 are in railway service on 40 different roads.

In his opening address, President Joyce emphasized the widespread interest now being exhibited in the treatment of timber and predicted that the industry is now on the eve of a tremendous expansion in railway work and elsewhere.

Report of Committee on Preservatives

The major portion of the report consisted of a discussion of the physical and chemical properties of zinc chloride, methods of handling and of analysis, specific gravity tables, etc.

Three papers bearing on the effect of zinc chloride treatment on the strength of wood were also included as follows:

"Experiments on the Strength of Treated Timber," by W. K. Hatt.

"The Effect of the Zinc Chloride Process of Preservation on the Strength of Structural Timber," by H. B. Luther.

"Results of Some Tests of the Effect of Zinc Chloride on the Strength of Wood," by T. R. C. Wilson and Ernest Bateman.

The first of these papers described experiments planned by Dr. Hermann von Schrenk and Dr. W. K. Hatt, and published in 1906 under the authorship of the latter. The second paper was an original contribution by Prof. H. B. Luther, of the Massachusetts Institute of Technology, and the third was an original paper by Messrs. Wilson and Bateman of the Forest Service, describing tests made by them at the Madison laboratory. The three papers taken together seem to indicate that:

(1) The treatment of wood with the usual strength of zinc chloride solutions seems to have but little permanent effect upon the strength of wood in bending even 5 years after treatment, provided the temperature of the wood during that time is not excessively high.

(2) There seems to be a slight permanent decrease in the resistance of zinc-treated wood to shock even at the normal temperatures. This decrease seems to be greater with greater absorptions of zinc chloride.

(3) At temperatures somewhat higher than the normal there may be a considerable reduction in all strength values.

The report also included information concerning vertical-retort tar. At the present time there is of vertical installations of all kinds a production of between 9,000,000 gal.

and 10,000,000 gal. per year of vertical-retort tar. With the existing high cost of gas oil, and the probability that it will continue high for a number of years, a very considerable number of plants are considering the installation of more coal gas capacity, and plans are drawn for the installation of 85,000,000 cu. ft. of vertical retorts. This will bring up the production to between 40,000,000 gal. and 50,000,000 gal. of tar per year. Coke-oven tar in its general characteristics resembles on one hand coke-oven tar and on the other, blast-furnace tar. Vertical-retort tar is more fluid than coke-oven tar, and is comparatively low in free carbon. Naphthalene is practically absent. Its tar acid content and sulphonation residue are high. Creosote oil made from vertical-retort tar on fractionation yields fractions which fall below the specific gravity requirements of the A. W.-P. A. specifications, but in general are well above the specific gravity range of oil derived from water-gas tar. Certain vertical-retort tars yield oils having gravities of fractions as low as water-gas oil. The latter tars are unusual, however, and are produced in limited quantities.

Water Gas Tar

A paper on water-gas tar, by W. H. Fulweiler, was also presented as a part of the report of the committee in which it was pointed out that the production for 1920 was 80,000,000 gal. As a result of practical experience it has been found that water-gas tar derivatives whether refined tar, distillates or mixtures, appear to give very satisfactory penetration. They have been used commercially in the full-cell, Rueping and Card processes with entirely satisfactory operating results.

The water-gas tar derivatives have been used in practically every branch of the wood-preserving industry. Its authenticated commercial use in treatment of railroad ties began in 1910, when the Public Service Railway Company of New Jersey began to use it in a regular 10-lb. treatment on their ties. They probably have in track 500,000 ties treated with water-gas tar. Its use by steam roads began in 1914. The Baltimore & Ohio has treated approximately 5,000,000 cross-ties with the Card process, using 1/2-lb. zinc chloride with 3 lb. water-gas tar. The Chicago, Burlington & Quincy has treated about 171,000 ties with water-gas tar and zinc chloride solution. The Philadelphia & Reading and the Pennsylvania have used water-gas tar in admixtures with coal-tar products in varying percentages from 10 per cent up to straight water-gas tar.

Report on Economics of Non-Pressure Treatments

As a general rule pressure treatment is more thorough, gives a longer life to the wood, and is more economical than non-pressure treatment. The penetration obtained by pressure is deeper, more uniform, and more subject to the control of the operator. Furthermore, the amount of preservative injected to obtain a given penetration may be varied to suit different requirements. This results in economical use of preservatives. It is possible also by pressure equipment and processes to treat green timber, when seasoned timber is unobtainable, whereas non-pressure processes require thoroughly seasoned wood.

On the other hand, there are innumerable cases where

pressure treatment is for some reason either impossible or inadvisable and the wood must be either treated by a non-pressure process, used without treatment of any kind, or replaced by some other structural material.

There are three principal methods by which wood can be treated without the use of artificial pressure, namely: (1) Surface treatments, (a) Spraying, (b) Brushing, (c) Dipping; (2) Hot and cold bath treatment; (3) Steeping treatment.

With methods (1) and (2) coal-tar oil and similar oil should be used.

With method (3) water-soluble preservatives, such as zinc chloride, sodium fluoride, and mercuric chloride should be used.

Non-pressure treatment should be adopted only when it is apparent that the added life which might be obtained by pressure treatment is not sufficient to offset the additional cost of the treatment, or when it is practically impossible to obtain pressure-treated timber. Specific cases in which non-pressure treatments are most likely to be advisable are as follows:

(1) For treating timbers and lumber used in building and car construction and repair work which must be framed at the building site, or which are used in such small quantities that it is impracticable to send them away for pressure treatment. Of the various non-pressure treatments possible, hot and cold bath treatment with creosote will generally be most effective. When apparatus for this process is not available, surface treatments may be used. For places where the odor or color of creosote would be objectionable, water-soluble preservatives applied by the steeping process may be desirable. These preservatives are, of course, not suitable where the wood is likely to be wet frequently.

(2) For timbers used in interior construction where the ends are placed on concrete, brick, or stone foundations, and only the ends are subject to decay, and for any other timbers where only points of contact with wood or other material are likely to decay prematurely, surface treatments are usually the only methods which can be used in such places, but great benefit at little expense can be expected.

(3) For fence posts under conditions which make pressure treatment out of the question, hot and cold bath creosote treatment of the butts is recommended, together with a hot or cold bath treatment of the tops. Surface treatments are not as effective as hot and cold bath treatment, and their use on posts is seldom to be recommended.

(4) For telegraph and telephone poles of durable species, from which experience has demonstrated good service may be expected when butt treated, the hot and cold bath treatment is recommended. Surface treating the butts of poles of durable species with creosote is usually also sufficiently effective to more than pay for the cost of treatment and may be used to good advantage where conditions prevent more thorough treatment.

Poles of non-durable species, especially for use in the southern states should be treated throughout their entire length by a pressure process.

(5) In general, the hot and cold bath treatment is the nearest substitute for pressure treatment, and is to be recommended in preference to the more superficial treatments. Dipping, spraying, and brush treatments are more superficial than the hot and cold bath process and generally result in only a slight penetration of oil. They are, therefore, most suitable for timbers not subjected to mechanical wear or serious checking. The steeping process due to the long soaking period approaches the hot and cold bath process in the matter of penetration. Since water-soluble preservatives are used, the treated wood has the limitations and advantages common to these preservatives.

Service Tests of Ties

The committee submitted detailed progress reports of the service secured from treated ties on the A. T. & S. F., the B. & O., the C. I. & L., the C. R. I. & P. and the St. L.-S. F. W. H. Kirkbride (S. P.) described a test installation of 90 creosoted ties, 65 of which were still in the track after 20 years' service. S. D. Cooper (A. T. & S. F.) described the practice adopted on that road three years ago whereby all ties taken out of track are inspected by representatives from the office of the superintendent of timber preservation before destruction, as a result of which the number of ties taken out prematurely has been reduced greatly.

The committee on ties described a series of tests of punctured ties which have been undertaken at the plant of the St. Helena Creosoting Company to ascertain the effect of perforating on the seasoning, penetration of creosote and the physical properties of fir ties and timbers. These pieces have been perforated and treated and are now under examination.

Closing Business

The following officers were elected for the next year: President, C. M. Taylor, superintendent, Port Reading Treating Plant, C. R. R. of N. J.-P. & R., Port Reading, N. J.; first vice-president, F. J. Angier, superintendent timber preservation, B. & O., Baltimore, Md.; second vice-president, H. S. Valentine, superintendent, Eppinger & Russel Co., New York City; secretary-treasurer, Geo. M. Hunt, chemist, Forest Products Laboratory, Madison, Wis. Directors: R. J. Calder, secretary-treasurer, International Creosoting & Construction Co., Galveston, Tex., and H. S. Sackett, assistant purchasing agent, C. M. & St. P., Chicago. It was voted to hold the next annual convention in Chicago.

TUSCALOOSA (ALA.) IS TO HAVE A TRAFFIC BUREAU, and the transportation committee of the Tuscaloosa Chamber of Commerce has gone so far as to entertain applications of various experts to manage it. Tuscaloosa could take no more forward step than this. A well-conducted traffic bureau is a great economy, continually active in the interest of each merchant member on the payment of one small annual fee. The Birmingham Traffic Bureau has collected \$150,000 for its clients in the past year, and that is just one item of its service. It has caused the suspension of threatened freight advances and maintained a general watchfulness over the shipping problems of the district.—*Birmingham Age-Herald*.



Photo by Keystone View Co.

Grain Elevator at Fort Williams, Ont.



Along the Right of Way of the Chicago, Milwaukee & St. Paul

Electric Motive Power in Freight Train Service*

One C. M. & St. P. Locomotive Handles 2,800-Ton Trains on
0.7 to 1 Per Cent Ascending Grades

By W. S. H. Hamilton

Railway Equipment Department, General Electric Company

HEVY TONNAGE freight trains are not only the most numerous on mountain railroads, but are also the most important and difficult from a train handling point of view. Previous to the electrification of the Chicago, Milwaukee & St. Paul, there were no roads electrified in this country where heavy trains of ordinary merchandise were handled on mountain grades. (The Great Northern electrification at Cascade Tunnel and that of the Baltimore & Ohio at Baltimore are not considered because steam engines are used to assist in starting.) Roads carrying ore or coal entirely have an immense advantage in that the cars are nearly always uniform and usually are all-steel equipment which can withstand rough treatment without injury. On the C. M. & St. P., the cars are of all kinds and descriptions and in rush seasons are often loaded beyond their normal capacity. While an effort is made to keep the weakest cars at the rear of the train, still there are many cars in service which were not designed to transmit the drawbar pull required in modern heavy freight service.

The majority of freight trains do not run on a schedule. True there is a schedule, but it is mostly used for convenience in dispatching and trains are not expected to adhere to it closely. To handle freight most effectively, the locomotives should be able to get the trains over the division in about eight hours and yet be able to handle the maximum tonnage possible. To do this they should be able to take advantage of the profile and speed up wherever possible, consistent with safety. On mountain grades it is most economical to use helpers and this usually allows the same train weight to be handled over the entire division.

On mountain grades ascending, the maximum speed permitted by the desirable power input to one train with two locomotives will usually be 15-20 m.p.h. (16 m.p.h. on C.M.

& St. P.). When operating on lighter grades, ascending, the locomotive should be able to go faster. The maximum safe speed is probably about 25-30 m.p.h. but again this speed may be limited by the desirable power input to a single train. The maximum safe speed on the level or "water" grades is somewhere between 35 and 45 m.p.h. but this varies considerably depending upon the track.

In descending mountain grades the maximum safe speed is about 15-20 m.p.h. and on the lighter grades 25-30 m.p.h.

The C. M. & St. P. freight locomotives are of the geared motor type shown in one of the illustrations. The full load speed is 16 m.p.h. at 3,000 volts and the maximum operating speed for the gear ratio is 30 m.p.h. The control provides three running speeds, two full field and one shunted. These are shown on the chart together with the speed curves on accelerating resistances. Two regenerating connections are provided, one giving a speed range from about 17-30 m.p.h. and the other about 9-15 m.p.h. The first (parallel) speed is the one generally used. Motor driven exciters are used to obtain the necessary field excitation during regeneration.

Freight Train Handling

The couplers of a freight car are not rigidly fastened to it, but are connected through a friction or spring arrangement or both, which means there is considerable stretch in them when transmitting a large drawbar pull. This is called "slack" and for practical purposes is taken as 1 foot per car. If an 80-car train is started with all the slack "bunched" at the start the locomotive will move 80 ft. before the caboose starts. Those who have ridden freight trains much can best testify to the shock produced if any attempt is made to speed up the locomotive until after the caboose has been started. This "slack" represents the most difficult problem in freight train handling and the first, last and most important rule in freight train handling is to "properly control the slack."

Let us consider as the first problem in heavy freight train

*This is the second of a series of three articles on this subject. The first (*Railway Age*, January 21, 1921) dealt with passenger service requirements and passenger train operation and the third will deal with the use of helpers in freight service. The author acted as an instructor to engineers on the locomotives used on the Chicago, Milwaukee & St. Paul, from December, 1915, to August, 1917, and from December, 1919, to April, 1920.

handling, starting a train on an ascending grade of not over .7 per cent with a single locomotive. On such a grade the train will not start back down the grade by simply releasing the brakes. On the C. M. & St. P. one locomotive handles a maximum train of 2,800 tons, about 60 cars, on grades of .7 to 1 per cent. On the Missoula division between St. Regis and Deer Lodge a maximum train of 110 cars, or nearly 5,500 tons, has been handled by one locomotive against a maximum grade of .4 per cent. The first start at a terminal is made after the brakes on the train have been tested. Usually when coupling onto the train, it is pulled out as much as possible before testing the brakes in order to see if it is all coupled and also to detect any short air hoses. These frequently give trouble because of excessive slack in the drawbars and at times a short extension coupler has to be put between cars in the hose line.

Starting a Train on an Ascending

Grade Without a Helper

When ready to start, the locomotive is backed against the train enough to bunch the head third of the train and is then started ahead. In starting extreme care must be taken not to get the head portion of the train moving too fast before starting the rear portion as this is liable to set up shocks severe enough to pull out a drawbar. Since the drawbar pull required to start a car from rest is much more than that required to keep it just barely moving, a long freight train has almost to be started car by car and the problem is to keep the locomotive just barely moving until the entire train has been started. If the locomotive is allowed to "stall" while doing this it is usually necessary to start over again.

The engineer, therefore, in starting brings the controller to the first notch and off again once or twice before leaving it there. (This does not mean that the first notch on these locomotives gives too much tractive effort as it provides only enough to just about move the locomotive alone, but if the controller were left in that notch in the beginning the locomotive would speed up too much and pull the slack out of the head cars too quickly.) As the locomotive moves, car after car is started and the engineer watches the ground carefully and also the ammeter and when the locomotive seems to be on the point of stalling brings the controller out another notch. Considerable experience is required to be able to judge just the proper instant, as for best results the controller must be moved just as the locomotive seems to be stalling without actually allowing it to do so. As soon as the locomotive has traveled a distance equal to the amount of slack in the train, the acceleration may be increased to any desired amount which is usually as near the wheel slipping point as it is desirable to go.

In first starting a freight train, especially in cold weather, it is necessary to run it slowly for the first three or four miles out of the terminal in order to warm up the journal boxes gradually. If this is not done hot boxes will result. This is accomplished by accelerating to the series running position of the controller and allowing the locomotive to run there for several miles before going on into the parallel positions. This same precaution must be taken after a train has been standing for some time in cold weather.

In making an ordinary stop where there is no necessity for stopping very quickly, the controller is eased off a notch or two at a time until the 1st or 2nd notch is reached, where it is left until the train stops. The independent brakes are then applied on the locomotive and the controller is shut off. This stops the train without shock and without any interchange of slack. In starting again it is usually necessary to take slack but quite often an attempt is made to start without taking the slack; while this may be successful, it requires a higher value of current. If there are any weak cars ("soft shells") near the head end of the train, this practice should be avoided.

In starting or stopping on an ascending mountain grade with only one locomotive, about the same procedure is followed as on the lighter grade with the exception that it is very difficult to take any slack without excessive shock to the train. However, in such cases the trains are not very long and can usually be started without taking the slack. In one case that the writer is familiar with it was necessary to set a few hand brakes at the rear of the train in order to be able to take enough slack and release them by whistle signal after the locomotive had the train started again.

Comparison of Steam and Electric Operation

Before considering operation down grade, a comparison may be made between steam and electric locomotives as regards their ability to start a heavy train. The electric locomotive is superior because in the first place the torque on a steam engine is not constant, but varies depending on the position of the cranks. In the second place it is difficult to judge exactly the drawbar pull being developed by a steam engine during the time that the slack is being taken in the



A C. M. & St. P. Freight Locomotive with a 100-Car, 5,000-Ton Train, Eastbound at Thelma on the Missoula Division

train and after the train has just started. Undoubtedly an experienced engineer can tell from the sound of the exhaust how much drawbar pull is being developed by the engine after it is in motion, even at fairly slow speeds, nearly as well as can be told by the ammeter indications on an electric locomotive. During the times referred to, however, the exhausts are so few and far between that they cannot be used as a guide. The effect of the expansion of the steam in the cylinders is variable and difficult to judge while moving very slowly. This point is brought out clearly in wrecking operations where it is desired oftentimes to move a locomotive only a few inches at a time. In such cases it was found to be much easier to do this with an electric locomotive than with a steam engine. The ammeter indication on the electric locomotives is at all times a measure of the drawbar pull being developed and the engineer can tell just how close the locomotive is to the wheel slipping point and thereby judge whether to move the controller another notch or not.

After the train is in motion there is practically no difference between the steam and electric locomotives until speeds of 6-8 m.p.h. for Mallets and 10-12 m.p.h. for simple engines are reached. Here the steam engine begins to lose torque in gaining speed while on the other hand the torque of the electric locomotive can be held at full value until speeds beyond 16 m.p.h. are reached. This results in considerable saving in time in starting a train.

Before taking up down-grade operation with electric loco-

motives, it is well to consider this operation with steam engines and air brakes. When a train arrives at the top of a mountain grade it is stopped and a test of the air brakes is made by applying the brakes and noting that they apply properly on all cars, or at least noting that the gage in the caboose shows a reduction. After this the brakemen go over the train and turn up the retainers on all cars.

The train is then started and as soon as the speed reaches, say, 6-8 m.p.h. a fairly heavy application of the brakes is made. This applies the brakes on all cars. This is held for a few seconds and then the brake pipe is recharged. The next and succeeding applications are lighter (about 10 lb. reductions in the brake pipe pressure), being only sufficient to move the triple valves and insure a fresh supply of air each time to the reservoirs on the cars. The cycle of operations between successive applications requires about 1 minute and is divided about as follows: full release 20 seconds, running position 10 seconds, application 20 seconds, lap 10

part first, or at least at the same time as the rear end. Failure to make this final application often causes trains to break-in-two.

When the train is stopped, the brake pipe is recharged and the independent brakes are applied on the engine to hold the train. As the brakes on the different cars leak off the train gradually bunches against the head end and the locomotive, but since this does not occur on all cars at the same time, the cars with the brakes set retard this bunching and thus prevent excessive shocks in the train. This is another very desirable feature secured by the use of retainers and will be referred to again.

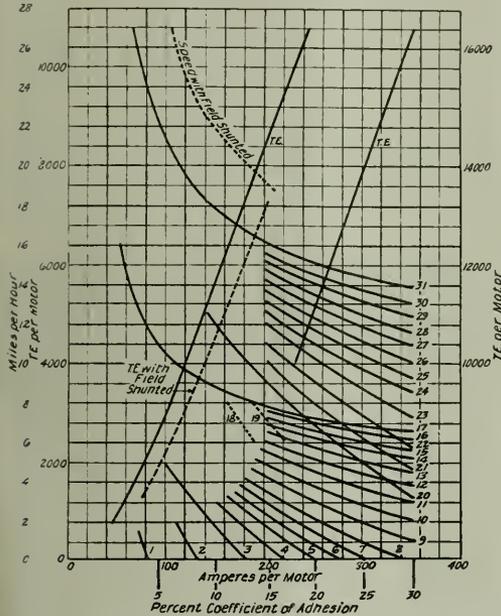
With the electric locomotives regeneration is used to control the speed and braking effort on descending mountain grades. On the freight locomotives used by the C. M. & St. P., the controller is so arranged that it is necessary to bring the main handle to either the full series or full parallel running position before the braking handle can be moved to the positions to apply and regulate the amount of regeneration. This makes the application of regeneration when "tipping over" the summit of a grade very easy, as the controller can simply be left on and the braking controller brought on as the speed increases. The regeneration starts gradually and the train bunches as each car in turn passes over the summit. However, when starting on a down-grade the application is not so easy, because of the motoring pulling out of the train slack before regeneration is applied.

The trains stop for an air brake test at the summit; this is done by making a 10 lb. reduction in the brake pipe pressure at the locomotive and noting whether this shows on the gage in the caboose. The conductor then makes a 10 lb. reduction by means of the valve in the caboose and the engineer sees it by means of the brake pipe gage in the locomotive. It is the usual practice to turn up retainers on 25 to 30 per cent of the cars, all at the head end of the train. These assist in controlling the slack in case a stop is made on the grade as previously described.

Starting a Train on a Descending Grade

The train is then started and if it is not all on the down-grade the regeneration is applied as described above. This same method is used on all grades of 1 per cent or less. If, however, the start is made from rest on a grade of 1.5 per cent or over, then the train is started and allowed to run, checking it a little at first by means of the independent brakes on the locomotive. This bunches most of the slack gradually. When a speed of about 17-19 m.p.h. is reached a light application (about 8-10 lb. reduction) of the automatic brakes is made, the independent brakes on the locomotive being allowed to apply. When this application becomes effective the main handle is brought out quickly to the parallel running position and the braking controller is brought on several notches. The independent brakes are released as soon as regeneration commences and the automatic brakes as soon as it has built up to the proper value. This procedure keeps the train bunched while regeneration is being applied and the cars with retainers assist in this, but they soon leak off and do not assist in holding the train after a few minutes.

Frequently one of these locomotives has to take a greater tonnage down a grade than it can hold by regeneration alone. To do this the air brakes have to be used to help hold the train. This condition occurs most often on the 2 per cent grade between Donald and Piedmont. One locomotive can hold back about 2,200 tons, whereas the tonnage down this grade is usually 2,800-3,000 tons. Under these circumstances more retainers are turned up though never on more than on 40-50 per cent of the cars (all at the head end) and after regeneration has commenced additional applications of the air brakes are made



Speed-Tractive Effort Curves on Resistance for C. M. & St. P. Freight Locomotives

seconds. Of course these times are only approximate and are varied by the engineer, depending on how the train is holding and the speed. The train crew in the meantime are watching the cars carefully and the retainers are cut out for a few minutes at a time on any cars which show signs of wheels overheating. Stops are made as required to cool the wheels. The brakes on the locomotive driving wheels are kept off during the descent to keep from overheating the tires.

When making a stop a full service application of the brakes is made, the engine driver brakes are allowed to apply, and just before the train comes to rest an additional application is made which is quite necessary. When the first application is made preparatory to stopping and is held on, leakage in the brake pipe throughout the train gradually causes the brakes to apply hardest at the rear of the train and this part of the train has a tendency to stop first and stretch the train out. By making an application just before the train stops, it has the greatest effect on the head end and stops that

from time to time to control the speed, the driver brakes on the locomotive being kept released. The applications are all light (10 lb. or less), being just enough to work the triple valves on the cars, and most of the work is done by the brakes on the cars with retainers up. These, however, do not heat up their wheels enough to bother. This method is entirely successful in operation, but is greatly facilitated by the arrangement provided on the bipolar passenger locomotives, whereby the brakes on the locomotive are automatically kept released while the locomotive is regenerating.

In stopping the train, the regeneration is reduced by moving the brake handle back a couple of notches and a light service application of the brakes is made, the driver brakes being allowed to apply. When the speed has decreased enough so that regeneration has practically ceased, both handles are shut off and such additional applications of the brakes are made as are necessary to stop the train.

Railroad Guaranty Bill Before Congress

WASHINGTON, D. C.

THE WINSLOW BILL, to specifically direct the Secretary of the Treasury to honor certificates of the Interstate Commerce Commission for partial payments to the railroads on account of their six months' guaranty, was favorably reported to the Senate on January 31 by unanimous action of the Senate committee on interstate commerce, after a brief hearing at which Chairman Clark of the Interstate Commerce Commission approved the purpose of the bill. The committee had had an opportunity to study the record of testimony on the bill before the House committee.

As briefly noted in last week's issue, a favorable report on the Winslow bill was filed in the House on January 26 by Representative Winslow. The report said in part:

Regardless of the question whether or not the ruling of the comptroller and the decision of the supreme court of the District of Columbia are in accordance with the terms of the law, there is no question in the minds of your committee (which held full hearings on the subject, at which were heard representatives of the carriers and of the Interstate Commerce Commission, and various individuals representing business interests) that the transportation act should be so amended as clearly to authorize the commission to make certificates in partial payment. If the commission definitely ascertains that a certain amount is due under existing law, no reason is apparent why the payment of such amount should be deferred until a final settlement of all disputed items is arrived at.

Accordingly the bill, the passage of which the committee now recommends, provides that the commission, if not at the time able finally to determine the whole amount due under section 204 or section 209, may make its certificate for any amount definitely ascertained to be due and may thereafter in the same manner make further certificates until the whole amount due has been certified. In order to clarify the bookkeeping processes involved in this payment the bill provides for the allocation among the appropriations already made by these sections of the transportation act of the partial payment warrants authorized by this bill.

The bill also authorizes the commission whenever in its judgment practicable to make a reasonable estimate of the net effect of any deferred debits and credits which can not at the time be definitely determined. When agreed to by the claimant such estimates may be used as a definitely ascertained amount which the commission is authorized to certify for payment, but such estimates so agreed upon are to be binding in final settlement. The principal class of cases covered by this provision are items for loss and damage claims and overcharge claims, which it is impossible to compute with exactness until the courts have settled the liability of the parties.

The testimony of witnesses before the committee represented very generally the railroads, the American Railway Express Company, and miscellaneous railway supply houses.

They all emphasized most forcibly the absolute need for such legislation as is proposed in this bill. They made it very clear that not only were their institutions unable to meet their proper running expenses and maintenance charges, to say nothing of pay-

ing their bills, long overdue, or undertaking to make necessary repairs or to provide for any development in order that they may keep up with the need for transportation facilities. It was testified generally that they were unable either to sell new securities or to borrow money temporarily, because of the already too great extension of their credit, on account of which banks and other creditors are demanding payments which the carriers are unable to make. Not only is this condition of affairs working against their day-to-day efficiency, but it is also resulting in the unemployment of tens of thousands of operatives who might, if the government would make payments on account, be immediately and wisely set to work.

The situation is so apparently unbusinesslike as to demand a correction of the present government method of paying its indebtedness to the carriers, etc.

In connection with the report, Mr. Winslow submitted a letter from Chairman Clark of the Interstate Commerce Commission saying that the commission is in full sympathy with the purpose of the bill and is of opinion that conditions and the financial situation are such as to make it highly desirable that the carriers shall have as promptly as possible the amounts due them under the guaranty provisions. It is physically impossible, he said, within a reasonably short time to make final certificates for all the carriers, and in the meantime it seems appropriate that partial payments should be made in so far as the same can be properly certified.

Representative Sims filed a minority report opposing the passage of the bill, both on technical grounds and on the ground that the guaranty was in the nature of a "gratuity" which the railroads are not entitled to ask for in advance of the final ascertainment of the amounts. Mr. Sims said in part:

No property right exists in favor of the carriers, as they were not required to perform any service of any character, or make any sacrifice, or incur any expense in behalf of the government in consideration of the guaranty. This guaranty provision of the transportation act can be repealed; and if repealed, no carrier would have any legal or enforceable cause of action against the government on account of such repeal.

At the time the transportation act was passed and government operation of the railroads ceased every product of the farm was double in market value that it is now. Thus the burden of this guaranty has been doubled. But, notwithstanding this fact, the carriers now ask Congress to amend the law advancing the date of payment of this guaranty so as to require it to be paid at a time when it is impossible for the farmers and producers of the Nation to receive even the out-of-pocket costs to them of their products, which will have to be sold at any price in order to pay the taxes necessary to be paid in order to comply with the unjust provisions of this bill.

The government has already paid during the guaranty period to the applying carriers by way of advances provided for under paragraph (h) of section 209, the sum total of \$260,431,874. This vast sum far exceeds the amount that any member of the House or Senate or anyone else supposed or believed would have to be paid the carriers to cover or make good any deficit that would or could possibly be incurred during the guaranty period under honest and efficient management. But we are now confronted with the astounding claim that the deficit for the six months exceeds \$600,000,000. That such a deficit could arise during six months (all spring and summer months) with no strikes, no floods, no fires, no let-up in traffic, is so astonishing as to challenge our credulity. This sum is so stupendous that duty to the public demands a congressional investigation and report by a committee of the House of Representatives before another dollar is paid on the guaranty claims of the carriers.

THE RAILROADS are desperately in need of funds. There are already considerable sums due from the government. Why, then, should it be necessary to wait until the last book is balanced before making payments? The Treasury can surely be well protected by a suitable margin. This remedial legislation is advocated by the Interstate Commerce Commission, which recognizes the necessities of the railroads, and has been willing to make certifications on account of the government guarantee. It is a matter in which common sense ought to prevail.—*N. Y. Commercial.*

Hearing on Divisions for New England Roads

Testimony of Trunk Lines Opposing That Presented by New England Roads Heard by Examiner

WASHINGTON, D. C.

HEARINGS BEFORE Examine. Gerry of the Interstate Commerce Commission on the application of the New England lines for larger divisions of the through rates into and out of New England were adjourned on January 31 after the railroads west of the Hudson river had completed the presentation of their testimony in opposition to that which had been presented by the New England lines during December. Adjournment was taken until February 7, at which time it was expected that rebuttal evidence would be presented on behalf of the New England lines, unless the case was terminated meanwhile as a result of the meeting of railway executives in New York to consider the proposals for affording the New England lines some relief by another method than that of changing the divisions.

After the representatives of the trunk lines had given testimony in support of their contention that the divisions accorded the New England lines are already liberal, representatives of the Central Freight Association lines gave testimony to show that many of the eastern roads west of the Hudson river are in as much need of relief as the New England lines and that they cannot afford to give up any of their revenue for the benefit of the latter.

C. E. Hildum, comptroller of the Lehigh Valley, presented a series of exhibits to controvert the claim of the New England lines that the eastern lines generally had received \$25,000,000 additional revenue from the rate advance by the inclusion of the New England lines in the eastern group. He said the exhibits used in connection with the rate case showed that the eastern roads, excluding New England, needed an increase of 32.71 per cent in their total earnings to produce a 6 per cent return, while the eastern group as a whole including New England needed 33.28 per cent or only .57 per cent more than if the New England lines had been excluded. This difference, he said, represented a difference of only \$13,000,000 instead of the \$25,000,000 which the New England lines claimed based on a percentage of the freight earnings only. On the other hand, he said, the inclusion of the Pennsylvania System increased the amount which the eastern group needed by \$32,000,000 and that the inclusion of the lines of the Pocahontas region in the eastern group brought down their percentage as much as the New England lines increased it. Mr. Hildum also said that in 10 months of 1920 the operating ratio of the eastern lines outside of New England was only a fraction less than that of the New England lines and it was higher than that of the New Haven. The latter's operating ratio was 99.99 while that of the Pennsylvania was 107.12. Mr. Hildum also said that many of the roads in the eastern group did not receive the 40 per cent advance because so large a part of their traffic was interterritorial and under the commission's order took an advance of only 33 1/3 per cent. On beginning the cross-examination, Charles F. Choate, counsel for the New England lines, expressed surprise that Mr. Hildum had not made up an exhibit to show that the New England lines owe the trunk lines money. Mr. Hildum said he could readily do so.

Michigan Lines Meet Same Unfavorable Influences

F. H. Alfred, president of the Pere Marquette, testified that the Michigan lines have been subject to the same unfavorable influences that have adversely affected the New England lines and that it would be unfair to require them to give up part of their revenues. The Michigan lines he

said, have been affected in the same way as the New England lines by the change of car rentals from a mileage to a per diem basis and the increase in the per diem rate, the standardization of wages and the increase in fuel costs resulting from the increased freight rates on the coal hauled from outside. The Michigan lines have always had large per diem balances against them which have increased as the rate has been increased, and the Pere Marquette had voted against the recent increase in the rate from 90 cents to \$1.00 per car per day, while he understood the New England lines had voted for it. The Michigan lines also have to get their coal from outside, and the Pere Marquette now pays about \$1.55 a ton to get its fuel coal to its own gateways.

Formerly, Mr. Alfred said, many of the Michigan lines paid a lower scale of wages on branch lines. Approximately half of the Pere Marquette mileage is branch line. The standardization of wages, therefore, resulted in a great increase in operating expenses. When the roads were taken over the Pere Marquette had agreements as to wages and working conditions with six of the railroad labor organizations, but when this road was returned there were agreements with 16 classes of employees and the same wages had to be paid on the branch lines of light traffic as on the most congested portion of a busy single track line.

"All roads have been made to suffer and their cost of operation has been increased by the standardization of wages and unbearable working conditions," Mr. Alfred said, "and I believe these conditions have as much to do with the troubles of the New England lines as anything. I assume the New England lines are as well operated as railroads anywhere, but all roads are suffering from the onerous conditions thrust upon us."

In connection with the subject of per diem, Mr. Alfred said he had always believed that the car rental should be based on a combination of mileage and per diem that would recognize the use to which the car is put as well as the time. He suggested that instead of the present rate of \$1.00 a day, the rates should be 40 cents a day plus 2 cents a mile. Assuming an average of 30 miles per car per day, this would equal the present rate on the average, but would not penalize the originating or delivering line that necessarily has a slower movement than a purely intermediate road.

W. H. Williams a Witness

W. H. Williams, chairman of the Wabash, occupied the witness stand for an entire day, presenting an elaborate series of exhibits analyzing the situation on the New England lines in support of his contention that their remedy does not lie in a readjustment of the divisions and that their proposal to redistribute the earnings of the eastern lines proposes to take without compensation from other lines in the eastern group that are in as needy a condition as the New England lines. Many of the conditions existing in New England, he said, are closely paralleled elsewhere, and if especially unfavorable conditions exist in New England they relate particularly to the rates and expenses pertaining to local traffic rather than to the interline traffic which, he said, is handled under the same conditions as exist elsewhere. He said the application of the New England lines does not suggest a separate grouping of those lines which would allow them to be accorded separate treatment in accordance with their peculiar needs.

Mr. Williams outlined some of the earlier negotiations be-

tween the trunk lines and the New England lines which were handled by the special committee of executives, of which he is chairman, which had been called into conference on January 24 by Chairman Clark of the Interstate Commerce Commission for the purpose of making another effort to reach a solution. He said that he and President Rea of the Pennsylvania and President Maher of the Norfolk & Western, representing the lines west of the Hudson, had previously conferred with President Pearson of the New Haven, President Hustis of the Boston & Maine and Mr. Choate and had asked them what would be the attitude of the New England lines if they would recommend to the other eastern lines a plan, subject to the approval of the Interstate Commerce Commission, for raising a sum of \$12,000,000 to be paid by the other eastern lines to the New England lines for one year. This proposition was not received favorably by the New England lines, and the representatives of the two groups of roads reported back to the committee that they had been unable to reach an agreement. This proposal, Mr. Williams said, was made with the understanding that it represented no concession of legal right, that the trunk lines considered the divisions of the New England lines not only reasonable and just, but liberal, and the proposal was made with a view to protecting the credit situation and to afford the New England lines a year in which either to readjust their rates or their expenses. On cross-examination Mr. Choate said that the \$12,000,000 had been declined because it would not enable the New England lines to meet their fixed charges. He said the record ought to show that the New England lines had made a counter proposition offering to accept a sum raised by making an assessment of 1.1 per cent of the freight revenues against the eastern lines west of the Hudson, which he said would represent about \$18,000,000 or \$20,000,000 instead of the \$25,000,000 the New England lines need. This proposal was rejected by the trunk lines. Mr. Williams said that one of the great difficulties was that the New England lines and the trunk lines could never agree on the figures in the case.

W. C. Maxwell, vice-president of the Wabash, also gave testimony to show that the C. F. A. lines have no money to spare to the New England roads. He presented one exhibit which showed the percentage of net operating income earned by the C. F. A. lines and the New England lines over a series of years, which showed that during the test period 1915 to 1917 the C. F. A. lines earned only 4.77 per cent, while five New England lines earned 5.6 per cent. During the long period of years during which the New England lines were far more prosperous than the C. F. A. lines, which were in a generally bankrupt condition, he said, no complaint was made by the New England lines that the divisions were unfair. The C. F. A. rates were advanced in 1917, but the companies received no benefit until after September 1, 1920, because their guaranty was based on the earnings for the three years ending June 30, 1917. It would now only intensify the situation to transfer the troubles of the New England lines to the C. F. A. lines. He also presented an exhibit to show that in the four states of Michigan, Ohio, Indiana and Illinois, the C. F. A. lines had been losing at the rate of \$18,000,000 a year, due to their inability to collect on intrastate traffic the increased rates authorized by the Interstate Commerce Commission for interstate traffic. However, he said, the commission had decided the Ohio and Illinois cases since this exhibit was made up. Mr. Maxwell also said that since 1914 the rates from C. F. A. territory to New York had advanced more than they had to New England. This was to show that the New England lines had sacrificed a part of their revenue by extending New York rates to the more distant New England points. For example, he showed that the first class rate from Chicago to New York had advanced 110 per cent, while the

rate to New England had advanced only 101 per cent; also, he said, the Railroad Administration had put in rates much lower than those of the Anderson scale between New England and trunk line territory. If it had put in the scale rates as a minimum it would have been a big help to both New England and the trunk lines.

On January 31 E. J. Pearson, president of the New York, New Haven & Hartford, took the stand to offer rebuttal testimony to statements made by Mr. Williams, which he said reflected on the management of the New England lines. Mr. Pearson said that passenger traffic in New England paid better than freight and that the deficiency in earnings regarding which the New England lines are complaining results largely from the freight traffic. He pointed out improvements made by the New England lines which had not been noted by Mr. Williams in his exhibits.

Letter Ballot Proposed After New York Conference

A joint conference of the New England, trunk line and C. F. A. railroad executives was held in New York on Tuesday. It is understood that the conference discussed a proposal to give to the New England lines the sum of \$15,000,000 to be pro-rated and raised from the C. F. A. and trunk line carriers.

W. H. Williams of the Wabash, chairman of the joint conference, said after the meeting that nothing had been finally decided and refused to hazard a guess as to what the final outcome would be. He said that several of the important roads were not represented at the meeting, and that therefore it was decided to secure a vote by letter on the final proposals.

It is understood that the proposal for the \$15,000,000 pool is not to interfere with the hearings on the matter of divisions now going on at Washington.

The recommendation of the committee of executives, which was discussed at a meeting in New York on Tuesday, was that a fund of \$15,600,000 be raised by an assessment of a percentage of the earnings of the eastern roads west of the Hudson, to be distributed among the New England roads, for the period from January 1, 1921, to February 28, 1922. On that date the two-year period for which the transportation act fixed the percentage of fair return at 5½ or 6 per cent will expire. The percentage after that time is to be fixed by the Interstate Commerce Commission and the proposed pool is intended to afford the New England lines some temporary relief with a view to a readjustment at that time.



Photo by Keystone View Co.

A Harlem River Dock, New York, with a Crane Which Unloads a Lighter and Loads a Car or Truck in One Operation

The Functions of a Railway Employment Service

Hiring and Following Up of New Employees of Vital Importance and Should Receive Expert Attention

By J. C. Clark

Assistant to General Manager, Oregon Short Line Railroad Company

THE HIRING AND FIRING of employees has been considered by a great many railroad officers as a small and insignificant part of the day's work. While the head of the department very frequently permits or instructs some subordinate to attend to the hiring, he takes care of the firing himself. As a matter of fact, hiring and firing employees are two very essential and very important duties of any supervising officer. In most cases, the hiring is done by each department, and is not handled systematically. Comparatively few railroad officers appreciate the extent to which the selection and placing of employees can be systemized. Furthermore, most railroad officers who have the responsibility of employing men are unable to develop their labor supply properly. As a consequence the ranks are filled up by men who have been rejected from other industries instead of by men who have been selected because they are the best there is.

The Employment Service

In an article in the *Railway Age* of June 18, 1920, I dealt briefly with the subject of employment. It is likewise impossible to discuss this subject fully in the present article, but I shall endeavor to bring out some of the main features. As stated in the previous article, in order to function properly the employment service must be familiar with the requirements of the organization it is to serve, both as to quantity and quality of labor.

Considering first the quantity of labor required. A system of labor turnover reports such as outlined in a former article (*Railway Age* of December 31, 1920), would be of great help after it had been well established, because it would reflect more or less accurately the changes in personnel, due to seasonal work. By comparing the labor turnover figures with the locomotive mileage, it would also be possible roughly to determine the requirements due to increased traffic. When it comes to supplying the daily needs of each department, the employment service can be made most effective. The superintendent of employment should have on his desk every morning a wire report from every department and division, showing not only the labor shortage, but any surplus that may exist. With this information, he can distribute the available supply of labor to the points where it is most needed, and also transfer certain classes of labor from one department or division to another, either temporarily or permanently.

This work of distribution can only be accomplished through a central office, where the superintendent in charge, by consultation with the general manager, can get a broad survey of the requirements of each department or division and make the necessary distribution impartially. Under our present system, it is often the case that the department or division that needs labor most has the smallest supply, while some other department or division has plenty. This may be due to a large number of causes such as different rates of pay, different working conditions, better organization and better treatment in one department than in another, or the difference in geographical location or climate, but a considerable part of this trouble is due to the failure of various employing officers to co-operate by exchanging men as conditions require. This is not surprising, since the management has provided no

systematic method of exchanging information. However, better results can be obtained through a "clearing house for labor" than by a mere exchange of information between employing officers.

Supplying Unskilled Labor

In addition to having a system of reports that will keep the superintendent of employment advised as to the quantity of labor required from day to day and from month to month, it is absolutely necessary to know the quality of labor required. We will consider first unskilled labor. In discussing this question, there are several features to be considered. The first is nationality. The superintendent of employment should have on file a record of the nationality of every gang on the road, so that if a division engineer shows on his daily report a shortage of labor in Gang No. 1, for example, the superintendent of employment will know at once the kind of men to send out to that particular gang.

The employment service must also know the kind of work each gang is doing and when the work of any particular gang is changed it should be advised fully of the change. Most common laborers have a preference for a particular kind of work, and it is always advisable to give such preferences consideration in sending out labor. Another important thing is the steadiness of the employment. Some laborers would be willing to go out for only a short time, while other laborers would not care to go unless the work was steady. In so far as it is possible to do so, the employment service should consider the preferences and desires of the men it employs, and in this way it can build up a reputation for consideration and fair-dealing that will make it much easier to secure labor.

Another big thing to be considered is the opportunities for promotion. While there is a large body of common labor that does not give much consideration to this feature, there is a considerable amount of labor in some sections of the country that would prefer to go to work on a job where there is some chance for advancement.

Employing Skilled Labor

The next question to be considered is that of supplying skilled labor. Before discussing the methods to be used, it is well to discuss briefly the question of supplying men for training schools. Nearly all railroads have a fairly well organized system of apprentice schools in the mechanical department. Some roads conduct training schools for operators, brakemen, firemen, and other classes of employees. It is of the utmost importance that the proper selections be made for these training schools. At the present time, certain educational standards are required, and the applicant is also required to give references. It is doubtful whether or not such references have any real value. A better method is to develop a system of rating each man who enters the service, and determine by observation whether or not he is a desirable employee.

Under the present system of employing skilled labor each foreman or superintendent employs his own men and is familiar with the requirements of each job. It is manifestly impossible for an employment officer to be familiar personally with each job on the railroad. It would therefore be neces-

sary to analyze each job or class of jobs and draw up a specification for each, giving each specification a number or symbol. I will treat this subject of job analysis and specification in a future article.

The discussion so far has covered only the basis or ground work for an employment service and it is apparent that a great deal of preliminary work will be necessary. When it comes to analyzing jobs, as referred to in the previous paragraph, I imagine various foremen and superintendents will discover a good many methods of doing work that they did not know existed and it may be necessary to change present practices in a good many respects. When the officer charged with installing the employment service has completed the ground work referred to, he will no doubt have been able to select men to be used as employment officers.

Functions of the Employment Service

To go back now to the functions of an employment service. These might be stated as follows: first, finding the labor supply; second, selecting from the available supply the right man for the right job; third, introducing each new employee to his foreman, his fellow employees, and to his work; and fourth, following up each new employee to see that he is engaged in the work for which he is best suited, with a view to making desirable changes and transfers, and also as a check on the selection made by the employment office.

Advertising at once suggests itself as a means of getting in touch with labor and it will produce good results if properly directed. As a rule, employers do not resort to advertising until the labor shortage becomes acute. Advertising, however, should be carried on with a view of getting in touch with the most desirable class of labor and inducing this class to enter railroad service. To accomplish this, the advertisement should state in effect that the railroad employs a large amount of labor and give a list of all the most important classified jobs. It should state the opportunities for advancement and should appeal to those interested to write direct to the superintendent of employment or apply to the nearest agent for an application blank.

Every agent or office of the railroad should be supplied with these application blanks. The blank should contain a fairly complete list of the most important jobs and the applicant should be required to check off at least three of the jobs which he would prefer. There should also be space on this blank for the applicant to state his age, nationality, previous experience and give references. This application blank should be mailed direct to the superintendent of employment, either by the applicant himself or by the agent.

When an application of this kind is received, it should be acknowledged at once and if no position is open in the class as checked off by the applicant, he should be so advised. If there are other jobs open that would seem to be suited to him, the applicant should be advised of that fact. If no job at all is open, the applicant should be requested to communicate further at a stated time, one month, two months or three months, in the future. If the applicant does communicate further at the time stated, it is an indication that he is desirous of getting into the railroad service and if there is still no position open, he should be placed on the preferred list and also be put on the mailing list for any railroad magazines or any other literature sent out by the railroad that would maintain his interest in railroad work. By consistently following up a system of this kind, a very much better class of labor can be secured.

There is another part of this work that should not be overlooked. Representatives of the employment service should visit high schools, academies, and colleges along the line and give talks to interest students in railroad work. These talks should be given with the idea of explaining various features of railroad organization and operation and in such a way as to interest not only the students, but the general

public. Such talks will create a better understanding between the public and the railroads and also draw a considerable amount of very desirable material into railroad service.

Selecting the Best Men

The next feature of the employment service is the selection of the best men from the available supply and placing each applicant where he is most likely to succeed or "make good." The process of selection in the first place is one of elimination. The first step is to have each applicant interviewed by a representative of the employment service at the point most convenient for the applicant. After the interview, the employment representative should investigate the references given by the applicant. This will eliminate the obviously undesirable without the necessity of the applicant appearing in person at the nearest employment office. It goes without saying that the employment representative should be a man of wide railroad experience and he should not summarily reject any applicant without some very good reasons and these reasons should be stated in his report to his chief.

The next step is the physical examination. In the interest of public safety all applicants having contagious or venereal diseases must be eliminated at once. However, such physical examinations are well understood and no comment is necessary here.

If the applicant is recommended by the travelling representative of the employment service, and is physically fit, he should be sent to the nearest employment office, where he should be given an interview by men trained for that purpose. Instead of being given an application blank and told to go and fill it out and bring it back again, he is taken into a private room and seated comfortably with the interviewer. The interviewer asks the questions and fills out the application blank. During the conversation, which is carried on in a very friendly manner, the interviewer draws out as much of the family history and experience of the applicant as possible. He also takes pains to explain the policies of the company with regard to promotions, pensions, insurance, or anything else that directly affects the welfare or contentment of the employee. He also explains the necessity for safety, and service to the public.

At the end of the interview, the interviewer should make a brief but lucid statement of his estimate of the applicant's qualifications and abilities. It may be difficult to secure competent interviewers in the beginning, but, by systematic effort, a sufficient number of interviewers can be developed and of course the employment office should always contain men who are in the process of training for this very important work.

Psychologists, phrenologists, and other types of character analysts have devised a large number of tests for which they make various claims. There is no doubt that some of these may be a distinct aid in selecting employees, but they will have to be developed very slowly and it will be impossible to make practical application of these tests at the present time. I would favor, however, the placing of expert psychologists on the staff of the employment superintendent for the purpose of assisting in the training of interviewers, who must be practical men, and in suggesting methods of selection. After all, the chief object to be attained is to place the applicant where he will do the best work and where he will be happy in his employment. The best guide in doing this is the applicant's preferences. It is impossible to build up a perfect organization if any considerable number of the individual employees are discontented. A great many applicants may not know what kind of work they want; others may think they know, but because of lack of experience find that they did not know their own preferences. For this reason, it is necessary to follow the man up after he has entered the service, and see that he is placed where he can do the best work and where he is contented.

Following Up New Employees

First impressions are too important to be left to hit-or-miss methods. When the new employee is ready to go to work, he should be introduced to his immediate superior officer by a representative of the employment service. He also should be introduced to some of his fellow workmen if possible. He should be told what equipment he will need and where he can get it, the practice with regard to pay days, and any other items of information that will help him in the first few days of his employment.

The following up of employees by the employment service after they have actually entered the service is very important, and should be handled systematically. There should be enough representatives of the employment service so that every new employee can be interviewed by one of them within a week. A second interview should take place within three weeks of the date of entering the service. These interviews should develop any misunderstanding the employee may have and will impress upon him the fact that the company is vitally interested in his success and welfare. These interviews should also develop whether or not the employee is satisfied with his work and whether the foreman or supervising officer is satisfied with the new employee. If dissatisfaction does exist, the employment service should take the necessary steps to investigate further and make transfers, or take any other steps to promote harmony and satisfaction.

It will be seen from the foregoing, that the hiring of employees is a specialized subject requiring special study. It is necessary to study the characteristics of each job to be filled and from this information determine what qualifications a satisfactory workman should have for each job. It is also necessary to study methods of getting in touch with desirable men, and devise methods of selecting applicants. At present, employing officers lack the time necessary to make these studies. Interviewing applicants alone requires more time than the employing officers are able or willing to give.

have been chosen because of their knowledge of the work to be done, rather than upon their ability to judge men. Experience in sizing up men and interviewing is an important factor in securing good results, and interviewing is an art requiring both natural ability and careful cultivation. It is practically impossible for the employing officer under present conditions to acquire the experience and get the results that a trained interviewer could.

When it comes to promotions, vacancies can often best be filled by men already employed in some other department. Heads of departments at present are not in a position to know the abilities and qualifications of men in other departments, but a centralized employment service could and should keep a list of likely men in all departments, with a view to filling any vacancy that may occur. Under present conditions department heads might object to releasing a good man to some other department, even though it is a promotion for the man involved. An employment service that had watched the matter closely and kept the proper records, would take into consideration the advantage to the organization as a whole, and the transfer could be effected without friction.

All things taken into consideration, an employment department, organized with the view of giving real service to all departments, is a great aid to the departments and to the organization as a whole.

Freight Car Loading

WASHINGTON, D. C.

THE NUMBER OF CARS loaded with revenue freight during the week ending January 22 showed a slight further decline, to 703,115, as compared with 804,866 in the corresponding week of 1920, 734,293 for 1919 and 668,941 for 1918. The weekly report compiled by the Car Service Division of the American Railroad Association is summarized as follows:

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

Summary—All Districts. Comparison of Totals, This Year, Last Year, Two Years Ago, for Week Ended Saturday, January 22, 1921.

Districts:	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Mdse. L. C. L.	Miscellaneous	Total revenue freight loaded			Received from connections		
										This year	Corresponding year	Corresponding year	This year	Corresponding year	Corresponding year
										1921	1920	1919	1921	1920	1919
Eastern	1921	6,263	3,847	49,111	1,281	7,316	874	41,583	51,114	154,389	190,375	175,441	185,784	205,158	208,576
	1920	5,441	3,964	49,112	3,825	7,453	1,342	33,087	86,151	134,262	148,995	145,995	99,180	101,880	101,880
	1919	2,537	4,146	49,857	7,271	3,836	2,559	32,467	43,138	145,995	145,995	145,995	145,995	145,995	145,995
	1920	2,743	3,657	49,112	3,719	3,875	1,647	37,396	60,019	162,168	164,342	164,342	116,082	142,544	142,544
Poconchos	1921	183	118	19,069	185	1,222	100	2,744	4,129	2,752	2,752	2,752	12,854	12,854	12,854
	1920	135	135	19,071	638	1,859	287	141	8,780	31,046	29,732	29,732	17,821	18,181	18,181
	1919	4,277	2,195	24,572	579	13,828	1,243	34,784	29,304	110,839	110,839	110,839	60,152	60,152	60,152
Southern	1920	4,093	2,861	26,559	405	17,906	2,629	23,814	10,247	129,514	106,839	106,839	78,249	63,707	63,707
	1921	14,157	10,268	6,555	1,488	14,195	1,153	23,223	26,548	97,587	97,587	97,587	44,694	44,694	44,694
	1920	10,350	9,722	12,871	1,191	15,867	1,786	18,764	37,708	108,257	104,556	104,556	52,973	69,238	69,238
	1919	14,262	12,403	21,322	232	2,962	1,615	86,896	29,156	108,808	108,808	108,808	45,414	45,414	45,414
Northwestern	1920	10,400	13,338	24,626	428	5,434	2,570	21,324	46,728	123,848	100,506	100,506	67,117	61,763	61,763
	1921	4,894	2,078	4,957	100	6,220	440	14,890	24,159	57,745	57,745	57,745	43,562	43,562	43,562
	1920	4,049	2,720	7,716	161	6,326	339	12,940	25,213	60,658	58,127	58,127	51,600	44,742	44,742
	1919	46,695	35,255	168,453	11,177	49,159	7,991	176,581	207,804	703,118	703,118	703,118	491,640	589,000	589,000
Central Western	1920	37,211	36,387	189,066	10,367	56,720	10,795	148,466	313,844	804,866	804,866	804,866	589,000	589,000	589,000
	1919	39,038	38,045	176,216	.....	52,348	15,470	.....	412,181	.....	734,293	734,293	589,000	608,751	608,751
	1920	9,464	.....	.....	610	.....	.....	28,118	.....	.....	.....	.....	97,360	97,360	97,360
	1919	.....	1,142	20,613	.....	9,361	2,808	.....	106,940	107,751	107,751	107,751	.....	.....	.....
	1920	7,657	.....	.....	.....	.....	.....	176,681	.....	.....	.....	.....	.....	.....	.....
	1919	.....	2,788	7,763	.....	3,186	7,479	.....	205,377	31,178	31,178	31,178	117,111	117,111	117,111

L. C. L. merchandise loading figures for 1921 and 1920 are not comparable, as some roads are not able to separate their L. C. L. freight and miscellaneous of 1920. Add merchandise and miscellaneous columns to get a fair comparison.

January 15, 1921	36,191	36,191	183,228	10,483	45,241	9,590	173,500	207,860	799,888	804,524	750,609	509,708	627,293	609,260
January 8, 1921	31,691	31,691	190,284	11,479	42,982	10,712	169,093	210,674	706,413	830,673	723,801	492,817	596,859	543,265
January 1, 1921	30,098	30,098	170,224	10,550	32,635	8,340	144,657	178,451	598,905	745,446	612,741	453,537	591,437	528,936
December 25, 1920	29,147	29,147	177,308	10,956	39,314	9,497	158,918	194,321	639,275	684,784	549,975	514,363	588,644	562,602

As explained before, all promising applicants should be carefully interviewed whether vacancies exist or not, in order to build up a waiting list of desirable applicants. In most cases, under present practice, applicants are not interviewed unless a vacancy exists.

Sizing up men is to a large extent a matter of subconscious impression. Some men are good judges of character, while others are not, and I believe that most railroad officers today

The freight car surplus for the week ending January 23 was 301,997 as compared with 288,115 the previous week and 258,678 during the week ending January 7. For the same week there were scattering shortages amounting to 1,328.

The percentage of freight cars on home roads on January 15 had reached 52.2, or within three-fifths of 1 per cent of the percentage for May 1, 1917.

Operating Statistics for November

The Interstate Commerce Commission has issued a summary of operating statistics for the month of No-

vember, 1920, of roads having annual operating revenues in excess of \$25,000,000, of which the principal items are as follows (including mixed and special train service):

Region and name of road	Freight-service train-miles (thousands)		Net ton-miles (millions)		Net ton-miles per loaded freight-car-mile		Car-miles per car-day		Net ton-miles per car-day	
	1920	1919	1920	1919	1920	1919	1920	1919	1920	1919
New England Region:										
Boston & Albany.....	November 288	281	116	124	24.4	21.3	32.2	29.2	514	461
	11 months 3,323	2,935	1,477	1,308	24.8	22.1	27.6	31.7	476	498
Boston & Maine.....	November 634	672	315	321	25.9	23.0	19.0	17.5	334	304
	11 months 7,562	6,625	3,620	3,161	24.6	23.3	16.6	17.6	294	299
New York, New Haven & Hartford.....	November 513	552	258	298	24.5	21.8	13.0	14.1	217	241
	11 months 5,611	5,611	2,827	3,057	23.8	23.2	10.4	14.2	184	248
Great Lakes Region:										
Delaware & Hudson.....	November 401	378	353	310	36.3	34.1	31.6	26.5	708	613
	11 months 4,631	4,090	4,111	3,386	35.4	35.5	27.9	26.6	662	615
Delaware, Lackawanna & Western.....	November 581	477	481	411	29.0	26.7	34.6	30.5	666	577
	11 months 5,748	5,084	4,902	4,614	28.8	29.3	29.2	27.9	589	578
Erie (including Chicago & Erie).....	November 1,179	1,039	923	800	30.0	27.7	35.6	35.6	638	633
	11 months 11,914	10,636	10,925	9,749	29.3	28.4	26.0	24.8	529	605
Lehigh Valley.....	November 621	576	547	537	32.8	30.2	28.0	24.5	588	519
	11 months 6,655	5,948	5,949	5,439	31.7	30.5	21.6	23.0	476	492
Michigan Central.....	November 497	569	347	442	23.9	21.9	27.8	20.6	431	350
	11 months 5,764	5,733	4,533	4,224	24.4	21.0	20.4	25.0	368	381
New York Central.....	November 2,176	1,826	2,098	1,698	29.7	23.8	26.4	22.4	491	406
	11 months 22,885	20,666	22,580	19,759	28.3	26.0	22.8	24.2	430	424
Pere Marquette.....	November 348	367	205	224	25.9	24.2	19.6	16.0	349	289
	11 months 3,785	3,753	2,483	2,355	26.4	24.3	16.0	17.9	324	325
Pittsburgh & Lake Erie.....	November 158	127	257	175	42.7	41.6	10.6	9.3	313	273
	11 months 1,418	1,407	2,191	2,022	42.3	41.2	8.6	9.2	250	250
Wabash.....	November 649	557	431	372	26.3	22.6	29.3	26.6	573	491
	11 months 6,432	5,774	4,523	3,790	23.2	23.5	26.9	26.6	528	469
Ohio-Indiana-Allegheny Region:										
Baltimore & Ohio.....	November 2,049	1,777	1,793	1,511	36.1	30.6	23.9	32.4	532	467
	11 months 21,877	18,362	19,978	16,398	34.8	33.1	24.6	23.1	572	500
Central of New Jersey.....	November 334	316	236	206	35.2	32.8	14.7	14.2	316	291
	11 months 3,528	3,343	2,439	2,247	34.1	33.1	13.9	12.6	300	278
Cleveland, Cincinnati, Chicago & St. Louis.....	November 726	696	613	522	27.2	21.6	27.8	26.5	608	545
	11 months 7,823	6,976	6,367	5,880	28.8	27.9	28.4	27.8	547	529
Pennsylvania System.....	November 5,017	4,582	4,536	3,712	36.5	30.5	22.2	19.1	518	417
	11 months 53,875	51,865	47,613	45,434	34.6	35.7	19.9	19.7	462	454
Philadelphia & Reading.....	November 715	592	638	393	30.3	27.0	22.5	16.7	537	423
	11 months 7,097	6,400	6,642	5,970	38.2	37.6	19.7	19.0	507	474
Poconontas Region:										
Chesapeake & Ohio.....	November 839	710	996	800	42.5	38.1	29.8	26.8	750	620
	11 months 9,454	8,039	11,461	9,451	41.3	40.3	35.6	26.0	895	624
Norfolk & Western.....	November 899	827	987	889	43.8	40.4	31.6	29.8	828	731
	11 months 9,040	8,203	10,764	9,757	41.9	39.6	34.7	29.1	924	715
Southern Region:										
Atlantic Coast Line.....	November 666	669	3,330	3,327	21.6	21.3	23.1	20.9	341	307
	11 months 7,559	7,214	3,530	3,327	21.6	21.3	23.1	20.9	341	307
Illinois Central.....	November 2,011	1,411	1,460	936	32.3	24.5	41.8	28.9	809	525
	11 months 21,459	16,283	16,048	12,155	29.5	26.7	41.2	32.5	815	603
(Including Yazoo & Mississippi Valley)	November 1,530	1,462	798	733	31.7	27.6	29.1	25.4	567	496
	11 months 17,275	15,874	9,191	8,330	30.3	29.0	30.9	25.5	621	500
Seaboard Air Line.....	November 416	396	217	223	23.7	22.4	23.7	21.5	404	359
	11 months 5,039	4,271	2,529	2,157	23.1	22.0	22.2	20.3	371	321
Southern.....	November 1,434	1,296	694	701	21.1	24.8	22.4	39.7	366	361
	11 months 16,333	12,506	8,677	6,670	23.7	22.0	23.8	20.7	409	341
Northwestern Region:										
Chicago & North Western.....	November 1,769	1,546	948	634	27.9	18.4	22.8	19.4	397	251
	11 months 19,166	16,540	10,734	9,136	26.0	24.0	21.8	20.2	381	327
Chicago, Milwaukee & St. Paul.....	November 1,726	1,715	1,011	999	26.4	23.3	30.4	24.7	489	405
	11 months 19,105	18,564	12,187	11,808	23.4	24.6	26.4	26.8	465	462
Chicago, St. Paul, Minneapolis & Omaha.....	November 352	392	150	185	24.3	25.1	24.6	23.3	389	382
	11 months 3,838	3,526	1,733	1,619	23.9	23.7	22.5	21.1	400	345
Great Northern.....	November 1,182	1,238	835	791	29.3	27.5	28.6	25.8	555	469
	11 months 11,400	10,750	6,989	8,478	28.8	28.6	27.8	23.5	548	599
Minneapolis, St. Paul & Sault Ste. Marie.....	November 642	678	321	318	24.2	20.9	27.5	30.4	417	446
	11 months 6,345	6,041	3,404	3,116	23.6	22.4	27.1	24.7	474	476
Northern Pacific.....	November 1,072	1,109	716	742	27.6	25.9	35.0	33.2	567	570
	11 months 10,911	10,393	8,296	7,806	27.3	27.0	27.9	27.1	621	625
Oregon-Washington R. R. & Navigation Co.....	November 242	236	148	147	27.8	24.1	27.6	30.2	514	542
	11 months 2,748	2,383	1,912	1,608	28.2	26.1	30.0	27.0	647	532
Central Western Region:										
Atchison, Topeka & Santa Fe.....	November 1,877	2,018	1,025	1,174	22.9	21.5	37.8	35.4	530	531
	11 months 20,004	18,668	11,858	10,884	22.7	21.9	33.6	29.2	520	448
Chicago & Alton.....	November 339	295	300	294	23.9	23.9	23.1	24.0	431	457
	11 months 3,813	3,468	2,175	1,937	27.1	25.9	23.3	22.6	421	378
Chicago, Rock Island & Pacific.....	November 1,391	1,379	698	682	25.5	23.5	29.8	20.9	513	366
	11 months 15,887	14,210	8,142	7,114	24.5	23.5	26.8	24.2	472	411
Chicago, Burlington & Quincy.....	November 1,922	1,654	1,384	1,089	30.0	24.6	33.5	29.3	458	438
	11 months 19,625	17,266	15,148	13,010	28.6	26.7	31.9	27.4	616	498
Denver & Rio Grande.....	November 352	350	201	203	28.0	26.3	21.0	21.1	382	378
	11 months 3,357	3,047	2,042	1,773	29.3	28.5	20.2	15.5	405	297
Oregon Short Line.....	November 425	438	273	303	24.8	20.3	43.7	43.5	725	705
	11 months 4,686	4,441	3,243	2,700	24.4	27.1	45.7	41.1	832	694
Southern Pacific.....	November 1,295	1,277	815	911	26.1	25.6	36.6	36.1	620	672
	11 months 14,019	12,439	9,494	8,754	25.3	25.5	35.4	33.5	635	593
Union Pacific.....	November 1,466	1,366	871	848	26.4	24.4	65.1	61.0	1,070	1,061
	11 months 14,004	12,532	9,230	8,278	24.5	23.5	71.0	58.9	1,263	979
Southwestern Region:										
Missouri, Kansas & Texas.....	November 335	327	182	198	25.6	24.4	27.8	27.9	404	470
	11 months 3,608	3,408	2,083	1,871	24.0	23.4	28.4	24.9	417	360
Missouri, Kansas & Texas of Texas.....	November 292	263	136	199	25.7	23.0	20.1	13.1	319	214
	11 months 2,988	2,908	1,312	1,133	24.7	23.5	17.8	13.2	287	198
Missouri Pacific.....	November 1,178	1,091	748	653	28.2	24.7	22.9	20.3	462	433
	11 months 12,928	11,474	8,360	6,905	27.0	25.2	22.9	19.9	458	402
St. Louis-San Francisco.....	November 514	886	401	399	26.9	25.3	21.2	20.4	376	334
	11 months 10,417	9,153	4,563	4,114	25.9	25.0	21.1	19.1	372	327
Texas & Pacific.....	November 340	339	170	149	22.9	22.9	22.8	21.1	363	350
	11 months 5,722	3,811	1,810	1,669	23.4	22.9	21.9	19.0	336	304

rail to destruction, the deflection was measured by each blow, the elongation for each inch over 6 in. and the total elongation was noted. The drop-test piece was taken from near the top of the ingot and in each case was the first five-foot length of rail immediately after reaching physically sound steel, i. e., free from pipe, and in the case of the rails from sink-head ingots also below the bottom of the sink-head. Of the 14 comparison rails none broke under four or five blows (six rails were nicked and broken after the fourth or fifth blow) while for the 35 Hadfield rails the range was two to seven blows, there being nine of four blows and four of three blows; only 22 or 63 per cent of the rails from sink-head ingots withstood four or more blows. The ductility as measured by the deflection and elongation is also somewhat greater and more uniform for the comparison rails.

The greater ductility and more uniform behavior under the drop test of the steel from the comparison ingots would appear to be due more to the chemical composition and especially to the nickel and chromium content of the Mayari steel than to any factor traceable to manufacture.

The Pennsylvania system through Mr. Gibbs submitted a report on the rails from this and earlier investigations from which the conclusion was reached that—"There is evidently no economy in the Hadfield process as regards wear, and it would require a much more extended trial to determine the relative freedom from failure."

It would appear, however, to be unfair to draw any general conclusions as to performance in service from so few rails as this investigation furnished, although it would not be expected that the Hadfield type of sink-head ingots would furnish any rails showing structural defects. While it is not claimed that the use of the sink-head process for the manufacture of ingots will solve all rail problems, it is maintained that its adoption would be a step in the direction of the elimination of rail failures.

I. C. C. Orders Increase in Illinois Freight Rates

WASHINGTON, D. C.

THE FIRST DECISION rendered by the Interstate Commerce Commission ordering advances in intrastate freight rates to correspond with those which it had authorized for interstate traffic in Ex Parte 74 was handed down by the Interstate Commerce Commission on January 28 in the Illinois case. It had previously ordered increases in state passenger fares in Illinois and several other states, but that part of the Illinois case relating to freight rates was reserved for separate decision. For interstate traffic in Illinois the Interstate Commerce Commission had applied the 35 per cent advance allowed to the western roads in some instances and the 40 per cent advance to the eastern district in others. The Illinois Public Utilities Commission had prescribed for intrastate traffic a scale of rates which it stated would result in increases not exceeding 35 per cent, but which the carriers asserted would yield less than 33½ per cent. The commission finds, however, that the state rates are unduly preferential of intrastate traffic and prejudicial to interstate traffic and increases corresponding to the interstate increases were ordered to be made effective on or before March 7 upon not less than five days' notice. The report by Commissioner McChord, after a general discussion of the conditions, said in part:

All the Illinois carriers involved are engaged in the handling of both state and interstate traffic. Generally the same train and often the same car that carries the intrastate traffic carries the interstate traffic.

When individual manufacturers, jobbers, and dealers in these cities outside the state draw their coal, for instance, from Illinois

mines they must pay relatively greater increases than their competitors just across the border in Illinois, and in shipping their goods into Illinois they must pay relatively more than the Illinois distributors. Thus, a double rate disadvantage is put upon the interstate shipper and his locality. As every business man knows, a competitor must often, if not generally, absorb the difference in freight rates against him or withdraw from the field. That such differences are prejudicial is a matter of common knowledge.

One of the most important instances of discrimination is found in the Chicago industrial district, which includes not only territory in Illinois in and about the city of Chicago, but reaches across the state line into Indiana, embracing such points as Gary, Indiana Harbor, and Hammond, with their great steel mills and other industries. These industries, when they located in these outlying districts, did so with the distinct understanding that they would forever be treated, from a rate standpoint, like all other points in the Chicago district, as though they were located within the city of Chicago. That is, Chicago rates were to apply to and from the entire industrial district. This arrangement had been adhered to in good faith for many years, but on August 26, 1920, the date on which the increases were made effective on both state and interstate traffic, the long-standing parity was destroyed, so far as traffic to and from points in Illinois was concerned, by the carriers increasing the rates between the Indiana points in the Chicago district and all stations in Illinois 40 per cent, under our finding, and between the Illinois points in that district and all stations in Illinois a lower percentage, under the Illinois commission's finding. That this treatment of the Indiana cities puts a cloud on their prospects and injures the ability of their industries to do business in Illinois against competitors favored by lower rates intrastate can not be denied.

St. Louis, Mo., and East St. Louis, Ill., are practically one community, yet the former's rates to and from points in Illinois have been increased 40 per cent and the latter's materially less. The effect, of course, is similar to that in the Chicago district. For instance, prior to August 26 the rates on coal from the Illinois mines to St. Louis were but 20 cents per ton higher than to East St. Louis, but since that date they have been 34 cents higher, not because of any change in conditions of transportation, but because the Illinois commission's judgment as to what was a reasonable increase happened to be different from ours.

Situations such as above described can be found at various points around the borders of the state.

Disparities between Illinois intrastate rates to and from Chicago and interstate rates between Illinois points and St. Louis were the subject of litigation in *Business Men's League of St. Louis v. A. T. & S. F. Ry. Co.*, 44 I. C. C., 308, wherein we found that the then existing adjustment was unduly prejudicial to St. Louis. The present rates present a similar situation.

In *Illinois Classification*, supra, it appeared that Indiana jobbers were shipping into Illinois in competition with Illinois shippers, but were confronted with relatively higher rates than were paid by their Illinois competitors to points in the same state. Except as to commodity rates in general, the situation was remedied as explained earlier in this report, but a similar difficulty has now been created.

Certain routes from Illinois coal mines to Illinois destinations are interstate while others are intrastate. Prior to August 26 the rates in most instances were the same via the different routes, but since that date the interstate rates from a given mine or group of mines are higher than the intrastate rates. The result is that interstate traffic has been practically destroyed by the coal being diverted to the intrastate routes. In other words, the intrastate business increases while the interstate traffic decreases. By the same token the intrastate rates jeopardize the interstate rates in that the interstate carriers must make the intrastate rates the measure of their interstate rates in order to secure part of the business.

The various rate situations hereinbefore described are cited as examples. Others of the same general character are shown by the record, and many others could be found. The contention is made by the Illinois interests that we should limit any finding of undue prejudice to the localities specifically shown to be affected. To our views upon the law of the case as expressed in our previous report herein and in *Rates, Fares and Charges of N. Y. C. R. R. Co.*, 59 I. C. C., 290, we may add that the instances pointed out are merely typical of a condition that is general. The rates to and from the various points on any given commodity, both state and interstate, local and joint, are closely related and interrelated, and the creation of material differences between them is subversive of established and sound economic and commercial conditions, resulting in a situation which could not reasonably be approved.

The Illinois commission points out that there are some instances where individual intrastate rates in that state, even with the lesser increases allowed by it, happen to be as high as or

higher than those applicable interstate for equal distances; but it is not claimed that this is true of the general body of rates. The application of lower rates intrastate in Illinois than for similar hauls interstate in the Illinois district and central territory is general, and even with increases in the amounts allowed by us in *Increased Rates, 1920*, and *Authority to Increase Rates, supra*, the intrastate rates on most of the important articles of traffic in Illinois would still be lower than the interstate rates in central territory. The differences are due in large part to the failure of the Illinois commission to grant the same increases in recent years as have been authorized by us.

Evidence was offered by the Illinois commission as to traffic density, showing that the western and southern lines have a density in Illinois much greater than the average on their entire systems and greater than the eastern lines have in Illinois. The figures for Illinois do not represent merely intrastate traffic, but all traffic that moves within, into, out of, or through the state. The traffic density on the eastern lines in Illinois is, in general, much less than on their entire systems, and the figures do not indicate to us that Illinois should have a lower basis of rates than obtains in the territory east thereof.

The Illinois commission also points out situations arising from the 40 per cent increase in the Illinois district as compared with the 35 per cent increase between Illinois and points in western territory and the 33½ per cent increase between Illinois and southern territory, pursuant to *Increased Rates, 1920*. The rate from Chicago to Davenport, involving a haul entirely within the Illinois district, takes an increase of 40 per cent, whereas, from Chicago to points in Iowa, just west of Davenport, and in competition with it, the increase has been but 35 per cent, thus lessening the rate difference that formerly existed in favor of Davenport. Rates on coal from Kentucky fields to Illinois points, involving hauls from the southern territory into the eastern territory, were increased 33½ per cent, as against the increase of 40 per cent sought within Illinois. These situations are considered by that commission as justifying an intermediate percentage increase intrastate in Illinois as a border state. Situations of the kind cited are, of course, general and can be found at all points along the northern, western and southern borders of the Illinois district and, in fact, at any place in the country where any two of the rate groups fixed in *Increased Rates, 1920, supra*, adjoin. The difficulty could have been avoided only by a horizontal increase for the entire country. This was recognized in our report.

Some readjustments may be appropriate in individual instances where substantial injury results. An approval of the Illinois commission's rates would mean the approval of lower rates in Illinois, and, indirectly, lower rates perhaps west of the Mississippi River, than in official classification territory. Such inequalities as call for readjustment may be brought to our attention in the appropriate way and dealt with as occasion requires.

After the Illinois commission's first order was issued the Public Service Commission of Indiana rendered its report on an application for increases to the extent authorized by us. The Indiana commission declined to grant such increases and expressly indicated in its report that it was controlled by the action of the Illinois commission and by the existence of lower intrastate rates in Illinois than in Indiana. In other words, the Indiana commission felt that in justice to the citizens of Indiana it could not permit higher rates within that state than applied within the state of Illinois. It requires no stretch of the imagination to realize what would be the situation if every state in the Union would take similar action, savoring of reprisal and retaliation, thus requiring the imposition upon interstate traffic of unreasonably disproportionate increases in order to insure the prescribed return. It was just such a situation that Congress sought to prevent when it enacted the statutory provisions with which we are here concerned.

Upon this record we find no conditions within Illinois so different from those affecting interstate traffic as to justify the present differences in rates. Illinois intrastate traffic is not contributing its just proportion of the revenues of the carriers, measured by the statutory rate of return "upon the aggregate value of the railway property of such carriers held for and used in the service of transportation." The record establishes that the present intrastate charges for freight services and for the transportation of milk and cream by the steam railroads subject to our jurisdiction and by the Chicago, Lake Shore & South Bend and the receiver of the Aurora, Elgin & Chicago on the third-rail division of that line, in Illinois, lower than the just and reasonable corresponding interstate rates and charges authorized in and established in the eastern group, including the Illinois district, pursuant to Ex Parte 74, afford intrastate traffic and shippers and localities within the state undue preference and subject interstate traffic and shippers and localities outside the state to undue prejudice, and unduly, unjustly and unreasonably discriminate against interstate commerce.

We are of opinion and find that to remove the unlawful prefer-

ence, prejudice and discrimination found to exist, charges for freight services and rates for the transportation of milk and cream intrastate in Illinois, in effect August 25, 1920, should be increased in amounts corresponding to those authorized in *Increased Rates, 1920*, and *Authority to Increase Rates, supra*, with respect to the interstate rates and charges in the eastern group and including the Illinois district. These findings shall not, however, be construed as prohibiting the restoration or establishment of proper differentials as between coal mines in Illinois and Indiana.

Commissioners Hall, Eastman and Potter dissented but did not file a dissenting opinion.

Highway Constructors Supply Cars to Railroads for Hauling Stone

THE CURTAILMENT of road construction as a consequence of car shortage and the restriction placed on the use of open-top cars resulted in the adoption of an interesting expedient by two Arkansas highway districts. Rather than hold up the work or attempt the use of motor trucks over a long road haul, the two road districts bought some air-dump cars which they furnished to the railroad for hauling the road materials in regular revenue service.

Crittenden county, Ark. (opposite Memphis, Tenn.) has



The Cars Were Handled in Solid Trains

undertaken a very extensive road building program at an estimated cost of several million dollars, covering the construction of between 200 and 300 miles of gravel roads. The supply of gravel being at Chaffee, Mo., 175 miles away, the problem of transportation became vital and the car shortage threatened to interrupt the work. In this emergency 105 Western air dump cars of 20-cu. yd. capacity and conforming to M.C.B. requirements were purchased from the United States War department and by arrangement with the St. Louis-San Francisco, these side dump cars are being operated



Storage Piles Were Built at a Dozen Convenient Places

in solid trains of about 35 each, between the gravel pit and the work, a distance of 175 miles. The railroad receives the regular tariff rates for the material hauled but allows 0.6 cents per mile for the use of the equipment. The plan was to build up storage piles of gravel in about a dozen places convenient to the roads from which the material could be taken to the work in motor trucks. These storage piles were about 800 ft. long and were built to heights of 20 to 30 ft. at the extreme end. This required the building of about

1,200 ft. of sidings at each pile, the expense of which was entirely justified by the results.

One advantageous feature of this experiment, from a railroad point of view, is the speed with which the trains of dump cars are being moved, a round trip of 350 miles, including the time consumed in loading and unloading, being made in three days. The train of gravel leaves the pit in the evening and arrives at its destination at about noon of the following day.

One of the problems to be solved was the manner of forming the fill so that the dump cars could operate most effectively from an elevation. It was planned at first to build up a fill to a height of several feet from which the cars could be dumped in the ordinary way. This was found to be unnecessary. At each storage pile the siding was laid on the natural ground surface and the cars were dumped from that. This gravel then was worked under the ties and the track gradually jacked-up until the proper elevation was secured. The fill then was widened in the usual way to the full width planned for the pile at the base. This having been accomplished, another lift was made at that point and then widened back to the other side, where the operation was repeated, and so on. This work could be expedited by the use of a spreader car on the fill.

The use of dump cars for hauling has proved satisfactory in every way. The road district is getting a constant supply of material and the railroad is getting a profitable business without diverting a single car from the necessary coal hauling service. In analyzing this problem with a view to its application to other projects, it should be assumed that 30-cu. yd. dump cars are being employed. In the case in point, the 20-cu. yd. cars were used for the simple reason that they were available when needed. It is obvious, however, that larger cars could be operated with greater economy. Allowance can also be made for some reduction in the cost of the material by the quarry or gravel men in consideration of the regular car loading schedule made possible by the use of the privately owned equipment. In view of the frequent suggestion for the use of highway motor trucks for the hauling of road materials in lieu of regular railway transportation, the results secured by the Arkansas road districts are worthy of careful consideration.

Railway Business Association Annual Dinner on March 31

PRESIDENT ALBA B. JOHNSON announces that the annual meeting and dinner of the Railway Business Association will be held at the Waldorf-Astoria Hotel, New York, on March 31. The speaking program for the dinner will consist of addresses by Daniel Willard, chairman of the American Railway Association for the railways and Edgar E. Clark, chairman of the Interstate Commerce Commission, for the government.

Mr. Johnson in his announcement says:

"Events current and to come in the world of railway transportation are vividly reflected in the distinctive features which mark the 1921 program for our annual meeting. We have always proclaimed that the primary aim of the Railway Business Association, while identical with the public interest, was the welfare and prosperity of the industry and trade which are cognate to railway operation and development. Both at our business sessions and at our dinner this policy of enlightened selfishness will be more clearly defined than in any previous year.

"Formerly the business sessions were restricted to an account of stewardship and election of officers. Conditions have complicated our work and our convention. In 1921 the members will discuss reports of several standing com-

mittees, each of which has for several months been conducting a labor of research, conference and discussion in a field essential to the preservation of the railway supply guild as a strong and progressive arm of rail transportation.

"Since our last dinner it has become evident that during the next three or four years the people of the United States will determine whether they are to be served with transportation through individual initiative of citizens or through a government agency. The answer will depend upon the satisfaction or dissatisfaction of the public with the service given them by the railway corporations under the Transportation Act of 1920. A vital fact in public satisfaction or dissatisfaction with service will be the operating economies through which net income may be made and kept adequate. The railway supply world is on the one hand a source from which a large part of such economies must come through mechanical advance. Our industry on the other hand is certain to dwindle and vanish as a constructive force if the railways themselves fall under the deadening hand of the government. In such a juncture our dinner platform will be occupied by the two men whose official position is that of leadership in solving the problem.

"Daniel Willard, president of the Baltimore & Ohio, is chairman of the advisory committee of the Association of Railway Executives, and chairman of the American Railway Association. He embodies the contact of the railways as a whole with the public and with the government. He is to define the problem from the point of view of the carriers: what must they do, what must they have, to be preserved?

"Edgar E. Clark is chairman of the Interstate Commerce Commission, whose function under the Transportation Act is to fix such rates, if management be honest, efficient and economical, as will as near as may be yield to each railway group a net railway operating income of 5½ per cent to 6 per cent upon the value of railway property devoted to transportation; and after March 1, 1922, to determine also what rate of income is requisite to afford service and increase of facilities adequate to the public need. Mr. Clark is to set forth the difficulties with which the commission is beset and the responsibilities of all concerned as he views them. "These addresses will go to the heart of the railway supply guild's problems."

In order to reduce the unwieldy size of the assemblage and promote the comfort and satisfaction of the diners, a limit is placed upon the number of seats which will be allowed to any subscriber. Each member company is entitled to subscribe for not exceeding 10 seats plus one additional seat for each "plural" member. Since the number of memberships which a member company may carry is limited by the by-laws to five (four "plural"), the maximum dinner subscription is for 14.

Valuation Hearing

HEARINGS on the bill to amend the valuation act to eliminate the requirement that the Interstate Commerce Commission shall ascertain the cost of acquisition of land were resumed before the House Committee on Interstate and Foreign Commerce on January 28. W. G. Brantley, representing the President's Conference Committee on Valuation, opposed the bill on the ground that a railroad must pay more than the acreage value of land whether it is acquired by purchase or by condemnation. The carriers are not contending, he said, for an excess value of their lands; all they want is the present value. The controversy comes up over what constitutes present value. The acreage value of adjacent lands, he said, is not the value of railroad lands. Never yet has a railroad been able to buy a strip out of a farm at the acre-

age value. The act as it now stands directs the commission in the determination of land values to ascertain what they cost the railroad and what it would cost today to acquire them if they did not have them, and then to determine their present value. Instead of expediting the valuation, Mr. Brantley said, the passage of this bill would delay it, because if Congress shall assume judicial functions and undertake to prepare the formula by which railroads shall be valued and determine to omit the cost of reproducing the land property, and if valuations are made under that formula and the courts continue to adhere to what they have been repeatedly deciding, the valuation will all come back to be remade. To authorize the commission not to assemble all the facts relating to the cost of reproduction of railroad property, he said, would be to inject an entire new theory of valuation into the proceedings.

Representative Dennison of Illinois said that in his state a large part of the cost of acquiring railroad right of way is represented by the damages it is necessary to pay to the owners of adjacent land, and asked if this cost would be excluded by the provisions of the bill. "Every dollar of it," said Mr. Brantley. "That is the purpose of the bill."

In reply to the statement by Chief Counsel Farrell of the Interstate Commerce Commission that the commission would undoubtedly allow as much as the railroads had ever paid for their land, Mr. Brantley said that the commission has served 55 tentative valuations and three so-called final valuations, and in not a single instance has it allowed for anything but the mere acreage value of adjacent land. It has also tendered to the carriers many separate land reports which do not make any allowance for the cost of acquisition. Mr. Farrell had objected that the commission could do nothing but estimate the cost of acquisition, and that it would be a farcical procedure. Mr. Brantley said that such an assertion is "grotesque" because it amounts to saying that the commission, with all its experience and its expert organization, cannot do what petit jurors are doing every day all over the land in condemnation proceedings. He said the commission's report as to the present value of adjacent land is only an estimate based on the consideration of all the available information and that to report the additional cost of acquisition would require no more of an estimate.

Samuel W. Moore, general counsel of the Kansas City Southern, made a similar argument on behalf of the Association of Railway Executives, saying that the purpose of this bill is to halt the proceedings now in progress before the commission to ascertain the cost of acquisition and damages. Its passage would be a specific direction to the commission to eliminate from the valuation all evidence on condemnation and damages and give no consideration whatever to that factor. It costs two or three times the value of adjacent land to acquire railroad right of way because of the damages to adjacent land. The commission in its valuation thus far has ignored the cost of acquisition and assigned to railway right of way only the value of adjacent land.

John E. Benton, general solicitor for the National Association of Railway and Utilities Commissioners, advocated the passage of the bill, saying that railroad rates have reached the limit of what the traffic will bear, and any further advances in order to pay returns on increased values which would be created by the inclusion of fictitious elements would result in disaster to the commerce of the country. He claimed that the inclusion of an estimate of the present cost of condemnation and damages in excess of the original cost or present value in the rate value of railroads would increase the aggregate value on which the return under the Esch-Cummins bill would have to be earned by several billion dollars, and would be a gross

injustice to the public. This valuation, he said, ought to be made in such a manner that it will command the confidence of the country and settle the question of what the railroad properties are worth. Generally speaking, in spite of the conspicuous examples the other way, he said, he thought the carriers will be found to have properties which will sustain their capital accounts. If this be true, it will be to their lasting interest to settle that fact to the satisfaction of the country. That cannot be done by any valuation which includes estimates in excess of present value based upon a fiction that the roads are non-existent and their lands would have to be obtained by condemnation today.

Substitute for Clayton Law Reported

WASHINGTON, D. C.

THE SENATE COMMITTEE on interstate commerce on January 28 reported favorably the bill proposed as a substitute for Section 10 of the Clayton law, as amended in accordance with the suggestions of the Interstate Commerce Commission. The bill was based on the one originally introduced by Senator Frelinghuysen, by request, which was drafted by the Association of Railway Executives, but was reintroduced with the amendments by Senator Townsend as a new bill, S. 4933. The Townsend bill provides as follows:

"Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled. That the Interstate Commerce Act be, and the same hereby is, amended by adding thereto a new section, numbered 20b, which shall read as follows:

"Sec. 20b. (1) That as used in this section the term 'carrier' means a common carrier by railroad which is subject to this Act, or any corporation organized for the purpose of engaging in transportation by railroad subject to this Act or any owner of a railroad engaged in interstate commerce as defined in this Act.

"(2) After sixty days from the date when this section becomes effective no carrier shall have any dealings in materials, supplies, or other articles of commerce, or shall make any contracts, or have any contracts made, after December 31, 1920, for construction or maintenance of any kind, to the amount of more than \$100,000 in the aggregate in any calendar year with another corporation, firm, partnership, or association not a common carrier, railroad company, terminal company, or joint facility company that is subject to section 20 of this Act when said carrier shall have as a director, president, manager, purchasing or selling officer, or agent in the transaction, any person who is at the same time a director, manager, purchasing or selling officer, or agent in the transaction of, or who has any substantial interest in, such other corporation, firm, partnership, or association unless and except such dealings or contracts shall be with the bidder whose bid is the most favorable to such carrier, to be ascertained by competitive bidding under regulations from time to time prescribed by rule or otherwise by the commission.

"(3) No carrier shall, when it has upon its board of directors, or as its president or manager, any person who is at the same time a director, president, or manager of another carrier, charge such other carrier for materials, supplies, or other articles of commerce a price in excess of that at which such articles are concurrently charged out by it for its own use, with the addition thereto of proper transportation charges.

"(4) No bid shall be considered unless the name and address of the bidder or the names and addresses of the officers, directors, and managers thereof, if the bidder be a corporation, or of the members, if the bidder be a partnership, firm, or association, be given with the bid.

"(5) Any person who shall, directly or indirectly, do or attempt to do anything to prevent anyone from bidding, or who shall do any act to prevent free and fair competition among the bidders or those desiring to bid, shall be punished as prescribed in this section in the case of an officer or director.

"(6) Every carrier having any such dealings or making any such contracts required hereby to be made by competitive bidding shall, within thirty days after making the same, file with the commission a full and detailed statement of the transaction, showing the manner of the competitive bidding, who were the bidders, their names and addresses, and the names and addresses of the directors and officers of the corporations and the members

of the firms or partnerships bidding; and whenever the commission shall, after investigation or hearing, have reason to believe that the law has been violated in and about the said transactions, it shall transmit all papers and documents and its own views or findings regarding the transactions to the Attorney General.

"(7) After this section takes effect, it shall be unlawful for any officer, director or agent of a carrier to receive, directly or indirectly, any benefit or profit or any money or thing of value in respect to the negotiation, hypothecation, purchase, or sale by the carrier of any stocks, bonds, or other evidences of interest or indebtedness issued by a carrier or noncarrier corporation.

"(8) After this section takes effect every carrier that is a party to the hypothecation, purchase, or sale of or other dealing in any stocks or bonds issued by a carrier or noncarrier corporation shall within twenty days after such hypothecation, purchase, sale, or other dealing report to the commission in such form and detail as the commission may require the particulars of the transaction.

"(9) If any carrier shall violate this section, it shall be fined not exceeding \$25,000; and every director, agent, manager, or officer thereof who shall have knowingly voted for or directed the act constituting such violation, or who shall have knowingly aided or abetted in such violation, shall be deemed guilty of a misdemeanor and shall be fined not exceeding \$5,000, or confined in jail not exceeding one year, or both, in the discretion of the court.

"Sec. 2. That section 10 of an Act entitled 'An Act to supplement existing laws against unlawful restraints and monopolies, and for other purposes,' approved October 15, 1914, be, and it is hereby, amended by adding thereto a new paragraph, which shall read as follows:

"The provisions of this section shall not apply to carriers, corporations, or owners of railroads that are subject to section 20b of the Interstate Commerce Act."

Heavy Switching Locomotives for the Grand Trunk

THE CANADIAN Locomotive Company, Limited, of Kingston, Ontario, have recently completed and delivered an order for ten heavy type eight-wheel switching locomotives for the Grand Trunk system. These engines were designed for the heavy switching service at Toronto and

and the latest type of butterfly fire door have been applied.

The weight of these locomotives is 242,750 lb., the factor of adhesion is 4.64 and the maximum tractive effort is 52,300 lb. The cylinder and valve chambers are bushed with Hunt-Spiller gun iron; also, the piston packing and valve rings are of the same material. The steam distribution is controlled by a 12-in. piston valve of the railway company's standard type, used in connection with the Young valve gear, which has proven very successful on this railway. The Ragonet type B power reverse gear is also applied.

The main frames are 6 inches wide and each cast in one piece, in accordance with the McNaughton process. The main axle is equipped with the Robb-McGarvey extended driving box journal 20 in. long, and all driving boxes are fitted with Franklin adjustable wedges; also Smith's adjustable hub liners are fitted to all driving wheels. Henry automatic grease cups are applied to all rods. Franklin radial buffers and unit safety draw bars are used between engine and tender. Barco flexible joints on air pump piping and Barco flexible connections between engine and tender are applied.

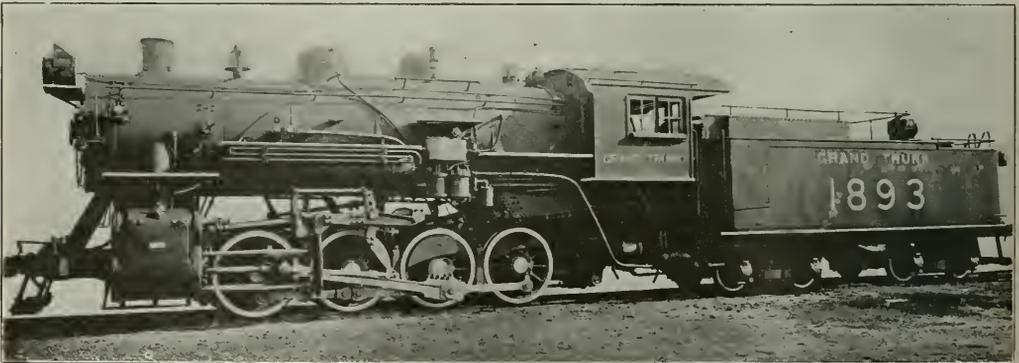
The tender is of the Grand Trunk railway standard type with a Commonwealth cast steel frame. The trucks are of the railway company's four wheeled outside equalized type with cast steel bolsters, Miner class A18 draft gear and Buffalo tender brake beams. All the material of which these locomotives are built conforms to the Grand Trunk railway standard specification. Further particulars are given in the table of dimensions.

General Data

Gage	4 ft. 8 1/2 in.
Service	Switching
Fuel	Bituminous coal
Tractive effort	52,300 lb.
Weight in working order	242,750 lb.
Weight of engine and tender in working order	406,700 lb.
Wheel base	15 ft. 6 in.
Wheel base, engine and tender	53 ft. 4 1/2 in.

Ratios

Weight on drivers ÷ tractive effort	4.64
Tractive effort × diam. drivers ÷ equivalent heating surface*	840.0
Equivalent heating surface* ÷ grate area	61.8



An Efficient Locomotive for Heavy Switching Service

Buffalo and at intermediate points. They are probably the heaviest engines in Canada of their type.

The boiler is equipped with the Locomotive Superheater Company's latest type A superheater with 32 units and is designed to carry a working pressure of 190 lb. per sq. in. It is radially stayed and flexible staybolts are used in the breaking zones in the sides, back and throat of firebox. The firebox is equipped with a smoke consumer having combustion tubes on each side; it also contains a brick arch supported on four 3-in. tubes. The O'Connor fire door flange

Firebox heating surface ÷ equivalent heating surface*, per cent.	5.7
Weight on drivers ÷ equivalent heating surface*	69.5
Volume both cylinders	18.42 cu. ft.
Equivalent heating surface* ÷ vol. cylinder	189.4
Grate area ÷ vol. cylinders	2.9

Cylinders

Kind	Simple
Diameter and stroke	26 in. by 30 in.

Valves

Kind	Piston
Diameter	12 in.
Greatest travel	8 1/4 in.
Lap	1 13/16 in.
Lead	3/16 in.

<i>Wheels</i>	
Driving diameter over tires.....	56 in.
Driving journals, main diameter and length.....	11 in. by 20 in.
Driving journals, other diameter and length.....	10 in. by 13 in.
<i>Boiler</i>	
Style.....	Radial stayed
Working pressure.....	100 lb. per sq. in.
Outside diameter at front.....	74 in.
Firebox, length and width.....	108 13/16 in. by 75 1/4 in.
Tubes, number and outside diameter.....	226—2 in.
Flues, number and outside diameter.....	32—5 1/2 in.
Tube and flue length.....	15 ft. 0 in.
Heating surface, tubes and flues.....	2,450.5 sq. ft.
Heating surface, firebox inc. arch tubes.....	225.5 sq. ft.
Heating surface, total.....	2,676.0 sq. ft.
Superheater heating surface.....	543.0 sq. ft.
Equivalent heating surface.....	3,490.0 sq. ft.
Grate area.....	56.5 sq. ft.

<i>Tender</i>	
Tank.....	Water bottom
Journals, diameter and length.....	6 in. by 11 in.
Water capacity.....	9,000 U. S. gal.
Coal capacity.....	10 tons

*Equivalent heating surface = total evaporative heating surface + 1.5 times the superheating surface.

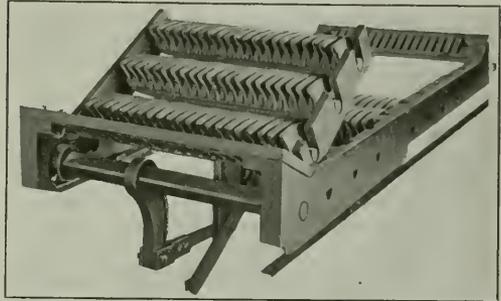
and the other dropped into a slot in the center frame. When assembled the slot in the center frame is closed by the front tie bar.

To permit the three finger bars in the lifting frame to be shaken with the remainder of the bars in the front section of the grate, the shaker arms of the bars in the lifting frame and those in the remainder of the section are connected independently, the two systems being united through a second connecting rod with one connection to each system. In order that the movement of the lifting frame may not interfere with the operation of the shaker rigging, the rod connecting the three finger bars in the lifting frame is extended forward so that when the finger bars are in their normal position its end is directly under the lifting shaft. The operating connection is made at this point so that when the lifting grate is open, the finger bars retain positions parallel to each other

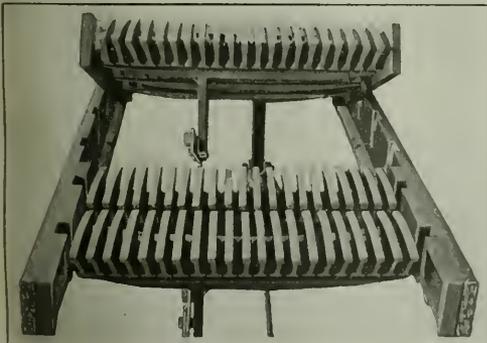
The Hulson Shaking Dump Grate

THE DUMP GRATE has always been a necessary evil in the locomotive firebox, necessary to provide for the removal of clinkers when cleaning fires at terminals, and an evil because of the "dead" surface of the dump or drop grate from which it is impossible to remove the accumulation of ash while the locomotive is in operation between terminals. The effective grate area is, therefore, practically reduced by the area of the dump grate.

In order that the entire area of the grate may be made uniformly effective, the Hulson Grate Company, Keokuk,



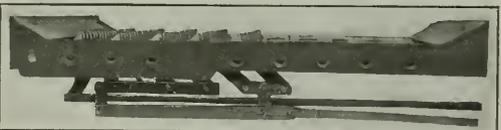
Front End of the Grate Showing the Operating Shaft and Lifting Frames



Hulson Locomotive Grate with the Lifting Grate Open

Iowa, has designed a locomotive grate in which the drop grate is replaced by three finger bars in a frame which may be swung upward about a shaft journaled at the front end of the grate frames. Standard finger bars are used in the lifting frame and they are shaken as a part of the front section of the grate.

The construction of the device is simple and will readily be understood by reference to the illustration. It will be seen that the side and center frames are recessed at the front ends, the length of the recess being sufficient to take in the cast steel lifting frames of rectangular cross-section with trunnion bearings for the three standard finger bars. Square holes are cored through the ends of the lifting frames which are reinforced with hubs to provide ample strength, and the frames are mounted on a 2-in. square wrought iron staff. This staff, with the lifting frames and a cast steel lifting arm mounted on it, is placed in the stationary grate frames, one end being slipped into a circular hole cored in the side frame



Side View of the Grate Showing the Operating Connections

shaking movement than is possible with the usual type of finger grates. Should heavy clinker accumulate, however, the lifting section provides a means of clearing the grate with the least possible amount of effort. After all ash and clinker which will pass through the grate has been removed by shaking, the surface of the lifting section is cleared with a hoe, the material being drawn back towards the center of the firebox. It is then raised and all material remaining on the grates is pushed forward and dropped into the ash pan. The ledges at the bottom of the recesses in the grate frames are chamfered for practically their entire length, three short lugs being left to support the lifting frames when in

the closed position. Any accumulation of clinker or ash on the ledges is thus prevented and the lifting grate will always freely drop back into place.

The lifting grate is operated from the cab, its normal position being closed, and a lock is provided to hold the operating lever in the open position when the lifting grates are raised. The possibility of the grate dropping while the locomotive is in operation is thus eliminated.

The usual location for the dump grate is at the front end of the firebox and the Hulson lifting section is designed for location at that point. Should lack of clearance under the arch in locomotives with shallow fireboxes interfere with this location it may be placed at the rear of the firebox, in which case it swings up from the rear end, under the door.

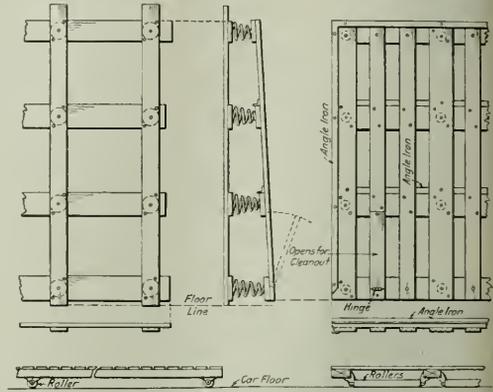
The device is simple and requires no expensive parts. The only special parts are the two cast steel lifting side frames, the square wrought iron shaft and the cast steel lifting arm. The only machine work required is the turning of the short journals on the ends of the shaft. A patent has been applied for.

Shock Absorber for Refrigerator Cars

IN 1914, a device known as the Cutler-Monesmith shock absorber was developed by George E. Cutler, New York, and B. L. Monesmith, Cresco, Iowa, for the purpose of reducing egg breakage in shipment. The device was adapted for refrigerator cars or sheathed freight cars and could be used for shipping other products than eggs. The original arrangement consisted of a loose floor racking supported on pieces of 2-in. pipe with spring buffers at either end of the car to absorb the shock. This arrangement was somewhat crude and recent developments are shown in the illustrations.

The principle of the improved shock absorber is the same as that of the first device, namely, the load is held as a unit within the car on a movable floor, the shock being absorbed

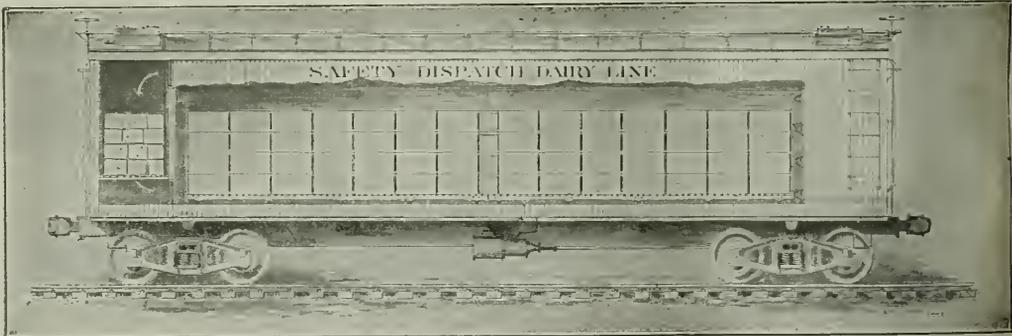
floor section is made such as to cause the front racks or buffers to stand in a vertical position. The width of the buffer is $\frac{3}{4}$ in. less than the interior width of the car. The buffers are ordinarily 5 ft. 8 in. above the floor of the car and $1\frac{1}{2}$ in. less than the width of the car. All buffers and



Details of Buffer Construction

floor racks receive one coat of linseed oil, well rubbed in. The metal work is treated with an anti-rust process.

The rollers shown are made of extra heavy $1\frac{7}{8}$ in. pipe, the journals being welded into each end of a steel plug $1\frac{1}{4}$ in. long. The journals are $\frac{3}{4}$ in. in diameter. The bearings are ordinarily made of malleable steel castings designed to support the load with a generous factor of safety. The springs are made of spring steel wire, oil tempered and carefully coiled to correct form and dimensions. Each end of



Phantom View of Cutler-Monesmith Device Applied to Refrigerator Car

by spring buffers at either end. There must be no projections on the interior of the car sides to interfere with lateral movement of the load. The correctness of the principle involved was amply demonstrated by the results obtained in service which have vindicated the contention of the inventors that the load must be made rigid within the confines of the movable carriage and be sufficiently separated from the car sides to permit forward and backward oscillation without contact.

The floor racks are made of 1-in. by 4-in. slats and 2-in. by 4-in. stringers. It will be noticed in the line drawing that the lowest spring is greater in free length than the highest one. This gives a greater spring compression at the bottom of the buffer, where it is most needed. The length of the

the buffer is provided with two clean-cut openings of sufficient size so that the ice bunkers may be readily cleaned. They have a hinge at the bottom and lag screws at the top.

Another important advantage of this device is the fact that the load rests a few inches above the floor of the car and there can be no damage due to water. The device is adaptable to use for other merchandise and food products, being by no means limited to the transportation of eggs. In case heavier material is to be shipped, it would only be necessary to furnish springs of greater tension and possibly insert two extra springs in the bottom row. The ideal spring tension would be one sufficient to gradually return the load to its central position after a shock, and thus have it ready for the next.

General News Department

The piece-work system has been restored in two departments of the foundry of the Pennsylvania Railroad at Altoona—the cleaning room and the wheel foundry.

A bill to provide that all meetings of the Federal Reserve Board and of the Interstate Commerce Commission shall be open to the public has been introduced in Congress by Representative McLaughlin, of Nebraska.

By a fire at the Pullman repair works at One Hundred and Eighth street and Langley avenue, Chicago, on the morning of January 27, a freight car shop was destroyed at a loss of about \$450,000. Seven new refrigerator cars and 12 Pullman sleepers were also destroyed. The fire was the result of spontaneous combustion in one of the tool rooms.

The Post Office Department has finally got around to asking for an appropriation for the amount it owes the Railroad Administration for the retroactive increase in mail rates for the period of federal control. The Treasury Department on Wednesday submitted to Congress an estimate for deficiency appropriation for the Department of \$65,575,832, which has been agreed upon as the amount due for the 26 months.

Thomas DeWitt Cuyler, chairman of the Association of Railway Executives, has written a letter to Chairman Esch of the House committee on interstate and foreign commerce regarding the statement made in his recent testimony before the committee, that he understood that the Southern Railway was contemplating a suit for \$84,000,000 against the government growing out of claims to that amount accruing under federal control. Mr. Cuyler says that he has been advised by President Harrison of the Southern Railway that such is not the fact and that the statement is not justified. He, therefore, asks that the record be corrected in this respect.

R. V. Massey, chairman of the newly organized joint reviewing committee of the Pennsylvania Railroad, says that the committee already has successfully disposed of, to the satisfaction of both sides, eight controversies which have been pending a long time, one of them since 1914. To emphasize the fact that the committee is a united non-partisan body for the judicial and impartial settlement of differences and not a mere conference between representatives of opposing sides, it has been decided that at the meetings no two representatives of the management or of the employees shall be seated together, but that they shall be alternated around the table. Mr. Massey is "confident that every member of the committee, whether representing the men or the management, is keenly alive to the responsibility resting upon him; and equally confident that not one of the committee has the slightest doubt of the ability of this body to adjust on a fair and friendly basis any differences which may arise affecting the employees represented."

Executive Committee Meeting of

C. I. C. I. & C. F. Association

The Executive Committee of the Chief Interchange Car Inspectors' and Car Foremen's Association of America will meet at the Hotel Sherman, Chicago, on Thursday and Friday, March 3 and 4. The entire membership is invited to this meeting to suggest changes in the A. R. A. Rules of Interchange.

End of Eight Years' Litigation

The Federal District Court in Kentucky, Judge Evans, has ordered the Western Union Telegraph Company by November 1 to remove its poles and wires from the right of way of the Louisville & Nashville Railroad. This, apparently, settles the suits which have been in the courts since 1912, as the present

order has been made in compliance with the order of the Circuit Court of Appeals, which decided in favor of the railroad company and directed the lower court to dissolve the injunction which had been entered forbidding the railroad company to interfere with the property of the telegraph company. The telegraph company made an appeal to the United States Supreme Court, but that court refused to interfere with the ruling of the lower tribunal.

Members of Construction Division, U. S. A., to Meet

Members of the Construction Division of the Army, including the commissioned and enlisted personnel, as well as those who served in civilian capacity and who live in or near New York City, will get together at the Aldine Club, 200 Fifth avenue, New York, at 6:30 o'clock on the evening of February 12.

The reunion will be a preliminary to the trip which many of them will make to Chicago on February 25, to attend the annual reunion of the Construction Division Association, and will consist of a banquet, in connection with which there will be sufficient entertainment to carry out the "get together" spirit of the occasion. Vance W. Torbert, 200 Fifth avenue, New York, is chairman of the banquet committee.

Operating Statistics for November

The Interstate Commerce Commission's monthly summary of operating statistics for large steam roads for the month of November shows a total net ton mileage of 37,194,000,000, which was an increase of 14½ per cent as compared with November, 1919. The average tonnage per train was 710 as compared with 681. The percentage of loaded to total freight car miles was 63.2 as compared with 71.2. The percentage of unserviceable cars was 7.4 as compared with 6.3. The average car mileage per day was 26.8 as compared with 23.4. The net ton miles per car day were 517 as compared with 437, and the average load per car 30.6 tons as compared with 26.3. The average cost per freight train mile, selected accounts, was \$2.26 as compared with \$1.70 in 1919. For the 11 months ending with November the average was \$2.01 as compared with \$1.62.

Eight Years for Stealing Baggage

For stealing baggage from the Pennsylvania Railroad, two men were sentenced in court at New York City on January 26, to eight years and three years six months imprisonment, respectively.

The prosecuting attorney said that thefts from baggage at New York City terminals during the past year had amounted to over \$3,000,000. From the Pennsylvania Station alone, he said, \$34,000 worth of baggage was stolen from August 23 to the end of 1920. Organized gangs operate at all the terminals. The scheme mainly used, he outlined, was to have an "outside man" check a small parcel for some nearby point. The "inside man" would transfer the check of the small parcel to some big box or trunk apparently filled with merchandise, and a third man would obtain the box or trunk at destination. One of the culprits was formerly a porter in the Pennsylvania Station.

Reductions in Wages and Work

The Erie Railroad has reduced the wages of unskilled laborers from 48½ cents an hour to 35, 33 and 30 cents. This is understood to apply to large numbers of trackmen and freight-house men. Complaint was made, on behalf of employees, to R. S. Parsons, general manager, who replied that the company intended to pay a fair differential above going rates of labor in the vicinity in which it is employed. "This action is only taken as a last extremity, and was avoided as long as possible. I do not see how

we can make any change in it at the present time, and sincerely trust that the whole question can be speedily settled to the satisfaction of all concerned."

In the Erie shops at Hornell, N. Y., most of the employees have been ordered to report for duty on only four days a week.

The Louisville & Nashville has reduced shop forces 10 per cent. The Delaware, Lackawanna & Western has taken similar action at Scranton, Pa.

The Southern Pacific has laid off 1,200 of its shopmen at Sacramento, Cal.

The Union Pacific has ordered the five-day week for shopmen and trackmen.

Punctuality Records on the Katy

The Missouri, Kansas & Texas, of Texas, reports that freight and passenger trains are being run with a higher percentage of punctuality than ever before in the history of the railroad, indicating that employees are not only trying but are actually rendering more efficient service than ever before. During December 92 per cent of all passenger trains were on time, and 85 per cent of all freight was moved on schedule.

General Manager H. E. McGee, in a circular to the public, says that with his harmonious and efficient organization, "We expect to continue, if not improve, this record. . . . To run one passenger train on time across the great state of Texas, it is necessary that approximately one thousand men, directly or indirectly connected with its operation, perform their duties efficiently." The company solicits constructive criticism, and would like to have passengers commend the men when they render unusual service or particular acts of courtesy.

The Pony Express and the Air Mail

Arguments have been advanced against the air mail service on the ground that it is too dangerous. But there have been comparatively few casualties. It is interesting to note that the same objection was advanced in 1860 at the opening of the "Pony Express" from Omaha to Sacramento. The continuous breakneck speed required of the riders, together with the perils of the wilderness trails made the enterprise appear foolhardy in the view of many.

Nevertheless, the "Pony Express" was started and performed a service of great benefit until supplanted by the telegraph. Each rider covered from 75 to 125 miles a day, largely on a dead run; horses were changed at relay stations, 10 to 15 miles apart. The schedule was 10 days in summer, 12 in winter, for the 2,000-mile trip. This was afterwards reduced to 8 and 10 days. The service commenced with 80 riders and 420 ponies and continued for 16 months. Only one mail pouch was lost during that period and only one rider was killed outright by Indians, although there were many attacks and hair-breadth escapes.

On December 17 Mail Pilot Moore completed a round trip by aeroplane between Cheyenne and Salt Lake City, between dawn and darkness. Pilot Moore left the Cheyenne field at 5:42 a. m., delivered 400 lb. of mail in Salt Lake City and was back in Cheyenne at 4:44 p. m. He had flown 800 miles, crossed the Rockies twice and made two stops. At times he attained an altitude of 13,000 feet.—*Union Pacific Bulletin*.

Brotherhoods Refusing to Submit Claims to U. S. R. A.

Representatives of the railroad labor organizations have sent a telegram to the director general of railroads protesting against his action in abolishing the three boards of adjustment created by the Railroad Administration and appointing to finish up their work a staff officer and two assistants who, they claim, are "unqualified because of their past and anticipated future affiliations as representatives of the railroad management." The boards, which were composed of an equal number of representatives of the employees and of the managements, have been passing on a large number of cases involving disputes as to working conditions and interpretations of wage orders arising during the period of federal control. The objection is that the staff officer, J. D.

Code, and his assistants, R. J. Turnbull and C. T. O'Neill, are not "bi-partisan." "If our understanding is correct," the letter says, "this will serve to advise you that we hereby withdraw every claim submitted to and now before the Railroad Administration . . . which have not been decided by Board of Adjustment 2 and 3, and you will further understand by the above notice that there are no claims which are properly before the Railroad Administration which require or permit any further handling by you as director general or your representatives."

To this Director General Payne replied, saying in part: "You do not make it clear whether you have any objection to Messrs. Code, Turnbull and O'Neill beyond the fact that they may—when they leave the service of the Railroad Administration—seek employment from railroads. This is entirely immaterial as I see it, because the railroads have no earthly interest in the claims of the employees now pending. The decision is expressly limited to the period of federal control. If these men are honest, liberal-minded, just men, I see no reason for any change. If they are not, I will be very glad to have you give me in confidence any facts which you may think pertinent."

The labor leaders then advised Mr. Payne that they had nothing further to submit and that they were making necessary arrangements and would request the return of the files in each of the claims.

Marine Equipment Manufacturers and Shipbuilders Organize

At a meeting held January 28, at the Biltmore Hotel, New York, representatives of 47 shipbuilding companies, manufacturers of marine equipment and dealers in marine supplies formed an association for the following purposes: To advance the interests of its members; to promote good-will between those who buy and those who sell marine equipment and supplies; to promote and supervise exhibits; and to co-operate with other associations in the marine field to the end that their efforts for the advancement of the designing, building and operation of ships shall be most productive.

It is proposed that membership in the Marine Equipment Manufacturers' Association shall be limited to those who build and repair ships, or make or sell equipment or supplies; manufacturers of or dealers in machinery or appliances for building, repairing or loading ships; marine insurance companies or brokers, and publishers of regularly issued periodicals devoted to marine subjects. It would not be limited to those who exhibit; but to exhibit, one must first be a member of the association.

The Marine Equipment Manufacturers' Association as planned will closely parallel the Railway Supply Manufacturers' Association in the steam railway field. The latter is organized on a permanent business basis and conducts its own exhibit in connection with the annual convention of Division 5, Mechanical, of the American Railway Association. In the marine field, one show has already been held in New York, a second is scheduled for Philadelphia in March and others are being planned for Chicago, New Orleans, San Francisco, Baltimore and Boston. While the New York show was held under the auspices of the National Marine League, it was managed by an exhibition company, with a pecuniary interest only, and the space cost more than six times per square foot what the exhibitors paid at the Atlantic City convention of the American Railway Association in June last. Further, and what is even more important, 90 per cent of the visitors at the Atlantic City exhibit were buyers, while at the marine show in New York probably less than five per cent were buyers. The Marine Equipment Manufacturers' Association expects to hold one show a year only and in conjunction with one or more of the associations in the marine field comparable with Division 5, Mechanical, of the American Railway Association—for example, the Society of Naval Architects and Marine Engineers. It is believed that when a comprehensive co-operative plan is laid before the several important societies in the marine field they will gladly arrange to meet simultaneously with the Marine Equipment Manufacturers' Association.

The temporary officers of the association are Colonel E. A. Simmons, acting president, *Marine Engineering*, Woolworth building, New York; K. L. Ames, Jr., acting secretary, American Steel Foundries, 332 South Michigan avenue, Chicago, Ill.

Meetings and Conventions

The following list gives names of secretaries, dates of next or regular meetings and places of meetings:

AIR BRAKE ASSOCIATION.—F. M. Nellis, Room 3014, 163 Broadway, New York City. Exhibit by Air Brake Appliance Association.

AIR BRAKE APPLIANCE ASSOCIATION.—Fred W. Venton, 836 So. Michigan Ave., Chicago. Meeting with Air Brake Association.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—F. A. Pothous, Supervisor of Demurrage and Storage, C. & N. W. Ry., Chicago.

AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—S. W. Derr, Philadelphia & Reading, Philadelphia, Pa.

AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, Illinois Central, Chicago. Next meeting June 20, 1921.

AMERICAN ASSOCIATION OF FREIGHT BAGGAGE AGENTS.—E. L. Duncan, C. & E. I. R. R., 332 South Michigan Ave., Chicago. Next meeting, June, 1921. Quebec, Can.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—C. X. Hope, C. & N. W. Ry., 143 Liberty St., New York.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—J. Rothschild, Room 400, Union Station, St. Louis, Mo. Next Convention, August 24-26, 1921, Kansas City, Mo.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Burritt, 8 W. 40th St., New York.

AMERICAN RAILROAD MASTER TINKERS, COPPERSMITHS' AND PIPE FITTERS' ASSOCIATION.—C. Borcherdt, 202 North Hamlin Ave., Chicago, Ill. Next convention September 12-14, Hotel Sherman, Chicago.

AMERICAN RAILWAY ASSOCIATION.—E. Fairbank, 75 Church St., New York. Next regular meeting, November, 1921.

Division 1, Operating (including former activities of Association of Railway Telegraph Superintendents).—W. J. Fripp (chairman), General Manager, N. Y. C. R. R., New York, N. Y.

Division 2, Telegraph and Telephone Section.—H. Hulst (chairman), Manager of Telegraphs, Grand Trunk Exhibit by Railway Telegraph and Telephone Appliance Association.

Division 2, Transportation (including former activities of Association of Transportation and Car Accounting Officers).—E. J. Pearson (chairman), President, N. Y., N. H. & H. R. R., New Haven, Conn.

Division 3, Traffic.—Robert C. Wright (chairman), General Traffic Manager, P. R. R., Philadelphia, Pa.

Division 4, Engineering.—E. H. Fritch, 431 South Dearborn St., Chicago. Next annual meeting, March 15-17, 1921, Chicago.

Construction and Maintenance Section.—E. H. Fritch, secretary.

Electrical Section.—George Gibbs (chairman), Chief Engineer of Electric Traction, Long Island Railroad, New York, N. Y.

Signal Section.—E. S. Bisset, 75 Church St., New York. Exhibit by Signal Appliance Association.

Division 5, Mechanical (including former activities of Master Car Builders' and Master Mechanics' Association).—V. R. Hawthorne, 431 South Dearborn St., Chicago. Next convention June 15-22, Atlantic City, N. J. Exhibit by Railway Supply Manufacturers' Association.

Equipment Painting Section.—V. R. Hawthorne, secretary.

Division 6, Purchases and Stores (including former activities of Railway Storekeepers' Association).—J. P. Murphy, General Storekeeper, N. Y. C. R. R., Collinwood, Ohio. Second annual meeting, June 20-22, 1921, Atlantic City, N. J.

Division 7, Freight Claims (including former activities of the Freight Claim Association).—Lews Pilcher, 431 South Dearborn St., Chicago.

Division 8, Perishable Freight.—E. F. McPike (chairman), 431 South Dearborn St., Chicago.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W. Ry., 49 Ave., Austin Station, Chicago. Next convention, October 18-20, 1921, New York City. Exhibit by Bridge and Building Supply Men's Association.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—(Works in cooperation with the American Railroad Association, Section 11.) E. H. Fritch, 431 South Dearborn St., Chicago. Next annual meeting, March 15-17, 1921, Congress Hotel, Chicago. Exhibit by National Railway Appliance Association.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—(See American Railway Association, Division 5.)

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—R. D. Fletcher, 1145 East Marquette Road, Chicago. Exhibit by Supply Association of the American Railway Tool Foremen's Association.

AMERICAN SHORT LINE RAILROAD ASSOCIATION.—T. F. Whittelsey, Union Trust Bldg., Washington, D. C.

AMERICAN SOCIETY FOR TESTING MATERIALS.—C. L. Warwick, University of Pennsylvania, Philadelphia, Pa.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Col. H. S. Crocker (acting secretary), Engineering Societies Building, 33 W. 39th St., New York. Next convention, April 27, 1921, Houston, Texas. Regular meetings, 1st and 3d Wednesday in month, except July and August, 33 W. 39th St., New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.

AMERICAN STEEL TRAPPERS' SOCIETY.—W. H. Eiseaman, 154 East Erie St., Chicago.

AMERICAN TRAIN DISPATCHERS' ASSOCIATION.—C. L. Darling, Northern Pacific Ry., Spokane, Wash. Next convention, June 20, 1921, Kansas City, Mo.

AMERICAN WOOD PRESERVERS' ASSOCIATION. F. J. Angier, B. & O., Mt. Royal Sta., Baltimore, Md.

ASSOCIATION OF FREIGHT AGENTS.—Willis H. Failing, C. & N. W. Ry., N. J. Jersey City, N. J. Next meeting at St. Louis, Mo.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucci, C. & N. W. Ry., Room 411, C. & N. W. Sta., Chicago. Exhibit by Railway Electrical Supply Manufacturers' Association.

ASSOCIATION OF RAILWAY EXECUTIVES.—Thomas De Witt Taylor (chairman), 61 Broadway, New York, N. Y.

ASSOCIATION OF RAILWAY SUPPLY MEN.—C. L. Mellor, 212 W. Illinois St., Chicago. Meeting with International Railway General Foremen's Association.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—(See American Railway Association, Division 1.)

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—(See American Railway Association, Division 2.)

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—A. J. Filkins, Paul Dickinson Company, Chicago. Meeting with convention of American Railway Bridge and Building Association.

CANADIAN RAILWAY CRAFTSMEN'S ASSOCIATION.—W. O. Thompson, N. Y. C. R. R., Buffalo, N. Y. Exhibit by Railway Equipment Manufacturers' Association. Next meeting, December 14.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Anton Klinc, 626 North Pine Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, West Morrison Hotel, Chicago.

CAR FOREMEN'S ASSOCIATION OF ST. LOUIS, MO.—Thomas B. Koeneke, Federal Reserve Bank Bldg., St. Louis, Mo. Meetings first Tuesday in month at the American Hotel Annex, St. Louis.

CENTRAL RAILWAY CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 2d Thursday in November and 2d Friday in January, March, May and September, Hotel Statler, Buffalo, N. Y.

CHIEF INTERCHANGING CAR INSPECTORS AND CAR FOREMEN'S ASSOCIATION.—J. C. Archer, General Car Inspector, Wabash R. R., Decatur, Ill.

CHIEF INTERCHANGING CAR INSPECTORS AND CAR FOREMEN'S SUPPLY MEN'S ASSOCIATION.—W. P. Elliott, Terminal R. R. Ass'n of St. L., East St. Louis, Mo. Next convention, September 15-17, Hotel Sherman, Chicago.

CINCINNATI RAILWAY CLUB.—H. Boute, 101 Carew Bldg., Cincinnati, Ohio.

EASTERN RAILROAD ASSOCIATION.—E. N. Bessling, 614 F St., N. W., Washington, D. C.

FREIGHT CLAIM ASSOCIATION.—(See American Railway Association, Division 7.)

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 321 Grand Central Sta., Chicago. Regular meetings, Wednesday preceding 3d Friday in month. Room 856, Insurance Exchange Bldg., Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—W. J. Mayer, Michigan Central R. R., Detroit, Mich. Next convention, August 16-18, 1921, Hotel Sherman, Chicago.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—J. G. Crawford, 702 E. 51st St., Chicago. Next annual meeting, May, 1921, Hotel Sherman, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 1061 W. Wabasha Ave., Winona, Minn. Next convention, September 12-15, Hotel Sherman, Chicago. Exhibit by Association of Railway Supply Men.

MAINTENANCE OF WAY MASTER PAINTERS' ASSOCIATION.—E. E. Martin, Union Pacific R. R., Room No. 19, Union Pacific Bldg., Kansas City, Mo. Next convention October 4-6, 1921, Buffalo, N. Y.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York. Next convention, May 23-26, 1921, Planters' Hotel, St. Louis, Mo.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—(See American Railway Association, Division 5, Equipment Painting Section.)

MASTER CAR BUILDERS' ASSOCIATION.—(See American Railway Association, Division 5.)

NATIONAL ASSOCIATION OF RAILROAD TOOL PRODUCERS.—E. E. Pershall, T. J. Moss Fe Co., 220 Security Bldg., St. Louis, Mo.

NATIONAL ASSOCIATION OF RAILWAY AND UTILITIES COMMISSIONERS.—James R. Walker, 49 Lafayette St., New York.

NATIONAL FOREIGN TRUCK COUNCIL.—O. K. Davis, 1 Hanover Square, New York.

NATIONAL RAILWAY APPLIANCE ASSOCIATION.—C. W. Kelly, Kelly-Derby Co., Peoples Gas Bldg., Chicago. Meeting with American Railway Engineering Association.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, excepting months of June, July, August and September.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meeting, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

PACIFIC RAILWAY CLUB.—W. S. Wollner, 64 Pine St., San Francisco, Cal. Regular meeting 2d Thursday in month, alternately in San Francisco and Oakland.

RAILWAY ACCOUNTING OFFICERS' ASSOCIATION.—E. R. Woodson. Next annual meeting, June 8, 1921, Hotel Traymore, Atlantic City, N. J.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Naxon, 600 Liberty Bldg., Broad and Chestnut Sts., Philadelphia, Pa.

RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, 515 Grandview Ave., Pittsburgh, Pa. Regular meetings, 4th Thursday in month, except June, July and August, American Club House, Pittsburgh, Pa.

RAILWAY DEVELOPMENT ASSOCIATION.—D. C. Welly, Missouri Pacific R. R., Little Rock, Ark.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, General Electric Co., Chicago. Annual meeting with Association of Railway Electrical Engineers.

RAILWAY EQUIPMENT MANUFACTURERS' ASSOCIATION.—D. L. Eubank, Galena Signal Oil Company, Richmond, Va. Meeting with Traveling Engineers' Association.

RAILWAY FIRE PROTECTION ASSOCIATION.—R. R. Hackett, Baltimore & Ohio R. R., Baltimore, Md.

RAILWAY REAL ESTATE ASSOCIATION.—R. H. Morrison, C. & O. Ry., Richmond, Va.

RAILWAY SIGNAL ASSOCIATION.—(See American Railway Association, Division 4, Signal Section.)

RAILWAY STOREKEEPERS' ASSOCIATION.—(See American Railway Association, Division 6.)

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 1841 Oliver Bldg., Pittsburgh, Pa. Meeting with American Railway Association, Division 5.

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, Westbury Battery Co., 30 Church St., New York.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—P. J. McAndrews, C. & N. W. Ry., Sterling, Ill. Next annual convention, September 20-22, 1921, Chicago. Exhibit by Track Supply Assoc. ion.

ST. LOUIS RAILWAY CLUB.—W. F. Prudden, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, Schroeder Headlight & Generator Co., New York City. Meeting with American Railway Association, Signal Section.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—L. W. Cox, 1217 Commercial Trust Bldg., Philadelphia, Pa.

SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. J. McFfill, P. O. Box 1205, Atlanta, Ga. Regular meetings, 3d Thursday in January, March, May, July, September and November, Piedmont Hotel, Atlanta.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, Western Ry. of Ala., Atlanta, Ga.

SUPPLY ASSOCIATION OF AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—C. M. Rubin, Duff Manufacturing Company, 935 Peoples Gas Bldg., Chicago.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillburn N. Y. Meets with Roadmasters' and Manufacturers of Way Association.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. R. R., Buffalo, N. Y. Exhibit by Railway Equipment Manufacturers' Association.

Traffic News

The production of soft coal during the week of January 22 declined sharply for the sixth week in succession. The total output is estimated by the Geological Survey at 9,139,000 net tons.

Canadian express companies have been authorized by the Board of Railway Commissioners to advance transportation rates from 20 to 35 per cent. The companies had asked leave to make a general increase of 40 per cent.

Interchangeable tickets for use on either the Pennsylvania or the Baltimore & Ohio, between Philadelphia, Baltimore and Washington are not to be honored after February 7. Re-establishment of normal pre-war train service by each road is given as the reason for changing from the practice inaugurated during federal control.

The Senate committee on interstate commerce has submitted a favorable report to the Senate on the bill recommended by the Interstate Commerce Commission, which has been passed by the House, proposing to amend the existing law relating to the transportation of explosives by including within its provision certain high explosives which are now omitted.

The Long Island Railroad on January 29 made a general advance of 20 per cent in passenger fares, excepting commutation tickets. This action followed the decision of the Appellate Division of the Supreme Court of the State, on the 28th, vacating the injunction which had restrained the railroad from complying with the order of the Interstate Commerce Commission requiring the advance in rates. The Appellate Division holds that the constitutionality of the Transportation Act of 1920 cannot be attacked in the State Court. The Staten Island Rapid Transit Company, which had been enjoined at the same time, also made the advance.

The Chicago, Milwaukee & St. Paul has put home-seekers' rates into effect at slightly over two cents a mile from Chicago to points in its territory as far west as within about 125 miles of the Pacific Coast. The tickets are for first class transportation for the entire distance. The company will sell the home-seekers' tickets from St. Paul, Minneapolis, Sioux City, Iowa, and tributary territory, as well as from Chicago. They will be on sale on the first and third Tuesdays of each month and will be good for 21 days. In addition to the new low rate for western home-seekers, the company will sell at Chicago and Milwaukee tickets good for ten days to prospective home-seekers going to points in northern Wisconsin and Michigan.

Committees to Confer With Shippers

The executive committee of the National Industrial Traffic League met in Chicago on January 25, to follow up and complete the arrangements for co-operation between shippers and carriers, which were made at the joint meeting with representatives of 17 trunk line railroads, held in New York last November. The Traffic League has appointed committees to work with groups representing the carriers. The committee which will represent the Traffic League in Official Classification territory has as its members W. H. Chandler, manager of the Transportation Bureau, Boston Chamber of Commerce, Boston, Mass., who is general chairman; N. D. Chapin, traffic manager, Syracuse Chamber of Commerce, Syracuse, N. Y.; L. C. Bihler, traffic manager, Carnegie Steel Company, Pittsburgh, Pa.; Paul M. Ripley, traffic manager, American Sugar Refining Company, New York City; George A. Blair, general traffic manager, Wilson & Co., Chicago. The league will be represented in western territory by a committee composed of H. C. Barlow, traffic director, Chicago Association of Commerce, Chicago, who is regional chairman; C. D. Mowen, commissioner, Ft. Smith Traffic Bureau, Ft. Smith, Ark.; Harry Dickinson, commissioner, Denver Transportation Bureau, Denver,

Colo.; J. P. Haynes, commissioner, Traffic Bureau, Chamber of Commerce, Sioux City, Ia.; Herman Mueller, traffic director, St. Paul Association, St. Paul, Minn. The committee for the southern territory has as its members W. C. Creighton, traffic manager, Charlotte Shippers' & Manufacturers' Association, Charlotte, N. C., who is regional chairman; C. S. Hoskins, president, Southern Traffic League, Tampa, Fla.; T. M. Henderson, commissioner, Traffic Bureau of Nashville, Nashville, Tenn.; Paul Giessow, general manager, New Orleans Joint Traffic Bureau, New Orleans, La.; T. A. Bosley, assistant traffic manager, Southern Cotton Oil Company, Richmond, Va.

The carriers have also selected representatives corresponding to and co-operating with the Traffic League's committees. To represent the railroads in Official Classification territory, a committee has been chosen whose members are G. H. Ingalls, vice-president, New York Central, New York City, who is general chairman; George D. Dixon, vice-president in charge of traffic, Pennsylvania System, Philadelphia, Pa.; T. C. Powell, vice-president, Erie, New York City; W. C. Maxwell, vice-president in charge of traffic, Wabash, St. Louis, Mo.; B. Campbell, vice-president, New York, New Haven & Hartford, Boston, Mass. The carriers' committee for western territory includes R. M. Calkins, vice-president, Chicago, Milwaukee & St. Paul, Chicago; Edward Chambers, vice-president, Atchison, Topeka & Santa Fe, Chicago; L. J. Spence, director of traffic, Southern Pacific, New York City; C. E. Spens, vice-president, Chicago, Burlington & Quincy, Chicago; C. Haile, vice-president, Missouri, Kansas & Texas, St. Louis, Mo. The members of the committee for the southern territory are C. T. Airey, vice-president and traffic manager, Central of Georgia, Savannah, Ga.; F. B. Bowes, vice-president, Illinois Central, Chicago; A. R. Smith, vice-president, Louisville & Nashville, Louisville, Ky.; C. R. Capps, first vice-president, Seaboard Air Line, Norfolk, Va.; and Lincoln Green, vice-president, Southern Railway, Washington, D. C.

The Broad Street Station Telegraph Office

The largest railroad telegraph office on the Pennsylvania system is in the general office at Philadelphia, known as "PO." It handles about 15,000 telegrams and reports daily, and requires the services of a chief operator, with five assistants; 41 Morse operators, two telephone message operators, 12 printer operators, and 33 messengers. The office has a switchboard accommodating 200 wires. There are 24 Morse sets, 12 duplex sets, two repeater sets, five Morkrum duplex printers, two telephone message desks, and a time repeater, which is used to send standard time from the Allegheny Observatory, to all of the telegraph offices on the system, at 2 a. m. and 2 p. m. daily. Between Philadelphia and Pittsburgh, by means of coils and condensers which divert the telegraph and telephone messages into separate paths, three telephone circuits are worked on four wires and each separate wire is used as a telegraph circuit. These separate telegraph circuits are duplexed so that by this means eight channels are secured for Morse operation from these four wires. The printers are also duplexed and operated over telephone circuits without the slightest interference with the telephone conversation.

In 1912 J. C. Johnson, then superintendent of telegraph, and now general superintendent of transportation, started what is known as the P. R. R. Educational Course, and this is conducted by correspondence. It includes courses in Electrical Engineering, Mathematics, Mechanical Drawing, Storage Batteries, Signal Engineering, Stenography, Italian-English and Spanish-English. This has enabled all employees to secure technical education without cost, thereby fitting them for more responsible positions in the service.

One of the requirements of employment of messengers in the telegraph service is that they must take up some course of study to fit them for promotion when they become too old for messenger service, and many of these former messengers now occupy positions of trust and responsibility in the various departments.—*The Mutual Magazine.*

MAKING THE RAILROADS WAIT.—The roads are not prospering under the higher freight and passenger rates granted last summer. This is an anxious period for them. The least Congress can do in all fairness is to direct the Treasury to continue paying installments on the balances run up against them through the Administration's short-sighted railroad policy.—*N. Y. Tribune.*

Commission and Court News

Interstate Commerce Commission

The commission has issued an amendment to its regulations governing passes so as to require each carrier to file with the commission a list of the names and titles of officers having authority to issue free transportation and of those having authority to request free transportation of other carriers.

The Interstate Commerce Commission has suspended until June 3, 1921, the operation of schedules which propose to reduce the rates on certain commodities from New York, N. Y., to Galveston, Texas, via the Southern Pacific Co.-Atlantic S. S. Lines (Morgan Line) applicable both as port to port rates and as proportional rates on traffic from seaboard interior points, also proportional rates via the Mallory line.

The commission has suspended until June 1 the operation of proposed through class rates from Albany, N. Y., Cumberland, Md., Elkins, W. Va., Richwood, W. Va., Scranton, Pa., Syracuse, N. Y., Williamsport, Pa., and points taking same rates to Green Bay, Wis., and other points in Wisconsin and Michigan located on west side of Lake Michigan via Manitowoc, Wisconsin.

The commission has ordered an investigation on the petition of the Steubenville, East Liverpool & Beaver Valley Traction Company that because of various franchise ordinances and regulations imposed by state and municipal authorities of Ohio, and of Pennsylvania, the company is unable to increase its rates for intrastate traffic by the amounts authorized by the commission for interstate traffic and under its recent order also for intrastate traffic in Ohio.

The commission has suspended until June 1 the operation of certain tariffs which propose to transfer El Paso, Tex., from the eastern boundary of the Mountain-Pacific territory, taking a 25 per cent increase under Ex Parte 74 decision, to the western group, making applicable instead the interterritorial percentage increase of 33½ per cent, and to transfer 33¼ per cent Group J points in Colorado, Nebraska, New Mexico, South Dakota and Wyoming to Group G basis on transcontinental class and commodity rates to the Pacific Northwest.

State Commissions

The Virginia Corporation Commission has received a petition from the Chesapeake Western asking permission to discontinue the operation of passenger trains, this because the improved highways lying parallel to the railroad have led to the increasing use of automobiles, thus taking away from the railroad enough passengers to make the trains unprofitable. This road is 50 miles long, from Elkton, Va., westward to Stokesville.

Court News

Hours of Service Act at Small Telegraph Stations

In an action for violations of the Hours of Service Act the charges were that telegraphers were employed more than nine hours in stations which were "continuously operated night and day." The question was whether the stations, Arlington, Mass., and Amherst, Mass., were of that character. The Arlington station was kept open continuously from 5:45 a. m. to 9 p. m., and Amherst from 6 a. m. to 9 p. m. The District Court for the district of Massachusetts holds that the mere keeping open of a station after 6 p. m. does not bring it within the nine-hour class. What constitutes night operation is a question of fact. The statute apparently refers to the divisions of the business day, 9 o'clock in the evening is apparently on the border line. In doubtful cases, said the court, the purpose for which the office is kept open is held the decisive factor. If kept open primarily for the

convenience of the public, it would not be "operated at night," within the statute. "Operated" means more than "kept open." Too severe limitation on hours of service at small stations would result in their being closed, thereby inconveniencing the public without any corresponding advantage. As the agreed statement of the parties threw no light on the purpose for which the stations were kept open during the evening nor on the sort of work then done at them; there could be no recovery of the penalties.—United States v. Boston & Maine, 265 Fed. 800.

The provisions of the Hours of Service Act on which this case turns are contained in the proviso of the second section, viz., that no train-order operators "shall be required or permitted to remain on duty for a longer period than nine hours in 24, in stations continuously operated night and day, nor for a longer period than 13 hours in stations operated only during the daytime." The question, therefore, was whether these stations were daytime stations, allowing operators to work 13 hours, or day and night stations allowing only nine-hour periods. Unless a station is operated in the night, as well as during the day, the nine-hour limitation does not apply.

The courts have pointed out several times that the statute is far from clear, and that, giving the language its ordinary meaning, it is evident there are places operated longer than "during the daytime," but which are not "continuously operated night and day." It is settled that the expression "continuously operated night and day" is to be understood as including stations which are closed part of the night, if they are operated during the daytime and a substantial part of the night. U. S. v. Atchison, 220 U. S. 37.

The point in this case, therefore, was practically, Is 9 p. m. too late to keep a day station open? And does that make it a day and night station?—U. S. v. B. & M., 265 Fed. 800.

Careless Loading by Shipper

The employees of the owners of a traction engine ran the engine on to a railroad's loading platform to load it on a car, and although they saw that the car was lower than the platform they attempted to run the engine on to the car without the use of blocks, which were at hand. The Iowa Supreme Court holds that the railroad was not liable to the owner of the engine for damages due to its falling to the ground.—Fidelity Thresher Co. v. Chicago, M. & St. P. (Iowa), 176 N. W. 615.

Crossing Bell Out of Order

In a crossing accident case, the New Jersey Supreme Court holds that an instruction to the jury that the railroad having installed an automatic bell at a highway crossing, it was the company's duty to use reasonable care to keep the bell in order and notify the public when it was out of use was erroneous. The statute defining the use of the bell merely absolves a traveler where the bell is installed from the consequences that would otherwise follow from his failure to stop, look and listen, and does not increase the obligations of the railroad.—Johnson v. C. N. J. (N. J.), 109 Atl. 359.

United States Supreme Court

Delivery Without Surrender of Bill of Lading

Does Not Necessarily Render Carrier Liable

In a case under the federal Uniform Bills of Lading Act, the main questions presented to the Supreme Court were, whether, upon the facts, there was a delivery to one in possession of the bill, and, if so, whether the delivery exonerated the carrier, it having been made without requiring surrender of the bill of lading.

In 1917 J. F. French & Co. shipped a carload of potatoes from Bailey, Mich., to Louisville, Ky., over the Pere Marquette and the C. C. C. & St. L. to their own order, notifying Marshall & Kelsey, Camp Taylor. The shipper attached the bill of lading to a draft for the purchase price and sold and delivered both, duly endorsed in blank, to a bank at Grand Rapids. This bank transmitted the paper to an Indianapolis bank, which, without obtaining payment of the draft, detached the bill of lading and wrongfully delivered it to Marshall & Kelsey. The car having reached Louisville, it was

delivered on request of one Bindner to the Southern Railway to be forwarded to Dumesnil, without requiring surrender of the bill of lading. The endorsed bill of lading had been left by Marshall & Kelsey with Bindner, an employee of the Southern, for safe-keeping. Later, upon the refusal of Marshall & Kelsey to accept the potatoes and honor the draft, possession of the car and bill of lading was returned to the shippers, who accepted them under protest and, without waiving any rights they might have, proceeded to dispose of the potatoes elsewhere in order to make the damage as light as possible for all concerned. The shippers then sued the Pere Marquette for compensation, contending that the carrier, by delivering the car upon request without requiring surrender of the bill of lading, had become liable for conversion of the potatoes. The shippers recovered judgment, which was affirmed by the State Supreme Court, 204 Mich. 578.

The railroad defended on the ground that there was a delivery at Louisville which exonerated it under Section 9 of the Federal Uniform Bill of Lading Act. Was the carrier liable for misdelivery, because the car was sent from Louisville to Dumesnil upon Bindner's request without surrender of the bill of lading?

First, The United States Supreme Court holds that having brought the goods to the destination named in the bill of lading the railroad's only duty under its contract was to make a delivery at that place; and it could make that delivery by turning the goods over to another carrier for further carriage. The fact that in forwarding the car the Big Four (C. C. & St. L.) used the original waybill, striking out the word "Louisville" under the "destination" and substituting "Dumesnil, Ky. So. R. R.," is held of no significance. The shipment from Louisville to Dumesnil was a wholly new transaction. In turning over the car for this new shipment the railroad made a disposal of it in assumed discharge of its obligations, which was, in legal contemplation, a delivery. Second, the delivery at Bindner's order was one which the carrier was justified in making under the provisions of section 9 of the act. The Big Four had no information, and there was nothing in the circumstances which should have led it to doubt that Bindner was lawfully entitled to request that the car be shipped to Dumesnil.

Finally, did such a delivery exonerate the carrier upon suit by the shipper when it failed to require surrender of the bill of lading as provided in that instrument? In the Supreme Court's opinion there is no exoneration where loss to shipper or subsequent purchaser of the bill results from such a failure; but where the loss suffered is not the result of the failure to take up the bill, mere failure to take it up does not defeat the exoneration.

There is nothing in the act which imposes upon the carrier a specific duty to the shipper to take up the bill of lading. Under section 8 the carrier is not obliged to make delivery except upon production and surrender of the bill of lading; but it is not prohibited from doing so. If instead of insisting upon production and surrender of the bill it chooses to deliver in reliance upon the assurance that the deliverer has it, so far as the duty of the shipper is concerned the only risk it runs is that the person who says that he has the bill may not have it. If such proves to be the case the carrier is liable for conversion and must of course indemnify the shipper for any loss. Such liability arises not from the statute but from the obligation which the carrier assumes under the bill of lading.

In this case the real cause of the loss was the wrongful surrender of the bill by the Indianapolis bank to Marshall & Kelsey by means of which the car was taken to Camp Taylor and the shipper deprived of the Louisville market. The shippers deliberately assumed the loss by their voluntary act in taking back the draft and bill which they had sold to the Grand Rapids bank. The delivery was made to one in possession of the bill of lading who could, and doubtless would, have surrendered it had he not been prevented by distance from doing so. To hold a carrier liable under such circumstances would seriously interfere with the convenience and the practice of business. For these reasons the judgment of the state court was reversed.—Pere Marquette v. French & Co. Decided January 17, 1921. Opinion by Mr. Justice Brandeis.

Foreign Railway News

Roumania Gets Credits for Purchase of Locomotives

LONDON.

It is reported that the banks of Roumania have granted important credits to the government to enable it to make substantial increases to the motive power of the Roumanian railways.

Mexico to Purchase Equipment

The Minister of Finance of Mexico has arranged with American firms for a credit of \$5,000,000, the proceeds of which are to be devoted to the purchase of equipment for the Mexican railways, according to cable advices from commercial attache Jackson at Mexico City.

Chinese Line to Purchase Passenger Cars

The Tientsin-Pukow Railway will purchase, according to information received by commercial attache Julian Arnold, 11 all steel passenger trains of 5 cars each. The company is also inquiring for ferries, with the view of establishing a train ferry across the Yantze river between Pukow and Nanking, in order to establish a through train service from Peking to Shanghai.

Chilean Road to Electrify

The Chilean government is asking for bids, to be opened in April, for the electrification of the government line from Valparaiso to Santiago, according to reports received by the Guaranty Trust Company. Bids are also asked for quantities of rails, switches and track accessories, for use on the government roads in the northern and central parts of the country according to reports.

Exports of Car Wheels and Axles in November

Car wheels and axles valued at \$738,825 were exported in November. This figure shows a substantial improvement over the similar total, \$543,753, for October. The largest shipment of this material, valued at \$309,683, was sent to France. Cuba comes next on the list with exports valued at \$131,483. The detailed figures by countries as compiled by the Bureau of Foreign and Domestic Commerce are as follows:

Countries	Dollars	Countries	Dollars
France	309,683	Argentina	1,354
Spain	56,248	Brazil	19,451
England	103	Chile	5,455
Canada	30,477	Colombia	3,929
Costa Rica	5,494	Peru	4,650
Honduras	32	Uruguay	1,127
Panama	2,277	Venezuela	2,134
Salvador	239	British India	13,229
Mexico	50,197	Dutch East Indies	60,506
Newfoundland and Labrador	1,035	Japan	10,987
Trinidad and Tobago	2,242	Turkey in Asia	272
Other British West Indies	155	Australia	279
Cuba	131,483	Philippine Islands	20,749
Virgin Islands	328		
Dominican Republic	4,686	Total	738,825

Lack of Locomotives Hampers Serbia

Commerce in Serbia is almost at a standstill, because of the lack of locomotives, according to Col. W. G. Atwood, technical adviser of the government of the Serbs, Croats and Slovenes, who has just returned to America after an absence of several years. With the assistance of several American engineers, 500 miles of railway were rebuilt last year. In spite of this, however, one million tons of grain are awaiting export, impossible because of inadequate railway facilities. Col. Atwood has made several reconnaissance trips over the mountains between Belgrade and the Adriatic and finds that railways can be built connecting the rich interior with the sea with comparatively easy grades and at a moderate cost.

A great help in rehabilitating the Serbian railways, according to Col. Atwood, is the entire absence of labor unrest in that country.

Progress Made by Mexican Lines

According to press reports from Houston, Tex., the director general of the National Railways of Mexico, F. Perez, has been in Texas conferring with officers of some of the Texas lines and has succeeded in securing the loan of a number of locomotives for use temporarily on the Mexican government lines to clear up the traffic congestion. W. G. McAdoo, formerly director general of railroads in the United States, has been selected to take charge of the Mexican roads for the time being, according to despatches from Mexico City. Mr. McAdoo is now in Mexico City.

English Railway Rate Committee Reports

LONDON.
The Rates Advisory Committee which was appointed by Sir Eric Geddes, minister of transport, for the railways of Great Britain during the fall of 1919, has recently made its report on the general revision of railway rates and charges for the railways of Great Britain in a document of over 60,000 words.

This committee was charged to report on: (1) the principles which should govern the fixing of freight and passenger rates, (2) the classification of merchandise traffic, and (3) the rates to be charged for parcels, perishable merchandise and other traffic conveyed by passenger train.

The committee was made up of a chairman, F. Gore-Browne, king's counsel, nominated by the Lord Chancellor, and of four other members as follows: Walter W. Berry, representing agriculture, nominated by the Board of Trade; W. J. Davis, representing labor, nominated by the Minister of Labor; W. A. Jepson, representing transportation and nominated by the Minister of Transport, and L. A. Martin, representing trade, nominated by the Board of Trade. W. M. Acworth, a prominent railway economist, also served on the committee in a consulting capacity at the suggestion of the Minister of Transport.

Two fundamental principles were recommended by the committee as governing all questions in the establishment of rates. These were: (1) Such charges must in no case be less than the cost to the railway companies of rendering the required services; (2) they must in no case be more than the value of the services to the shippers.

The committee proposed the establishment of a permanent rate tribunal consisting of three permanent paid members giving their whole time to the work, one being a person experienced in railway business, a second being a person experienced in commercial affairs, and the chairman being an experienced lawyer having no connection with railway or trading concerns and not holding judicial office. In addition to this tribunal, the committee recommended two panels, one to be called the shippers' panel, to be nominated by the Ministry of Transport in collusion with such associations, federations and chambers of commerce and agriculture as he shall consider best to represent the shippers' interests; the other panel to be called the railway panel and to be nominated by the Ministry of Transport in consultation with the Railway Companies' Association. These panels are to work with the rate tribunal as the latter sees fit, and in the event of a permanent member of the tribunal, other than the chairman, being unable to attend on any hearing, a member of the panel selected by the minister of transport would be authorized to take his place with all the power and duties of the permanent member.

The functions of the new tribunal would be to classify freight and fix freight rates, except in cases provided for by law, and to fix passenger fares.

The committee recommends the establishment of uniform rates, depending on distance, and the separation of terminal and cartage charges from conveyance rates. At present the rates on various railways for transportation of the same commodities over the same distance vary up to 35 per cent. The law provides for the maintenance of the existing rate structure until February, 1923, and it is not proposed that new rates should be established until that time.

Equipment and Supplies

Locomotives

THE TURNBULL CLIFFS FURNACE COMPANY, Cleveland, Ohio, has ordered 2 locomotives from the American Locomotive Company.

Freight Cars

THE TENNESSEE COAL, IRON & RAILROAD COMPANY has ordered 157, 70-ton gondola cars from the Chickasaw Shipbuilding Company, Birmingham, Ala.

THE TIENTSIN-PUKOW, reported in the *Railway Age* of January 28, as contemplating coming in the market soon for 300 gondola cars, is now in the market for this equipment, also for 200 box cars.

THE LOUISVILLE & NASHVILLE, reported in the *Railway Age* of January 14 as inquiring for 2,700 freight cars, has ordered this equipment as follows: 1,500 box cars, and 100, 40-ton stock cars from the American Car & Foundry Company; 500 box cars from the Mt. Vernon Car Manufacturing Company; 300, 40-ton coke cars, and 300, 55-ton gondola cars from the Chickasaw Shipbuilding Company.

Passenger Cars

THE PENNSYLVANIA EQUIPMENT COMPANY, 1420 Chestnut street, Philadelphia, Pa., is in the market for a second-hand 200 hp. McKeen or Hall-Scot all steel gasoline motor car, having smoking, passenger and baggage compartments.

Iron and Steel

THE UNION PACIFIC has ordered 10,000 tons of rails from the Illinois Steel Company.

Miscellaneous

CARR BROTHERS, INC., 65 Broadway, New York, has placed an order for 450 axles to be used on locomotives and cars on the Mexican railroads.

THE BOARD OF DIRECTORS OF THE UTAH-IDAHO CENTRAL, operating the electric line between Ogden, Utah, and Preston, Idaho, has authorized the issuance of \$300,000 in notes for the purpose of purchasing equipment and rolling stock and making improvements. It is said the greater part of the money will be used in the purchase of freight cars.

Signaling

THE RICHMOND, FREDERICKSBURG & POTOMAC has contracted with the Union Switch & Signal Company for an electro-pneumatic interlocking, 28 working levers, to be installed at A F block station, near Alexandria, Va., the junction with the Chesapeake & Ohio and the Southern. This apparatus will take the place of a 60-lever mechanical machine. The tower, of brick, is now under construction.

BOOK PAPER FROM SOUTHERN PINE AND RED GUM.—The U. S. Forest Products Laboratory announces that it has demonstrated the feasibility of making high grade book paper from these woods. One cord each of loblolly pine and red gum will make one ton of paper at a cost which will allow of a good margin of profit at prevailing prices. Additional information and samples of paper can be obtained from the Forest Products Laboratory, Madison, Wis., on request.

Supply Trade News

J. D. Shaver has been made sales manager of the Cleveland Crane & Engineering Company of Wickliffe, Ohio.

W. F. Warden, president of the Burt Manufacturing Company, Akron, Ohio, died of heart trouble at Deland, Fla., on January 19.

George E. Pratt, who is interested in the **Simplex Safety Apparell Company**, Chicago, has been appointed sales engineer of this company.

John Hyland, formerly manufacturers' agent at Atlanta, Ga., is now in the sales department of **The Lehon Company**, with headquarters at Chicago.

L. A. Lenhart, plant manager of the General American Tank Car Corporation, East Chicago, Ind., has resigned to become vice-president of the Youngstown Steel Car Company, Niles, Ohio.

James W. White has joined the sales organization in the New York office of the **Okonite Company**, Passaic, N. J. Mr. White was formerly in the service of the General Railway Signal Company and remained there for four years and was then with the Union Switch & Signal Company for about five years.

The Black & Decker Manufacturing Company, Baltimore, Md., will open a new branch office and service station at 75 Fremont street, San Francisco, Cal., on February 1. This office will have jurisdiction of the company's affairs over the entire Pacific Coast territory and will be in charge of **F. A. Johnson**.

Harry M. Evans, eastern sales manager of the **Franklin Railway Supply Company, Inc.**, has been elected vice-president of the company, with offices at 30 Church street, New York. Mr. Evans was born at Meadville, Pa., and was educated in the public schools at that place. He began railroad work as a call boy on the Erie, and served in various positions in the mechanical, transportation and traffic departments of that road. He entered the mechanical department of the Franklin Railway Supply Company in October, 1908, as traveling representative. In August, 1916, he became assistant western sales manager, and in January, 1917, was appointed eastern sales manager, which position he was holding at the time of his recent election as noted above.

J. L. Jackson has been appointed manager of the West Coast department of the **Mummet Lumber & Tile Company**, with headquarters at Chicago, effective January 20. Previous to his present connection, Mr. Jackson was with the **Duncan Lumber Company**, of Portland, Ore., which company he had joined in 1913, after two years' service with the **Douglas Fir Sales Company**, of Portland.

Louis B. Rhodes, southeastern sales representative of the **Vapor Car Heating Company, Inc.**, with headquarters at Richmond, Va., died of heart failure on January 25, at Nash-

ville, Tenn. Mr. Rhodes was formerly master mechanic on the Georgia Southern & Florida and had served as superintendent of motive power of the Virginian. Later he was with the **Ward Equipment Company**. He was in the service of the **Standard Heat & Ventilation Company** at the time when the latter company was consolidated with the **Chicago Car Heating Company** in the organization of the **Vapor Car Heating Company**.

A. T. Kuehner has been appointed mechanical engineer of the **Standard Stoker Company, Inc.**, New York. Mr. Kuehner is the inventor of the **Keener journal box** for locomotive drivers and trucks. This device will be manufactured and placed on the market by the **Standard Stoker Company**. Mr. Kuehner, until his recent appointment, was on the staff of **C. A. Gill**, superintendent of motive power of the **Baltimore & Ohio**.

Obituary

Edmund M. Blake, production engineer for **Chas. R. McCormick & Co.**, San Francisco, Cal., and president of the **Railroad Tie Producers Association**, whose death on January 12, at San Francisco, was

noted in the *Railway Age* of January 14 (page 216), was born at Taunton, Mass., on August 13, 1874. Mr. Blake was educated at Amherst College and Harvard University, graduating from the former institution in the class of 1897 and completing his studies at the **Lawrence Scientific School** at Harvard in 1899. Upon leaving college, he entered the service of his father, **Percy M. Blake**, a consulting hydraulic engineer, and since this time has had a wide and varied experience,

both in this country and abroad. During the first few years of his professional career, he served as a designer with the **Eastern Bridge & Structural Company**, Worcester, Mass., was assistant engineer for the **New York Rapid Transit Commission** and was a designer with the **Brown Hoisting Machinery Company** at Cleveland, Ohio. In 1902, he returned to the employ of **Percy M. Blake** as principal assistant engineer and during the next four years had charge of steam and water piping for a number of waterworks systems. From 1906 to 1908, he was in private practice in Boston, Mass., and had charge of the design and installation of waterworks and hydraulic systems at Wareham, Wrenham, Westford and at Provincetown, Mass. In 1909, after a year's service as manager of the **Idaho Irrigation Company**, he entered private practice in Boise, Idaho, which practice he left two years later to become engineer in charge of the improvement of the **Neponset river**, undertaken by the **Massachusetts State Department of Health**. In May, 1916, he entered the employ of the **Holbrook, Cabot & Rollins Corporation**, as engineer on drydock work at South Boston, Mass. From October, 1917, to December, 1918, when he became associated as production engineer with **Chas. R. McCormick & Co.**, he fulfilled a number of war commissions with credit to himself. Mr. Blake, in 1905, was sent abroad by the **United States Department of Agriculture** to investigate and report on drainage and irrigation in Italy. While abroad he also inspected and reported on the **Paris subways** and the **London tunnels**. At the time of his death he was president of the **National Association of Railroad Tie Producers**, his death occurring shortly before the opening of the convention of this association at San Francisco, to which he had given so much of his time.



Harry M. Evans



E. M. Blake

S. W. Dudley Leaves Westinghouse Organization

S. W. Dudley, widely known authority on matters pertaining to train and traction control, retired on February 1 as chief engineer of the Westinghouse Air Brake Company, Wilmerding, Pa., to accept a professorship of mechanical engineering at Yale University.



S. W. Dudley

Mr. Dudley has been associated with the air brake company for 17 years. Starting as a special apprentice in 1903, he spent the summer of that year and the next in the plant, returning to school to complete a postgraduate course during the other seasons. When he established permanent connections with the organization in 1905, he was attached to the office of the late Walter V. Turner, then mechanical engineer of the Westinghouse Air Brake Company. Here he was assigned as a member of the party in charge of the first road tests of the Type R triple valve between Pittsburgh and Fairhance, on the Pennsylvania Railroad, later acting as engineer's assistant during a series of important demonstrations of the ET equipment and the Type R passenger triple valve on the New York Central. He was charged with the responsibility of compiling much of the data relating to these demonstrations, which resulted in the development of the high emergency retained features which were added to the Type R triple valve to complete the Type L, later adopted for the motor cars of the New York Central's electrified zone.

In 1906, Mr. Dudley was assigned to the New York office to follow the installation, operation and maintenance of new air brake equipment that was placed in service on electric locomotives and motor cars during the inauguration of the New York Central's terminal electrification. A year later he was called back to Wilmerding to take charge of the air brake publicity department, where he remained until 1909, when he was appointed assistant mechanical engineer. In 1910 he became assistant chief engineer (in charge of operation), and in 1914 he was advanced to the position of chief engineer, which title he retained up to the time of his resignation.

Mr. Dudley graduated from Yale University, to which he now returns, with the class of 1900, completing thereafter a post-graduate course which qualified him for his M.E. degree.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company will build a complete ice plant at Hobart Station, Cal., which will cost approximately \$500,000 and will include a 500-ft. icing dock, an office building, and a cooling tower. The company also contemplates rearrangements of its facilities at Calwa, Cal., to make space for an addition to the existing ice plant, which will cost \$90,000. The Santa Fe will install a 120-ft. turntable at Clovis, N. M., at a cost of \$46,000.

ATCHISON, TOPEKA & SANTA FE.—This company contemplates an 11-stall addition to its roundhouse at Newton, Kan.

ATLANTIC COAST LINE.—This company will build a reinforced concrete bridge including a draw span at Moore Haven, Fla. The work will be done by company forces.

CAROLINA, CLINCHFIELD & OHIO.—This company will make improvements and additions to its passenger station at Johnson City, Tenn., at a cost of about \$7,500. The work will be handled by company forces.

CHICAGO, BURLINGTON & QUINCY.—This company is accepting bids for the construction of a hotel and restaurant at Cody, Wyo.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—This company is improving its yard facilities at Jeffersonville, Ind., by extending 7 yard tracks at a cost of approximately \$143,000. The company contemplates other terminal improvements at Jeffersonville in the future.

GREAT NORTHERN.—This company contemplates the construction of car shops at Minot, N. D.

MISSOURI, KANSAS & TEXAS.—Proposals have been requested for the construction of a reinforced concrete inbound freight-house, 50 ft. by 600 ft., with second-story office, 50 ft. by 100 ft., and platform, 8 ft. by 600 ft. and 58 ft. by 100 ft., replacing the present brick and frame station at Jefferson street and Ross avenue, Dallas, Tex.

WESTERN MARYLAND.—This company has awarded a contract to the Wellman Seaver Morgan Company, Cleveland, Ohio, for the erection of a ship coal handling device of steel construction at Port Covington, Baltimore, Md.

THE AMERICAN ELECTRIC RAILWAY ASSOCIATION, in a report on the condition of the electric railway industry throughout the country for the past year finds indications of a gradual and steady approach to a stable basis. Regulatory bodies, recognizing that fair rates of return are essential to the maintenance of good service, have steadily ordered relief throughout the country; and, also, they recognize that rehabilitation of lines will be a slow process and that at least the present advanced rates must be maintained for some time even if falling costs, anticipated but not realized as yet, should come. Badly needed improvements have been deferred by virtually every company.

The report shows that 548 cities, representing more than 90 per cent of the riding population in cities, are paying fares ranging from five cents with a one-cent charge for transfers, to a flat rate of ten cents. One hundred and twelve cities pay a ten-cent fare. Electric railway receiverships are not so numerous. There were only 16 in 1920, representing a total capital stock of \$25,313,655, as compared with 48 receiverships, representing a capital stock of \$221,259,354, in 1919. During the year 450 miles of track were dismantled and 308 miles of track abandoned.

From every part of the United States the reports show not only regulatory bodies but car riders generally as taking the greatest interest in the restoration of companies to a healthy state. The inclination to prevent companies from receiving sufficient return to maintain good service is believed to be confined to a small number of persons.



Photo by Keystone View Co.

Summit of Pikes Peak, Colorado, with Rack Rail Train

Railway Financial News

ALABAMA & VICKSBURG.—This company has applied to the Interstate Commerce Commission for authority to issue notes to the United States for loans from the revolving fund, for the refunding of part of its mortgage debt and for the purchase of locomotives. It is proposed to give notes to the government for \$1,394,000 for a loan and other notes to the amount of \$542,900, and to take up the entire issue of \$1,936,000 of mortgage bonds, exchanging the \$542,900 of notes for a part of the outstanding bonds. Authority is also asked for another note to the United States for a loan of \$170,000 for the purchase of locomotives, and it is proposed to issue \$4,000,000 of first mortgage bonds under a new mortgage which will be used as collateral for the various notes. The bonds will bear interest at 6 per cent, dated April 1, 1921, and maturing April 1, 1951.

ALABAMA, TENNESSEE & NORTHERN.—The Interstate Commerce Commission has approved a loan of \$90,000 to this company to aid it in meeting its maturing indebtedness.

ATCHISON, TOPEKA & SANTA FE.—This company has applied to the Interstate Commerce Commission for a certificate authorizing it to undertake the operation of the leased line of the Buffalo & Northwestern.

BALTIMORE & OHIO.—This company has been authorized by the Interstate Commerce Commission to nominally issue and hold in its treasury \$2,744,000 of its refunding and general mortgage bonds, series B. In the same order authority was granted to subsidiaries of the Baltimore & Ohio to issue and deliver their bonds to its nominees in payment for additions, improvements and betterments to the amount of \$1,860,000.

This company has applied to the Interstate Commerce Commission for authority to assume rental payments amounting to \$617,769 under an equipment trust agreement of December 1, 1917, between the Seaboard Air Line and the Commercial Trust Company, trustee.

BIRMINGHAM, SELMA & MOBILE.—This company has applied to the Interstate Commerce Commission for a loan of \$25,000 for 10 years to assist it in completing an extension of its line.

BUFFALO, ROCHESTER & PITTSBURGH.—This company has declared a semi-annual dividend of \$3 on the common stock, and the regular semi-annual dividend of \$3 on the preferred stock, both payable February 15 to stock of record February 10. Previously the company had been paying dividends of \$2 a share on the common semi-annually.

CENTRAL OF GEORGIA.—This company has been authorized by the Interstate Commerce Commission to enter into a proposed equipment trust agreement for the issuance of \$650,000 of equipment trust certificates, for the purchase of 7 locomotives, 13 passenger cars and 4 express cars at an estimated total cost of \$1,088,835.

CENTRAL & GULF.—This company has applied to the Interstate Commerce Commission for a loan of \$500,000 for 15 years to assist the company in the purchase of equipment and in completing an extension of 30 miles to Pine Bluff, Ark.

CENTRAL WISCONSIN.—The Interstate Commerce Commission has issued a certificate authorizing this company to acquire and operate the railroad owned by the Fairchild & Northeastern, extending from Cleghorn to Owen, Wis., 65 miles.

CHICAGO, INDIANAPOLIS & LOUISVILLE.—The Interstate Commerce Commission has approved a loan of \$115,000 to this company to aid the company in providing itself with additional motive power consisting of 5 Mikado freight locomotives at a total estimated cost of about \$340,000. The carrier itself is required to finance about \$225,000 to meet the loan of the government.

CHICAGO, MILWAUKEE & ST. PAUL.—Samuel McRoberts has been elected a director to succeed John D. Ryan, who has resigned because of Section 10 of the Clayton Act.

CHESAPEAKE & OHIO.—This company has been authorized by the Interstate Commerce Commission to issue \$50,225,000 of common capital stock from time to time in exchange for its 5 per cent convertible 30-year secured gold bonds at certain rates specified in the order.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—This company has been authorized by the Interstate Commerce Commission to guarantee a promissory note of the Louisville & Jeffersonville Bridge & Railroad Company for \$108,000 to the United States government.

DENVER & RIO GRANDE.—Affidavits alleging that fraudulent transactions by interlocking directorates led to the receivership sale of this road were filed by J. L. Webster, an attorney for the stockholders' committee, on January 28, at St. Louis, Mo., with Federal Judges Walter H. Sanborn and Robert E. Lewis. The court gave the defendants in the suit 30 days in which to file a counter petition. Mr. Webster asserted that the physical property of the road was valued at \$225,000,000, although it was sold for \$5,000,000, and the securities held by the road were worth \$9,722,000 alone. Mr. Webster announced that after the briefs had been filed he would institute proceedings at Denver to have the sale set aside.

ELBERTON & EASTERN.—This company has applied to the Interstate Commerce Commission for authority to issue \$12,050 of first mortgage 5 per cent gold bonds held in its treasury.

FLEMINGSBURG & NORTHERN.—This company has applied to the Interstate Commerce Commission for a loan from the revolving fund of \$10,000 for three years to enable it to retire floating indebtedness.

FORT SMITH & WESTERN RAILWAY.—This company has applied to the Interstate Commerce Commission for authority to issue 62,400 shares of a total of 70,000 shares authorized, of no par value, common stock, \$1,500,000 of a total authorized issue of \$3,500,000 of 7 per cent first mortgage bonds and \$3,744,000 of a total authorized issue of \$10,000,000 of 6 per cent second mortgage bonds, in connection with its reorganization of the Fort Smith & Western Railroad. The new securities are to be exchanged for \$7,000,000 of first mortgage bonds of the railroad company.

GEORGIA NORTHERN.—This company has applied to the Interstate Commerce Commission for a loan of \$200,000 for 15 years to assist it in the purchase of rolling stock.

GREENE COUNTY.—This company has applied to the Interstate Commerce Commission for a loan of \$60,000 from the revolving fund to retire various items of indebtedness.

HOCKING VALLEY.—The Interstate Commerce Commission has approved a loan of \$1,665,000 to this company to enable the company to provide itself with additions and betterments to equipment and to way and structures.

ILLINOIS CENTRAL.—This company has applied to the Interstate Commerce Commission for authority to issue \$3,564,000 of equipment trust certificates, series G, on the Philadelphia plan, to finance 60 per cent of the cost of 75 locomotives. It is proposed to sell the certificates to Kuhn, Loeb & Co. at 96 per cent of par or on a basis of 7.15 per cent.

INDIANA HARBOR BELT.—The Interstate Commerce Commission has issued an order extending the time within which this company was authorized to issue \$2,200,000 of promissory notes from 60 days to six months after November 6, 1920.

INTERNATIONAL & GREAT NORTHERN.—At a meeting of the note-holders' protective committee on January 21, Frederick Strauss, vice-chairman, was elected chairman to succeed Alexander J. Hemphill, and Winslow S. Pierce was elected a member of the committee.

MARION & RYE VALLEY.—This company has been authorized by the Interstate Commerce Commission to guarantee a note of the Virginia Southern to the Secretary of the Treasury for \$38,000.

NEW YORK CENTRAL.—A. T. Hardin, vice-president in charge of operation, has been elected a director to succeed William K. Vanderbilt, deceased.

NORFOLK & WESTERN.—The Interstate Commerce Commission has issued a certificate authorizing the acquisition and operation by this company of feeder lines owned by the Tug River & Kentucky and the Williamson & Pond Creek.

NORTHERN PACIFIC.—This company has applied to the Interstate Commerce Commission for a certificate authorizing it to acquire the property of the Billings & Central Montana.

NORTHERN PACIFIC.—The Interstate Commerce Commission has issued a certificate authorizing this company to abandon a branch line, 1.8 miles, with 1.75 miles of spur track, in Richard County, N. D.

NORTHERN PACIFIC.—Frank L. Polk, formerly Acting Secretary of State, E. M. Willis and A. H. Gillard, have been elected directors succeeding J. P. Morgan, Lewis Cass Ledyard and Payne Whitney, who resigned in compliance with Section 10 of the Clayton Act.

OREGON-WASHINGTON RAILROAD & NAVIGATION COMPANY.—This company has been authorized by the Interstate Commerce Commission to issue first and refunding mortgage bonds payable in dollars in exchange for not exceeding £3,782,400 of similar bonds which may be surrendered by the holders as provided in the company's first and refunding mortgage dated January 3, 1911.

PANHANDLE & SANTA FE.—This company has applied to the Interstate Commerce Commission for a certificate to operate the leased line of the North Texas & Santa Fe.

PENNSYLVANIA.—Kuhn, Loeb & Co. and other bankers have sold an issue of \$60,000,000, 15-year, 6½ per cent bonds, due February 1, 1936. The bonds were sold at 99¼ and interest, to yield about 6.58. They are to be secured by \$60,000,000 Pennsylvania Railroad general mortgage 6 per cent gold bonds, series "C," due April 1, 1970, and \$6,000,000 Philadelphia, Baltimore & Washington Railroad general mortgage 6 per cent gold bonds, series "A," due April 1, 1960.

PEORIA & PEKIN UNION.—The Interstate Commerce Commission has approved a loan of \$1,799,000 to this company, for the purpose of aiding the company in meeting the maturity, February 1, 1921, of its bonded indebtedness in an aggregate principal amount of \$2,994,000. The carrier itself is required to finance \$1,195,000 to meet the loan of the government. The company has also been authorized to extend the time of maturity of its first and second mortgage bonds for five years from February 1, 1921, to increase the interest rate on the first mortgage bonds from 6 per cent to 7 per cent and on the second mortgage bonds from 4½ to 7 per cent.

The Lake Erie & Western has applied to the Interstate Commerce Commission for authority to guarantee a 6 per cent 5-year promissory note of the Peoria & Pekin Union for \$181,000. The Illinois Central has similarly applied for authority to guarantee 25 per cent of a proposed loan of \$1,861,000 to the Peoria & Pekin Union, and the Peoria & Eastern for authority to guarantee a 6 per cent, 5-year promissory note of the Peoria & Pekin Union for \$226,250. The notes are to the United States Government.

PHILADELPHIA & READING.—This company has applied to the Interstate Commerce Commission for a loan of \$1,185,625 for 15 years, to enable the company to pay approximately 20 per cent cash for the purchase of 25 consolidation freight locomotives at \$75,450 each, 5 switching locomotives at \$36,000, 5 passenger locomotives at \$61,000. The company proposes to issue or join in the issue of equipment trust certificates for the balance, 50 per cent of the amount of the certificates to be applied as security for the loan and the balance to be sold on the best available terms.

PORTLAND, ASTORIA & PACIFIC.—The Interstate Commerce Commission has issued a certificate authorizing the acquisition and operation by this company of the line owned by the United Railways Company from Wilkesboro to Linnton, Oregon, 18.64 miles, and another certificate authorizing the United Railways Company to abandon operation of the line.

RARITAN RIVER.—This company has applied to the Interstate Commerce Commission for authority to issue \$100,000 of promissory

notes at 6 per cent to reimburse the treasury for money expended out of income for investment.

RICHMOND TERMINAL.—This company has been authorized by the Interstate Commerce Commission to issue 35 promissory notes aggregating \$3,100,000, with interest at 6 per cent. The notes are payable to the Richmond, Fredericksburg & Potomac and the Atlantic Coast Line.

UNION PACIFIC.—This company has been authorized by the Interstate Commerce Commission to issue first lien and refunding mortgage bonds payable in dollars in exchange for not exceeding \$771,600 of similar bonds which may be surrendered by the holders as provided in the company's mortgage dated June 1, 1908.

VALDOSTA, MOULTRIE & WESTERN.—Special Master J. W. Talbert will offer this road for sale on February 22 at Valdosta, Ga., at the upset price of \$165,000.

VIRGINIA SOUTHERN.—The Interstate Commerce Commission has approved a loan of \$38,000 to this company to aid the carrier in meeting its maturing indebtedness. The carrier itself is required to finance \$37,000 to meet the loan of the government.

The Virginia Southern has applied to the Interstate Commerce Commission for a loan of \$75,000 for 10 years to enable it to take up a bank loan.

WESTERN ALLEGHENY.—This company has applied to the Interstate Commerce Commission for authority to issue demand notes to the amount of \$100,000.

WESTERN MARYLAND.—This company has been authorized by the Interstate Commerce Commission to issue \$225,000 of 6 per cent marine equipment gold notes under a proposed agreement of conditional sale for the purchase of a car float and to sell the notes at not less than par and accrued interest.

This company has applied to the Interstate Commerce Commission for authority to issue \$3,000,000 of equipment gold notes, consisting of \$1,500,000 of a preferred series at 7 per cent which have been sold at par and \$1,500,000 of a junior series at 6 per cent, which it is proposed to pledge as collateral with the Secretary of the Treasury. The notes are for the purchase of 40 consolidation freight locomotives, and they are to be paid off at the rate of \$100,000 a year for each series from 1922 to 1936.

WICHITA FALLS & NORTHWESTERN.—This company has applied to the Interstate Commerce Commission for an order authorizing the issue of a series of 10-year, 6 per cent receivers' certificates, to be pledged as collateral for the amounts found to be due the director general of railroads.

WISCONSIN & NORTHERN.—This company has been authorized by the Interstate Commerce Commission to issue \$49,400 of first mortgage 6 per cent gold bonds and to sell them at not less than 90 per cent of par. The company had applied for authority to sell them at not less than 75.

Dividends Declared

BUFFALO, ROCHESTER & PITTSBURGH.—Common, \$3 semi-annually preferred, \$3, semi-annually; both payable February 15 to holders of record February 10.

DELAWARE & HUDSON.—2¼ per cent, quarterly, payable March 21 to holders of record February 26.

ILLINOIS CENTRAL.—1¾ per cent, quarterly, payable March 1 to holders of record February 4.

NORFOLK & WESTERN.—Common, 1¾ per cent, quarterly, payable March 19 to holders of record February 28.

PENNSYLVANIA.—1½ per cent, quarterly, payable February 28 to holders of record February 1.

THE ILLINOIS CENTRAL, by advertising in the newspapers throughout the territory served by its lines, is calling attention to the highway crossing problem. The advertisement states that it is the "safe" crossing which is the most dangerous; and that electric bells, watchmen, and signs at crossings should warn the driver to be constantly on the alert. During the four years ended December 31, 1920, 4,350 persons were killed and 12,750 injured in automobile grade-crossing accidents in the United States, and for the same period 158 were killed and 659 injured in that class of accidents on the Illinois Central System.

Railway Officers

Executive

C. D. Mackay, whose appointment as vice-president of the High Point, Randleman, Asheboro & Southern, Yadkin, Carolina & Northwestern, Tallulah Falls, Hartwell, Danville & Western and Blue Ridge (all subsidiaries of the Southern), was announced in the *Railway Age* of January 28 (page 309), was born September 22, 1884, at Durham, N. C. He was educated in the public schools and entered railway service in 1902 as a clerk in the local freight office of the Southern at Raleigh, N. C. From March to December, 1903, he served as a stenographer in the office of the master mechanic of the Seaboard Air Line at Raleigh. On the latter date he became a clerk in the office of the first vice-president of the Southern. From September, 1908, to April, 1915, he was secretary to the first vice-president. On the latter date he was made secretary of the Southern's subsidiary companies. In 1919 he was promoted to assistant to vice-president of those companies, and was serving in that capacity at the time of his recent promotion.

Financial, Legal and Accounting

L. M. Bradish has been appointed assistant general auditor in charge of receipts of the Pullman Company. **H. R. Holmgren** has been appointed assistant general auditor. **B. C. H. Olson** has been appointed auditor of disbursements and **H. J. England** auditor of valuation. These appointments were effective January 1.

William H. Burns, general auditor of the Chicago, Rock Island & Pacific, whose election to succeed Frank Nay as head of the accounting department of the Rock Island, was announced in the *Railway Age* of January 28 (page 309), was born in Chicago on April 23, 1865. He entered railway service in 1880 as clerk to the storekeeper on the Rock Island, but left the service of the company shortly to complete his education. He returned to the employment of the Rock Island in 1882, being engaged in clerical work under the roadmaster. In January, 1883, he was transferred to the office of the freight auditor where he served until June, 1898. On the latter date he was promoted to freight auditor, a position which he held until July, 1902, when he was made auditor of freight traffic. In October, 1905, another promotion made him assistant general auditor, and in 1909 he became general auditor of the Rock Island. During the period of federal control, Mr. Burns was federal auditor, resuming his former duties as general auditor when government control ceased. Mr. Burns retains his former title of general auditor, but has been given also the duties of the former controller.

W. H. Anderson has been appointed paymaster on the Chicago, Milwaukee & St. Paul, with headquarters at Chicago, succeeding Garner Ranney, who has been assigned to other duties. **W. W. Scannel** has been appointed auditor of station accounts, succeeding Mr. Anderson. **E. F. Hoy** has been appointed car accountant, succeeding Mr. Scannel, and **J. Dewar** has been appointed assistant car accountant. The appointments and changes are effective January 15.



W. H. Burns

Operating

H. Hulatt, consulting manager of telegraphs of the Grand Trunk, has been appointed manager of telegraphs, Western Lines, with headquarters at Montreal, effective February 1. The position of consulting manager of telegraphs has been abolished.

H. M. Gargan, whose promotion to superintendent of the Champlain division of the Delaware & Hudson was announced in the *Railway Age* of January 28 (page 309), was born December 12, 1886, in New York City. He attended the public schools in that city and Fordham Preparatory School and was graduated from Fordham University in 1909 with the degree of bachelor of science. Mr. Gargan first entered railway service on January 1, 1914, as a yard clerk at Wilkes-Barre, Pa. On March 1 of the same year he was promoted to chief clerk to the general yardmaster and served in that capacity until April 15, when he was promoted to assistant night yardmaster. On June 1 he became night yardmaster of the Hudson yard. On April 15, 1915, he was promoted to general yardmaster of the same yard and on March 1, 1916, was transferred in the same capacity to Wilkes-Barre. He was promoted to assistant trainmaster of the Susquehanna division on May 1, 1916, and became trainmaster of the same division on May 15 of the following year. On May 15, 1920, he was detailed to the office of the general manager without change of title. He was serving in that capacity at the time of his recent promotion.

Traffic

D. F. Lindsay has been appointed general western passenger agent of the Lehigh Valley, with headquarters at Chicago, effective February 1, succeeding A. B. Hill, deceased.

G. Williams has been appointed general freight agent of the Denver & Rio Grande, with headquarters at Denver, Colo., succeeding W. M. Lampton whose death was announced in the *Railway Age* of December 31 (page 1184).

C. D. Chancellor, whose promotion to assistant general freight agent of the Central of Georgia was announced in the *Railway Age* of January 21 (page 263), was born at Okolona, Miss., on December 11, 1884, and was educated in the public schools. He entered the employ of the Central of Georgia in 1897 at the age of 12, as a mimeographer in the freight traffic department. He served subsequently in many positions throughout the department, including the following: correspondence mail clerk, tariff mail clerk, tariff index clerk, correspondence file clerk, quotation clerk, rate clerk, executive rate clerk and chief clerk of the rate department. He was serving as chief clerk at the time of his recent promotion.

Engineering, Maintenance of Way and Signaling

C. S. Knapp has been appointed engineer of valuation of the Pullman Company, effective January 1.

Paul Sterling, maintenance engineer of the New York, New Haven & Hartford, Lines West, has been appointed assistant to engineer, maintenance of way with headquarters at New Haven, Conn., effective February 1. **R. L. Pearson**, division engineer of the New Haven and New London divisions, has succeeded Mr. Sterling as maintenance engineer, Lines West. **E. E. Oviatt**, division engineer of the Danbury division and the Central New England, has succeeded Mr. Pearson and **C. D. Perkins** has succeeded Mr. Oviatt.

Obituary

W. J. Moule, assistant comptroller of the Canadian Pacific, died January 28, at Montreal.

James Buckley, general eastern passenger agent of the Erie, died at New York on January 28.

H. G. Haugan, at one time controller of the Chicago, Milwaukee & St. Paul, died on January 31, at Pasadena, Cal. Mr. Haugan retired from active railroad service 10 years ago after 40 consecutive years of service with the St. Paul.

EDITORIAL

Railway Age

The Table of Contents Will Be Found on Page 5 of the Advertising Section

Autogenous welders receive five cents an hour above the standard rate paid machinists at the point employed. This is quite fitting and proper as autogenous welding is work that requires special knowledge and special skill.

A Bonus for Quality

Unfortunately it is a flat wage rate and unfortunately, too, speed in welding is a desirable factor. These two facts are apt to cause trouble, as the quality of the weld is of primary importance. Because of the five cents an hour higher wage and because he has the privilege, a machinist may decide that he wants to do autogenous welding even though he has had no previous experience in this line of work and may not be a man who is capable of becoming a first-class welder. This, of course, means a lot of time spent in training and may mean many bad welds with possibly a failure that will give all autogenous welding a black eye. Speed in welding is, of course, desirable, but it should never be obtained at the sacrifice of quality. Conscientious and skillful work coupled with careful and intelligent supervision provides the only sure road to successful welding. Generally speaking, it is not difficult to tell the difference between a good and a bad weld and payment for welding should be in proportion to the ability of the operator and the quality of the work he turns out. A five cent higher basic rate of pay can not be called a bonus, but if a bonus were given it ought to be on a quality rather than a quantity basis. Companies outside of railroads are considering this form of payment, and in all probability it will eventually find its way into railroad practice.

The most important work of the trainmaster at the present time (on many roads) is the mastering of trains. Included in his duties, now as at all times, he

The Trainmaster's Most Useful Function

finds a great variety of functions, and, of course, no useful duty is to be neglected without formulating very convincing reasons for such neglect; but with the shadow of a lay-off, because of lack of work, which now hovers over many brakemen (and over conductors and other trainmen as well), the propensity to waste time at the company's expense is observable with increasing frequency. Unless your freight train crews are actuated *and known to be actuated* by the highest sense of honor, you may expect them to prolong in any and every possible way the hours for which they will receive wages. Pay-and-one-half for overtime is a plum that does not grow on every bush, and the plums must be harvested while they are within reach. On one division of a prominent road, last month, a new (and temporary) trainmaster reduced train operating expenses for a month at the rate of about fifty dollars a day, simply by seeing that a lot of average trainmen stepped out of the "average" class and did as well as they knew how. The words which we have italicized are intended as a suggestion to the preoccupied superintendent who, in connection with trainmen's ambition to do good work, takes too much for granted. Those words cannot safely be predicated of the average trainman. The idea of a temporary trainmaster is also a good suggestion. You need one or more additional

regular trainmasters, without doubt. There are not many divisions where this is not true. But, feeling doubtful about your ability to show in definite figures the profitableness of another man every month in the year, you hesitate to ask for an appropriation. Why not pick out a good man to do some of this work, just for one or two months?

David Van Alstyne, who recently returned from a 17 months' trip around the world in which he gave special attention to railway and railway supply conditions, briefly summed up his impressions as to the possibilities of the sale of American railway supplies abroad in an address before the executive committee of the Railway Business Association. This we are printing elsewhere in this issue. Mr. Van Alstyne has the faculty of "getting to the bottom of things" and of subjecting problems which he tackles to a most thorough and exhaustive analysis. He is not likely to be carried away by fads and fancies. The suggestions which he makes as to how American railway supply manufacturers can increase their sales and prestige abroad are therefore worthy of the most careful consideration. American railway supply manufacturers generally have not specialized upon selling their wares abroad and do not recognize the amount of painstaking work which must be done to break down prejudices and to get the foreigner fully to appreciate the necessity of using the latest and best appliances and equipment. To do this properly will require a highly specialized organization such as comparatively few, if any, manufacturers can afford to maintain. Obviously, therefore, it will be advisable for the manufacturers as a group to pool their interests in creating a market for American railway supplies and in seeing that the equipment when furnished is rightly used.

Men employed in railroad repair shops are a factor, and probably the most important factor, in shop production. It

The Morale of Shop Forces

is true that without adequate machinery and proper routing methods shop output is greatly limited, but without men proud of their work and earnestly striving for results, the possibilities of economy in shop operation *will never be realized*. Present shop efficiency on a man-hour basis is too low and recent reductions in shop forces make it doubly important to increase by every possible means the morale of men now employed. Careful consideration of local grievances, fancied or real, at each shop and the prompt removal of just cause for complaint will do much to inspire confidence in the fairness of the managements. In fact, any mutual exchange of viewpoints between managements and men, followed by the fair settlement of a disputed question, is bound to have beneficial effects. In a larger way, however, the morale of shop forces can never be increased satisfactorily under present conditions and as long as the national agreements are in effect. These agreements, by maintaining seniority rights and a standard guaranteed daily wage irrespective of output, offer impassable obstacles to increasing the morale of shop

forces. Seniority rights prevent a foreman from showing partiality in advancing men under his supervision, but in practice few foremen need such a check on their authority. In any case, seniority rules have a most deadening effect on the efficiency of workmen. How can a man be proud of his work or take unusual interest in it when that interest fails to secure his advancement over a "don't care" neighbor with a few months' longer service? It is absolutely essential that the proper incentive be provided to secure even an average shop output. A man cannot be expected to work earnestly and enthusiastically with an eye always open to short cuts and easier ways of accomplishing results when his extra effort brings no greater financial reward than does the indifferent, careless attitude of a fellow workman. An important step toward increasing the morale of railroad shop forces will be taken at Chicago when the Railroad Labor Board declares the national agreements void.

Reports from Mexico are increasingly encouraging. By the payment of claims for American cars lost during the years of revolution, the National Railways of Mexico had restored to them on January 1—after a period of two years of suspension—the interchange privileges of the American Railway Association under the per diem rules. Last week news came of the completion of negotiations by the Mexican government and American bankers for a loan of \$5,000,000 to be used for the purchase of supplies and equipment, especially locomotives, to rehabilitate the National Railways. The announcement is now made that Francisco Perez, the director general of the National Railways, who for the past few weeks has been visiting the executive offices of some of our southwestern roads, has made arrangements for the leasing of 10 locomotives from the St. Louis-Southwestern, 9 from the Illinois Central, 8 from the Missouri, Kansas & Texas and 3 from the Gulf Coast Lines. In addition various companies have leased to the National Railways 200 tank cars of 10,000 gal. capacity. This borrowed equipment, it is understood, will be used principally in the northern part of the country to relieve the widespread congestion of traffic in that section. The borrowing of this equipment by the National Railways is encouraging, because, with the other forward steps taken by the administration, it gives promise of an early return of normal transportation conditions in Mexico, and is also indicative of the renewed co-operation of the Mexican lines with the carriers on this side of the border—a mutual agreement which will without doubt benefit all parties concerned.

Good News from Mexico

Under present conditions, when serviceable engines are being stored on nearly all roads, the operating department is afforded the opportunity for exercising some discrimination in the selection of power. When every engine is needed for service, it is sometimes impossible to apply the principles of efficient operation in assigning locomotives but this is one handicap that does not exist now. Nevertheless, there are numerous cases where the power that would do the work most economically is not used and often it seems that the selection of engines to be put in white lead is based on considerations of convenience rather than economy. Perhaps some of the mistakes are due to a misconception regarding the efficient range of operation of the same locomotive. The opinion seems to be quite generally held that locomotives are most efficient at the maximum rates and the use of heavier engines on trains of less than the full tonnage is wasteful. Working on this

What Engines Should Be Stored

the need for more shops, better shop tools, more housing capacity and better facilities at engine terminals, as well as greater development of other transportation facilities that affect the amount of service which may be obtained from a locomotive in a given time, in a general way has been recognized by railway officers for some time. This recognition has not, however, been taken a sufficiently practical form. Measures for increasing the carrying capacity of the roads have been confined largely to increasing the supply and capacity of rolling equipment. In an article appearing in this issue facts are presented which show a marked and consistent decrease in the number of trains handled per year by the average freight locomotive during the decade just prior to the war. Furthermore, it appears that all the emergency measures taken as a result of the war stress have only been successful in holding the 1913 average during the years of heaviest traffic since that time, and then at the expense of a considerable accumulation of deferred maintenance. In considering these facts, it should be clearly understood at the outset that they are in no sense an indictment of the efficiency with which the existing transportation plants have been operated. Indeed, the facts presented show a marked improvement in operating efficiency. Not only have the tons of revenue freight per train increased steadily, but they have increased at a greater rate than the potential hauling capacity of the locomotive unit. What the facts do point to, however, is a material waste of capital as a result of the present unbalanced development of railroad facilities, and they suggest the question, How shall the expenditure of new capital be balanced so that the greatest average return may be obtained from every dollar invested? This is a question which ought to be more carefully considered than it generally has been during the past 20 years. Its more careful consideration undoubtedly would result in greater provision being made for getting the best and greatest possible service for that all-important part of the railway plant, the locomotive.

large engines are often stored and lighter power kept in service; yet, in most cases, this is not conducive to economy. The most economical rating, considering all items of expense, is in general about 10 or 15 per cent less than the maximum that the engine can haul. As between different types of locomotives, the most powerful will obviously produce the lowest cost of wages per ton-mile if hauling full tonnage. Therefore, so long as the traffic is sufficient to permit of loading the heaviest power to its normal rating, this power should be kept in service. However, in case the full tonnage cannot be maintained, would it be economical to substitute the lighter engine? If the tonnage per train is the same in either case, there would be no difference in the wage cost and the decision would depend on the relative cost of fuel and repairs. With modern locomotives, the fuel consumption on the basis of horsepower is lowest at moderate rates of work. A superheated steam locomotive that consumes about 4 lb. per horsepower hour at maximum power uses only about 2½ lb. when working at half the maximum rate. This saving of 37 per cent would be reduced in actual service by an increase in the proportion of standby losses. But it is evident that the low rates of working result in marked economy in the use of fuel. Repairs also are minimized when the engine is not forced and the expense of upkeep would probably be reduced sufficiently to prevent any increase in the cost per ton-mile. The result would be that the large locomotive hauling less than full load would be more economical than the smaller engine loaded to its full capacity.

Time to Restore the Balance

The need for more shops, better shop tools, more housing capacity and better facilities at engine terminals, as well as greater development of other transportation facilities that affect the amount of service which may be obtained from a locomotive in a given time, in a general way has been recognized by railway officers for some time. This recognition has not, however, been taken a sufficiently practical form. Measures for increasing the carrying capacity of the roads have been confined largely to increasing the supply and capacity of rolling equipment. In an article appearing in this issue facts are presented which show a marked and consistent decrease in the number of trains handled per year by the average freight locomotive during the decade just prior to the war. Furthermore, it appears that all the emergency measures taken as a result of the war stress have only been successful in holding the 1913 average during the years of heaviest traffic since that time, and then at the expense of a considerable accumulation of deferred maintenance. In considering these facts, it should be clearly understood at the outset that they are in no sense an indictment of the efficiency with which the existing transportation plants have been operated. Indeed, the facts presented show a marked improvement in operating efficiency. Not only have the tons of revenue freight per train increased steadily, but they have increased at a greater rate than the potential hauling capacity of the locomotive unit. What the facts do point to, however, is a material waste of capital as a result of the present unbalanced development of railroad facilities, and they suggest the question, How shall the expenditure of new capital be balanced so that the greatest average return may be obtained from every dollar invested? This is a question which ought to be more carefully considered than it generally has been during the past 20 years. Its more careful consideration undoubtedly would result in greater provision being made for getting the best and greatest possible service for that all-important part of the railway plant, the locomotive.

One of the foremost objections to the National Agreement with the maintenance of way forces lies in the increased difficulty which this agreement imposes on the already difficult problem of supplying enough good track foremen. Of the class of men that has been available for track labor in recent years, there is only a relatively small proportion which offers any promise of qualifying as foremen. Therefore, it is highly desirable that the supervisory forces be afforded every possible facility in the selection of the most likely material. There is a saying among roadmasters that any track man who cannot qualify as an assistant foreman or even foreman after a year's experience as a track laborer need never be considered at any later time. This opinion is borne out by a study of the railway careers of hundreds of track supervisors and roadmasters. While many of them spent 15 to 20 years in the capacity of section and extra gang foremen before they were promoted to the supervisory position, few of them spent very many years as laborers. Recognizing the truth of this and knowing that proper material for foremen is not commonly attracted to the gangs for the mere opportunity to work as laborers, the supervisory officers have not restricted their search for foremen to the labor forces, but have looked for likely material wherever they could find it. Many of them set up what were in effect systems of apprenticeship for foremen by inducing the prospects to enter one of their gangs with a virtual promise of a trial as foreman after a certain period of training. At the last convention of the Roadmasters' Association, one of the committees submitted recommendations for an elaboration of this idea as the most feasible solution of the problem. Under the National Agreement all such plans bear the stamp of irregularity and a rigid enforcement of the provisions of the agreement imposes such restrictions on the supervisor in his endeavor to effect a rapid promotion for the most promising candidate that he is very likely to be quickly discouraged.

One of the most interesting recent developments in the handling of freight has been the practical discussion of the large size portable container for use on motor trucks, railway cars or vessels. The development of the container system for handling interchange l. c. l. traffic on motor trucks at Cincinnati, has attracted country-wide attention and much favorable comment. During the war the government tested out on the Warrior river a somewhat more extensive plan in the form of large size containers for carriage on railway flat cars and river boats. In an article in last week's *Railway Age* there was shown the latest development along this line, an express container car now operated in experimental service by the American Railway Express Company over the New York Central between New York and Chicago. The containers used are of steel and have a capacity of three to five tons. Nine containers are loaded on one car and in one of the experimental trips, nine containers were transported from nine big concerns in the one city to a similar number in the other; the containers being carried between the freight station and warehouse on motor trucks. It is to be expected that the use of containers of this general type will eliminate much of the manual labor required to load or unload shipments at freight houses or transfer stations and will reduce to a minimum the clerical work required in billing and checking. One of the most important savings will undoubtedly be in the reduction of losses due to theft and damage. There are, however, many difficulties still to be overcome, particularly as to the handling of the containers at manufacturing plants,

freight stations and warehouses. A big box of some three to five tons is not easily moved about without cranes and it does not happen that concerns dealing in such commodities are as most suitable for carriage in these containers have such cranes. The working out of feasible means of moving the containers while they are off the car or motor truck seems therefore to be the next and most important step. Nevertheless, the development of the use of the large container represents real progress and will be watched with great interest by railroad men and shippers.

In the consideration of the situation of the New England roads now before the Interstate Commerce Commission in connection with the matter of divisions, there must necessarily be in the background, at least, the question of what is to be done with these roads in the matter of consolidation. The

Consolidation and the New England Roads

commission is now engaged in preparing its report on this important question as provided by the Transportation Act. It has engaged the assistance of Professor William Z. Ripley of Harvard University and it is understood that he has filed his report and opinion. Dame Rumor, who has been exceedingly busy of late in starting gossip on railroad consolidations, has been quoted in the public prints as saying that various ideas have been considered as to the consolidation of the New England roads. One is that an amalgamation may be worked out looking to the establishment of one New England system. Another is that the Pennsylvania may take over the New Haven and that the New York Central may acquire the Boston & Maine or that in general the New England carriers will be absorbed by trunk line carriers west of the Hudson river. Outside of the fact that the entire question is largely in the hands of the Interstate Commerce Commission just at present, another measure of official standing has been given to the discussion by some remarks of Andrew J. Peters, mayor of Boston, in his annual message to the city council of that municipality. "The proposed consolidations of the New England railroads with the Pennsylvania Railroad and the New York Central," says Mayor Peters, "would be a most unfortunate catastrophe for all New England, especially for the people of Boston. . . . the intimate touch with local conditions so essential in this situation would be entirely lacking." There is much truth in what Mr. Peters says, but it is also evident that if the lines are consolidated into a single system the feature of competitive railway service will be eliminated from the New England industrial centers. In short, it is apparent that the working out of a scheme of consolidating the New England carriers, if such is finally deemed advisable, is far from a simple matter.

In the discussion of J. C. Fritts' paper before the January meeting of the Western Railway Club, it is worthy of note that officers of the car departments of two railroads advocated fixing the A. R. A. prices for labor and material used in foreign car repairs so high that they would provide a profit on repairs for which bills are rendered. Such a policy is fundamentally sound. There are two forces which affect the maintenance of freight equipment in interchange. One is the common interest of all railroads in having serviceable equipment; the other is the interest of the individual roads in keeping down their own expenses and employing their resources in the most profitable channels. Only in periods of car shortage does the first exert any appreciable influence. The other is always acting and is particularly strong

An Economic Force Worse Than Wasted

when the greatest opportunity exists for doing constructive work in car repairs: i. e., during periods when there is a surplus of equipment. Under the existing price policy these two forces tend to oppose each other. With prices for labor and material fixed at a level intended, on the average, to cover the bare cost plus overhead the immediate interests of the individual road are not clearly served by a constructive policy of handling repairs to foreign cars, by which in effect it is donating a service from which other roads reap more immediate benefit than it can itself. If this service is worth rendering at all it is worth paying for. This is a principle which holds in all commercial and industrial transactions and the present condition of freight cars supports the contention that it holds with equal force in transactions between the railroads. Why should it not be accepted in interchange repairs, thus directing both of these two motive forces toward raising the standard of car maintenance, instead of having them oppose and neutralize each other, as they tend to do under the present price policy of the mechanical division of the American Railway Association?

What the Railways Are Trying to Do

WHAT THE RAILWAYS ARE TRYING to do in the hearings before the Railroad Labor Board is to pave the way for the re-establishment of working rules and conditions under which they can get increased efficiency of labor. They have not suggested the reduction of any basic wages except those for unskilled labor.

Increased efficiency of labor would make it possible to handle the same amount of business with fewer men. Therefore, like a reduction of wages, it would cause a reduction of operating expenses. A reduction of expenses, through increased efficiency of labor, would be more beneficial to the railways as well as their employees than a reduction of wages. Maintenance of relatively high wages would make the railroad business a preferred source of employment and enable the railroads to get and keep the best class of men. Apparently the only alternative to an increase in the efficiency of labor is a reduction of basic wages, since the operating expenses must be greatly reduced.

Spokesmen of the railways have presented voluminous evidence to the Railroad Labor Board and the public to show how, and the extent to which, the present working rules and conditions have reduced the efficiency of labor. Spokesmen of the employees have retorted that operating expenses are being inflated by bad management. Whether this charge is true or not, the answers to it are obvious. First, mismanagement in other particulars would not justify the continuance of a policy which resulted in wastes through an excessive payroll. Secondly, the Railroad Labor Board has no jurisdiction over the general management of the railroads, but only over their relations with labor. Therefore, the charges and evidence regarding other forms of mismanagement should be presented, not to the Railroad Labor Board, but to the Interstate Commerce Commission, which is the body that has supervision over the general management. The labor leaders are merely trying to evade the question before the Railroad Labor Board when they drag before it matters over which it has no jurisdiction.

The attempts some of the labor leaders have made to divert attention from the questions actually before the Labor Board have been palpable, and in some cases ludicrous. They opened the hearings on national agreements by charging the railway companies with wasting many millions of dollars by giving repair work on locomotives and cars to outside equipment companies. They got some newspapers to publish a yarn to the effect that the railways had raised a fund of approximately \$30,000,000 for propaganda to break down

the labor unions. The climax was capped when one of the labor leaders solemnly informed press and public that under government control railway officers had taken out and buried large quantities of materials and supplies to inflate operating expenses and discredit government operation. Even the most gullible must find it difficult to imagine federal managers, general managers and other high railway officers purloining large amounts of such weighty articles as steel rails, ties, brake beams, and even perhaps cars and locomotives, carrying them out in the dark watches of the night and entombing them in ditches along the right of way! Charges such as this are enough to bring ridicule upon all the allegations made by the labor leaders against the railway managers.

It has been charged by some labor leaders that a very large part of the increase in the payrolls and in the number of employees, under government control, was made by the railway managers to discredit government operation. The facts regarding the increases in the number of just two classes of employees are sufficient to show how little basis there is for this charge. The number of employees belonging to the nine principal shop crafts increased from 302,828 to 443,774, or 47 per cent. Their annual payroll increased from \$318,000,000 in 1917 to \$890,000,000 in 1920, after the Railroad Labor Board's award, or 180 per cent. The number of road train employees in 1917 was 226,936, while when the railways were returned to private operation their number was only 225,415, an actual reduction of 1,521. Their total compensation in 1917 was \$344,865,593, while after the wage award last July it was running at the rate of about \$658,000,000, or an increase of 90 per cent.

These two general classes of employees worked under the supervision of exactly the same federal managers, general managers and other general officers. There was, however, an enormous increase in the number of shop employees, while there was no increase in the number of road train employees. If railway officers had desired to pad expenses, they would hardly have deliberately increased greatly the number of shop employees and actually reduced the number of road employees. The vast increase in the number of employees in the shops took place because the Railroad Administration, over the opposition of experienced railway officers, made changes in the working rules and conditions in the shops which these experienced officers predicted would be productive of inefficiency.

The working rules and conditions which have produced inefficiency, and the consequent great increase in the number of employees, are the very working rules and conditions which the railway managers are now trying to get rid of. Undoubtedly other and great increases in efficiency and economy must be obtained. The cost of fuel has increased from about \$400,000,000 in 1917 to about \$700,000,000 in 1920. It must be reduced. The cost of materials and supplies has increased from about \$700,000,000 in 1917 to about \$1,600,000,000 at the present time. It must be reduced. The railroad payroll is the largest item of all. In 1917 it was about \$1,704,000,000. It has increased until, according to the latest estimates, it was running before the recent large reductions of forces were made at the rate of more than \$3,700,000,000 a year. It also must be reduced.

All these items of expense must be reduced, first, to enable the railways to earn the net return they are entitled to, and which they must earn to furnish the public good and adequate service, and, secondly, to enable them in due course to make reductions in freight and passenger rates. Evidence has accumulated that many of the present freight and passenger rates are too high, and actually are destroying business. Railroad employees cannot afford to have expenses and rates kept so high that they destroy business, because reductions of railroad business destroy the source of their

employment. The interest of railroad employees is to have the railroads handle a maximum business, to employ as many men as are reasonably needed to handle this business, and to pay them the highest wages consistent with the hazards of the employment, the wages paid in other industries and the cost of living. In the long run working rules and conditions which force the railways to employ an excessive number of men will reduce railway traffic, prevent the railways from prospering and being adequately developed, and, in consequence, injure railway employees as well as the railway companies and the public.

Freight Moving Less Than During Switchmen's Strike

THE DECLINE in the freight traffic of the railways has continued until the volume of business being handled has almost set a new low record for recent years. The total number of cars of freight loaded in the four weeks ending January 29 was 2,819,352. This was 460,043, or 14 per cent less cars than were loaded in the same weeks of 1920. It was 116,000 less cars than were loaded in the same weeks of 1919, although at that time the traffic was undergoing the heavy slump which followed the signing of the Armistice. Last April, when the switchmen's strike seriously interfered with transportation, the amount of freight moved declined to a point which it was said at the time threatened the industrial and financial welfare of the country. But even last April, when the effects of the strike were most felt, the railways moved slightly more freight than they did in January, 1921.

The complete statistics of earnings and expenses in January are not yet available but enough is known about them already to make certain that they will make a very bad showing. This bad showing will be due, first, to the tremendous and almost unprecedented decline of traffic and earnings, and, secondly, to the inability of the railways, with present costs of materials, fuel and labor, to effect the drastic economies needed. Probably the railways as a whole have laid off at least 300,000 men since September 1, but the present rules, working conditions and wages, especially those of unskilled labor, are making it necessary to pay so much to those who are kept on the payrolls as to make the labor cost excessive in proportion to the earnings. The present situation is a striking illustration of the fact that the railways are subject to the same wide fluctuations in business, and in both gross and net earnings, as other business concerns, and that therefore if they are to be enabled to earn an annual average year by year of 6 per cent their earnings and expenses must be put on a basis where they will earn at the rate of much more than 6 per cent in periods of good business to provide against the days of bad business.

The Highway Engineers Can Help

WHATEVER THE UNCERTAINTIES of the future that may jeopardize the success of private undertakings at the present time, they can have but little influence on public projects such as highway construction in the various states. Thus, while uncertainties as to the future may constitute legitimate reasons for deferring shipments in certain commercial lines, there can be no like justification for delaying the transportation of materials used in highway construction and few realize what an immense tonnage could be given to the railroads if this work were undertaken at once in a volume commensurate with the plans outlined for the coming season.

Thus, Illinois has projects for 600 miles of new and hold-

over construction, while Pennsylvania proposes to build 700 miles. At the rate of 100 carloads of material per mile of road, the work in prospect in these two states alone represents 130,000 carloads to be handled by the railroads some time during the coming season. The plans for all this work may not all be completed, but it is true beyond any question that a very large part of it will be carried out. Therefore, the highway construction programs impose on the railroads a very definite freight business that must and will be handled some time during the present year.

Just when this business will be offered to the railroads depends on the decision of the states' highway executives. The hauling can be delayed until the summer months, when the railroads may be again pressed to the limit of their capacities, or it may be done during the present period of surplus transportation with many thousands of cars available for immediate use. This prompts the suggestion that railway officers appeal consistently to highway engineers to exercise their influence for the early letting of contracts and the movement of materials. In no field is the opportunity for prompt action more favorable. Most states now permit the payment for materials when delivered, the great bulk of paving materials are not injured in any way by storage and advanced delivery does not entail any rehandling not otherwise required. On the other hand no commodity suffers more than road material in the competition for equipment used in hauling coal.

Last year one of the great obstacles that defeated programs for highway construction was the failure of material deliveries. The one way to avoid a repetition of this is to start these deliveries now.

New Books

Railway Surveying and Permanent Way Work. By S. W. Perrott and F. E. G. Badger. 303 pages, illustrated, 6 in. by 9 in. Bound in cloth. Published by Edward Arnold, London, Eng., and distributed by Longmans, Green & Co., New York.

As its title suggests, this book is in reality divided into the two main subjects of railway surveying and of maintenance of way practice, or, stated according to English phraseology, of permanent way work. The book has a joint authorship, being the product of two English engineers, S. W. Perrott and F. E. G. Badger, both with experience not only on leading English roads but in other countries as well. From their experience they have included in a part of the text a discussion of the detailed work in surveying, planning and constructing an economic railway in more or less undeveloped and tropical countries. In this section, as well as in the parts devoted to railway surveying, the subjects in question such as reconnaissance, preliminary location, location, curves and construction, etc., are handled in a fairly detailed and fundamental manner, though throughout there is assumed that the reader has an understanding of surveying to some degree or other.

With a few exceptions the discussion of the problems mentioned conforms to American terminology and practices. The permanent way or maintenance of way section, however, is more of a treatise of English methods of track preparation, construction and maintenance. While dealing in a fairly broad way with such general subjects as ties, ballast, rail and drainage, etc., the major portion covers the practical installation problems of sidings, switches, turnouts and cross-overs, etc. The book, throughout, is well illustrated with reproductions of actual field and office notes, sketches and maps for the first part as well as numerous other plans and drawings more directly concerned with the second part or permanent way section.

Letters to the Editor

A Safety-First Catechism

St. Louis, Mo.

TO THE EDITOR:

The instructions which a railroad superintendent gives to his subordinates will be found usually to follow a certain uniform course, from the fountain head to the point where the information is needed, or is effective. First, a rule is formulated—perhaps it was formulated forty years ago. Next, it is put into a rule book and employees are told to familiarize themselves with the contents of the book. Thirdly, there is an oral examination on the rules, and the employee commits to memory the one we have in mind, to the extent of being able to answer the question which is put to him concerning it. Fourthly, someone disobeys the rule and a circular is issued to warn employees generally to avoid the suspension or other bit of ill luck which has befallen the person who forgot or ignored the rule. This business of warning employees to take a lesson from others' mistakes is done, in many cases, with very little skill; and so we see, with increasing frequency, a fifth stage—the stage of larger and more skillfully worded circulars. This is the stage of really effective warnings—effective, that is, in as high a degree as it is possible to accomplish with nothing but paper, type, ink and a printing press. This last stage is a great improvement. Effort put forth in putting style into circulars to employees is not wasted. Large type, colored ink, ingenious features of make-up and all other beautifying elements should be employed as freely as practicable.

But I want to propose a sixth stage: get a written answer from the employee. The most impressive type, or coated paper, or illustrative photographs are useless except as they aid in impressing the desired lesson on the employee's mind; and to get information on that point the man must be induced to express his own thoughts. Oral answers are inherently unsatisfactory, 99 times out of 100, because of the lack of mental training on the part of the examinee. Enginemen and conductors are not rhetoricians. Mere memorizing may give false or deceptive evidence of knowledge; and both oral and written answers fall short in a large percentage of cases because nothing is done to induce the examinee to do any original thinking.

I have been led along this line of thought by seeing a safety-first circular issued recently by a prominent western road. So far as concerns the time-honored standard rules, the point that I have made—or am trying to make—may perhaps be looked upon as lacking in novelty; every operating officer has tried, in this field, all the experiments that he can think of, and he does not wish to think of any more. But safety-first is different. In this the problem is not to make the employee know a rule, but rather to make him more thoroughly digest a rule which he knows already.

The circular to which I refer has to do with the case of a brakeman who was riding on the side of a car while pulling out some stock cars from a stock-yard track and was struck and knocked off by the stock-yard gate, which had been left open; and he was injured. The circular was beautifully made up, on fine paper, in large type, readable some distance off. It was illustrated with a picture and it would attract attention on any bulletin board (if not buried or obscured by other papers, or by the slovenly condition of the board—which condition is frequently observable in trainmen's lobbies). It gave the name of the town, the date, and other details and said that a number of other men on that road had been injured, at other stations, from the same cause.

Continuing, it says: "These accidents can be avoided by the exercise of a little care on the part of the men who use these stock-yards, by closing and fastening the gates after using."

"Agents, section men and trainmen should see that this is done, and where gates are left open the fact should be reported before and not after someone is hurt."

"Please explain this matter to the stock shippers and secure their co-operation."

"The employee in charge of switch movement or last using the gates at stock-yards must see that they are closed and secured."

Now, that is fine, as far as it goes. But what effect will it have, except on men near the scene of the accident, or who have recently had occasion to know the details of an accident of that class? The poster might perhaps be improved by adding a half dozen other similar cases, with names and dates and a statement of hospital experiences, cost, etc.; but even then it might not be read with care by the right men. I propose a regular questionnaire on stock-yard gates. Possibly I am going too much into details; but let us try it. After long experience with circulars I have come to feel an annoying sense of unsatisfied expectation whenever I see a document like this, in which there is such a wide gulf between the potential value of the teaching set forth (the value to the man who really remembers it) and the complete and unconscious indifference of the man who ought to have heeded the lesson but did not do so and who, in consequence, got hurt. Send the circular (perhaps on a small sheet) to every brakeman; and with it a letter calling for answers to questions like the following:

Did you ever witness an accident of this kind?
Did you ever hear of one?
At what places and how many of them?
How long ago?
Who was at fault?
How many stock yard gates on the division where you run?
Do you know of any yards with gates out of repair?
If the carpenter or the station agent is to blame for an injury to a brakeman, how does that affect the brakeman?
Who should report gates which are out of order?
When?
To whom?
How?
Do you carry in your pocket some sheets of paper suitable for use in making such a report?
What will happen if you report a gate which ought to be reported by the station agent?

These queries ought to have some visible effect in making a brakeman sit up and take notice. If the author of the circular from which I have quoted will pardon my freedom I will suggest some general questions:

How can the section man decide whether it is he, or the agent, who should report a particular case?
How can a section man know that a gate has been wrongfully left open?
What kind of a speech, and at what length, shall an agent address to a shipper to secure his co-operation?
How should he co-operate?
Who should sign the last paragraph (*italicized*) which I have quoted above?

Does this leave any doubt as to who is responsible for fastening the gate?

Now, I do not pretend to have made a finished questionnaire; I do not warrant this as the best that can be made. Possibly it would be useful for six months but not for twelve. But I do believe that questions of this kind will arouse thought on the part of brakemen or other men who actually read the poster (and the questionnaire); and, surely, that would be a definite accomplishment.

Does someone say that a proceeding of this kind would annoy the men, and that to the extent of doing actual harm? I reply that a good many are annoyed by present safety-first activities. Let us see why this is so. Possibly the introduction of a more serious annoyance might clarify the atmosphere and lead to a general movement to diagnose and cure all annoyances.

May I not ask that you will at least find out what is the state of mind of that portion of your readers who do *not* agree with what I have here proposed? B. T. HOROUCH.



Adequate Shop and Terminal Facilities Permit More Effective Utilization of Motive Power

Are Modern Locomotives Efficiently Used?

Ton-Mile Output Fell Behind, Increasing Tractive Capacity for More Than a Decade Prior to the War

FOR THE PAST 17 years no improvement has been made in the efficiency with which the potential hauling capacity of freight locomotives has been utilized on the railroads of the United States. During this period the average tractive effort of locomotives in freight service has increased about 58 per cent, net tons per train have increased over 100 per cent, but freight train miles per locomotive have shown a decrease of nearly 20 per cent, and apparently only the stress of war conditions has prevented a marked and steady decrease in the net results as measured by the ton miles produced per year by each 1,000 lb. available tractive effort. These statements are based on an analysis of Interstate Commerce Commission statistics from 1902 and 1903, the first years for which the necessary basic data were reported, down to the end of 1919, and are supplemented by estimates for 1920 which are sufficiently accurate to indicate the trend during that year as compared with previous years.

From 1900 to 1914, inclusive, the Interstate Commerce Commission, in its annual report, has classified the number of steam railroad locomotives according to the service to which they were assigned and has included a statement showing the average number of net ton-miles produced annually per locomotive in freight service. Beginning with the annual report for the fiscal year ending June 30, 1902, locomotives have been classified by types in addition to the service classification, the number of locomotives and aggregate tractive efforts being given in each case. By the elimination of the number of locomotives and the aggregate tractive effort for those types which quite generally are not used in freight service, it has been possible to arrive at a fair approximation of the average tractive effort of the freight locomotives in service each year. In each case the number of locomotives so determined has been found to check within a few per cent

of the number of locomotives definitely assigned to freight service elsewhere in the reports, which is sufficient indication of a reasonable degree of accuracy in the average tractive effort so determined for the purpose of determining the general trend. Other basic data are freight train miles per year and net ton-miles per train mile, which, in the absence of gross ton-mile statistics, may be used without serious error as the measure of train load. These data are given directly in the commission's reports.

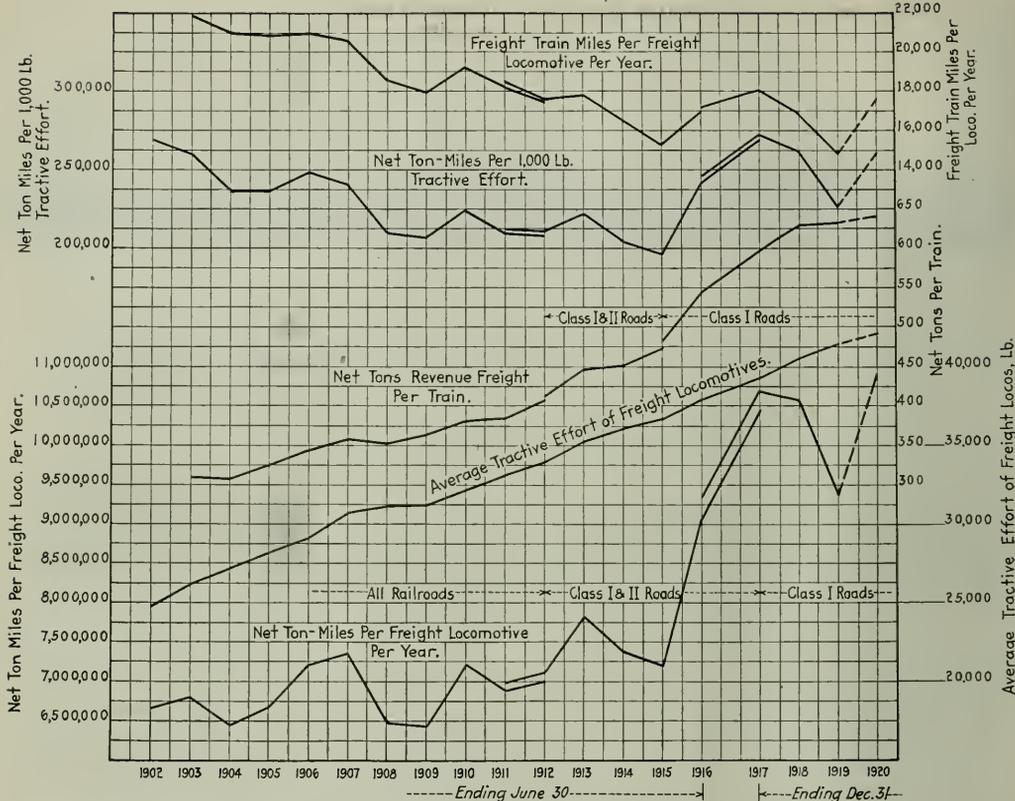
For the years following the fiscal period ending June 30, 1914, changes in the basis of locomotive classification, and the substitution of the locomotive mile for the locomotive in all ratios involving locomotive performance, have placed some difficulties in the way of a continuance of the comparison. However, the total number of locomotives and the average tractive effort of all locomotives are given, and a study of the relationships existing, respectively, between the total number of locomotives and their average tractive effort on the one hand and the number of locomotives in freight service and their average tractive effort on the other, reveals a high degree of uniformity.

For 14 years freight locomotives, according to the method of compilation employed by the Interstate Commerce Commission, have never been less than 57 per cent and have never reached 60 per cent of the total number of locomotives in service. For the latter half of this period the percentage has never been below 59. Similarly, the average tractive effort of freight locomotives has varied from 15 per cent to 21 per cent above the average tractive effort of all locomotives, and here again the range of variations from year to year have tended to smooth out during the six or seven years immediately preceding the close of the period, when 16 and 17 per cent were the prevailing ratios.

For the purpose of a general survey of the trend of loco-

FREIGHT train miles per locomotive have decreased 18 per cent since 1903. Does not this represent a loss of over two months' service a year for each freight locomotive, or an investment in idle locomotives of from \$100,000,000 to \$200,000,000?

Total locomotive tractive capacity has increased $2\frac{1}{2}$ times since 1903. Could not this investment, if used to help keep shop and terminal facilities abreast of the increasing locomotive capacity, have earned a large return upon itself by reducing maintenance and operating costs?



Trend of Efficiency of Freight Locomotive Utilization, 1903 to 1920

DATA AND RATIOS SHOWING THE EFFICIENCY OF UTILIZATION OF LOCOMOTIVES IN FREIGHT SERVICE—1903 TO 1920

Fiscal year	All locomotives		Freight locomotives†		Ratio ave. T. E. of all locos. to all locos.		Per cent of all locos. in frt. service	Net ton-miles revenue frt. (thousands)	Net ton-miles per frt. loco. per year‡	Net ton-miles per 1,000 lb. T. E. per year	Revenue frt. train miles§ (thousands)	Rev. frt. train miles per loco. per year	Net ton miles per train mile
	Num-ber	Ave. tractive effort, lb.	Num-ber	Ave. tractive effort, lb.	ave. T. E.	all locos.'s							
1902	41,225	20,480	23,594	24,800	1.21	57.3	173,221,279	6,666,499	269,000	557,804	21,900	310.54	
1903	43,871	21,780	25,444	26,200	1.20	58.0	174,522,090	6,807,942	237,000	567,065	20,900	307.76	
1904	46,743	22,800	27,029	27,200	1.19	57.9	186,463,110	6,456,846	237,000	578,614	21,000	322.26	
1905	48,357	23,700	27,869	28,200	1.19	57.7	215,877,551	7,232,563	248,000	626,840	21,000	344.39	
1906	51,672	25,200	29,848	29,100	1.15	57.8	236,601,390	7,375,585	240,000	662,107	20,600	357.35	
1907	55,388	25,800	32,079	30,700	1.19	58.0	218,381,555	6,488,829	209,000	622,084	18,500	351.80	
1908	56,733	26,356	33,653	31,000	1.18	59.4	218,802,987	6,447,702	207,000	606,092	17,900	362.57	
1909	57,212	26,634	33,933	31,200	1.17	59.3	255,016,910	7,237,559	224,000	671,807	19,200	380.38	
1910	58,947	27,280	34,922	32,200	1.18	59.4	253,783,702*	6,913,258*	209,000*	662,957*	18,200*	383.10	
1911	61,327†	28,400	35,292*	33,100	1.17	59.4	264,080,746*	6,998,740†	212,000†	636,314†	18,400†	406.76*	
1912	62,262†	29,100	36,615†	33,900	1.16	59.8	263,779,908†	7,134,323†	210,000†	642,739†	17,500†	410.26†	
1913	63,378	30,200	37,924	35,300	1.17	59.9	301,398,752	7,843,666	222,000	676,748	17,800	445.43	
1914	64,760	31,000	38,752	36,100	1.16	59.8	288,319,890	7,366,713	204,000	638,489	16,500	451.80	
1915	64,105	31,600	38,400	36,700	...	...	276,830,308	7,209,122	196,000	584,026	15,200	474.45†
June 30, 1916.	62,988†	32,600	37,735†	37,900	...	...	343,099,938†	9,092,628†	241,000†	641,813†	17,000†	483.74†
Dec. 31, 1917.	61,890†	35,000	36,860†	39,300	...	...	394,465,400†	10,701,200†	272,000†	660,430†	17,900†	597.29
1918	63,889	35,600	38,330	40,600	...	...	405,379,284	10,573,422	262,000	646,007	16,900	628.49
1919	64,868	35,700	38,920	41,400	...	...	364,236,950	9,358,606	226,000	577,117	14,800	631.10
1920**	64,100	36,300	38,460	42,100	...	...	421,000,000	10,900,000	260,000	676,000	17,500	640.00

*These figures and those for the preceding years include Class III railroads. Prior to 1908, returns from switching and terminal companies are also included.
 †These figures, and those for 1913, 1914 and 1915 are for Class I and Class II roads.
 ‡These figures, and those for the years following, are for Class I roads.
 §Number of locomotives shown for 1920 are based on A. R. A. Car Service Division, reports. Average tractive effort is estimated on the basis of approximately the same change as in the preceding year. Ton miles and train miles are based on Bureau of Railway Economics reports for nine months, assuming proportionately the same volume of traffic during the last three months as existed in 1919.
 ¶Number and average tractive effort of freight locomotives for years after 1914 are estimated. The number of freight locomotives is taken as 59.9 per cent of all locomotives; their average tractive effort as 116 per cent of the average for all locomotives.
 ††Published by the Interstate Commerce Commission up to and including 1914. Calculated for the years since 1914.
 ‡‡Includes mixed train mileage.

motive utilization it does not seem unreasonable to assume a fairly close adherence to these relationships during the succeeding years, since there has been no marked change in types of motive power nor has there been any marked change in the distribution of locomotives to the various classes of service. Therefore, for the years following 1914, the number of freight locomotives has been assumed to be 59.9 per cent of the total number of locomotives and their average tractive effort has been assumed to be 16 per cent greater than the average of all locomotives.

Operating statistics published by the United States Rail-

Whatever objections may be raised to the accuracy of the figures given for the last few years, they do not apply to the years prior to the outbreak of the European war and it is the steady downward trend of the efficiency of locomotive utilization during those years which is the most significant fact brought out in the table and diagram.

Referring to the diagram, it will be seen that the average tractive effort of freight locomotives increased with remarkable steadiness throughout the period. Owing to wide fluctuations from year to year in the volume of traffic, as well as in the increase in the number of locomotives in service, the



A Typical Freight Locomotive of 1903

road Administration covering the years 1918 and 1919, present a service classification of locomotives which month by month shows no appreciable variation in the percentage of locomotives assigned to the various services. But this is so widely different from the distribution formerly carried by the Interstate Commerce Commission reports that the difference is evidently due to a change in method of classification, rather than in the actual distribution of the power. The classification is not believed to be comparable with that of

average net ton-miles handled by each freight locomotive showed wide variations, but the net ton-miles per 1,000 lb. tractive effort has consistently declined throughout the entire period.

The curves show a series of cycles of high and low averages and in comparing the net decrease in the efficiency of locomotive utilization over the pre-war period, consistency requires that years occupying approximately like positions in the first and last of these cycles be chosen as the basis of



A Typical Freight Locomotive of 1921

the commission and the latter has been followed consistently throughout the survey.

With the number of freight locomotives established, complete data are available for the calculation of the net ton-miles per freight locomotive, which has been thus arrived at for the years since the abandonment of that ratio by the commission.

Attention should be called to the fact that it has been necessary successively to drop from consideration switching and terminal and Class III roads, and finally the Class II roads. These changes in a measure affect the comparability of the data, but the diagrams show how small is the effect in relation to the trend of the curves.

the comparison. Partly for this reason and partly because some of the basic data first became available in that year, 1903 has been chosen for comparison with 1913.

During the decade the net ton-miles of traffic increased from 173,221,000,000 to 301,399,000,000, or 74 per cent. The number of locomotives in freight service increased from 25,400 to about 37,900 and the average tractive effort per freight locomotive increased from 26,200 lb. to 35,300 lb., or 35 per cent. This increase in the number and capacity of locomotives made it possible to handle 74 per cent more traffic with an increase of only 21 per cent in the number of freight train miles, from 557,804,000 in 1903 to 676,749,000 in 1913.

During this period much attention was given to tonnage rating and train loading for the purpose of taking the fullest advantage of the operating economies made possible by more powerful locomotives. That much in this direction was accomplished is evident from the fact that the average tons of revenue freight per train increased about 43 per cent, or about 20 per cent more than the potential capacity of the average freight locomotive. In 1903 revenue freight per train averaged 310.5 tons, while in 1913 the average was 445.4 tons.

These comparisons all attest the remarkable increase in the effectiveness of locomotives as operating factors during this decade. But the efficiency with which these locomotives were utilized as producers of ton-miles did not keep pace with the increases in capacity. This is very evident from the fact that the net ton-miles per 1,000 lb. tractive effort decreased from 260,000 in 1903, to 222,000 during the fiscal year 1913, a reduction of about 14.5 per cent. Considering the remarkable increase in the net train loads, it is evident that this loss must be accounted for by the reduction in the freight train mileage obtained from each locomotive. An average of 21,800 freight train miles was obtained from each freight locomotive in service in 1903, while in 1913 the average was only 17,800, a reduction of 18 per cent. On the basis of the results obtained in 1903, this is equivalent to a loss of more than two months' service per year for each freight locomotive in the United States.

Following the reduction in traffic during the business depression of 1914-15, traffic increased rapidly during the next two years, and reached a peak of 394,465,000,000 ton-miles in the calendar year 1917. During this interval there had been an actual decrease in the number of locomotives in service, because of the excess of retirements over locomotive purchases. But the aggregate tractive capacity had actually increased, and the average tractive effort of locomotives in freight service had increased from 36,700 lb. to 39,300 lb. This brought the ton-miles per 1,000 lb. tractive effort up to a point only slightly, if any, above that of 1903 when allowance is made for the fact that the figures for 1903 cover all railroads, including switching and terminal companies, while those represented by the higher curve for 1917 apply only to the Class I roads. This was accomplished by increasing the train loading to 597 net tons, 34 per cent above the loading in 1913. The marked increase in net ton-miles per 1,000 lb. tractive effort was due entirely to this factor, as the train mileage per locomotive in 1917 still

showed a loss equivalent to two months' service for each locomotive as compared with the mileage obtained in 1903.

The estimates for 1920 are based on the record of the nine months' traffic, assuming a volume of traffic during the last three months of the year proportionately the same as that actually handled during the last three months of 1919. Whether or not this will exactly square with the facts, it is evident from the nine months' records that such a traffic could have been handled, so far as motive power capacity is concerned, with results almost identical to those of 1917.

It is not the purpose of this article to discuss in detail all the causes for the marked decline in locomotive output up to the outbreak of the war. It is significant, however, that this decline was due entirely to the steadily decreasing train mileage per locomotive and that the marked increase in output since 1915 has not been due to improvements in this factor. The cause must therefore be looked for either in the locomotive, or in other facilities affecting the service-ability of the locomotive.

Undoubtedly, large modern locomotives require more frequent shoppings and more attention to running repairs than the motive power of 17 years ago. But it seems incredible that the motive power in service today, made up as it is of units representing every stage of development for at least 20 years, is inherently incapable of rendering in a year more than the equivalent of service that was obtained in ten months from the locomotives of 17 years ago.

May not much of this loss be attributed to the failure of shop and engine terminal facilities to keep pace either with the increasing numbers or increasing weights of locomotives?

During the period under consideration the number of locomotives has increased more than 50 per cent and the average hauling capacity between 65 per cent and 70 per cent. But neither of these increases alone is a measure of the increases which should have been made in facilities for caring for motive power. The combined effect of the two is that there is $2\frac{1}{2}$ times as much tractive capacity to be maintained, repaired and turned as there was 17 years ago, and in some respects this capacity requires more attention per tractive effort unit than did that used at the beginning of the period.

Is it not possible that the failure to provide more than a small part of the needed shop and terminal capacity is costing the railroads the carrying charges on from \$100,000,000 to \$200,000,000 invested in idle locomotives which, had it been invested in shops and terminals, would have earned a return in reduced maintenance and operating costs?



A Southern Railway Train at Spartanburg, S. C.

President Declines Railway Employees' Requests

Reply to Union Leaders Says Present Agencies Should Settle Differences—Employees Delay Reply

THE VIGOROUS STAND taken before the Railroad Labor Board by General W. W. Atterbury, vice-president of the Pennsylvania and chairman of the Labor Committee of the Association of Railway Executives, against the continuance of national agreements brought forth talk of general railroad strikes, charges and answers. The matter finally reached President Wilson, whom representatives of the labor organization petitioned for the presentation of the issues involved to Congress and representatives of the carriers followed with specific answers to the charges made by the labor leaders. General Atterbury went before the Labor Board on January 31 after the Labor Committee of the Association of Railway Executives had been in session at Chicago for three days. His statement at that time—one of the results of this meeting—was reported in full in the *Railway Age* of February 4 (page 317). The representatives of the employees refused to reply to his remarks immediately, requesting instead the right to be heard before the Board took action on the demands contained therein. This request was granted by Judge R. M. Barton, chairman of the Board, who later set February 7 as the employees' "day at court."

In the meantime, executives of the brotherhoods filed long telegrams to the President, declaring that they did not believe that the carriers were in the financial condition outlined by General Atterbury and attacking the latter for "violating all decent proprieties, disregarding the Transportation Act and flouting existing agencies such as the Interstate Commerce Commission and even Congress itself."

"General Atterbury's policy," the telegram charged, "is to disrupt labor unions, turn public opinion against the employees and place wages on a previous basis so that railway profits might be enhanced when prosperity returned."

In support of these contentions, the telegram reiterated the charges of mismanagement and control by a New York banking group which have been made repeatedly during the past month by various labor leaders and which are under investigation by the Interstate Commerce Commission.

Executives State Position to President

The charges made in the employees' telegram were immediately answered by T. DeWitt Cuyler, chairman of the Association of Railway Executives, who said in a telegram to the President:

I understand from press despatches a telegram has been sent you by the heads of certain railway organizations. If correctly reported, the charges contained therein are deliberate and gross misrepresentations. They are propaganda intended to discredit private management of railroads in the interests of the Plumb Plan and to defeat efforts which are being made in good faith to abolish rules and working conditions which were adopted as war measures, the continuance of which are causing inefficiency and waste in railway operation that are costing hundreds of millions of dollars.

The charge that the railroads of the country are controlled by a single banking group in New York is untrue and is known to be untrue by every one familiar with railroad affairs.

The charge that since the resumption of private operation, inefficiency and lack of economy have been deliberately encouraged is conclusively disproved by the record of the railroads from March 1 to the end of 1920. In its annual report to Congress on December 9, 1920, the Interstate Commerce Commission stated:

Comparing August, 1920, with August, 1919, the increased mileage had the effect of increasing the car supply 287,694 cars; the increased tonnage per car had the effect of increasing the car supply approximately 104,942 cars.

During this period the railroads increased the average movement per freight car per day 6.3 miles—from 22.3 to 28.6 miles.

They increased the average load per car 1.7 tons—from 28.3 to 30 tons. They reduced the accumulation of loaded but unmovable cars from 103,237 on March 1 to practically zero on December 31.

The truth is—as every shipper and traveler knows of his own experience—that the railroads were never more efficiently operated than in the last 10 months of 1920. Never before was so much service rendered with each car, each locomotive, each mile of track and each ton of coal.

The charge that the railroads sent cars and locomotives to outside shops for repair because of any dual financial interest is entirely untrue. The Interstate Commerce Commission has already taken jurisdiction over this matter, and the railroads are prepared to fully prove before the Commission the imperative necessity for their action. They will show that the comparisons of cost given were misleading; that the repairs in question were of the heaviest character; that they frequently involved substantial rebuilding; and that so far as possible this equipment was sent to the shops at which it had originally been constructed for the obvious reason that said shops had extra parts, patterns and tools which would enable them to effect these repairs efficiently and promptly.

The major field of imperative economy at the present moment is in the labor cost of railway operation. In 1917 this was approximately \$1,700,000,000. During the greater part of 1920 it ran at the rate of approximately \$3,700,000,000. The fact is that the labor cost of railway operation grew during the war period to a point where it absorbed the entire increase in railway operating revenues and is at this moment, despite the increase in rates granted by the Interstate Commerce Commission on August 26, 1920, leaving many railroads, in the face of declining traffic, practically stripped of earning power.

When General Atterbury went before the United States Railroad Labor Board and called its attention to the fact that numerous companies cannot even earn their operating expenses under conditions of present costs and traffic, and asked for the immediate abrogation of these agreements, rules and working conditions, he was proceeding in strict conformity with both the spirit and the letter of the Transportation Act. Unless these rules and working conditions had been continued by mutual consent they would have terminated on September 1, 1920, in accordance with the Transportation Act, and would not now be in effect had not the United States Railroad Labor Board, in its wage decision of July 20, 1920, asked the railroad companies to continue them temporarily, pending a hearing.

The fact that this hearing tends to be protracted at a time when the necessity for economy grows with every hour produced a situation requiring, in our judgment, drastic and immediate action.

The suggestion that we should hold a conference with the leaders of the labor organizations offers no solution of the difficulty. Each railway company is prepared to negotiate with its employees proper rules and working conditions adapted to different conditions in various parts of this country. It is utterly impossible for the United States Railroad Labor Board to make uniform rules and working conditions for all the railroads of the country without causing abuses like the present, when, by a mere change in title, four of the employees of the Pere Marquette had to be paid over \$9,300 in back pay, without any change in character or volume of work.

It would be equally impossible for any joint conference between all railroads and all organizations of employees to draft a uniform set of rules not subject to the same abuses.

The action requested by General Atterbury on behalf of the railroad companies is the only action which, with government sanction, can free the hands of the railway executives and enable them by orderly procedure with their own men to develop appropriate rules and working conditions.

All suggestions of other investigations or of the transfer of this subject to some other body are not only not in accordance with the Transportation Act but necessarily involve that very delay, the avoidance of which was the purpose of General Atterbury's presentation.

The only rules that stand the tests of practical operation and do not involve endless controversy are rules which are negotiated between each management and its own men and have behind them a common understanding. The opportunity of securing this is requested by the railroads in the interests of that efficient and economical operation required by the Transportation Act and is not only for the purpose of enabling the railroads to achieve the

earning power contemplated under that Act, but also in the interests of an ultimate reduction in transportation rates to the public.

Last, but not least, it is in the interests of the men who work upon these railroads. As General Atterbury stated, we recognize that as the wages of railroad employees were the last to go up, they should also be the last to come down, and if by restoring the conditions necessary to efficiency and economical operation, the railroads can postpone for a reasonable period the reduction of basic wages which will ultimately be required they will be only too glad to do so in the interests of the great body of their employees.

The pressing financial necessities of the railroads are such that if denied the opportunity of initial economy through proper rules and working conditions their only other recourse must be in a reduction of basic wages.

The railway executives are proceeding in this matter with the keenest sense of obligation to the public. They feel that they are trustees of a great public interest in the reduction of railway operating expenses to a normal level. They feel that in moving in this matter they are representing, not only their own interests, but the interests of the farmer, the consumer, labor and manufacturers in other industries, and the railway employees themselves. They have every confidence that at a time when the various industries and workers of the country are each making their respective contributions to a decline in the cost of living and a return to normal conditions, the great body of railway employees themselves will certainly not refuse to make their similar contribution.

President Wilson on February 6 replied to the telegrams addressed to him by the railroad labor leaders and the railroad executives at Chicago last week, declining to interfere in any way, during the last month of his administration, in the controversy between the railroad executives and the labor leaders regarding the abrogation of the national agreements. The labor leaders had asked for a Congressional investigation of the railroad situation but the President in his reply indicated confidence that the case is now in the hands of the proper tribunal and he therefore referred the copies of the telegrams to the board and to the Interstate Commerce Commission for such action as they may deem wise. The President's action was taken on recommendations made to him by John Barton Payne, director general of railroads, to whom the telegrams were submitted on their receipt last week. The President's reply to the labor leaders, copy of which was also sent to the executives, was as follows:

I have carefully considered the several telegrams addressed to me dealing with the labor questions and railroad management now under consideration by the Railroad Labor Board in Chicago.

The transportation act, approved February 28, 1920, to a greater extent than any previous legislation places all questions dealing with finances and railroad management and necessary rates under the jurisdiction of the Interstate Commerce Commission; hence all questions involving the expense of operation, the necessities of the railroads, and the amount of money necessary to secure the successful operation thereof are now under the jurisdiction of the commission. At the same time the act placed all questions of dispute between carriers and their employees and subordinate officials under the jurisdiction of the Railroad Labor Board, now sitting in Chicago.

This board is composed of three members constituting the labor group, representing the employees and subordinate officials of the carriers; three members constituting the management group, representing the carriers, and three members constituting the public group, representing the public. So far as I am advised, the board may be relied on to give careful and intelligent consideration of all questions within its jurisdiction. To seek to influence either of these bodies upon anything which has been placed within their jurisdiction by Congress would be unwise and open to grave objection.

It would be manifestly unwise for me, therefore, to take any action which would interfere with the orderly procedure of the Interstate Commerce Commission or of the Railroad Labor Board; and all the matters mentioned in your telegram are within the jurisdiction of one or the other of these bodies, and in their action I think we may repose entire confidence.

In view of the foregoing, it does not seem wise to comply with your suggestion that the matter be submitted to the Congress, and the only action deemed necessary is to submit copies of the telegrams received from you and from the representatives of the railroad executives to the Interstate Commerce Commission and to the Railroad Labor Board for such action as these bodies may deem wise in the premises. This will be done.

Jewell Claims Vindication in President's Reply

B. M. Jewell, president of the railroad department of the American Federation of Labor, declared that the president's message was a complete vindication of the stand taken by the unions in that it "makes it perfectly clear that the board should confine its jurisdiction strictly to the controversy as to wages and working conditions, leaving financial matters to the Interstate Commerce Commission." His statement follows:

The telegram of the president is a complete vindication of our position. I am delighted at what he has said: He has made it perfectly clear that the board should confine its jurisdiction strictly to the controversy as to wages and working conditions, leaving financial matters to the Interstate Commerce Commission.

Mr. Atterbury, therefore, made a serious mistake in applying to the board for financial assistance. We did not consider the facts warranted his prediction that the transportation industry was threatened with immediate bankruptcy. Evidently the president did not think so either. We did not feel that a financial disaster was impending, as predicted by Mr. Atterbury, but considered it our duty to call his statement to the attention of the president so that if the president considered the Atterbury statement seriously proper measures might be taken.

The president has stated unequivocally that financial appeals should be restricted to the Interstate Commerce Commission and not dragged before the Railroad Labor Board. Mr. Atterbury made a serious mistake by his ill-considered action and has placed the railroad executives in an embarrassing position. It is to be deplored that the public was temporarily deceived and that the orderly proceeding of the board was temporarily interrupted by his misguided activities.

Now that the financial aspects of the matter are clearly settled we shall have to take up in answer before the board certain other features of Mr. Atterbury's statement. He has cast aspersions upon railroad employees which we cannot permit to pass uncontroverted. We feel that it is our duty also to show that Mr. Atterbury is in reality the railroad representative of the sinister, anti-union movement which is being heavily financed under the guise of a so-called open shop campaign. We shall do this in an orderly way before the Railroad Labor Board.

Mr. Jewell again attacked General Atterbury's position the following day in a statement issued to the press in which he said:

"My criticism of Mr. Atterbury's action is that if the transportation industry is in the deplorable condition stated by Mr. Atterbury, no time should have been wasted in applying to the Labor Board, which is powerless to act, but application should at once have been made to those public agencies which could prevent the catastrophe which Mr. Atterbury predicts. Why isn't application made to the Interstate Commerce Commission? Why don't the bankers and bonding houses appear before the committees of the House and Senate? Why aren't the railroad presidents, who are now compelled by the bankers to appear before the country practically as beggars seeking public charity, put to work on this problem so that it may be adequately treated by the proper public agencies?"

Atterbury Answers Claims

W. W. Atterbury, Chairman of the Labor Committee of the Association of Railway Executives, issued a statement on Tuesday in reply to the assertion of B. M. Jewell, representing the employees, that President Wilson's reply meant that the Board would consider only wages and working conditions, and that financial questions would be considered by the Interstate Commerce Commission.

"His hope that the financial results of existing rules and working conditions can be hidden from either the Labor Board or the public will not be realized," said Mr. Atterbury's statement.

"He would maintain indefensible waste and inefficiency even at the cost of destroying the earning power of the railroads or of compelling them to go to the Interstate Commerce Commission for still higher rates.

"The producers and consumers of the country cannot support Mr. Jewell's program. It requires no conspiracy against

union labor to explain their attitude or mine. The railroads are struggling to regain the reasonable productivity of a considerable part of their employees, now seriously impaired by the rules and working conditions coming over from the war. That conspiracy is the conspiracy of the entire country."

This reply was followed in turn by the issuance of two statements by General Atterbury in both of which he presented evidence to sustain his contentions made before the board on January 31. The first statement said:

The railroads have asked the Railroad Labor Board to approve the re-establishment of the agreements, rules and working conditions in effect on December 31, 1917, because they believe it is absolutely necessary to effect economy by reduction of the present huge railway payroll. They believe that this reduction of the payroll can be effected at this time with more justice to railway employees and the public by establishing rules and conditions of work which will make practicable a great increase in the efficiency of labor and of railway operation, than by a reduction of basic wages, except those of unskilled labor.

The labor leaders, in public statements, have sought to represent the plan proposed by the railway executives as intended, not to benefit all concerned by increasing the efficiency of operation, but to destroy rights and privileges to which the employees are entitled. No class of men, however, has any right to profit at the expense of the public by agreements, rules and working conditions which cause great inefficiency and waste, and facts regarding the present railroad payroll show that it is being enormously inflated by inefficiency and waste.

The most concrete and abundant evidence of the inefficiency and waste being caused by present rules and working conditions is afforded by the statistics regarding the payroll of the employees in the shops. Since the national shop crafts agreement is the principal one now under consideration by the Railroad Labor Board, statistics regarding the payroll in the shops are most pertinent at the present time.

In the year 1917, before government operation was adopted, the railways employed 302,828 machinists, boilermakers, blacksmiths, electricians, air brakemen, car inspectors, car repairers, other skilled shop employees, and machinists' helpers and apprentices. In 1920, when the number of locomotives and cars to be maintained was only slightly larger than in 1917, they had 443,774, an increase of 140,946, or 47 per cent. The total wages paid to those employees in 1917 was \$317,879,549, while in 1920, after the advance in wages granted by the Railroad Labor Board last July, their wages were running at the rate of approximately \$890,000,000 a year, an increase over 1917 of 180 per cent.

Another class of employees included in one of the national agreements is the clerks. In 1917 the railways employed 184,063 clerks, while in 1920, when business was normal, they were employing 238,693 clerks, an increase of 29 per cent. The total wages paid to clerks in 1917 was \$189,009,506. After the wage award made by the Railroad Labor Board the wages of the clerks were running, as near as can be estimated, at the rate of \$399,300,000 a year, an increase of 112 per cent.

Another of the classes of employees included in one of the national agreements is the maintenance of way employees. In 1917 the railways had 350,000 section men and other unskilled laborers, and in 1920, 376,000. The wages paid to them in 1917 amounted to \$220,000,000, while, after the wage award made by the Railroad Labor Board, their wages, as near as can now be estimated, were running at the rate of \$476,000,000, an increase of 112 per cent.

It requires only a glance at these figures to see that a very large part of the increase in the amount of wages paid to each of the classes of employees mentioned was due, not merely to the advances made in wages, but to an abnormal increase in the number of employees. This increase in the number of employees, in turn, was due to rules and working conditions which destroyed the efficiency of labor, reduced the output per man and rendered it necessary, if needed maintenance work on the railways was to be done, to employ a much larger number of men. The increase of over 140,000, or 47 per cent, in the number of certain classes of employees in the shops is especially significant. It has been charged that the railways turned over the repairs of large numbers of locomotives and cars to outside plants and thereby took work away from their own men. As a matter of fact, the inefficiency of labor in the shops was so great that in spite of the fact that over 50 per cent more men were on the payrolls than in 1917 it was impossible to get all the needed repairs to equipment done in the railways' own shops.

The total number of employees of the railways increased under government control by 261,000. It is a fact of the highest significance in its bearing upon the matter of agreements, rules and working conditions, whose nullification we have asked the Railroad Labor Board to approve, that of this increase 232,563 occurred

in shop employees, clerks and maintenance of way employees, with whom the Railroad Administration made the three principal national agreements. It would be difficult to cite better evidence of the deadly efficiency destroying effect of these agreements. The railways, in asking the Labor Board's approval to return to the rules and working conditions in effect at the end of 1917, are merely asking the opportunity to begin a restoration of the efficiency of labor which must be attained in order to secure efficient and economical operation of the railways. The public returned the railways to private operation in the belief that it would be more efficient and economical than government operation. The Transportation Act requires efficient and economical operation of the railways. Efficient and economical operation cannot, however, be secured without a removal of the great restrictions upon and obstacles in the way of efficient management which are set up by rules and working conditions which were adopted as war measures. The railways desire to treat their employees with entire fairness. All charges to the contrary are baseless. They cannot, however, assume the responsibility for consenting any longer to a continuance of conditions which make efficient and economical operation impossible.

General Atterbury authorized the second statement as follows:

When I went before the United States Railroad Labor Board on January 31 there was an emergency requiring prompt and energetic action by the Board. I said:

Many railroads are not now earning, and with present operating costs and traffic, have no prospect of earning even their bare operating expenses, leaving them without any net return and unable to meet their fixed charges.

Since I made the above statement I have been advised by Thomas DeWitt Cuyler, chairman of the Association of Railway Executives, of the result of a canvass of the operating results of most of the railways of the country for the month of January. It is understood, of course, that it is impossible to close the actual accounts so soon after the end of the month, and that the results of the latter part, therefore, have to be estimated.

This canvass shows that 36 railroads estimate that they failed to earn even their operating expenses for the month of January. Among these roads are: The Atlanta, Birmingham & Atlantic; the Buffalo & Susquehanna; the Central of Georgia; the Detroit, Toledo & Ironton; the Erie; the Great Northern; the Gulf & Ship Island; the Hocking Valley; the Long Island; the Minneapolis, St. Paul & Sault Ste. Marie; the Maine Central; the New York, New Haven & Hartford; the Northern Pacific; and the Philadelphia & Reading.

While earning their operating expenses, 28 additional roads estimate that they did not earn their taxes and fixed charges during the month of January. Among these are: The Arizona Eastern; the Atlantic Coast Line; the Baltimore & Ohio; the Boston & Maine; the Chicago, Indianapolis & Louisville; the Chicago, Milwaukee & St. Paul; the Chicago, Rock Island & Pacific; the Lehigh Valley; the Minneapolis & St. Louis; the Missouri Pacific; the Norfolk Southern; the Pennsylvania; the Pere Marquette; the Western Maryland; and the Wheeling & Lake Erie.

Under present traffic and operating conditions these were the results despite the fact that the 64 companies referred to—of which only a partial list is given above—have, in the aggregate, decreased their labor cost of operating by laying off approximately 200,000 employees since September 1, 1920.

These companies have a total main line mileage of more than 100,000 miles and constitute approximately 40 per cent of the railroad mileage of the country.

In addition, there are other companies of well established earning power under normal conditions which expect their earnings for January to exceed their fixed charges by only a narrow margin.

The railroads cannot believe that the United States Railroad Labor Board, which, by its wage decision of July 20, 1920, has kept these national agreements, rules and working conditions in existence since September 1, can or will deny to the railroads and to the public the relief requested.

Included in the above figures of lay-offs and mileage are a number of companies which I have not specifically mentioned, which, in previous years, have also had difficulty in approximating a fair earning power. In a developing country like the United States there always has been a number of such railways. Their economic and traffic conditions have not justified the payment of trunk line wages nor the observance of trunk line conditions of work, even when these have been far more reasonable and less costly than at present. Nevertheless, the augmentation of their difficulty only goes to illustrate that it is economically unsound, and can only be fraught with disaster, to attempt to compel all of the railroads of the country, regardless of their differing conditions, to meet precisely the same wages and the same working arrangements.

Our application to terminate immediately the war-time working

arrangements which do apply alike, regardless of these differing conditions, is simply the attempt to secure government sanction for the necessary process whereby these railroads can again fit their expenses and operating rules to the conditions of the territories whose public servants they are.

All the suggestions for laying this matter before Congress or some other public body, with the implication that if not so done the condition is not really serious, will, I am sure, mislead no one.

Congress has passed the Transportation Act. The Interstate Commerce Commission, pursuant to that Act, has fixed rates. Nevertheless, the railroads cannot achieve their earning power under continuing abnormal and inflated operating expenses, of which the labor cost is the principal item. Hence, in accordance with the letter and spirit of the Transportation Act, the railroads are before the one body which ought to grant them relief—namely, the United States Railroad Labor Board.

Jewell Asks for More Time

While both the carriers and the employees were publicly defining their respective positions in this controversy, Mr. Jewell petitioned the Labor Board for additional time in which to prepare his reply to General Atterbury's requests. This petition was opposed by E. T. Whiter, who presented a letter on this subject written by General Atterbury and vigorously opposing any further extension of time. After consideration in executive session, however, the Board granted Mr. Jewell's request and February 10 was set as the date upon which he would be heard.

Whiter Concludes Railroad's Presentation

Following the refusal of representatives of the labor organizations to reply to General Atterbury's testimony on January 31, Chairman Barton of the Board directed Mr. Whiter to continue with his testimony regarding the national agreements until the requests made by General Atterbury could be considered by the Board in executive session. Mr. Whiter accordingly discussed in turn the agreements and proposed agreements with the Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station Employees, the Brotherhood of Railway Signalmen of America, the International Brotherhood of Stationary Firemen and Oilers, the Order of Railroad Telegraphers, the American Train Dispatchers' Association, the Masters, Mates and Pilots of America, and the International Association of Railroad Supervisors of Mechanics. In closing his presentation in the case, Mr. Whiter said:

In closing the statements of the railroads with reference to the requests under consideration in this hearing, we desire to emphasize the statements contained in our opening remarks:

First. That there is no obligation upon the individual railroads to accept and adopt these agreements, wage orders, etc., to which they were not a party; that there is no obligation in law or reason that they should be required to adopt these intricate, complicated and extensive regulations, which were applied throughout the United States, with utter disregard of conditions on the individual properties or the extraordinary, in many cases grotesque, results which followed. Further, that the necessity for specific understanding to continue these agreements was plainly recognized by the labor organizations who were parties to such agreements, as shown by their letter of March 24, 1920, which said:

During government control of railroads, general orders, supplements, addenda, national agreements and interpretations thereof were issued by the United States Railroad Administration, as result of negotiations conducted with the organizations parties to this conference.

These general orders, supplements, addenda, national agreements and interpretations thereof are continued in effect until September 1, 1920, except as amended by mutual agreement between the organizations and managements of the railroads and carriers covered by the Transportation Act of 1920.

In the interest of successful operation, it is desirable that definite agreements be had prior to September 1, 1920, providing for the preservation of the conditions of employment thereafter, and that these agreements be entered into at the earliest possible moment.

Further that the terms and provisions of the Transportation Act have not been complied with, with respect to the requirement that bona fide efforts must be made to reach agreements between the parties directly concerned before the controversies can be submitted to your Board. We hold that this is a separate and distinct phase of the problem before the Board and that this phase should be disposed of by the Board independently of the merits of the respective agreements and the individual rules contained therein.

Second. Through the wage orders, addenda, supplements, interpretations, etc., which we have brought to the attention of the Board, we feel that the Board will recognize that through the provisions of Decision No. 2 of the Labor Board that:

The board assumes as the basis of this decision the continuance in full force and effect of the rules, working conditions and agreements in force under the authority of the United States Railroad Administration. Pending the presentation, consideration and determination of the questions pertaining to the continuation or modification of such rules, conditions and agreements, no changes therein shall be made except by agreement between the carrier and employees concerned. As to all the questions with reference to the continuation or modification of such rules, working conditions and agreements, further hearings will be had at the earliest practicable date, and decision thereon will be rendered as soon as adequate consideration can be given.

Many bases of classification of service for purposes of pay, application of rules, etc., have been continued, notwithstanding that by reference to the terms of the agreements themselves, they terminated February 29, 1920; also by reference to Circular 121 of the director general it will be found that he states that decisions by the Railroad Administration, Boards of Adjustment, staff officers, etc., were not to extend beyond the termination of federal control of the railroads, viz: 12:01 A. M. March 1, 1920. These Boards of Adjustment and staff officers have continued to render decisions, and so far as known, may continue to render decisions as long as they exist, affecting the responsibility of the Railroad Administration, in cases occurring during the period of federal control. Many decisions have been rendered since the date of Decision No. 2. Some of these decisions have been incorporated in our presentation. We feel that your Board certainly did not in Decision No. 2 base your conclusions on decisions of these Boards of Adjustment which had not theretofore been rendered.

From the provisions of Decision No. 2 quoted herein, there would not appear to be any doubt of the intention of this Board to continue the bases of pay resulting from the decisions of proper authorities of the Railroad Administration, but it is very properly a question whether this Board intended to vitalize decisions which by instructions of the director general were to only apply up to the end of federal control and continue them in the same manner as it did acts of the Railroad Administration prior to the date of its decision.

These decisions have such extensive ramifications and are so utterly out of all reason in the light of practical conditions and the extravagant payments resulting, as repeatedly stated herein, that we feel the only practical way to properly dispose of these complications is by negotiation between the managements of the individual properties and the proper representatives of their employees, and that no Railroad or tribunal could justify such expenditures and expect that the patrons of the railroads should pay rates for producing revenues to be expended in such a manner.

"Independent" Organizations Testify

Representatives of the various "independent" organizations who have been fighting since the creation of the Board for the right to be heard as organizations in the present case began the presentation of their case to the Board on February 7. J. L. Eldridge, vice-president of the Railroad Yardmasters of America, P. F. Richardson, president of the American Federation of Railway Workers, T. A. Austin, president of the Dispatchers, Telegraphers and Agents (an organization on the Pennsylvania), P. J. Coyle, president of the Brotherhood of Railroad Station Employees, E. H. Morton, president of the Order of Railroad Station Agents, M. H. Comerford, International Union of Steam and Operating Engineers, T. H. Eiland, president, Colored Railway Trainmen, and R. L. Mays and O. Long, Railwaymen's International Benevolent and Industrial Association, consecutively presented testimony for their respective organizations. In practically all cases the eight-hour day with time and a half for overtime was asked for the employees represented, instead of the monthly rates upon which the majority of these employees are now working.

Jewell Presents Rebuttal

Mr. Jewell in the interval granted him to prepare a reply to General Atterbury repaired to New York and retained Frank P. Walsh, the labor counsel, and W. Jett Lauck, economist, and a battery of publicity men to assist in bringing a conspiracy charge before the Board. Mr. Jewell planned to ask for postponement of consideration of the question of national agreements and for a hearing upon the

evidence the unions wished to present in support of their charge that railway executives and financiers have conspired to re-establish autocratic control of the transportation industry.

Chairman Barton in opening the session on February 10 read a resolution passed by the Board which prohibited the presentation of such evidence and which pointed out that the Interstate Commerce Commission is the proper body before which to present such charges.

This action of the Board entirely disrupted Mr. Jewell's plans, and he immediately asked for a ten minute recess to formulate a new plan of attack. The Board's resolution also denied General Atterbury's requests for immediate abrogation of the National Agreements and for the right to pay unskilled labor the prevailing rate in the territory where they are employed. The resolution, after reciting the history of the present case, stated that the Board must hear all of the evidence before ruling on the National Agreements and that it was powerless to grant General Atterbury's request regarding unskilled labor because the matter has not been brought before the Board according to the procedure outlined by the Transportation Act.

After a short recess Mr. Walsh began a presentation on behalf of the employees. He confined his remarks to replies to General Atterbury, attacking the Pennsylvania and charging that his statements are misleading. That the railroads are in a precarious financial condition was denied by Mr. Walsh, although the statement was not accompanied by proof. He also asked the Board to subpoena a list of railway executives "to show that the application of the rules of the National Agreements was not wasteful." This list includes the following: R. S. Lovett, J. D. Rockefeller, Jr., W. D. DeForest, A. H. Smith, G. F. Baker, Samuel Rea, H. S. Vanderbilt, L. F. Loree, A. J. County, F. H. Davis, W. W. Atterbury, Howard Elliott, Julius Kruttschnitt, Fairfax Harrison, A. H. Harris, C. Hayden, C. Steele, J. E. Reynolds, E. T. Stotesbury, T. DeWitt Cuyler, H. Walters, M. H. Smith, A. W. Krech, E. V. R. Thayer and C. E. Ingersol.

Colonel Bugg Explains A. B. & A. Situation

B. L. Bugg, president of the Atlanta, Birmingham & Atlantic, in connection with the refusal of the employees of that road to accept a reduction in pay, has issued a statement in which he declared that if the people of Georgia feel that the road is of value to the commonwealth, it is for them to voice that feeling without delay. The road is now losing \$1,000,000 a year. It is out of the question to ask for increased freight or passenger rates. If they were granted people would travel over other lines, and ship their freight over the lines of competitors. Continuing, Colonel Bugg says:

"If we offered the road for sale, we couldn't even find a prospective purchaser. No one wants to buy a property that is losing \$1,000,000 annually. Our payroll has increased almost three-fold for each employee since the war began. If the reduction we ask for is granted, we can continue operation. If it is refused, right at this time, I see nothing for the owners of the property to do but get what they can out of it by scrapping the whole thing. The controversy concerns the people of Georgia to a far greater degree than merely their interest in the wage troubles. The question has already been raised at the hearing before the board at Chicago whether or not the road is of sufficient value as a public servant to justify its continuance, and if in case it should be scrapped, the necessities of the communities it serves would not be cared for by other existing roads in stronger financial condition.

"If the people of Georgia feel that this road is of value to the state and its citizens, and that it performs a public service that cannot be dispensed with without imposing

great inconvenience upon the industry of the state and loss upon its citizens calamitous in magnitude, it is time for some expression to be given and not wait until decisions and judgments have been rendered which will start this property on the way to the junk pile. Has not the state of Georgia and its citizens an interest here that is superior to that of the owners of the property or its employees?"

"Although the road has been in the courts for a long time, it has always been able to pay its operating expenses up until the time it was taken over by the federal government. Since the establishment of our road, the tax values in the counties traversed by its lines have increased from \$50,000,000 to \$360,000,000 and a large part of that territory is served by us exclusively. The arable lands for five miles on each side of our right of way have increased \$40,000,000 in value during that same time.

"More than 1,000,000 people are served by our line exclusively. If this road should be scrapped they would be without rail transportation. And we furnish absolutely the only competition for many of our most important towns, including Fitzgerald, Douglas, Moultrie, Waycross, Thomasville, Vienna, Montezuma and LaGrange. And there's no part of the system that can be lopped off and permit the rest of the system to remain in operation. We are getting about the same returns from each of our branches."

Railway Mileage of the World

THE BUREAU of Railway Economics has issued the following compilation showing the railway mileage of the various countries of the world as of 1917, taken from the Archiv fur Eisenbahnwesen for July-August, 1919:

Continent and country	Miles of railway	Continent and country	Miles of railway
AMERICA:			
Alaska	655	AFRICA:	
Argentina	22,310	Algeria and Tunis.....	4,220
Barbados	109	Belgian Congo.....	1,038
Bolivia	1,502	British East Africa.....	2,355
Brazil	16,557	British Africa.....	2,449
British Guiana.....	104	German Africa.....	2,595
Colombia	708	Italian Africa.....	106
Canada	30,738	Morocco	777
Chile	5,014	Portuguese Africa.....	1,183
Costa Rica.....	546	Union of South Africa.....	11,237
Cuba	2,331	Total—Africa.....	29,921
Dominican Republic.....	400	AUSTRALIA:	
Dutch Guiana.....	37	New South Wales.....	4,133
Ecuador	652	New Zealand.....	2,973
Guatemala.....	613	Northern Territory.....	145
Haiti	140	Queensland.....	4,867
Hawaii	88	South Australia.....	2,168
Honduras	150	Tasmania.....	901
Jamaica	196	Victoria	3,871
Martinique.....	139	Western Australia.....	3,665
Mexico	15,840	Total—Australia.....	22,523
Newfoundland.....	874	EUROPE:	
Nicaragua	200	Austria-Hungary (incl. Bessarabia and Herzegovina).....	28,704
Panama	298	Belgium.....	5,477
Paraguay	291	Bulgaria.....	1,509
Peru	1,728	Denmark.....	2,642
Porto Rico.....	340	Finland.....	2,429
Salvador	199	France.....	31,958
Trinidad.....	108	Great Britain.....	23,696
United States.....	259,555	Germany.....	40,381
Uruguay	1,639	Greece.....	1,012
Venezuela	634	Italy.....	11,337
Total—America.....	364,745	Luxembourg.....	326
ASIA:			
Arabia (incl. Cyprus).....	61	Malta, Jersey, Man.....	68
Asia Minor (incl. Syria).....	3,337	Montenegro.....	12
British East Indies.....	35,277	Netherlands.....	2,113
Ceylon	671	Norway.....	1,975
China.....	6,838	Portugal.....	1,854
Cochin China, Cambodia, Anam, Tonkin.....	1,490	Roumania.....	2,388
Japan (incl. Chosen).....	8,855	Russia (European).....	36,219
Malay States (Borneo, Celebes, etc.).....	857	Serbia.....	977
Malacca	57	Spain.....	9,538
Dutch East Indies.....	1,773	Sweden.....	9,296
Persia	34	Switzerland.....	3,293
Pondicherry.....	59	Turkey (European).....	1,431
Portuguese Indies.....	51	Total—Europe.....	218,628
Philippines.....	691	RECAPITULATION:	
Russia (Asiatic).....	9,886	America.....	364,745
Siam.....	976	Asia.....	70,913
Total—Asia.....	70,913	Africa.....	29,921
		Australia.....	22,523
		Europe.....	218,628
		Grand total.....	706,730

Railway Funded Debt

THE BUREAU OF RAILWAY ECONOMICS has compiled a table showing the railway funded debt actually outstanding, maturing each year from 1920 to 1949 and each 10-year period thereafter, compiled from the annual reports of the carriers to the Interstate Commerce Commission as follows:

RAILWAY FUNDED DEBT (ACTUAL) OUTSTANDING) MATURING EACH YEAR FROM 1920 TO 1949, AND EACH TEN YEAR PERIOD THEREAFTER

Railways of Class I—United States					
Year of maturity	Mortgage bonds	Collateral trust bonds	Income bonds	Miscellaneous obligations	*Total
1920..	\$102,098,600	\$33,088,000	\$3,898,000	\$15,090,140	\$154,174,740
1921..	73,904,585	227,013,900	.....	21,554,288	322,472,773
1922..	57,983,500	44,579,000	.....	33,633,260	136,195,760
1923..	77,657,000	4,636,000	.....	354,597	82,647,597
1924..	9,088,000	3,000,000	.....	7,812,447	19,900,447
1925..	143,123,575	44,991,630	.....	48,391,252	236,806,457
1926..	47,112,000	24,288,000	.....	468,597	71,868,597
1927..	55,793,442	7,260,000	.....	26,979,822	90,033,264
1928..	121,772,100	38,699,500	.....	44,597	160,516,197
1929..	95,693,754	98,293,000	18,892,062	83,814,593	296,693,409
1930..	86,178,600	.....	4,543,907	22,275,853	112,998,360
1931..	154,101,520	4,705,000	6,000	15,044,597	173,857,117
1932..	52,327,000	3,000,000	10,000,000	59,410,927	116,039,927
1933..	112,454,535	.....	9,104,000	72,000,597	184,455,132
1934..	228,453,000	16,000,000	9,104,000	80,143,744	333,700,744
1935..	55,069,000	.....	13,849,250	115,886,111	184,304,361
1936..	103,641,000	.....	.....	44,597	103,685,597
1937..	119,573,717	4,840,000	.....	5,246,697	129,660,414
1938..	120,557,445	8,349,000	1,349,500	1,404,597	131,660,542
1939..	147,998,339	.....	890,450	4,505,662	153,394,451
1940..	145,877,340	.....	.....	5,048,595	150,921,937
1941..	113,326,150	.....	.....	44,597	113,370,747
1942..	75,091,000	.....	.....	5,138,597	80,229,597
1943..	105,535,149	.....	2,000,000	44,597	107,579,746
1944..	3,353,000	.....	.....	44,597	43,599,597
1945..	100,519,600	.....	286,250	44,597	100,850,507
1946..	69,328,500	40,176,000	370,000	44,597	109,919,097
1947..	157,310,000	.....	.....	10,035,597	167,345,597
1948..	164,207,805	7,272,000	.....	38,585,797	210,065,602
1949..	234,466,800	34,100,500	25,007,000	44,597	293,618,897
1950 to 1959..	\$1,176,507,704	\$128,059,790	\$69,570,643	\$88,057,274	\$1,462,195,321
1960 to 1969..	779,042,694	.....	49,156,923	10,071,000	838,270,617
1970 to 1979..	51,350,000	.....	.....	.....	51,350,000
1980 to 1989..	340,910,000	20,118,000	18,095,000	.....	379,123,000
1990 to 1999..	1,019,060,505	9,143,000	51,346,000	.....	1,079,549,505
2000 to 2009..	154,750,305	11,180,900	24,661,125	5,500,000	196,092,330
2009 & upward	186,820,300	.....	.....	.....	186,820,300
Not distributed	5,337,743	.....	7,615,000	16,776,246	29,728,989
Total entire period	\$6,888,178,767	\$812,793,130	\$310,641,110	\$784,083,135	*\$8,795,696,142

*Does not include equipment obligations amounting to \$271,161,225 and also \$11,750 receipts outstanding for funded debt. Adding these amounts to the total of \$8,795,696,142, the total funded debt actually outstanding of the railways of Class I amounted to \$9,066,869,117 on December 31, 1919, which is approximately 82 per cent of the total funded debt of all steam roads in the United States. Foregoing returns do not include data for the Pittsburgh, Shawmut & Northern R. R.

Increasing Car Mileage*

By L. R. Smith

Supervisor of Transportation, Southern Pacific, San Francisco

THE CAR DISTRIBUTOR and his force form the nucleus around which the fabric of increased car mileage must be built. Therefore, it is most important that the car distributor be a specialist in car handling, and that he be surrounded by a competent and sufficient force. The car distributor's bureau is a poor place to practice extreme economy. In the conduct of his office, he should have the necessary information from all sources, including a daily report from each agency station showing the number of each car on hand at that station at a given time each day, the date of receipt, whether loaded or empty, loading or unloading, an explanation of the delay, if delayed, and whether required for loading, if empty. Each

local way-freight conductor should render a report of cars on hand, set out and picked up at non-agency stations, showing loads and empties, and any other information which may be required to insure prompt disposition.

The car distributor's territory should be so restricted and his duties so limited as to afford him the time necessary to analyze the reports received, associate empty equipment with outstanding orders, and direct the attention of the proper officer to delays or improper movements.

Above all the desired results depend upon the education of those interested in car movement as to the actual value of a car day. Price lists show the values of materials and scrap. Requisitions for supplies are checked carefully, as they represent actual money on their face. Everyone knows the rate of per diem paid upon foreign cars, and to a considerable extent that figure influences prompt movement. But few realize the actual value of a car per day, or that it has an actual monetary value. "Price lists" showing the money valuation per day for each class of car for the prevailing season, placed before each employee involved in the handling of cars; the same information placed before shippers in such way as to impress upon them the effect wastage of car time has upon them will soon have everyone watching for possible leaks in car days.

Enlist the Employee

By M. Nicholson

General Manager, C. M. & St. P., Seattle, Wash.

Increased car miles can be obtained only by interesting every employee who has an opportunity to speed up the loading, unloading or movement of a car. Employees have been over-instructed through letters, circulars, bulletins, etc., but the personal appeal to the employee to do his best is the most effective. If the car repairer responsible for the repair of the car and its movement to and from the repair track; the roundhouse organization responsible for furnishing power for the prompt movement of trains; the agent, despatcher and yard forces who have the direction of movements in hand; the track forces who have the upkeep of the tracks in their charge, are all directly interested in speeding up the movement of a car, and if the individual employee in each department sees only the one object of avoiding delay to cars, whether loaded or empty, there will be a decided improvement in the average miles per car per day, and the traffic of the country will be moved with much greater despatch than heretofore and without additional cars. Additional tracks, roundhouse facilities, and power, are essential long before any increase in the number of cars.



Photo from Keystone View Co.

Train Ferry at New Orleans

*Papers presented in the Railway Age's contest on Increasing Car Mileage.



The Columbia Bridge Presents an Attractive Appearance

New Bridge Marks Progress in Transportation

Four-Track Structure of the Philadelphia & Reading Crosses Schuylkill River at an Historic Site

By Harry B. Glisson

Assistant Engineer, Philadelphia & Reading, Philadelphia, Pa.

OCCUPYING THE SITE of what was one of the first large railroad bridges constructed in this country, the Columbia bridge of the Philadelphia & Reading in the Fairmount Park section of Philadelphia, Pa., is now well along towards completion. The crossing of the Schuylkill river at this point has for nearly a century carried a large

Philadelphia & Columbia Railroad, one of the earliest steam lines constructed in Pennsylvania, and, in fact, in the United States. The bridge spanned the Schuylkill river between Rockland and Belmont, in Fairmount Park, Philadelphia. It was 1,050 ft. long, with seven spans and carried both a double-track railway and a carriage way, with a total width



Turning Two Arches at One Time with Steel Centering

amount of traffic in and out of that city. It is the growth of this traffic in connection with the use of heavier power that has made it necessary to replace a double-track through-truss iron bridge, the successor of the original bridge, with a four-track reinforced concrete structure of modern design and pleasing appearance. A brief history of the operations over both the original bridge and the new, forms, in a measure, an interesting commentary on the growth of the transportation system of this country.

The original Columbia bridge was built by the canal commissioners of the state of Pennsylvania in 1834 for the

of superstructure of 48 ft. It was built of white pine timber and, owing to the careful manner in which it had been protected from the weather, the bridge when removed in August, 1886, was as good as when first constructed in 1834.

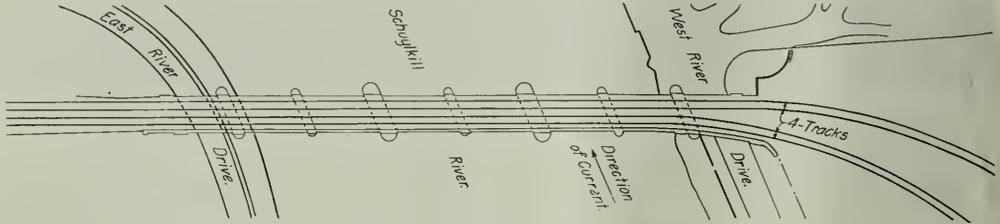
Interesting History

This wooden structure was the first railroad bridge of any considerable size constructed in the United States, and was the oldest wooden railroad bridge in existence at the time it was dismantled and removed in 1886 to make way for an iron superstructure. The following description written about

the time of the removal of the old wooden structure in 1886 is of interest:

Strange burdens have been borne across the old bridge during its half century of usefulness. Unnumbered thousands of pedestrians have tramped its floors, and vehicles of every description have rolled along through its dark tunnel-like structure. Not only have freight and passenger trains crossed the river upon its substantial arches, but even canal boats have been trundled across and brought into the very heart of the city of Philadelphia.

Until the construction of the Pennsylvania Railroad numerous canal boats were built in detachable sections. Freight was loaded on these crafts at Pittsburgh and other points and the boats were taken by land and water to their destinations.



The Bridge Is in Full View from Drives on Either Side of the River

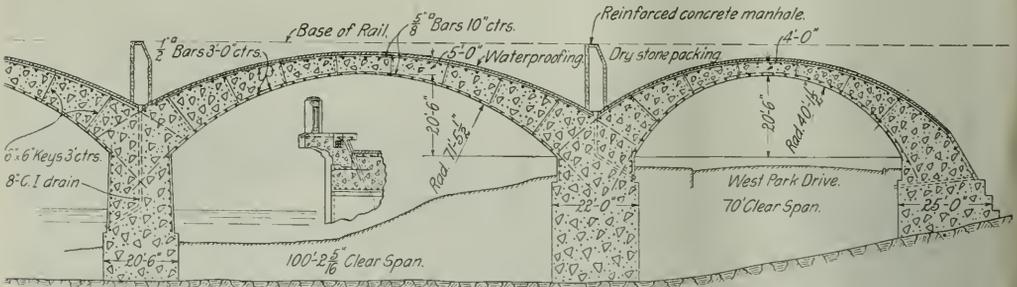
At the termination of the water routes the sections of the canal boats were detached and each run upon a truck. They were then drawn from the water and placed upon the railroad tracks over which they were conveyed to their destination. Freight loaded upon boats in Pittsburgh was often unloaded from the same vessels in the Market street warehouses of Philadelphia.

The above description refers to what was known as the State Works, embracing the western division of the Pennsylvania canal from Pittsburgh to Johnstown, the Portage Railroad with its ten inclined planes over the Allegheny mountains to Hollidaysburg, the Middle division of the

iron truss bridge. Several years ago the floor system of this bridge was strengthened and now this structure has been replaced, having become too weak to carry the present traffic safely.

Traffic Handled

The traffic passing this point consists of all the freight and passenger trains received from and delivered to the Baltimore & Ohio at Philadelphia; the traffic to and from the Central of New Jersey over the New York division of the Philadelphia & Reading, and a large portion of the traffic of the Reading, including that derived from the indus-



General Details of the Masonry

Pennsylvania canal, extending from Hollidaysburg to Columbia, and the Philadelphia & Columbia with its inclined plane at Columbia, ascending from the Susquehanna river, thence by locomotives to the head of the inclined plane at Belmont, descending to the Schuylkill river where the road crossed the Columbia bridge and entered the city, via Pennsylvania avenue, the route of the old Union canal to Broad street, where it then turned into Market street.

The main line of the Philadelphia & Reading was opened for traffic in 1838, between the cities of Philadelphia and Reading, and in order to reach the business center of the city of Philadelphia the railroad used a portion of the state road jointly with the state of Pennsylvania, from a point just north of the Columbia bridge and extending to its

tries along its main lines in this part of the city of Philadelphia and the Chester branch.

About 80 trains every 24 hours with an approximate average weight of 12,000 tons each are handled over this portion of the main line and in addition to this volume of traffic, numerous shifting movements are made to and from the Belmont yard located at the north end of the bridge. The through-truss bridge was not considered safe to pass the Mallet and Mikado locomotives used on the Reading and in addition the heaviest locomotives permitted to pass over the old truss bridge were not allowed to pass others of the same class while on the structure. All trains were required to reduce speed to 20 miles per hour while crossing.

Because of these conditions it was decided to replace the

double-track through-truss bridge with a modern concrete structure located at the side of the truss bridge and far enough up stream to permit of the completion of one-half of the new concrete bridge, which could then be placed in service before removing the old structure. The line of the new bridge was given a slight angle with the old in order to permit of a better alinement at the north end.

Plans Approved by Art Jury

The plans as approved by the Art Jury of the City of Philadelphia and the Water Supply Commission of Pennsyl-



Preparing for the Construction of the Second Section

vania and adopted by the railroad called for a four-track concrete arch bridge having eight spans and with a foot walk on the up stream side of the bridge. The eight spans consisted of two arches over the Fairmount Park driveways on each side of the river, each with a 70-ft. clear span, and six arches over the river with clear spans of 100 ft. 2 $\frac{5}{8}$ in.



The Work on the First Section Nearing Completion

each, all measurements being taken at the spring line and at right angles to the faces of the piers. In order to provide the proper rise for the spans and the required distance from the top of rail to the extrados of the large arches it was necessary to build the tracks at an elevation about 3 ft. higher than that over the old and revise the grades both north and south of the new bridge.

The Design

The design provides for four tracks, 13 ft. center to center, and a foot walk on the up stream side with vitrified clay ducts in each coping for electric light, signal, telephone and telegraph wires. The center lines of the piers have been placed parallel to the direction of the current in the river and make an angle of 65 deg. 41 sec. with the center line of the bridge. The total length of the bridge between the faces of the abutments is 971 ft. 3 $\frac{7}{8}$ in. with a total width under the coping of 57 ft. 6 in.

Each arch is a segment of a true circle with a rise of 20 ft. 6 in., the radii of the large arches being 124 ft. 9 in. and 71 ft. 5 $\frac{1}{2}$ in. and the smaller 76 ft. 3 $\frac{3}{4}$ in. and 40 ft. 1 $\frac{1}{2}$ in., giving a crown thickness of 5 ft. and 4 ft., respectively. Abutment piers located in the river channel are 28 ft. wide at the spring line. The two piers at the short spans over driveways are 20 ft. wide and the three intermediate piers are 16 ft. The design permits the turning of two large arches and the removal of the steel centering in



Constructing the Masonry Wall to Retain the Stone Packing

one operation, the abutment piers providing the stability for the concrete as placed. All the piers have circular ends and are battered $\frac{1}{2}$ in. per ft. on all faces.

Steel reinforcement was used to provide for stresses due to changes of temperatures in the piers, arch rings, spandrel walls, copings and balustrades, and was placed 3 in. back from the face of the concrete. The reinforcement in the neat work of the piers consisted of $\frac{1}{2}$ -in. rods spaced 3 ft. vertically and 2 ft. horizontally. In the arch rings, extrados and intrados it consisted of $\frac{5}{8}$ -in. rods spaced 10 in. center to center parallel with the center line and $\frac{1}{2}$ -in. rods spaced 3 ft. parallel to the faces of the piers. In the back of the spandrel wall, $\frac{3}{8}$ -in. rods were placed on 1-ft. centers. Every alternate rod extends the full height of the spandrel wall and into the arch ring for a distance of 2 ft. This arrangement provided a bond between the arch ring, the spandrel wall and the coping, the long rods also extending into the coping.

For construction purposes the large arch rings were divided into seven sections, and the small into five. The construction joints in the arch rings were carried through the spandrel wall, the coping and the balustrade, after which the top of the joint through the sidewalk and the coping was filled with waterproofing cement to prevent any water

from passing through the joint and down the face of the spandrel wall.

At the piers the construction joint was made where the post and balustrade meet and in order to prevent cracking of the balustrade No. 16 sheet zinc was placed between the joint under the balustrade and the joint between the balustrade and the post so that the balustrade concrete between these two points is free to move with changes in temperature.

Method of Construction

The work of construction was started in July, 1917. Excavation was started at the north abutment. Wood was used for all framework and sheeting. The work was carried on for two river foundations at a time and progressed from the shores toward the center of the river with the greatest depth of foundation below normal water of 23 ft. The most troublesome foundation to excavate was for Pier No. 1, the material removed being large stones, a cubic yard and greater in volume, similar to the material composing the entire area of the bank between the river and the park driveway. The water from the river reached the excavation in such volume that a puddle was necessary along the bank of the river for a distance of 300 ft. to stop the flow. The bottom of this foundation was 20 ft. below normal water level.

Wooden forms were used for all neat work concrete, the lumber being tongued and grooved, surfaced two sides, and 1 1/2 in. in thickness. Wooden centers were used for the



Contrast the Old Original Bridge with the New

70-ft. spans over the driveways, and steel centers for the larger spans, sufficient for turning two arches at a time. The forms for the umbrella sections over the piers were supported in some cases by the steel centering, and in other cases they were built up and supported from the foundation offset.

Floating derricks were used for handling the steel centers, the cofferdam construction, the excavation from the river piers and for the puddling on the outside of the cofferdams. The material for the puddle was dredged from the river channel up and down stream from the bridge site.

Most of the concrete was mixed at the north end of the bridge and transported by narrow gage cars, attached to a cable and operated by a steam hoisting engine at the same end, the movements being controlled by electric bells. The narrow gage track was placed at the side of the truss bridge and supported by the lower chord members. Two 1-yd. side dump cars were attached to the cable, and the concrete chuted from the cars through steel spouts into the forms.

The concrete mixing plant consisted of two 1-yd. mixers operated by steam and fed from an overhead storage bin by gravity. The sand and the crushed gravel were clam-shelled into the bin from storage piles. From the mixers the concrete was elevated and chuted into a hopper over the narrow gage track, that delivered it to the dump cars. All concrete was of a 1-2-4 mix. Embedded stone was used below the spring line in all foundations, piers and abutments.

All backs of arches and spandrel walls were covered with three layers of asphalt-saturated fabric attached to the concrete, fastened together and covered with melted asphalt, making a solid waterproof membrane. This was protected from injury by being covered with a layer of 1-2-4 concrete 2 1/2 in. in thickness, reinforced with No. 12 electrically welded wire cloth of 4-in. by 4-in. mesh. All filling over the arches to the height of sub-grade consisted of one and two man stone packing. Drainage was provided at each pier through an 8-in. cast iron pipe with the discharge end of the pipe placed below the normal water level of the river and a masonry manhole over the mouth of the pipe, with suitable openings in the sides of the manhole to permit the water to reach the pipe. The top of the manhole was brought up to the level of the top of the ties and covered with a cast iron cover in order that the drain pipes and the openings leading the drainage to the manholes could be cleaned.

The outlet of the drains being below the normal water surface will not be visible and it is not likely that they will be stopped up by ice forming in the pipes, except perhaps in extremely cold weather, when an extra thickness of ice forms on the river.

All of the engineering work was done by the company forces of the Philadelphia & Reading under the direction of Samuel T. Wagner, chief engineer; Clark Dillenbeck, assistant chief engineer; Edwin Chamberlain, assistant engineer, and the writer in charge of the forces at work in the field. Before the work could be placed under contract the approval of the Art Jury of Philadelphia, the Fairmount Park Commissioners, the Water Supply Commission of Pennsylvania and the Public Service Commission of Pennsylvania had to be secured. Seeds & Derham, Germantown, Pa., were the contractors for the masonry and grading.

REPRESENTATIVE MANUFACTURERS of Massachusetts and Connecticut will leave on March 12 in a train of 5 Pullman cars, a dining car and a club car for an extended trip in Mexico. The purpose of the excursion is to examine the possibilities of trade extension in that country and make friends with the business men and government officials. The party will return to this country on April 4.



From American Railroads

Selling American Railway Supplies Abroad*

Organization of Specialists, Intelligently Supported, Will Get Results at Reasonable Expense

By David Van Alstyne,
American Locomotive Company

I SAILED IN MAY, 1919, for Capetown and continued for 17 months through South Africa, Rhodesia, Belgian Congo, Portuguese East Africa, British East Africa, India, Federated Malay States, Java, Australia, Philippines, China, Korea and Japan. The principal sources of information upon which I depended for railroad statistics, names and addresses of railroad officials, etc., were the American consuls and the Vacuum Oil Company. Mr. Whaley, vice president of the Vacuum Oil Company, had very kindly supplied me with letters to many of his foreign representatives, but whether I had letters to them or not, I always found them glad to give me any assistance I asked them for.

As for the American consuls general I have found them everywhere not only exceedingly well informed but anxious to be of all the assistance possible. For example, one consul general, not content with what he could give me himself, called up a banker friend and asked him to come to his office and give me more, which he did. Another took me to his club to have me meet people worth knowing; another told me that any time I would write him he would gladly interview or gather information concerning anybody we might have under consideration as agents. Still another, instead of directing me to a man I wished to meet, went with me and introduced us. I cite these incidents to show the character of the men we have representing us in our consular service which I feel we have every reason to be proud of; in fact, the treasurer general of Portuguese East Africa told me that he had served the Portuguese Government in several places throughout the world, and that in his opinion our consular service is the best in the world, though he thought the German service was superior to ours before the war.

I wish also to testify to the value and accuracy of reports, in so far as I have been able to check them, made by our trade commissioners, such as those by Frank Rhea on the railways of Australia, China and Japan.

South African Railways

The railways of the Union of South Africa have 10,000 miles of track, 3 ft. 6 in. gage, generally well constructed with heavy rails and good ballast, but laid according to the natural contour of the ground almost without cuts or fills, going around sharp curves where the hills are too steep, or over them where the grade does not exceed 1 in 30.

A great deal has been and is still being said and written concerning the importance of changing the gage to 4 ft. 8½ in. My judgment is that the gage will never be widened because the economy to be effected will not justify the cost. South Africa, like Mexico, is a high plateau, making it necessary to climb long steep grades of 2 per cent to 3 per cent up 4,000 ft. to 6,000 ft. to get up into the country from any port on the coast. Water is scarce and irrigation expensive. Several times as much land is required to raise an equal number of cattle or sheep as in this country. The distances are great and settlement and development of the natural resources must necessarily be slow. Imports or uphill tonnage will be light in comparison with the extent of the country, while exports, comprising the heavier tonnage, such as coal, beef and some grain, is down hill.

What is vastly more needed than change of gage is reduction of curvature and grades, and this is fully recognized by the able and aggressive general manager, Sir Wm. Hoy, who is carrying out such a program as rapidly as he can afford it, besides equipping the road with locomotives and cars of large capacity. Already he is operating several thousand forty-ton coal cars and has begun the application of heavy couplers in place of the hook and link. I apprehend, also, that before very long their difficult braking conditions on mountain grades will result in the displacement of the vacuum brake by the pressure brake, though thus far there appears to be little enthusiasm for such a change.

Also I understand that as a result of a report recently made by an English electrical engineer, it is likely that the mountain grade out of Durban and perhaps the Capetown suburban service may be electrified. I very much doubt the possibility of any such economy as the report claims, but experience seems to indicate that the electrification microbe is of a variety that either we do not get the disease at all or we get a fatal case, rarely a reasonable attack.

Ills of Government Ownership

The South African Railways are government owned and operated and subject to all the ill and evils pertaining thereto. Almost everywhere I have been, the railroads are either partly or wholly controlled by the government, and the results of government operation seem to be about the same everywhere. While the service rendered may be fairly good, it appears to be universally expensive. I have met many able railway men who would rejoice in the opportunity to produce better results, but on account of the difficulty in getting prompt or intelligent action from the government, there is more or less prevalent lack of enthusiasm and a disposition to say "we can't do any better because we are a government proposition." Also I think there is no doubt that government railway labor is more difficult to control because of the meddling of politicians, and this is particularly noticeable in South Africa and Australia.

A former chief commissioner of the Government Railways of New South Wales told me that good results on a government railway depend far more on the ability and force of the chief executive than they do on a privately owned railway, because he accomplishes his good results in spite of his superiors and not because of the support he receives from them.

It is a rare thing to hear a railway official speak in favor of government operation, and about the only good argument I have heard in its favor is that the government can better afford to build and operate at a loss in undeveloped countries than private capitalists. I should also note that labor commissions are often more interested in votes than in efficient service thereby making good discipline difficult to maintain.

American Railway Supplies in British Colonies

South Africa has enjoyed a slow but steady growth in its imports and exports for a good many years and will continue to do so, and there is a relatively small but growing market there for American railway supplies.

Having traveled under the British flag for ten months and made the acquaintance of a large number of British railway men, I am convinced that we exaggerate their prejudice

*An address made before the October meeting of the executive committee of the Railway Business Association.

against American goods, and that a good deal of the prejudice which does exist is justified, due to inferior goods or goods not made as they want them.

Englishmen are conservative and, I think, more than other nations disposed to think that what comes from their own country is necessarily better than that from other countries, but the Englishman is always a gentleman, always receives you cordially and is always ready to listen to what you have to say. When you can deal with such men as the large majority of those I have met, it is only a matter of time when their prejudice will be overcome.

I could cite a good many instances of unexpected courtesies I have received at the hands of British railway men. As instances showing a tendency in our favor, I might cite the case of one chief mechanical engineer who told me he was glad that now that the war is over he will not have to buy any more engines in America or Canada, but volunteered the information that he was using Baldwin engines, purchased during the war, on his hardest passenger run. Another chief mechanical engineer said he always liked to see American builders because he could get so much more worthwhile information from them than from the British. Another told me that he is adopting many American practices and designs.

In another instance, the managing director of one of the largest roads in India told me there was a growing dissatisfaction with their buying through London because their London buyers so frequently sent them what they chose to rather than what was ordered, and that sooner or later they will break away from buying through London and buy direct. Still another case is that of our consul general at Sydney, New South Wales, who told me that in a recent report the British consul at Sydney had advised British manufacturers that they had better make their packages more attractive in appearance if they wished to hold on to the little trade left them by Americans.

Rhodesia and Belgian Congo

Of Rhodesia and Belgian Congo there is not much to be said except that the principal industry in the Congo is copper mining and smelting belonging to British, Belgian and French capitalists, and managed by Americans.

Also a railroad is projected and partly built from Elizabethville to Lobito Bay on the coast of what was German Southwest Africa, to shorten the haul from the Congo to England, the route at present being south to Bulawayo and east to Beira in Portuguese East Africa.

To compete with the Lobito Bay Line the Rhodesian and Beira & Mashonaland railways were considering building a cut-off from Salisbury northwest to a point in the neighborhood of Livingston, which would materially shorten the distance from the Congo to Beira.

The Situation in East Africa

Portuguese East Africa is said by South Africans to offer the greatest opportunities of all the undeveloped countries in the world in agricultural products, timber and minerals.

The Mozambique Chartered Company, J. Gordon Brown, general manager, with office at Beira, is spending a great deal of money in various kinds of development, including building a railroad 150 miles from Beira to Chindio on the Zambesi river to connect with the Nyassa Railway.

Judging from conversations with the governor general at Beira, the treasurer general at Lorenzo Marques and others, the Portuguese are very anxious to have Americans invest in Portuguese East Africa to offset the growing influence of and control by the British, and it is common talk that it is only a question of time when Delagoa Bay, the harbor at Lorenzo Marques, will come under the control of Great Britain in payment of a loan made to Portugal.

On the other hand, it is stated that due to frequent changes in the Portuguese government, and peculiarities of Portu-

guese methods, it is difficult for foreigners to do business in Portuguese East Africa, though it is to be noted that it apparently has not seriously retarded the British. Tropical fevers are a serious handicap to white men living in the interior of Portuguese East Africa.

The treasurer general at Lorenzo Marques told me that Americans are the most timid people in the world in the matter of extending credits and the chairman of the board of probably the largest importing and exporting concern in South Africa and doing business up the east coast as far as Uganda, told me that in 25 years' experience handling British and American goods he had never represented but one American house which would accept such risks as are commonly accepted by those of other nations.

At Mombassa, British East Africa, I found quite a boom on, many discharged soldiers going into the country to take up land allotted to them by the government, though there were also a good many people coming out of the country, having had enough of it after a short trial.

Also, at Mombassa, I was told by C. D. Gun-Browne, who had charge of the transport service in the German East Africa campaign, that he had several groups of motor cars of various makers, both British and American, and that the Ford group was the most reliable of all and the least expensive in maintenance.

It is also of interest to note that Cecil Rhodes' dream of a "Cape to Cairo route" is a reality now by rail and water, except a few hundred miles, I believe, in Uganda.

India and Its Problems

India has 25,000 miles of railway, one-half of which is 5 ft. 6 in. gage, with the balance chiefly metre gage. The country is quite level in most parts, the railway equipment light, with light trains the rule. Clearance limits are too low and narrow to ever permit fully utilizing the possibilities of a 5-foot 6-inch gage. They use the hook coupler and vacuum brake, but have a committee at work on a heavy automatic coupler. Many of the railway shops are modern and well equipped and they build a lot of their own equipment, at a reasonable cost.

At Jamalpur on the East Indian Railway, they were making the finest looking basic open-heat castings I have ever seen, and in the iron foundry, barefooted and practically naked molders and helpers were pouring off a 100-ton heat. The Tata Iron and Steel Company at Jamshedpur rolls plates, shapes, bar and rails and employs 20,000 natives. The ownership I understand to be British and Parsee, but the management is American.

One of the most serious problems in India is that of fuel. Their high grade coal in the eastern part of the country is giving out, but there are large deposits in the western part of low grade coal which they seem to have been unable to burn successfully on a grate, and they are, therefore, much interested in finding out about burning it in pulverized or some other form. Fuel oil is said to be too expensive for all the roads, except one or two which can get it direct by water from Persia.

The ratio of natives to white people in India is about 2,000 to one, and the bulk of railway business is native third-class travel, which is very cheap and profitable. Not much attention is given to keeping a check on first-class passengers and of about 800 rupees worth of tickets I bought, I still have three-quarters unpunched and not even looked at.

Federated Malay States and Java

The Federated Malay States Railway, metre gage, has excellent roadbed and equipment, and runs some very fine passenger trains at uncomfortably high speed for the narrow gage. Kuala Lumpur, the railway headquarters, 250 miles north of Singapore, has government and railway buildings which would be a credit to any city. While I was at

Kuala Lumpur, 2,000 native railway shop employees returned to work after a two weeks' strike for more money.

Everywhere I have been I have observed that no matter how otherwise primitive and unsophisticated the natives may be, they are able to organize sufficiently to make demands and call strikes. In Johannesburg the native gold miners sent a committee to meet the employers and demand higher wages and better conditions. At Bulawayo I witnessed a conference between 300 striking Matabels sitting in a circle on the ground and the railway general manager standing in the centre. Many thousand Indian coolies were on strike in the Bombay jute mills, and a little later the Tata Iron and Steel Company had a prolonged strike almost forcing them to close the plant. In Hongkong the native electricians' union struck and stopped the tram cars and electric lighting. In Shanghai the dock laborers struck, and I learned that numerous unions were in process of being organized. In Japan organized labor is becoming very strong, and wages have increased a higher percentage since before the war than they have here, though, of course, the difference between Japanese wages and ours is greater than ever.

Everywhere that I have been able to make observations, output per man has been much below ours, whether from white or native labor, and ranging, I should judge, from one-half to one-fifth. Some of the difference is, of course, attributable to our better equipment. Rarely have I been able to find railway shops which had a good cost system, and railway statistics as we have them are almost unheard of. The principal exception is the Chinese Government, which issues annually an excellent report, devised by Americans.

Java has an excellent railway, 3 ft. 6 in. gage, running the length of the island—500 miles. The government is said to have a large program for railroad construction and other development in Java, Sumatra and Dutch Borneo. The Java Dutch seem to prefer to do business with Americans and are anxious to have American capital invested in the Dutch East Indies.

I was told that a great deal of American capital is being invested in rubber plantations in Sumatra and the Federated Malay States.

It was painful to see locomotives fired with teak and other hard woods which I suppose would be worth almost a dollar a foot here.

Australia

Australia has a few more square miles than the United States and five million population. Three-fourths of the population live in six cities. It is a white man's country, and the government makes it almost impossible for any cheap Oriental labor to come in. The state governments are all more or less controlled by the labor party, and their policy seems to be to meddle with all kinds of business. Whenever the newspapers or a group of agitators can make a good case against some branch of private business, the government takes it over and makes it worse. Almost all the railway and tramway mileage is government owned and controlled.

There is little immigration and very little outside capital coming into the country. Business men claim that the governments are killing all enterprise and development, and many of them predict a revolution. The ratio of government employees to total population is said to be one to five, the highest in the world. Chinese labor, which can stand the intense heat, is much needed in Queensland on the sugar estates. The Queensland government forbids it, and the sugar industry is only half developed.

The railways skirt the coast from Fremantle on the west coast to north of Brisbane in Queensland on the east coast, there being very little mileage in the interior; in going from Fremantle to Brisbane, 3,500 miles, the gage changes five times. Three gages are in use—3 ft. 6 in.; 4 ft. 8½ in. and 5 ft. 3 in. According to three chief commissioners whom

I met, the cost of keeping idle equipment and labor for transferring goods and passengers at points where the gages change is tremendous.

All the railways have water competition and since the fertile country is along the coast and the interior is a desert, or subject to droughts, there is not likely to be very rapid railway extension into the interior.

In the matter of unifying the gage there is a good deal of jealousy between the states, but the general opinion seems to be that in the course of time they will all adopt 4 ft. 8½ in., which is the federal territory standard.

The good coal being near the southeast coast, the cost of fuel is a serious matter in south and west Australia, and since there are large deposits of low grade coal in south Australia, they are much interested in finding some way to use it, either by pulverizing or through some other process.

At Sydney I visited the Clyde Engineering Works, which has an order from the New South Wales Government Railways for 300 locomotives. The government railways of New South Wales and Victoria have fine shops and build much of their own equipment. At Newcastle there is a large steel plant locally owned but having an American manager.

In my travels I have met many Americans in business and several managing large industrial plants, but nowhere any American railroad men, except two in China, managing roads still on paper, and one in Manila. Since I left Australia, I have read in the *Railway Age* that an American named Clapp has gone out to Australia to be chief commissioner of the Victorian Government Railways.

The policy of the Australian governments is to patronize home industries as far as possible, and railways are not permitted to buy outside the country what can be had in Australia.

The Philippines

Manila has 600 miles of 3 ft. 6 in. railway and a program for building 300 miles more. The uncertainty as to how soon the Philipinos will be given their independence retards development, and I heard Americans complain that American capital is being invested everywhere in the Orient except in the Philippines.

China

China has 6,000 miles of railway, built and operated under many different managements which have three things in common, namely, a 4 ft. 8½ in. gage, an American vertical plane coupler and a uniform height of coupler, or nearly so.

All the railway mileage is in the eastern half of the country and undoubtedly the great extent of the country, the population of 400,000,000, and tremendous agricultural resources will call for rapid extension of the railways, whenever they can establish a stable government and put a stop to their endless civil wars. Gradually the government is taking over the control of the railways, but foreigners, especially the British, still control a considerable per cent of the mileage, and hence the buying also.

Practical railway executive talent is very scarce among the Chinese, and one of the most prominent Chinese engineers told me he hoped the foreigners would continue to manage those roads which they still manage because there are at present so few Chinese capable of doing it efficiently. Having had ample opportunity to verify this opinion, has led me to wish that Chinese students, who come to this country for a college education and expect to go into railway service in China, might first get some actual railway training which would be much appreciated by them and would carry a knowledge of American methods and equipment into China. Recently the Chinese-American Engineers' Society was organized in Peking, and I had the honor of becoming a member of it.

For the past year the Ministry of Communications has had

a Commission of Technical Advisers from several nations at work standardizing methods and equipment on the government railroads. The two principal advisers are an Englishman, T. R. Johnson, on maintenance of way and structures, and F. H. Clark, formerly of the Baltimore & Ohio on mechanical matters.

Japan

In Shantung, Manchuria, Korea, Formosa and Japan the railway service is all under the control and management of the Japanese government and is generally very good.

The Shantung, South Manchurian, Formosan and Korean railroads buy, I presume, chiefly in the United States, but it is the policy of the Imperial Government Railroads to get as much finished product as possible within the Empire.

Railway shops, locomotive works and plants exhibit exceptional energy and enterprise, but their productive efficiency, I should judge, is considerably below ours. Their production of steel is still small compared with their consumption, but with their extensive control of iron ore, coal and blast furnaces in China, they will, before long, supply practically all their requirements in steel, no doubt.

Japanese trade has suffered a very severe setback since the war, chiefly, I understand, for two reasons; one, the Chinese boycott and the other the almost universal unpopularity of the Japanese and Japanese goods. While the boycott has been more or less intermittent, sometimes feeble and other times very intense, it has on the whole been quite effective and very expensive to the Japanese. A representative of a large Japanese importing and exporting house told me the boycott had cost his firm millions of dollars, and in some places Japanese firms have been driven out of business.

The unpopularity of the Japanese seems to extend all over the Orient, and to all nationalities, being at its worst, I should say, among the British, but I am disposed to think that a great deal of it is commercial jealousy more than anything else. My personal experience with the Japanese has been exceedingly agreeable.

Japanese goods were condemned in almost every country I was in. In South Africa the complaint was that Japanese goods are never up to sample and that they will buy no more at any price. In India almost the entire freight car equipment of the country was running without power brakes because of the very inferior quality of the rubber hose, gaskets and rings they were obliged to take from Japan during the war, and in Australia there is a law excluding goods not up to the standard of Australian goods, which I was told was chiefly intended to exclude Japanese goods. It is interesting to note that the Japanese have in Korea exactly the same problem of cheap labor driving out the more expensive as we have in California.

In the railway shops in Dairen, Manchuria, and Seoul, Korea, only 25 per cent of the labor is Japanese because it costs considerably more than the native Chinese and Korean labor and is not worth the difference for most of the work.

How to Create a Market for

American Railway Supplies

In all the countries I have visited, which comprise nearly all the civilized world except Europe and South America, it is to be observed that the volume of railway supply business is small in comparison with the enormous territory to be covered and that in all but China, Java and the Philippines there is more or less prejudice against American goods. Even in China there is prejudice against us on the part of the foreigners, to the extent that each nationality naturally prefers to buy of its own country.

On the other hand, all of these countries are still greatly undeveloped, but are growing, some rapidly, others slowly, and I believe that we have decided advantages over most other producing countries in that we have most highly devel-

oped the art of railroading, have the greatest productive efficiency, and superior methods and enterprise in introducing our goods. Having in mind, therefore, that our first problem is to create a market and considering all the conditions, I have been thoroughly impressed with the idea that, if practicable, American railway supply manufacturers should combine and handle their business through one or more large organizations which could afford to employ the highest class of talent.

The specialist who can convince the railway man that we offer the latest and best, who can talk the railway man's language and who can assist him in solving his difficulties by showing him how they have been solved in this country, it seems to me, is the man who will make friends for American railway equipment in countries where the best may be unknown and where there is prejudice against things foreign or different from what they are accustomed to. Steadily increasing wages and difficulty in handling labor would seem to me to help create a demand for the most efficient in railway equipment.

Such men, I should think, would come from the ranks of the first-class railway men. Being railway men they would be able to specialize in many classes of railway equipment sufficiently well for the purpose. Such men would provide the service necessary to keep customers satisfied after the goods are sold, and service is as much needed abroad as in this country.

In most countries outside the United States when you have won over the mechanical man, the job is practically done because he generally gets what he wants.

The small volume of business and the time required to enlarge it would not justify any one manufacturer in sending out the class of representatives I have in mind, but it seems to me that a group of manufacturers could well afford it and safely expect excellent results eventually.

I have heard a number of complaints from American representatives in foreign countries to the effect that we do not understand foreign trade; that we do not take proper care of it; that we are very anxious to get it when domestic business is bad but neglect it and lose all the ground previously gained, when domestic business is good.

One man told me that the intermittently hot and cold way his principals had of treating their foreign business was very discouraging; another that he expected to lose his mind trying to get his people to understand what was required in his territory; a third that a general officer of his company had not been out to study conditions in his territory for twelve years; and a fourth that when a man crosses the ocean to represent an American house, he might as well go to the moon in so far as any assistance from headquarters is concerned.

The general officer of one of our largest corporations, whom I met in Japan, said he had gone out to study conditions in the Orient, and that now his big problem was how to make the people at home understand them, which he felt would be a very difficult undertaking.

Other people are out after business also, but I doubt if any of them know as well how to get it as we do, with the possible exception of the Germans, whom I found after business in three places—Portuguese East Africa, Java and China.

Observation of the workings of the big import and export houses has not impressed me that they are the best adapted to exploit such highly technical goods as railway equipment, especially where such equipment has to be introduced into a new and prejudiced field. They have too great a variety of lines and too little specialized talent.

The problem is chiefly to create a market and having created it, to hold it. I have a firm conviction that an organization of specialists, intelligently supported would get results at reasonable expense.

An Optimistic View of the Railway Situation*

Favorable Public Opinion, Closer Co-operation and Wise
Legislation Make Outlook Promising

By Julius H. Parmelee
Director, Bureau of Railway Economics

IN DISCUSSING THE railway situation from an optimistic point of view, I am not unmindful of the depressing traffic and operating condition in which the railways find themselves at the present time. We are in the midst of a traffic slump. Revenues have declined, net earnings have been far from adequate since the rates were increased, and the labor situation is charged with dynamite. Let us, however, remove ourselves for a few minutes from present conditions and take a look into the future, which has in it, to my mind, many elements of optimism and of encouragement.

To get the perspective for such a forward look we must go back over railway history for 20 years. The period between 1900 and 1910 was of the greatest significance for the American railways. For one thing, the Interstate Commerce Commission during the decade secured what it had been demanding for years, namely, authority over interstate freight and passenger rates, with power to suspend rates, to initiate investigations with or without complaint, and to prescribe penalties for violations of its rate decisions. Total railway mileage grew about 25 per cent during the decade, whereas business grew at a much faster rate. Freight traffic increased 80 per cent, while the passenger traffic more than doubled. The general level of prices increased about 2½ per cent a year, while railway wages rose about 2 per cent annually. Although the operating ratio increased during the decade, the rate of return on investment increased from about 4½ per cent to about 5½ per cent. In other words, although the railways experienced a period of rising prices and wages, they kept ahead of the increase in cost of operation by greatly increasing their business and by introducing efficient methods that more than offset the increase in expenses. The trend was distinctly favorable to the railways.

Was there any change in this trend after the commission secured control over railway rates in 1910? The answer may be made in two ways. In the first place, railway growth virtually ceased, so far as new construction was concerned. Prices increased 25 per cent a year, or 10 times as fast as before, while wages rose about 8 per cent a year, so that by the end of 1917 the average annual earnings of railway employees were 64 per cent higher than they were in 1910, and the operating ratio had increased from 66 to more than 70 per cent. Average receipts per ton-mile, which had increased between 1900 and 1910, fell to a lower level in 1917 than in 1900. The rate of return on investment, which is the final basis for judging railroad prosperity, declined to about 5½ per cent. Taking the eight years from 1910 to 1917, inclusive, and breaking them up into two four-year periods, we find that the rate of return on investment was less during the second than during the first four-year period, despite the fact that the second four years contained the year 1916, which the heavy war traffic made one of the banner years in railway history.

In the second place, to reach an answer we may summarize the rate decisions of the Interstate Commerce Commission during the eight years from 1910 to 1917. Beginning with the two general rate petitions filed by the Eastern and Western carriers in 1910, both of which were denied by the commission, and extending through the Five Per Cent case of

1913-1914, the Western case of 1915, and the Fifteen Per Cent case of 1917, we find that the commission in every case either denied the petitions of the carriers or granted them only in part. There were long delays between the time petitions were filed and the date they were finally decided, and it cost the railways millions of dollars merely to find out whether or not the commission would grant them the desired increases.

I make no criticism of the Interstate Commerce Commission in this connection. Economic tendencies, such as the rapid rise in prices and wages, were running against the railways in this period and the commission was itself the victim of certain economic and political forces which it would indeed have taken a courageous body of men to withstand. Nor do I claim even that the commission was responsible for the unfortunate financial position into which the railways were slowly but surely drifting. Whatever the cause, the railways unquestionably found their earnings on the decline and their credit steadily on the wane. The situation during this period, while not critical, certainly carried the signs of impending crisis, were not something done to relieve the situation.

When President Taft approved the Mann-Elkins Act in 1910, which was the final step in the series of acts conferring on the commission the power to regulate rates, it was believed that the problem of railway credit was solved, at last. As a matter of fact, it was not so near solution at the close of 1917 as at the beginning of 1910.

That the problem was fraught with danger was recognized by many students of the railway problem, and no less by the railway executives themselves. In September, 1914, a committee of railway executives waited upon President Wilson and laid before him the facts with respect to the declining credit of the carriers as related to their duty to furnish efficient service to the American public. As a result of this conference, the President publicly announced his willingness to "call the attention of the country to the imperative need that railway credit be sustained and the railroads helped in every possible way, whether by private co-operative effort or by the action, wherever feasible, of government agency." He continued: "I am glad to do so, because I think the need very real."

Furthermore, the President's annual message to Congress in December, 1915, suggested the creation of a commission of inquiry, "to ascertain, by a thorough canvass of the whole question whether our laws, as at present framed and administered are as serviceable as they might be in the solution of the (railway) problem." In a later paragraph the President called the effort to solve the railway problem a step toward "national efficiency and security." "In this (he added) we are not partisans, but heralds and prophets of a new age."

In response to this recommendation Congress, in 1916, appointed a Joint Committee to make a comprehensive study of the transportation question. Partly because of the death of its chairman, Senator Newlands, and partly because of the inception of government control of the railways, no formal report was ever filed by the committee.

This very brief survey of the trend of railway affairs dur-

*Address before the Washington, D. C., Traffic Club on February 5, 1921.

ing the periods prior to and succeeding 1910 indicates how the trend had changed, from one that was inclined upwards to one that was discernibly inclined in the opposite direction. The entry of the United States into the war, followed by government operation of the railways a few months later, represented a break in the continuity of the trend, and we may therefore skip the three years that elapsed between December, 1917, and September, 1920, and consider the prospects for the future. In doing so, let us place ourselves, to quote again from the President, "not in the attitude of partisans, but of heralds and prophets of a new age." That we have entered a new era in transportation no one will deny, however differently we may view the benefits or drawbacks of the new order.

In the first place, the railways have survived the period of government operation and have emerged stronger in public opinion than ever before. There is no question in my mind that for the present, at least, the American people have had their fill of the government in industry, and that the railways have a clear field for the development of a strong, well organized industry. This gain is one of the most important results of our entry into the great war.

In the second place, railway managements have during the past four years been learning the value of co-operation, which will mean much for operating efficiency in the future. Organization of the Railroads' War Board in 1917 as a voluntary method of forwarding the national war program was an important step. On the theory that for the time being war was the nation's business, the railway companies submerged their individual interests and unified their operations into one continental system. The beneficial effect of that forward step in railway co-operation was so great that it is difficult even to comprehend it. The period of federal control also furnished an object lesson of the value of co-operation, so that today we have the spectacle of a fine give-as-well-as-take spirit among the railway companies, without losing any of the benefits of a healthy rivalry. The resulting advantages are many and patent, affecting the railways themselves, their employees, efficiency of operation, and the attitude of the public. No one who has been an observant spectator of railway affairs for the past few years can fail to have been impressed with the growth of this fine spirit of co-operation.

In the third place, the railway managements are more sensitive to public opinion than ever before. In all their recent appearances before public bodies, the railroad representatives have been careful to emphasize their appreciation of the public's stake in transportation efficiency, and to place the public interest above that even of the railway owner and employee. I believe them to have taken this position in all sincerity, and not because they consider it the better part of expediency. Contrast this with the different attitude of many railway executives in the past, and one can see how far we have traveled toward a clearer understanding of the railway problem by the railways themselves. With a motto of "adequate and efficient transportation service the first consideration," the future of railway operations cannot but be brighter than the record of the past ten years.

In the fourth place, the railways and their employees are on terms of a better understanding of each other's point of view than for some time, perhaps better than ever before. I say this with full appreciation of the present strained situation in the railway labor world, from which I feel that both sides will emerge with a more wholesome respect for each other. Railway labor has learned several valuable lessons during the past year. The employees discovered, for example, that the public at large considers its own interests more vital than that of any one class. They are coming to realize that liquidation of industry cannot come unless they make their contribution in the shape of greater efficiency

and loyalty, forego special privileges they have acquired, and even, if necessary, accept a lower wage level to accord with lowered living costs. But the lesson has not all been labor's to learn. The managements see labor's point of view more clearly than has sometimes been the case, and are giving the interests of labor, as well as that of the general public, the most earnest consideration. This has taken various forms, such as a greater share in questions of management, as on the Pennsylvania, but whatever the form, I believe a better day is here with respect to the so-called "capital and labor" problem on the railways. What that will mean for the future efficiency and prosperity of the railways is clear without the necessity of elaboration.

Last, but by no means least, a new era in transportation was ushered in by the passage of the Transportation Act, which has now been effective for nearly a year. You are all familiar with the details of that act, and I need refer only briefly to the four principal provisions of the act which in my opinion justify optimism for the future. For the first time in history the investor in railway securities, without whose co-operation not a wheel would be turning on the railways today, has his investment safeguarded through the assurance of a definite rate of return on his investment. Second, operating efficiency is assured through the provisions giving the commission power to require honest, efficient and economical management, also the power to unify certain operations in times of emergency. Third, the interests of labor are assured through the provisions of orderly procedure in the case of wage and working disputes. Fourth, greater efficiency and economy are foreshadowed in the provisions of the act relating to consolidation of the many railway properties into a smaller number of strong, well organized systems. The Transportation Act is far from a perfect, or even a satisfactory, legal document; in some respects it has not yet commenced to function, while in other respects it is functioning only partially or at least faultily; it will doubtless be amended again and again; but as a whole it points the way to a much brighter future for the railways than they could foresee five years ago.

In spite of many serious problems still remaining to be solved, and many obstacles to be surmounted, I trust that this discussion of the broader aspects of the problem will convince you, as it has already convinced me, that the future of the railways is brighter today—taking a long look ahead—than it has been at any time during the past 10 years.



Photo by International

The Railway Line Which Intersects the Great Chinese Wall

Shippers' Views on Increased Loading of Cars

Commercial Traffic Men Offer Suggestions to This End for the Consideration of Railway Officers

IN THE *Railway Age* for January 28, five railway men who contributed to the contest on car loading presented their views on methods that could be instituted for improvement. Much of the matter presented concerned the part which the shipper must play in making a success of this project. With a view to the presentation of the other side of this important problem, we publish in this issue a series of papers contributed to the contest by representatives of the shippers, most of whom point out in no uncertain terms the changes of practice which could be well instituted by railways as a means of encouraging the shippers to do their part. In a measure these suggestions concern means of expediting the movement of traffic so that the shipper can see that his efforts are being appreciated. Other matters brought up concern changes in traffic arrangements, rates, etc., which would make it of pecuniary advantage to the shipper to load the cars to capacity.

Strengthen the Right Arm of the Superintendent

By E. H. Shaughnessy

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The gap between the actual car loading and the possible car loading is due, generally speaking, to underlying fundamentals beyond the control of those actually engaged in putting the freight into the car. Ignoring the question of merchandise car loading at freight houses, which is always troublesome and purely a matter for decision as to whether it is better to load heavy and pay many claims, or light and not pay so many claims, it seems that the reasons which cause the loading to stop short are about as follows:

(1) The customer's order is filled, (2) the car is full, (3) there has been a man failure.

Discussing these items inversely; man failure, either on the part of the railway or shipper, may be expressed as carelessness, ignorance or disobedience on the part of employees, individually or jointly, as the case may be. These things have considerable to do with inefficient carloading but, in the writer's opinion, not nearly so much as is generally supposed. Ordinarily, men loading a car will fill it unless some outside influence stops them. The only effective remedy for man failure on these counts is sufficient, competent, railway supervision. The way to get this sort of supervision is to strengthen the good right arm of the division superintendent. By this is meant closing the gap between the station agent and the train master on a fifty-fifty basis by:

- (a) Making the station agent a real man of affairs with increased authority and responsibility,
- (b) increasing the train masters' organization, if necessary,
- (c) eliminating the "inspectors" of this and that, who only muddy the water.

There is here, a most fertile field for constructive thought and endeavor. The need seems to exist right now for efficient railway officers of the new school. Recruits of the right sort and in sufficient quantities to fill vacancies are apparently not in sight. What better sort of recruitment for all around men is there than through the station forces? The writer feels constrained to say that the agents will quickly close up their 50 per cent of the gap if only given the opportunity to break away from the mass of non-essential routine stuff

they are obliged to struggle with daily and they will prevent "man failure" as no one else can.

As for the train masters' organization, it should be extensive enough to keep the entire divisional operation under personal daily observation. The train masters should be all-around men, not specialists, and responsible for practically everything that happens. The management should be eminently fair in providing enough of them so that the necessity for "touching the high spots" would be entirely done away with.

There should be no inspectors, so-called, working under general officers or department heads. They simply muddy the water. The inspecting should be done by the general officers or department heads personally, who could speak with authority on the ground, instead of sending out the betwixt and between inspector to observe and report. It stands to reason that the reports will be one-sided, therefore unfair, and, generally speaking, a source of friction in what ought to be a smooth-running machine.

Under the second item affecting light loading, "The Car Is Full," is found a very frequent cause for underloaded cars arising from one of two contingencies; (a) character of the freight, (b) character of the car. For several years past, particularly under the urge of war necessity, rapid strides have been made by shippers in condensing bulky articles so as to increase the loading per car. The incentive in reducing freight charges is taking care of this feature almost satisfactorily. The isolated cases where cars are wasted through chronic carelessness in loading bulky articles properly comes under the head of sufficient, competent supervision as covered in the first item. It seems proper to say that there ought to be a uniform method devised for rating cars so that when they are completely filled with scientifically condensed bulky freight, full tonnage will be credited to the loading station, otherwise the records are not fair in comparison.

Coming to the character of the car we find a situation that brings down the figures materially. Some time in the future, it ought to be the near future, it is to be hoped that those who really run the railroads will get together and force the issue with the car designers so that real standardization of equipment will be a fact and not a fancy.

Recognizing the fact that the odd (freakishly is too harsh a word) designed car had a mission to fulfill when it came out of the works, the thing to do is to hitch the car to its mission. In other words, if the railroads really want to increase car loading the thing to do, right away, is to get the cars back on the home roads where their eccentricities can be utilized. The way has been provided through the car service division, of the American Railway Association, and it is up to the superintendents of transportation to carry out enthusiastically and effectively the policies as outlined by that division. However, the superintendents of transportation are helpless unless there is sufficient competent divisional supervision to put these policies into effect on the ground. Unless the station agent and the train master are on top of the work and know beforehand that cars are going to be placed for loading in an intelligent manner with the idea of a full load, and keeping the cars in the home service as far as it is humanly possible to do so, everything else is wasted and idle effort.

The first reason given for reducing the average load of cars, namely, "The Customer's Order Is Filled," seems to the writer to be of first magnitude in effect. Surely those who

have come to grips with the underloaded car at close range have found this obstacle a most frequent one and the hardest to overcome. The answer is for customers to "Buy a Carload." There is nothing new in this idea and considerable progress has been made in spasmodic campaigns on the propaganda order, but the surface has only been scratched. It seems correct to say that the bulk of underloaded cars in this category are for the merchant in the small town, or the small merchant in the big town. These two classes, dealing direct with the consumer, receive a very great part of freight handled by the railroads so that their policy becomes the railroad policy, whether or no, and the policy of most merchants coming under these heads is to order goods in limited quantities without regard to car capacity, but with great regard to their own limited warehouse capacity. It is only by the closest, unselfish co-operation between railroad organizations, for the common good, that the "Buy a Carload" idea will become universal.

How is this to be brought about? Sufficient, competent divisional supervision—there is no other way. Of course statistics should be prepared showing the car loading in cars delivered to the consignees as well as those loaded by shippers, so that division officers may be accurately guided in their efforts, but statistics, circulars, moving picture exhibits, what you will, are of very little avail unless the station agent and the train master have the objective constantly in mind and strive for it persistently without any letting down in their effort whatsoever.

What the Roads Could Do to Encourage the Shipper

By C. T. Bradford

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Company, Chicago

It should be assumed at the start that under favorable conditions the majority of shippers would utilize cars as nearly as possible to their maximum capacity. This is being done today to a liberal extent, but the carriers themselves could contribute a good deal to this end by adopting certain measures such as the following:

Recondition equipment so that it will stand this heavy loading. Our attention has been called frequently to the shifting of loads in cars which were in no condition to withstand the impact and which should have been in proper repair before such loads were put into them.

Carriers should make a study of the manner in which the switching is done. A great many damage claims undoubtedly now arise as result of rough or careless switching in hump yards or elsewhere, and this damage is naturally greater where goods are piled high in the car to reach the maximum car loading capacity.

It does not seem that the present practice of charging shippers for dunnage furnished by them is one which would encourage heavier loading. The use of dunnage is of course to protect the goods in the car and permit heavier loading, and a transportation charge on this dunnage, based on the freight rate applying on the goods which the car contains, tends to discourage rather than encourage the use of dunnage and consequent heavier loading.

There are certain kinds of freight such as import freight which carriers load themselves. It is suggested that carriers study carefully the loading of import freight to see if they themselves are not guilty of light loading.

It also must be remembered that the loading of a car is necessarily held down to some extent and in some cases by the commercial needs of the country dealer or consumer as to the quantity of goods which he can take care of at one time. This loading could be improved by the extension of

stopover arrangements, whereby a car may be stopped in transit to unload partially and sent on to an intermediate point to finish unloading, the through rate to apply from original point of shipment to final destination, plus a stop-over charge at the intermediate unloading point. Such arrangements are now in effect in the west and central freight association territory to some extent, but not in the southern or eastern trunk line territory. An extension of this privilege would enable more combination loads to be made to consignees in adjoining towns and thus bring up the average car loading.

It would be inconsistent for carriers to suggest increased demurrage rates concurrently with the heavier loading of cars. It is obvious that the length of time required for unloading and loading is in direct ratio to the weight of the carload, and an increase in demurrage rates would not seem to be an encouragement to heavier loading but rather the reverse.

Traffic Problems Involved

By J. F. Atwater

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While maximum loading of cars helps diminish the general congestion on the railroads, especially at terminals and points of interchange, it does have its disadvantages unless due care is used. It is not advisable to load cars 10 per cent over their maximum carrying capacity, for if cars are overloaded, it has been the writer's experience from observations that such cars are frequently crippled in transit to such an extent that it requires the carrier to transfer the loading. This seriously interrupts traffic and causes an additional expense to the carrier which could have been avoided if the proper care had been taken in loading the car at its initial point of shipment. Too heavy loading contributes to the pulling out of a great many draw bars. If proper judgment was used, maximum loading would be a great benefit to the carrier and to the shipper.

Bulk material, such as forest products, grain, and iron and steel manufactured products, should not be loaded above the marked carrying capacity of the car. Such articles as manufactured hardware, which are packed in cases, should not be loaded too heavily, regardless of how substantial the case may be, because almost invariably the lower tier of packages will be crushed, entailing claims for the carriers to adjust.

The carriers themselves can, if they would, still extend the maximum loading of commodities. Consolidated Classification No. 1 permits the mixing of various articles under what is known as Rule 10, but throughout the Classification there are hundreds of items classified with only a l.c.l. rating and under the conditions of Rule 10 a shipper cannot take the benefit of consolidation unless there is a c.l. rating on his commodity. The Classification committee in promulgating the Consolidated Classification, in establishing c.l. ratings, would only consider items that moved in carload lots. This, in my opinion, is a mistake. Regardless of whether there is a c.l. movement or not, c.l. ratings should be provided for all articles where there is a possibility of prevailing upon the shipper to forward in carload lots. In loading a car to its maximum capacity, it involves a large expense to the shipper, for it requires extra labor in stacking up packages and cases in the car. Therefore, no shipper is going to this expense when there is no carload rating and no benefits to be derived therefrom.

Articles without a carload rating are delivered through the local freight houses and on account of the various articles loaded at a local station into a car, it is not advisable to

load a car to its cubic capacity, due to the fact that there are too many light and fragile articles which are sure to be damaged from overloading if the maximum capacity is pursued.

Great advantage can be derived in the use of equipment by loading of two carload consignments in one car, when shipments are destined to points in the same direction. Such consignments are handled under two bills of lading. It is possible, in some instances, to load two carload shipments destined to two individuals located in the same town in the same car and the shipper should take advantage of this opportunity. Then, again, a large shipper having orders from two individuals in the same direction which would warrant loading to the carload minimum should arrange to load the material in the same car under two bills of lading, notifying the local agent to this effect and arrange with the local agent to consign the car to an intermediate point for the first consignee to unload his goods and, after unloading is completed, forward the car to its ultimate destination. In such cases both waybills follow the car, and the agent at the first stopping place retains the waybill until the first consignee has completed his unloading and then forwards the car to its ultimate destination on the original waybill. For some unknown reason, this practice has not been followed to any great extent, but it should be encouraged by the carrier.

Carriers should not undertake to increase the minimum weights in their classifications and tariffs but should take other methods to encourage heavy loading. There are a great many instances where cars cannot be loaded to their marked capacity, due to the fact that the consignee is not in position to buy above a reasonable classification minimum weight. Rather than increase the minimum weights, carriers should encourage the loading of two carload consignments in one car.

The Basic Defects and Their Correction

By C. W. Hoisington
San Francisco, California

By loading to the capacity of a car we will gain three distinctive points: (1) We will increase the earning power of the car, (2) effect a reduction in car miles and (3) effect a reduction in the number of cars to be handled.

It is a well known and proven fact that enlightenment and education are the prime factors in gaining a desired point both with the public and our employees, and in order that we may prescribe for the treatment of the prime causes responsible for the failure to load to capacity we will classify them as follows:

- (1) About 20 per cent of the nation's freight in commodities that cannot be loaded to car capacity.
- (2) Reduced capacity loading due to making local merchandise set outs.
- (3) Use of 100,000-lb. capacity cars in merchandise and light commodity service.
- (4) Lack of information to shippers on loading and ordering equipment.
- (5) Lack of efficiency in the office of the division car distributor.
- (6) Lack of efficiency in terminals, in placing cars.
- (7) Lack of efficiency in the local agent's office.

A review of the seven retarding influences bring forth some pertinent conclusions:

(1) In localities where fruit, stock, merchandise, cotton, wool, wooden ware, furniture, autos, hay and mill work are in abundance, it behooves operating officers in these localities to make a very close study to avoid the loading of high capacity cars as far as practical.

(2) In making local merchandise set out cars, unless to

a point where box cars are in demand, a close study should be made of the conditions.

(3) The practice of retaining 100,000-lb. capacity cars in local merchandise service, which should be watched, as these cars have a larger earning capacity in other classes of service.

(4) An endeavor should be made to interest commercial bodies, industries, shippers large and small on the importance of loading to capacity and ordering such equipment as will suit their needs.

(5) The local division car distributor should be thoroughly familiar with the various commodities loading in his territory and keep a close surveillance on all orders placed for equipment.

(6) The local agent can accomplish wonders by acquainting himself thoroughly with the needs of all the patrons of his station and tributary blind sidings. To stimulate interest a prize is an ideal method for showing the leading agent on loading to capacity that his efforts are noted.

(7) To improve the efficiency of yards in placing cars for loading make a systematic study of requirements of empty equipment and use just such as is suited.

Offer the Shipper a Real Inducement

By C. E. Childe
Manager, Omaha Chamber of Commerce, Omaha, Neb.

The best, fairest and most effective way to make a shipper load cars heavily is to adjust rates so that it is profitable for him to load heavily. The classification ratings and minimum weights in effect today have been inherited for the most part from the time when 15 to 20 tons was a maximum car load. A number of important commodities, such as dry goods, for example, move at the same rates in carloads as in less than carload quantities. On a large number, if not the majority of articles of commerce listed in the classification, the difference between l.c.l. and c.l. ratings is much too small to reflect the actual difference in cost of transportation in less than carload lots as compared with carloads.

Take for example small arms ammunition, the l.c.l. rating is second class and the c.l. rating (Western Classification) minimum weight 30,000 lb. is third class. This difference of only one class offers little inducement for a wholesaler or retailer to buy in carload quantities, and no inducement at all to load cars to capacity of 80,000 to 100,000 lb.

Minimum carload weights named in the classification are generally much lower than the car capacity. This is partly due to the fact that minimum weights have not been revised upward to the extent they might have been in view of the largely increased capacity of modern box cars, and partly to the fact that many shippers do not have capital or facilities necessary to handle freight in shipments loaded to the capacity of the car. Nevertheless, if lower rates were made on cars loaded to capacity than on cars loaded, let us say to half their capacity or one-third of their capacity many shippers would find it profitable to handle the capacity load instead of the small load.

The classification makers should wake up to the fact that it costs the shipping public money to handle high priced goods in units of large quantities, on account of capital invested in the large shipment, necessity of acquiring storage space, risk of deterioration and other commercial factors which discourage heavy loading of cars. Unless there is a concession made in the freight rate for the heavily loaded car of manufactured goods, it will usually be more profitable for shippers to handle such goods in l.c.l. or small c.l. units.

Permanent heavy loading of freight equipment would, therefore, be promoted by the following considerations: (1) Establish c.l. rates on all freight which may move in carload quantities; (2) Revise relationship of rates between l.c.l. and

c.l. quantities to reflect more nearly the lower cost of handling in carloads; (3) Increase c.l. minimum weights where possible to do so without imposing a hardship upon the shipping public; (4) Where commercial considerations necessitate low minimum c.l. weight, establish an alternative lower c.l. rate, applicable when the car is loaded to or approximating its capacity; (5) After accomplishing these reforms, give more consideration to furnishing cars adapted to the load for which they are ordered. Do not furnish a 100,000-lb. capacity car for loading a shipment of 60,000 lb. of freight when a lighter capacity car is available.

The Shipper Must Be Shown

By P. W. Coyle

Traffic Commissioner, St. Louis Chamber of Commerce, St. Louis, Mo.

The shipper is just as anxious to please his customer as the carrier is to please the shipper—hence general usages of trade must be observed. Often these usages, and the commercial units thus established, do not permit the shipper to give the intensified loading he might, without the risk of displeasing and possibly losing a good customer. However, the shipping public is disposed to exert its influence towards the expansion of the trade units to correspond more consistently with the minimum weights established by the carriers on carload business. In order to stimulate this, and to encourage the shipper in any such propaganda, the carriers, as a whole, should show—by clear, specific facts—that there is concerted action on their part to furnish promptly, and through a well defined system, available cars for loading; and that well established methods are in vogue for handling loaded cars expeditiously not only in train movement but through the terminals.

A shipper loses all enthusiasm for intensified loading that can possibly be inspired by glittering generalities, with respect to improvement in service and furnishing of equipment, when he gets neither. Most shippers are "from Missouri." Again, most shippers are from and of the United States, and they are always willing and anxious to cooperate on a perfectly frank and honest reciprocal basis, to the end that our transportation facilities may be so used as to contribute their full share to the development of the commerce of the country.

The shippers should load all cars to their maximum capacity as far as it is possible to do so without material injury to their trade, and that they should educate their patrons to deal in units of quantity to as great a degree as consistent, which will enable them to give intensified loading; that they should use great care in ordering cars, so as to get those of the minimum capacity suitable for their business; that they should not order cars beyond their capacity to load within the free time; and, it goes without saying, they should load and unload promptly. Every care, every activity and every sacrifice made in this respect redounds to the interest of all concerned by increasing the circulation of empty cars throughout the country.

The carriers should pool their cars or adopt such methods of distribution as will permit the use of all available equipment, regardless of actual individual ownership. It is suggested that no cars should be assigned to any particular class of traffic, except, of course, refrigerator and tank cars; and coal cars, in emergency. Obviously, cars suitable for the traffic peculiar to any particular section of the country should be kept in as close proximity to that section as economic conditions will permit, but not to the exclusion of their use for traffic of a different character when other cars are available.

There seems to be a great deal of lost motion and a waste of equipment in the handling of l.c.l. merchandise shipments

in way freight or local service. It would seem more economical to provide cars of much smaller capacity (such as are used in England) more in keeping with the requirements for loading at the principal distributing centers to the larger points on the way division, so that such small cars loaded to their capacity might be switched at the intermediate points rather than haul a number of large capacity cars over a large percentage of the division with light loading.

The opportunity for intensified loading does not rest entirely with the shipper. In my estimation there are great opportunities in reach of the carriers in this respect. To illustrate: Often two or more lines, each operating through less carload merchandise cars to a common point, no one of which has sufficient tonnage to run a car daily, hold the cars under partial load, or the freight is accumulated in the freight house until sufficient tonnage is secured to justify sealing the car to the break bulk point. Thus, it may be that there are three roads each performing the same process of accumulating tonnage. Hence, there may be, and often is, delivered at three depots sufficient tonnage in the aggregate to justify running a daily car if it could be started from some one of these depots. Therefore, this class of traffic might well be pooled in the interest of full car loading and for the benefit of both the carrier and the shipper.

Another feature wherein the elements of conservation and intensified loading are involved, concerning which it would seem that modern facilities might be employed to good advantage: A large number of cars are used daily in transferring less carload shipments between the different depots. These hauls, in many cases, are long and through congested terminals, often consuming from one to five days in transit, and the cars are not loaded to capacity. It would seem that modern motor trucks might be used in this service to good advantage.

If the shipper does not load or unload a car promptly or fails to load to the minimum prescribed by tariff he pays for this delinquency in dollars and cents. When, however, he gives intensified loading it is a patriotic duty. In either event his record is open to immediate inspection.

The people, through proper legislation, have given the carriers rates which should yield the legally prescribed net revenue for the use of the facilities held and used by the carriers for transportation "under honest, efficient and economic management" as the law requires. The shippers are, therefore, entitled to have as specific information as can reasonably be given with respect to the furnishing of equipment and the movement of loaded cars in the several rate zones prescribed by the commission, so they may know that the required service is rendered. If this were given systematically at reasonable periods it would stimulate the spirit of co-operation.

Mexican Railways Lease American Equipment

FRANCISCO PEREZ, director general of the National Railways of Mexico, returned last week to Mexico after some ten days spent in interviewing officers of some of the southwestern railroads particularly with reference to leasing locomotives and cars to relieve the congestion on the northern section of the government lines.

His trip was successful in that he secured 9 locomotives from the Illinois Central, 8 from the Missouri, Kansas & Texas, 10 from the St. Louis-Southwestern, 3 from the Gulf Coast Lines and several from the International & Great Northern. In addition 200 tank cars were leased from tank car lines at Houston, Tex. Of the locomotives leased, 20 will work between Matamoras, Saltillo and Tampico, where the traffic congestion is said to be especially acute.

Mr. Perez said that the National Railways now had 13,262 box cars in service as against 22,000 before the revolution, and that there were at present 581 locomotives in service and 161 awaiting repairs. Repairs have been held up, he said, due to the lack of materials, but with the recent placing of a \$5,000,000 loan in this country in order to finance purchases of material this large percentage of bad order equipment should soon be materially reduced.

It was announced by I. Duhart, assistant general agent of the National Railways at New York, that the following orders for motive power and rolling stock had been placed since January 1: 11 locomotives, 100 tank cars, 25 box cars, 5 refrigerator cars and 100 second-hand Pullman tourist cars.

Rumors to the effect that W. G. McAdoo, formerly director general of railroads in the United States, who has been in Mexico City, would take charge of the administration of the National Railways of Mexico have been definitely denied both by Mr. McAdoo and by Director-General Perez. Rumors still persist, however, that Mr. McAdoo's visit has to do with a reorganization of the National Railways. According to one report, the former director general is representing the minority stockholders of the lines which were amalgamated to form the National Railways. The Mexican government, it is said, owns 51 per cent of the stock of the National, but the claims of the company against the government for damages to the property during the revolution are so great and the accumulated interest on the bonded indebtedness represents such a vast sum that, it is further stated, the ownership is really outside the hands of the government. It is said that President Obregon has expressed the opinion that the roads should be returned to their real owners.

Mr. Perez was accompanied on his trip by F. P. De Hoyos, general agent of the National at New York. The reception accorded the Mexican railway men was everywhere cordial—particularly at Houston, where the Chamber of Commerce gave a banquet in their honor.

Railroad Guaranty Bill Passed by House

WASHINGTON, D. C.

THE WINSLOW BILL, providing for partial payments to the railroads on account of the \$300,000,000 to \$400,000,000 still due them on their guaranty for the six months following the termination of federal control, on certificates of the Interstate Commerce Commission, was passed by the House on February 8 with very little opposition. An effort to pass the bill on the day before under a suspension of the rules had been defeated by vote of 220 to 111. To pass a bill under suspension of the rules requires a two-thirds majority and the failure of the bill on that occasion was attributed mainly to resentment on account of the effort of the Republican steering committee to jam the bill through with very little debate and without opportunity for amendment. Chairman Esch, of the House committee on interstate and foreign commerce, had proposed a rule which would have given opportunity for a debate, but the plan was changed by the steering committee, and several representatives who said they were in favor of the bill voted against the motion to pass it under suspension of the rules. On the final passage of the bill one amendment was adopted, proposed by Representative De Walt, which provides that when the commission, as authorized by the bill, makes estimates for deferred debits and credits, on agreement with the carriers, such estimates shall be prima facie, but not conclusive, evidence of their correctness in amount. The bill provided that such estimates should be binding in final settlements.

The principal opposition to the bill came from Representative Huddleston of Alabama, who frequently acts as the

spokesman of the Plumb Plan League in the House; Representative Sims of Tennessee, who proposed an amendment that the railroads should be paid in certificates bearing 6 per cent interest instead of in cash, and Representative Blanton of Texas, who took the position that the bill would add another burden to the taxpayer on top of those that had already resulted from federal control of the railroads.

The bill as passed provides what several representatives during the debate said they thought had been provided when the transportation act was passed. It specifically authorizes the Interstate Commerce Commission, if not able finally to determine the whole amount due under Section 204 or Section 209 of the transportation act, to a carrier or the American Railway Express Company, to make its certificate for any amount definitely ascertained by it to be due, and thereafter in the same manner make further certificates until the whole amount due has been certified. The authority of and direction to the Secretary of the Treasury under such sections to draw warrants is made applicable to each such certificate. In ascertaining the several amounts payable, the commission is authorized in the case of deferred debits and credits which cannot at the time be definitely determined, to make, whenever in its judgment practicable, a reasonable estimate of the net effect of any such items and, when agreed to by the carrier or express company, to use such estimate as a definitely ascertained amount in certifying the amounts payable under either of such sections and such estimates so agreed to shall be prima facie, but not conclusive, evidence of their correctness in amount.

The bill is expected to be taken up in the Senate possibly by the end of the week and efforts will be made to expedite its passage.

In explaining the purpose of the bill, Representative Esch said that the guaranty provision was inserted in the transportation act because Congress knew that the railroads had not earned their compensation during the 26 months of federal control by hundreds of millions of dollars.

"We knew," he said, "that they had not earned it for any of the 26 months of federal control, save three. We knew that there were pending obligations with the director general of railroads for increases of wages. We knew that those applications had not been acted upon by the director general of railroads. We knew that these men had been put off from time to time on promises that their wages would be increased. We knew, further, that we had to provide for such an emergency.

"One thing we did not know, however, was that the Railroad Labor Board would not be appointed by the President for six weeks after the law became operative. We did not know that within one month after federal control there would be an unlawful strike involving from 40 to 60 per cent of the yardmen and switchmen in the great freight-producing centers of the United States. Those things we did not know, but the transportation act by guaranteeing the standard return for the six months enabled the carriers to operate notwithstanding these severe handicaps. Without it the transportation system would have failed before the six months would have expired. The \$600,000,000 required to make good the guaranty is chargeable in part to the order of the Railroad Labor Board of July 20, 1920, retroactive to the first of May, 1920, which meant that for four months of the six months of the guaranty period the railroads had to pay over \$200,000,000 additional wages. The guaranty provision is a legal obligation. This bill seeks to permit the payment of what is left unpaid of that guaranty by means of partial payments. The Interstate Commerce Commission, complying that the language of the law we had passed justified partial payments, issued certificates therefor. The comptroller of the Treasury, however, held that this could not be issued. The result will be a delay of weeks, months and, in some cases, years before settlements can be made. In the

meantime the railroads cannot pay for supplies; the supply people cannot pay their employees. As a result many institutions have cut down their working forces and some have shut down their plants because they cannot get the money which the railroads claim is due them. In this bill we simply want to give the Interstate Commerce Commission the right to issue certificates for partial payments and have them honored by the Treasury Department so that the railroads can get this money, so that unemployment can be reduced, and so that this money can be put into circulation, and so that business may be restored."

After the failure to pass the bill under suspension of the rules, the rules committee brought in a special rule providing for one hour of general debate and five minute speeches on amendments. Several of the speakers pointed out that the bill did not involve any additional expenditure, but merely provided for the prompt payment of a part of the money which had already been appropriated and which it had been assumed had already been provided for. Several amendments were proposed designed to safeguard the government by requiring a bond in case of any over-certification, but these were defeated after it had been explained that the certificates for partial payments made by the commission merely provided for such amount as cannot be reduced by further accounting or otherwise and is certainly due the railroads. Representative Bland of Indiana said that the railroads owe the coal operators of his state \$5,000,000 and in his district alone they owe \$1,849,000. Representative Goodykontz said that the representatives who were opposing the bill are what are commonly known as the "Plumb Planners" who would like to see the whole American railway system collapse.

A motion to re-commit the bill to the committee for an amendment to provide that no carrier shall declare a dividend after receiving a partial payment until it shall first make settlement of all valid judgments unpaid against it, was defeated by vote of 189 to 74.

While the bill was being debated in the House, arguments were being heard before the Court of Appeals of the District of Columbia on the petition of the Grand Trunk Western for a writ of mandamus to compel the Secretary of the Treasury to honor a partial payment certificate issued by the Interstate Commerce Commission in its favor for \$500,000. The petition had been denied by the Supreme Court of the District of Columbia which had sustained the ruling of the comptroller of the Treasury and the railroads appealed the case. Alfred P. Thom and J. Harry Covington, representing

the railroads, argued that the transportation act placed discretion as to the issuance of certificates in the hands of the Interstate Commerce Commission and that the only function of the Secretary of the Treasury in the matter was a ministerial one of drawing warrants on the commission's certificates. District Attorney Laskey argued that it was the duty of the Treasury Department to see that the certificates of the commission were in proper form as authorized by the law and that the law merely provides for one final certificate in the case of each carrier.

Senator LaFollette has offered in the Senate an amendment intended to be proposed by him to the Townsend bill, which is similar to the Winslow bill passed by the House, providing that no payment of money shall be made to any railroad company under the transportation act until it shall be determined by the Interstate Commerce Commission upon full investigation that the company has not since March 1 paid or contracted to pay unreasonable and extravagant prices for railway supplies, equipment, repairs and renewals charged to its maintenance account or that it has not paid or agreed to pay unreasonable sums as salaries to its officers or directors or that it has not otherwise managed and conducted its business in a dishonest, inefficient or uneconomical manner in violation of the terms of the transportation act.

Freight Car Loading

WASHINGTON, D. C.

FREIGHT CAR LOADING continued to decrease during the week ending January 29, according to the weekly report compiled by the Car Service Division of the American Railway Association, but principally because of the continued falling off of the coal and ore movement. The loading of most other commodities has been increasing during January while the number of cars loaded with coal and ore has decreased. The total number of cars loaded with revenue freight during the week was 699,936, as compared with 703,115 for the preceding week and 803,332 for the corresponding week of last year. For the corresponding week of 1919 the loading was 718,297 and for 1918 it was 642,016. Throughout January the loading has been above that for January, 1918, when a condition of congestion prevailed and the winter weather was unusually severe. For the week ending January 30 the car surplus was 324,186 and the shortage was 810. The summary of the report follows:

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO. FOR WEEK ENDED SATURDAY, JANUARY 29, 1921

Districts	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Mlse. L. C. L.	Miscellaneous	Total revenue freight loaded			Received from connections		
										This year 1921	Corresponding year 1920	Corresponding year 1919	This year 1921	Corresponding year 1920	Corresponding year 1919
										Eastern	1921	5,587	3,681	43,115	1,077	8,161	888	43,146	53,523	159,178	188,189	175,375	187,665	214,517	203,385
Eastern	1920	5,154	4,063	49,175	3,336	7,656	1,838	32,260	84,687	33,549	46,904	147,523	101,261	119,582	132,802
Allegheny	1921	2,543	3,556	49,051	6,245	3,868	2,007	33,549	46,904	36,203	65,462	167,970	157,199	13,096	19,640
Allegheny	1920	2,508	3,544	50,971	6,095	4,203	1,938	36,203	65,462	27,077	49,832	130,058	101,261	60,919	68,872
Peachontas	1921	213	109	17,685	187	1,339	99	2,462	4,983	139	9,002	31,962	30,058	59,223	52,505
Peachontas	1920	165	130	19,717	691	1,872	246	139	9,002	109,202	125,372	106,937	47,023	55,044	
Southern	1921	3,928	2,189	23,182	549	13,284	1,153	34,916	30,611	54,929	179,123	179,123	214,844	489,184	589,838
Southern	1920	4,473	2,769	28,833	210	8,963	3,253	18,621	54,929	26,221	95,662	108,424	98,264	65,486	58,723
Northwestern	1921	11,311	9,572	5,710	1,283	17,367	1,250	22,748	26,621	37,253	103,675	120,841	99,500	44,076	54,650
Northwestern	1920	9,671	8,804	13,300	1,237	17,183	1,766	19,210	27,046	29,442	103,675	120,841	99,500	44,076	54,650
Central Western	1921	11,261	11,580	18,960	324	3,178	1,884	27,046	29,442	103,675	120,841	99,500	44,076	54,650	44,200
Central Western	1920	10,173	12,302	23,041	421	4,133	2,888	21,320	45,063	61,074	50,964	69,936	489,184	589,838	577,709
Southwestern	1921	4,987	1,881	4,949	84	6,480	412	15,456	23,370	57,619	61,074	50,964	69,936	489,184	589,838
Southwestern	1920	4,360	2,547	6,470	169	7,071	422	14,844	25,191	61,074	50,964	69,936	489,184	589,838	577,709
Total all roads	1921	39,830	32,368	162,652	9,749	53,677	7,693	179,123	214,844	699,936	803,332	718,297	654	88,525	608,751
Total all roads	1920	35,504	34,769	188,813	9,760	58,011	11,701	142,627	321,537	803,332	718,297	654	88,525	608,751	609,260
Total all roads	1919	32,251	31,958	161,752	5,596	55,966	15,057	126,469	421,313	699,936	718,297	654	88,525	608,751	609,260
Increase compared	1920	3,326	7,600	74,839	0	25,666	6,000	36,496	103,396	103,396	103,396	654	88,525	608,751	609,260
Decrease compared	1920	1,268	1,791	26,261	11	4,404	4,008	106,743	103,396	103,396	103,396	654	88,525	608,751	609,260
Increase compared	1919	7,579	410	900	9,749	4,008	2,636	179,123	173,500	173,500	173,500	173,500	173,500	173,500	173,500
Decrease compared	1919	1,944	1,079	2,208	2,289	7,664	3,341	206,469	18,361	18,361	18,361	18,361	18,361	18,361	18,361

L. C. L. merchandise loading figures for 1921 and 1920 are not comparable as some roads are not able to separate their L. C. L. freight and miscellaneous of 1920. Add merchandise and miscellaneous loadings to get a fair comparison
 January 22..... 46,095 35,235 168,453 11,177 49,159 7,991 176,581 207,804 703,115 804,866 734,293 491,640 589,000 608,751
 January 15..... 44,861 35,125 183,228 10,483 45,241 9,590 173,500 207,860 709,888 840,524 738,609 509,708 609,260
 January 8..... 39,690 31,494 190,284 11,429 42,982 10,717 169,093 210,674 706,413 830,673 723,801 492,817 596,859 543,265
 January 1..... 30,098 23,950 170,224 10,550 32,635 8,340 144,657 178,451 598,905 745,446 612,741 453,537 591,437 525,055

General News Department

The Air Brake Association has selected the Hotel Sherman, Chicago, as the meeting place for the 28th annual convention which will be held on May 3-6, 1921.

The spring meeting of the American Society of Mechanical Engineers will be held at the Congress Hotel, Chicago, on May 23 to 26. Sessions are planned by the professional sections on aeronautics, fuel, management, material handling, machine shop, power, forest products and railroads, the details of which will be made public later.

A preliminary compilation of the revenues and expenses of the railroads for the month of December indicates a net operating income for that month of only about \$23,000,000, whereas to earn a 6 per cent return provided for by the transportation act the roads should have earned about \$86,000,000. Returns for 157 of the larger roads showed a net operating income of \$14,000,000.

The directors of the Gulf Coast Lines, acting in behalf of a group of the principal owners of the road, have offered a limited amount of the stock, of the constituent companies, to employees at \$65 a share (par value \$100). According to the announcement, the company will guarantee returns of six dollars a share on this stock for a period of 30 months.

Prof. W. Z. Ripley of Harvard University, who has been engaged by the Interstate Commerce Commission to report on a tentative plan for the consolidation of the railroads into a limited number of systems, has submitted to the commission a report proposing a plan applying to the eastern railroads and is expected to submit his report on the western and southern roads later in the month.

William Mitchell Acworth, the well-known English economist and writer, is now Sir William Acworth, the title of Knight Bachelor, conferred by the Viceroy of India and approved by the King of England, having been announced in London on January 12. Sir William is chairman of a governmental committee which has been appointed to inquire into the administration of the railroads of India, and he is now in that country. Sir William's books on railroad affairs are among the best, and the best known, in the English language. His detailed and thorough knowledge of the philosophy and the history of railroad economics in all the countries of the world is unique, and he is sure to illuminate every feature of railroad management or operation on which he writes. In the important doings of the British Government, and of Parliament, in connection with the railway reorganization plans of the past two years Sir William has had an active share.

New York Railroad Club Meeting

J. J. Mantell, manager, New York Region, Erie Railroad, will speak on "Transportation Problems of the Metropolitan District" at the meeting of the New York Railroad Club in the Engineering Societies Building, New York, on Friday evening, February 18.

Safety on the Southern Pacific

The Southern Pacific reports substantial diminution in certain casualty records for 1920. Deaths of employees by accident were fewer by seven, or 13.2 per cent, as compared with 1919, and 17, or 27 per cent, compared with 1918. The number of persons killed in grade crossing accidents per million locomotive miles was 0.95, in 1920, compared with 1.40 in 1919, a decrease of 32 per cent.

There was a total of 760 highway crossing accidents in 1920, of which 393 were caused by attempts to cross tracks in front

of trains; in 163 cases, or more than 21 per cent of the total, automobiles were run against trains; 116 automobiles stalled on the track and were hit by trains; 19 skidded into a train or a car; 53 ran into and broke down crossing gates; three ran down and injured crossing flagmen, and 13 accidents resulted from miscellaneous causes.

During the year 1920, 195 meetings were held of safety committees, at which 4,490 safety suggestions were discussed; 182 papers were read on accident prevention and 70,408 employees were talked to individually by members of safety committees.

United Engineering Society—Board of Trustees

At the annual meeting of the Board of Trustees of United Engineering Society, on January 27, the following persons were elected officers of the society for the ensuing year: President, J. Vipond Davies; vice-president, Calvert Townley; vice-president, W. L. Saunders; secretary, Alfred D. Flinn; treasurer, Joseph Struthers; assistant treasurer, George H. Pegram.

Engineering Council and A. S. M. E.

to Meet in Syracuse

Herbert Hoover will be the principal speaker at a meeting in Syracuse on February 14 at which it is expected the plans of the American Engineering Council for dealing with industrial relations and, particularly, with the waste due to unemployment will be outlined. On the following day, February 15, the National Council of the American Society of Mechanical Engineers will meet.

Resolution Regarding Dangerous Highway Crossings

Representatives of organizations attending the National Conference on Highway Traffic Regulations, held at Washington, D. C., from January 9 to 12, 1921, adopted resolutions recommending increased protection for grade crossings by giving special attention to the most dangerous ones. The detailed resolutions were:

RESOLVED, That this Conference express its approval of the present efforts to eliminate dangerous grade crossings, and recommend that, so far as practicable, dangerous grade crossings be both avoided in future construction and eliminated in existing construction.

Pending the removal of such crossings, this Conference recommends that the proper authorities be authorized to classify grade crossings as "ordinary" and "dangerous," and require the latter, in addition to standard grade crossing signs, to be marked with uniform and conspicuous signs specifying the speed with which such crossings may be crossed, obedience to such speed restrictions to be required by law.

RESOLVED, That this Conference recommend that red lights be used as signals of extreme danger and for no other purpose except for vehicle tail lights; and that green lights be used as traffic regulation or direction signs and for no other purpose.

RESOLVED, That this Conference, recognizing the need for a uniform system of highway signs, request the U. S. Bureau of Standards to make a study of signs, including colors, size and arrangement of letters, height and location.

Representatives of the American Railway Association and the American Electric Railway Association were present and voted; as well as members of various automobile associations, safety associations, police and highway associations and the National Safety Council.

Instruction in Kiln Drying

The February course in practical kiln drying of lumber, given by the Forest Products Laboratory at Madison, Wis., will be held from February 14 to 25. The instruction in the course is not confined to any particular kind of lumber or type of kiln, although methods of drying different species of lumber and the operation of various types of kilns are discussed. Emphasis is laid on the underlying principle of suc-

cessful kiln drying and these can be adapted to any conditions. The course will be particularly concerned with ways and means to cut down present losses in seasoning, both outdoors and in the kiln. The following are some of the subjects covered: Testing lumber while drying; methods of preventing checking, case hardening, warping and collapse; regulation of temperature, humidity and circulation in the kiln; advantages and disadvantages of different types of kilns and kiln equipment, and identification of lumber. A co-operative fee of \$150 per person is charged to pay the expenses of conducting the course.

The practical course of instruction at the laboratories in boxing and crating, which was given from January 10 to 15, will be repeated March 7 to 12 and May 2 to 7. Registrations for these courses can be made by mail for either date.

A. R. A. Names Executive Committee

The secretary of the American Railway Association, J. E. Fairbanks, has announced the personnel of the executive committee for the calendar year 1921 as follows: Division I, Operating, General W. W. Atterbury; Division II, Transportation, E. J. Pearson; Division III, Traffic, C. H. Markham; Division IV, Engineering, H. G. Kelley; Division V, Mechanical, W. B. Storey; Division VI, Purchasing and Stores, W. G. Besler; Division VII, Freight Claims, N. D. Maher.

I. C. C. Appropriation

The Senate on February 8, disagreed to an amendment of its appropriation committee proposing a reduction from \$1,900,000 to \$1,600,000 in the appropriation for the general expenses of the Interstate Commerce Commission. The appropriation for the present fiscal year was \$1,600,000 and the commission had asked for \$2,160,000, but the House cut it to \$1,900,000 and the Senate committee attempted to cut it to the figure for this year. The action of restoring the figure to that set by the House was taken after a considerable discussion of the expenses of this commission and of the Federal Trade Commission, in which one or two senators criticized the salaries paid by the Interstate Commerce Commission. Senator Smoot started to read a list of the salaries, including the chief counsel, director of service, director of finance, director of traffic, at \$10,000 a year each, one assistant counsel at \$6,500 and another at \$5,000. Senator Warren read a letter from Chairman Clark of the commission inviting attention to the fact that the transportation act very largely increased the jurisdiction and duties of the commission and that the intelligent consideration and determination of some of the new questions placed within the commission's jurisdiction required men of capacity, unquestioned integrity, experience and industry. The commission has never expended a dollar, he said, for salaries or in any other direction which it did not feel was fully justified in the interests of the service and it has not in any instance fixed a salary that did not seem to be imperatively necessary in order to induce men to enter the service rather than to accept offers from outside the government service which from the sole point of salary were more attractive.

Heavy Electric Traction Program for A. E. R. A.

The committee on heavy electric traction of the Engineering Association of the American Electric Railway Association has made preliminary assignments on the subject of heavy electric traction about as follows:

1. Co-operate with the American Railway Engineering Association regarding progress in heavy electric traction with a view to keeping the members of the American Railway Engineering Association posted on developments in the field. In this connection cover foreign practice as well as that in the United States.

Much of the information pertaining to foreign electrification will be obtained from the files of H. W. Cope and from the General Electric Company. Any additional information which is deemed desirable will be obtained by correspondence.

2. Continue compilation of statistics regarding electric locomotives.

Last year's committee issued a number of questionnaires

regarding equipment to America's electrified railroads, and to industries operating electric locomotives. The results, however, were not entirely satisfactory, comparatively little information being obtained. In order to attack the subject from a different direction, Mr. Cope will undertake to go over the list of companies which are using Westinghouse equipment and will tabulate information from the engineering files of the Westinghouse Company. A. H. Armstrong, chairman of electrification committee, General Electric Company, will be requested to compile similar data from the files of the General Electric Company.

It was the consensus of opinion that locomotives and multiple unit car tabulations should be continued. The subject "Locomotives" will include locomotives with four driving axles, and multiple unit cars will include equipment in which the trailers, as well as motor cars, are equipped with controllers for operating from either end. Equipment which does not conform strictly to these limits may be included at the discretion of the traction committee.

3. Continued study of electric switching engines.

Records of electric switching results are scarce, as few companies operate electric switches extensively and some data will probably be obtained regarding steam switching and further data selected on electric switching as it becomes available.

4. Study the subject of multiple unit cars vs. electric locomotives in passenger service and report on the percentage of service given by means of such cars.

There are virtually but three railroads in this country which operate both multiple unit and locomotives equipment electrically, and information necessarily will come from these railroads. C. H. Quereau, superintendent electrical equipment, New York Central, will take charge of obtaining and compiling data on this subject.

Boston Mayor Opposes Consolidation

of New England Roads

In his annual message to the City Council, Mayor Andrew J. Peters devotes several paragraphs to the proposals advanced as to the possible consolidation of the New England carriers with carriers west of the Hudson River.

"The Transportation Act," says Mr. Peters, "provides that the Interstate Commerce Commission shall prepare and adopt a plan for the consolidation of the railways of the United States into a limited number of systems and which would provide that 'wherever practicable the existing routes and channels of trade and commerce shall be maintained.' Studies of this problem are now being made and will soon be considered for recommendation for action by the Interstate Commerce Commission.

"One plan under consideration is that the New Haven system shall be consolidated with the Pennsylvania Railroad, and that the Boston & Maine and Northern railroads shall be joined to the New York Central. Another plan is that the New England roads shall be consolidated in one or two systems.

"The proposed consolidations of the New England railroads with the Pennsylvania and New York Central would be a most unfortunate catastrophe for all New England, especially for the people of Boston. This transfer would take the control and direction of our railroads away from Boston and place them in the hands of interests in New York or elsewhere. To such interests the problems of New England would be of minor importance, and the intimate touch with local conditions so essential in this situation would be entirely lacking.

"I am deeply opposed to any consolidation which would give to the railroads west of the Hudson River the power to determine whether New England should develop its present industrial facilities, or become the rich man's summer playground. These railroads would take over the New England roads provided only that such a consolidation was profitable to their stockholders. Such profit could come only at the expense of New England.

"Our manufacturers would have new difficulties in reaching western markets. At the present time New England shippers can ship west over any of six trunk lines, but, were the New Haven consolidated with the Pennsylvania under the ruling of the Interstate Commerce Commission, the latter road could

compel New England freight, originating on its lines, to move over its own rails to Chicago or its other western terminals. So, shippers would have but one line in place of six. In export traffic, it is easy to see that the Pennsylvania road would do its export business at its own terminals in Baltimore, Philadelphia, or New York, rather than haul its ocean-bound freight the additional distance to Boston. With the harbors of Boston and New England, and a proper amendment of our Interstate Commerce Act, it would be possible for a New England road to develop its water connections and, by the aid of water routes, reach any of the distributing points of our country."

Relations of Employer and Employee

L. F. Loree, president of the Delaware & Hudson Company, speaking before the Chamber of Commerce of the State of New York at a meeting held in New York City on February 3, objected to resolutions proposed by the committee on industrial problems, and proposed instead thereof a resolution calling for the proper incorporation of both employee-unions and employer-unions. The committee had proposed to seek legislation, both at Washington and Albany, looking to the endorsement of the views on the settlement of industrial disputes which were set forth in the report made by the President's Industrial Conference last March. The Chamber of Commerce committee had in mind particularly street railway conditions and the public service interests of similar character, but the resolution as well as Mr. Loree's proposal is of interest in the whole industrial field.

Mr. Loree said, in part: "What are the roots of the labor trouble? They are eighty years old and should be familiar to all of us. First, they are founded on the basis of discontent. Properly regulated, discontent is a necessary function of success; but let it run wild, and it leads to anarchy.

"The second thing is the attitude of labor on the closed shop question and the boycott.

"The third is the organization of secret societies, which cannot, I think, be looked upon with unconcern by any civilized government, and particularly by any person who has reflected upon the Jacobin movements which preceded the revolution in France, or who bears in mind the actions of those who are threatening the life of the British government today. So I suggest that this substitute be adopted in place of the report of the committee:

"Be it resolved, That the Chamber of Commerce of the State of New York appeals to the Legislature of the State of New York to enact legislation to give effect to the recommendations of Governor Nathan L. Miller in his annual message to reform the organization and powers of the Industrial Commission so as to provide for a single-headed commission, with a board of three, to be allotted to discharge exclusively quasi-judicial and legislative functions, and to be clothed with authority to investigate labor conditions and to deal with labor disputes; and to that effect legislation be enacted:

"1. To declare all organizations having for their purpose the control of wages or conditions of employment, by joint action on the part of employees or employers, to be charged with a public interest, and hence properly and necessarily subject to public supervision and regulation.

"2. To provide that all such organizations shall have capacity to hold property and sue and be sued, in their corporate names, in all respects as though they were individuals.

"3. To provide for the supervision of the accounts and records of such organizations, including insurance funds and similar activities; in the same way that the accounts and records of street railway and similar corporations are supervised.

"4. To provide for the supervision of every vote upon the question of ordering a strike, including the following: (a) no such vote to be taken until after a summary inquiry by public authority concerning the matters in dispute, (b) every person voting to be furnished with a statement made by public authority of the results of such inquiry, (c) every such vote to be taken by secret ballot, and (d) an honest count and freedom from intimidation and corrupt influence to be safeguarded by public authority."

Traffic News

The Transportation Club of Louisville, Ky., will hold its annual banquet on February 24.

The railroads of Ohio have made a general advance in passenger rates, to the basis of 3.6 cents a mile, in accordance with the order of the Interstate Commerce Commission, and corresponding to the rates which the Commission has prescribed for interstate passenger fares. It is understood that officers of the State of Ohio will, if not successful in their present proceedings in the lower court, appeal to the United States Supreme Court against this federal action.

New England Hearings Concluded

The hearing before an examiner of the Interstate Commerce Commission on the application of the New England lines for larger rate divisions was brought to a conclusion on February 7 after a day had been devoted to rebuttal testimony. This, it was generally understood, was purely for the record because it was expected an adjustment would be reached as a result of the letter ballot which is being taken on the plan to raise a fund of \$15,000,000 among the trunk lines to be distributed among the New England lines.

Prof. W. J. Cunningham of Harvard University replied to the testimony offered at the previous hearing by W. H. Williams, chairman of the Wabash, which had attributed the difficulties of the New England lines to local conditions and factors involving the efficiency of operation, rather than to insufficiency of rate divisions. Mr. Williams also took the stand again, and several other witnesses testified regarding details of operation and rate-making.

Post Office to Pay Railroad Administration

As briefly noted in last week's issue the post office department has asked Congress for a deficiency appropriation of \$65,575,832 for the amount due the Railroad Administration for the retroactive increase in railway mail rates for the period of federal control.

The sum named has been agreed upon by officials of the Post Office Department and the Railroad Administration as the balance due for the service performed during the period named, with the exception of certain sums now a matter of litigation in the Court of Claims for the performance of incidental, side, terminal and transfer service which the department contends is not specifically chargeable prior to March 1, 1920.

The amount of this adjustment was determined as follows: "The average monthly earnings of the railroads during the 18 months from January 1, 1918, to June 30, 1919, was \$4,345,635.10. This period was used as a basis for the reason that practically all accounts had been adjusted for that period under the former basis of pay. At that rate the pay for the 26 months of federal control (26 times \$4,345,635.10) would have been \$112,986,512.60. Applying to this sum the flat increase of 57 per cent agreed to at conferences with officials of the Railroad Administration, the increased earnings of \$64,402,312.18 was realized. The aggregate earnings for the entire period at the increased rate is therefore \$177,388,824.78.

"To this debit the following credits should be applied:

Fines	\$431,926.04
Advance payments during the period from July 1, 1919, to Feb. 29, 1920, on routes where final adjustments were not made	19,806,554.49
Final adjustments at the rates authorized in the Interstate Commerce Commission's order No. 9200 ..	2,540,061.70
Final adjustment at the rates authorized by the act of July 28, 1916	10,813,018.69
Aggregate payments for this service performed from Jan. 1, 1918, to June 30, 1919	78,221,431.83
Total	111,812,992.75

Commission and Court News

Interstate Commerce Commission

The Interstate Commerce Commission has rendered its decision in the Michigan passenger fare case ordering increases in the intrastate rates corresponding to those allowed for interstate traffic.

The commission has suspended until June 7 the proposed withdrawal of the interchangeable acceptance arrangements applying on 60-trip commutation tickets of the Baltimore & Ohio and the Pennsylvania between Baltimore and Washington.

The commission has further suspended until April 2 the operation of a supplement to a Minneapolis & St. Louis tariff which provides for the cancellation of joint through rates on coal from mines on the Minneapolis & St. Louis in Illinois to destinations in Michigan and Alexis, Ohio.

The Interstate Commerce Commission has suspended from February 5 until June 5, 1921, the operation of certain schedules shown in a supplement to a Minneapolis & St. Louis tariff which propose increased proportional commodity rates on grain and flour, carloads, from Council Bluffs, Ia., Omaha and South Omaha, Neb., (when originating beyond) to Duluth, Minn., Superior, Wis., and certain other points taking same rates.

The Interstate Commerce Commission has issued a correction of its order authorizing increases in intrastate freight rates in Illinois. The order erroneously provided that the increases authorized were to be applied to the rates in force. As the rates had been increased under the order of the Illinois commission by a percentage less than that authorized by the commission in the general rate case, the order was amended to provide that increases shall be applied to the rates in force on August 25, 1920.

The Interstate Commerce Commission has vacated its suspension of numerous tariffs filed by Agents W. J. Kelly and F. A. Leland, which in putting into effect the rate increases authorized by the Interstate Commerce Commission in Ex Parte 74 made increases of 35 per cent in class and commodity rates between eastern and southern groups and the Southwest. The tariffs were suspended under protest of various shippers that the commission's order provided for an increase of 33 $\frac{1}{3}$ per cent in these inter-territorial rates. The commission finds that 35 per cent was properly applied as to certain inter-territorial rates based on combinations, but its suspension stands as to many of the tariffs.

Court News

Exclusive Privilege to Solicit Business

On Railroad Premises in Kansas

The Kansas Supreme Court, reviewing the cases in the various jurisdictions on either side of the question, holds that a railroad company may grant an exclusive privilege to one carrier of passengers and merchandise and exclude all others who desire to go upon its premises for the sole purpose of soliciting customers or business.—Mader v. City of Topeka (Kan.), 189 Pac. 969.

Contributory Negligence at Flag Station

There is no law or custom requiring a train to stop on any particular spot even at a regular station, let alone at a flag station, and especially at one with no mark for indicating where passengers are to stand for boarding the train; and the Louisiana Supreme Court holds that one who, after assisting a friend to flag an approaching train, started walking down the track, on the theory that the train would stop before it reached him, was guilty of contributory negligence. Wells v. M. L. & T. (La.), 84 So. 492.

Boiler Inspection Act Does Not

Apply to Locomotive Cab

The New York Appellate Division holds that the federal Boiler Inspection Act, requiring locomotive boilers and appurtenances to be kept safe, does not apply to a locomotive cab, so that sections 3 and 4 of the Employers' Liability Act, precluding the defenses of contributory negligence and assumed risk, where a safety act is violated, do not deprive the railroad of these defenses in an action for injuries caused by a depression in the floor of the cab. A cab is not appurtenant to a boiler, and the intention of the act was to guard against accidents peculiar to boilers.—Brown v. L. V., 191 App. Div. 691, 181 N. Y. Supp. 800.

State Commissions

The Railroad Commission of Louisiana, following a re-hearing in connection with the order issued by the Commission last March, requiring the Louisiana Railway & Navigation Company to improve its roadway, has annulled and cancelled the proceedings against the railway, in which a fine of \$1,000 was imposed, with the threat of \$100 a day for each day in which the Commission's order was not complied with. The testimony shows that the railroad has within two years spent about \$2,000,000 in improving its roadway and its plant generally; that abnormal weather conditions have prevailed throughout the past two years, and that the officers are in good faith prosecuting the work necessary to put the road in good condition. A number of patrons of the road testified that strenuous efforts were being made to give good service.

Personnel of Commissions

Charles P. Coady, at present a member of congress, has been appointed a member of the Public Service Commission of Maryland, succeeding James C. Legg, deceased.

H. D. Lyon, heretofore inspector, has been appointed senior railway signal engineer, Bureau of Safety, Interstate Commerce Commission, and has been assigned to work in connection with tests and development of automatic train control devices under Section 26 of the Interstate Commerce Act. Investigation of railroad accidents will continue to be a part of his duties. Mr. Lyon had his first signal experience as a helper in the installation of electro-pneumatic block signals on the Central of New Jersey about 1892; his subsequent experience ranged from helper to foreman in construction work for the Union Switch & Signal Company and the Standard Signal Company; he also held positions as signalman on the Central of New Jersey, maintainer on the New York Central, maintainer and inspector on the Interborough Rapid Transit Company, and assistant chief inspector, general inspector and field engineer on the New York Central. In January, 1910, he resigned from the New York Central to become inspector for the Block Signal and Train Control Board of the Interstate Commerce Commission, and was engaged in engineering work in connection with investigation of block signals and automatic train control devices until the Board was abolished in June, 1912. He was thereafter assigned to the Bureau of Safety and has served as an inspector in that bureau until the present time.



H. D. Lyon

Equipment and Supplies

Locomotives

THE MEMPHIS, DALLAS & GULF is inquiring for 1 locomotive.

Freight Cars

THE FRUIT GROWERS EXPRESS is inquiring for 100 steel underframes.

THE RHODESIAN RAILWAYS are inquiring, through the car builders, for 15 cars.

THE LACKAWANNA STEEL COMPANY, Buffalo, New York, is inquiring for from 100 to 200 flat cars of 70 tons capacity.

THE DELAWARE, LACKAWANNA & WESTERN has ordered 40 caboose cars from the Mt. Vernon Car Manufacturing Company.

CHARLES P. PERIN AND S. M. MARSHALL, 1107 Broadway, New York, are asking for prices on 300 steel ore hopper cars and 500 steel coal hopper cars, to be of 50 tons capacity, for export to India.

THE TENNESSEE COAL, IRON & RAILROAD COMPANY has ordered 150 70-ton gondola cars from the Chickasaw Shipbuilding Company and not 157 70-ton as incorrectly reported in the *Railway Age* of February 4 (page 347).

Passenger Cars

THE CHICAGO, BURLINGTON & QUINCY is inquiring for 10 dining cars.

THE BESSEMER & LAKE ERIE, reported in the *Railway Age* of December 3, as being in the market for 8 steel coaches, 4 baggage cars and 3 combination mail and baggage cars, has renewed its inquiry for this equipment.

Iron and Steel

THE MISSOURI, KANSAS & TEXAS has ordered 14,000 tons of rails from the Illinois Steel Company.

THE CHICAGO & EASTERN ILLINOIS has ordered 2,500 tons of steel rails from the Illinois Steel Company.

THE OREGON-WASHINGTON RAILROAD & NAVIGATION COMPANY has ordered 10,000 tons of rails from the Illinois Steel Company.

Miscellaneous

THE CHICAGO & EASTERN ILLINOIS has ordered 100 per cent rail joints from the Rail Joint Company, to be used with the recent order for 2,500 tons of steel rails ordered from the Illinois Steel Company, 750 tons of which are 100-lb. rail.

Trade Publications

GATE, GLOBE, ANGLE AND CHECK VALVES.—The Walworth Manufacturing Company, Boston, Mass., has issued a six-page folder which illustrates the diversified line of brass valves which this company manufactures. A list is included showing the sizes in which the various types are made and giving a list of prices. The circular calls attention to the fact that the Walworth Manufacturing Company has been making valves since 1842.

CANADIAN TIES FOR INDIA.—The Canadian government steamer "Canadian Inventor" has sailed from Vancouver, B. C., for Calcutta, carrying creosoted ties from the Vancouver Creosoting Plant; 3,800,000 feet. The ties are being sold in competition with Australian woods.

Supply Trade News

T. T. Bond, formerly traffic manager of Fairbanks, Morse & Co. at Chicago, has been elected vice-president of Harry C. Wood & Co., freight brokers and forwarders, New York.

John L. Bacon has been appointed manager of service and inspection department of the Franklin Railway Supply Company, with headquarters in New York. Mr. Bacon was formerly district manager of the Cleveland office of the same company.

G. Lewis Taylor, for the past 12 years assistant chief engineer of the McClintic-Marshall Company, Pittsburgh, Pa., has been appointed chief engineer, succeeding the late Paul L. Wolfel. Mr. Taylor graduated from the University of Pennsylvania in 1900.

A. D. Graves, who has been appointed general manager of Pratt & Lambert, Inc., Buffalo, N. Y., as was announced in the *Railway Age* of January 28, is a native of Ohio, his boyhood having been spent in Columbus. He was a bookkeeper in a wholesale drygoods house for nearly five years previous to entering the employ of a concern manufacturing varnish. In 1908, he started as a salesman for Pratt & Lambert and spent the next ten years in developing trade in Philadelphia and vicinity, when he became manager trade sales. Mr. Graves is one of the successful 12 Pratt & Lambert men whose high percentage of sales won them a trip to Europe in the summer of 1914.



A. D. Graves

Theodore L. Dodd has been elected vice-president and a member of the board of directors of the Alleghany Steel & Tube Company, with headquarters at Chicago. Mr. Dodd will have jurisdiction over the sales in the Middle West, extending to the Pacific coast.

B. A. Bell, railway specialist for the Western Electric Company, has been appointed railway representative of this company at Atlanta, Ga., effective February 1, succeeding J. W. Smith. Before taking up the duties of railway specialist Mr. Bell was general salesman for the Western Electric Company.

The Forman-Bassett Company, Cleveland, Ohio, have opened new headquarters in the Hotel Cleveland for the sale of the General Fireproofing Company's line of steel office equipment, expanded metal lath, concrete reinforcements and waterproofing compounds. F. W. Wagner is sales manager in charge of the branch.

The Austin Machinery Corporation of Louisiana has been incorporated under the laws of that state as distributors for Louisiana, Arkansas, Mississippi and Tennessee for the products of the Austin Machinery Corporation. The capitalization is represented by \$100,000 of preferred stock and \$200,000 of common stock. The general offices of the corporation will be at 1020 Maison Blanche Building, New Orleans, La.

Alexander England, assistant chief engineer of the Westinghouse Air Brake Company, Wilmerding, Pa., has been appointed chief engineer, to succeed S. W. Dudley, whose retirement on February 1 was noted in the *Railway Age* of

February 4. **R. E. Miller**, engineer of tests and inspection, has been promoted to superintendent of tests and inspection; **W. E. Dean**, assistant engineer of tests, has been promoted to engineer of tests, and **A. A. Mackert**, chief inspector, has been promoted to engineer of inspection.

Alba B. Johnson, formerly president of the Baldwin Locomotive Works, has resigned from the board of that company and also as a director of the Standard Steel Works, Philadelphia, Pa. **John M. Hansen**, president of the Standard Steel Car Company, Pittsburgh, has been elected a director and member of the executive committee of the Baldwin Locomotive Works and **W. L. Austin**, vice-chairman of the board of directors of the Baldwin Locomotive Works, has been elected a director of the Standard Steel Works, Philadelphia, to succeed Mr. Johnson.

E. Emery, formerly manager of the R. H. Blackall Company, Pittsburgh, Pa., has opened offices in the Oliver building, Pittsburgh, under the firm name of the **Emery Sales Company**, handling railway supplies. Mr. Emery will serve as special representative, reporting to the Pittsburgh office of the Schaefer Equipment Company, handling its full line of foundation brake details in a defined territory. He will also have charge of sales in the Pittsburgh district of the Mason Packing Company, Pittsburgh, which manufactures the Mason semi-metallic packing for locomotive air pumps, and will represent the Standard Horsenail Company, New Brighton, Pa., handling its line of taper pins, shaft keys and channel pins. Mr. Emery was graduated from the Chicago Manual Training School in 1899, after which he was connected for two years with the F. B. Reddington Company, Chicago, in an engineering capacity. He was for eight years with A. Sorge, Jr., & Company, Chicago, handling a steam specialty line. He was engaged in sales and engineering work for a time and later was with the Parker Boiler Company, Philadelphia, Pa., for one year as general sales manager. Mr. Emery was then assistant sales manager of the Rust Boiler Company, Pittsburgh, and when that business was sold to other interests he joined the R. H. Blackall Company.



E. Emery

E. D. Kellogg has been appointed New Jersey representative for the Conveyors Corporation of America, Chicago, manufacturers of machinery for handling coal, sand, gravel, ashes and other loose bulky materials. Mr. Kellogg will handle the American trolley carrier and the American steam jet conveyor in the northern half of New Jersey, with his headquarters at the eastern office of the company, 110 West Fortieth street, New York. Mr. Kellogg graduated from Stephens Institute of Technology in 1898, and specialized in the design and construction of steel structures in this country and Canada until 1916, when he entered the material handling field with the Terry Manufacturing Company, New York, manufacturers and builders of heavy derricks and traveling cranes.

The Toledo Crane Company, Bucyrus, Ohio, successors to the Toledo Bridge & Crane Company, Toledo, builders of Toledo cranes, has been chartered under the laws of Ohio, with the following officers: **C. F. Michael**, president; **W. F. Billingsley**, vice-president and general manager; **A. G. Stoltz**, treasurer, and **C. Gallinger**, secretary. The officers with **C. H. Dexheimer** are the stockholders and directors. All stock has been subscribed and paid in and none will be offered for public subscription. The main office is at Bucyrus, with

sales offices in New York City, Boston, Philadelphia, Pittsburgh, Buffalo, Cleveland, Cincinnati, Chicago, St. Louis, Kansas City, Seattle, Salt Lake City, San Francisco, Birmingham and Minneapolis. The company will have completed by March 15 a building 120 ft. by 320 ft., to be used for erecting and assembly, with a machine shop 60 ft. by 300 ft., a structural shop 90 ft. by 300 ft., a pattern shop 60 ft. by 140 ft., and a forge shop 40 ft. by 100 ft., all to be equipped with modern tools.

J. Allan Smith has resigned as president of the U. S. Light & Heat Corporation, Niagara Falls, N. Y. Mr. Smith is leaving to engage in business for himself, a step which he has long been contemplating. He has been identified with the affairs of the U. S. Light & Heat Corporation for a number of years, managing its business during the most precarious times of its existence. In the early days the business of this company largely consisted of the manufacture and sale of train lighting devices, and under the management of Mr. Smith, the storage battery manufacturing business has grown until now it is one of the largest battery producers of this country. Mr. Smith has been succeeded by **C. O. Miniger**, of Toledo, Ohio, who is vice-president of the Willys Corporation and general manager of the Auto-Lite division of that corporation at Toledo. Mr. Miniger is well known to the automobile industry; he has been closely identified since the early days of the automobile with the manufacture and sale of electric lighting and starting devices for motor cars. He was one of the original incorporators and organizers of the old Electric Auto-Lite Company which began in a very limited way manufacturing electric starting devices. When John N. Willys acquired control of that company, Mr. Miniger was placed in charge of its affairs and through his efforts its business has been built up to one of the largest producers of electric starting and lighting devices for motor cars. It has also become a large producer of farm lighting outfits. Mr. Miniger will give all of the attention which may be necessary to his new duties but will still continue to be in charge of the Electric Auto-Lite division of the Willys Corporation at Toledo. His title in the U. S. Light & Heat Corporation will be president and general manager. **C. L. Lane** has resigned as vice-president and general manager of the U. S. Light & Heat Corporation and **D. H. Kelly** has been elected to serve as vice-president and assistant general manager. Mr. Kelly was for eight years secretary of the Toledo Scale Company, Toledo, and for the past two years has been assistant sales manager of the Willys Light division of the Electric Auto-Lite Corporation. He has had 10 years' experience in the railroad field.

Obituary

Clifford J. Ellis, district manager of sales for the Midvale Steel & Ordnance Company and the Cambria Steel Company,



C. J. Ellis

with headquarters at Chicago, Ill., died at his home in Evanston, Ill., on January 31. Mr. Ellis had been district manager of sales for more than 30 years and for 37 years had been in the service of the Cambria Steel Company at Chicago. He was born on November 23, 1860, and when 19 years of age entered the employ of Wood Morrell & Co., Johnstown, Pa., who controlled the Cambria Iron Company. Not long thereafter he became assistant to the treasurer and in 1883 he was transferred to Chicago, entering the sales department of the company, where he had served up to the time of his death.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company, which was noted in the *Railway Age* of February 4 (page 349), as intending to build a complete ice plant at Hobart Station, Cal., at a cost of approximately \$500,000, has awarded the contract for this work to C. A. Fellows, Los Angeles, Cal. This company has awarded the contract for the construction of the frame blacksmith shop at Newton, Kan., which was noted in the *Railway Age* of January 28 (page 308), to Jerome Moss, Chicago. The Santa Fe will build new icing facilities at Clovis, N. M., including platforms at a cost of \$21,660. The company's icing facilities at Waynoka, Okla., will be also increased by the construction of additional platforms and ice chutes so as to permit the handling of 44 cars instead of 17, as at present. The work at Waynoka will cost about \$30,000.

CHICAGO UNION STATION.—This company, which was noted in the *Railway Age* of January 28 (page 308) as accepting bids for the wrecking of the old Chicago & Alton freight house at Harrison street and the Chicago river, has awarded the contract for this work to the W. J. Newman Wrecking Company, Chicago.

ILLINOIS CENTRAL.—The Groom Coal Company will build a frame coaling station at Belleville, Ill., on the line of this company.

NORTHWESTERN PACIFIC.—This company is preparing plans for improvements contemplated on its terminal at Sausalito, Cal.

PATTERSON & WESTERN.—This company has applied to the Interstate Commerce Commission for a certificate authorizing the abandonment of its line between Patterson and Jones Station, Calif., a distance of 23.6 miles.

RED RIVER VALLEY.—This company has completed surveys for a line from Fargo, N. D., north to Alvarado, Minn., a distance of approximately 100 miles. The project was abandoned temporarily during the war, but has been revived and the company plans to begin construction of this line during 1921.

SOUTHERN PACIFIC.—The Railroad Commission of California has ordered this company to improve its depot facilities at Oakland, Cal., at a cost of not less than \$50,000, declaring that the existing facilities are unsatisfactory.

THE ATCHISON, TOPEKA & SANTA FE, in ten months of 1920, paid 259 bills for loss or damage on trunks, suitcases and traveling bags, a total expenditure of \$5,449, or an average of \$21 per shipment; and J. R. Hitchcock, assistant general manager of the company's Coast Lines, has sent to station agents a six-page table showing for each of these damaged shipments the date, the starting point, the destination, the amount of the bill and a brief description of the nature of the damage.

Two hundred and fifty-nine items of this kind make an impressive exhibit. One wonders what would be the average loss per shipment, if all shipments, including those not damaged, had been included.

Some of the losses were, no doubt, simple thefts, but the statement says that losses are in the minority; the majority is made up of damage items. A great many entries read "chafed" or "ratched," and the salient feature of the comments printed in the circular is a call to enforce more strictly the rule requiring such goods to be adequately packed and protected. But it appears that about 80 per cent of the shipments originated east of the Santa Fe's eastern terminus, many of them in New York and New England, so the question of getting this economy-lecture into the right hands is not an easy one.

The same pamphlet contains a similar table of losses on drugs and druggists' sundries which totals 707 claims, amounting to \$7,824; an average per shipment of about eleven dollars.

Railway Financial News

BALTIMORE & OHIO.—*Authority to offer bonds as security for notes.*—This company has been authorized by the Interstate Commerce Commission to pledge from time to time as security for short term notes \$9,935,000 of various bonds which are nominally issued or authorized.

CHESAPEAKE & OHIO.—*Authorized to guarantee note.*—The Interstate Commerce Commission has authorized this company to guarantee a promissory note of the Louisville & Jeffersonville Bridge for \$54,000, payable to the United States.

CHICAGO, BURLINGTON & QUINCY.—*Oral argument on capitalizing surplus.*—The Interstate Commerce Commission has announced an oral argument on February 14 on the application of this company to capitalize its surplus.

CHICAGO, MILWAUKEE & ST. PAUL.—*Authorized to guarantee note.*—The Interstate Commerce Commission has authorized this company to guarantee a 10-year 6 per cent promissory note of the Indiana Harbor Belt for \$116,000 as part security for a loan from the United States.

CHICAGO, ROCK ISLAND & PACIFIC.—*Application to issue bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue \$1,000,000 general mortgage 4 per cent gold bonds, dated January 1, 1898, and maturing January 1, 1988, to be deposited with the Central Union Trust Company of New York as a basis for an issue of \$1,000,000 first and refunding mortgage 4 per cent gold bonds, dated April 1, 1904, and maturing in 1934, which are to be held for use from time to time as collateral for short term loans.

CHICAGO, TERRE HAUTE & SOUTHEASTERN.—*Stockholders approve lease to C., M. & St. P.*—The lease of this property to the Chicago, Milwaukee & St. Paul for 999 years has been approved by 68 per cent of the stock and 79 per cent of the income bondholders.

CHICAGO & EASTERN ILLINOIS.—*Authorized to issue stock and bonds for reorganization.*—The Interstate Commerce Commission has authorized this company to issue \$4,285,000 of prior lien or first mortgage bonds, \$32,156,000 of general or second mortgage bonds, \$24,030,150 of preferred stock, and \$25,500,000 of common stock, in accordance with its recent application for the purpose of reorganizing the Chicago & Eastern Illinois. The company is also authorized to assume liability for the payment of various outstanding bond issues which are not to be disturbed in the reorganization, together with equipment obligations, and in the event that a loan of \$785,000 be made to the company from the revolving fund, and that the director general of railroads shall lend \$3,500,000 to the receiver, the company is authorized to issue and pledge as security for such loans additional prior lien or first mortgage bonds not exceeding \$1,071,000.

CHICAGO & NORTH WESTERN.—*Bond issue.*—Kuhn, Loeb & Co. announce the purchase of \$15,000,000 15-year 6½ per cent gold bonds, which are offered to the public by them and the National City Company for subscription at 99¼ per cent and accrued interest, to yield about 6.58 per cent. The purpose of the issue is to provide funds to pay off \$10,000,000 Chicago & North Western debenture 5 per cent bonds, maturing April 15, 1921, and \$5,000,000 Milwaukee, Lake Shore & Western consolidated mortgage 6 per cent bonds, maturing May 1, 1921. The new issue will be secured by the pledge of \$18,000,000 face value Chicago & North Western 5 per cent general mortgage bonds. The issuance of these bonds is subject to the approval of the Interstate Commerce Commission.

New director.—Marshall Field, 3rd, has been elected a director to succeed James A. Stillman, president of the National City Bank, resigned because of Section 10 of the Clayton Act.

CHICAGO & NORTH WESTERN.—*Authorized to guarantee note.*—The Interstate Commerce Commission has authorized this company to guarantee the 10-year 6 per cent promissory note of the Indiana Harbor Belt for \$116,000 as part security for a loan from the United States.

DELAWARE, LACKAWANNA & WESTERN.—*Oral argument on capitalizing surplus.*—The Interstate Commerce Commission has announced an oral argument on February 14 on the application of this company to capitalize its surplus.

DENVER & RIO GRANDE.—*New stockholders' committee head.*—Benjamin B. Odell, president of the Aetna Explosives Company and former Governor of New York, and S. M. Schatzkin have become members of the stockholders' protective committee. Mr. Odell was elected chairman of the committee, following the resignation of the chairmanship by Jefferson M. Levy. The other members are George F. Secor, G. Tracy Rogers and John T. Steele.

ELECTRIC SHORT LINE.—*Application for bond issue.*—This company has applied to the Interstate Commerce Commission for authority to issue its 15-year gold bonds, at not less than 90, at the rate of \$15,000 per mile, and its non-cumulative preferred stock, at not less than 90, at the rate of \$10,000 a mile, to complete its line from Hutchinson to Clara City, Minn., 52 miles.

FORT SMITH & WESTERN.—*Sale ordered.*—Federal Judge F. A. Youmans has ordered the sale of this road to the highest bidder on March 31, at Fort Smith, Ark. The road has been in the hands of a receiver since October 9, 1915. A new company, the Fort Smith & Western Railway, was incorporated in Delaware, January 10, 1921, with an authorized capital of \$7,000,000. The incorporators are Alton S. Dustin, Homer H. McKeehan, and W. E. Stewart, Cleveland. The Corporation Trust Company is the company's Delaware representative.

GEORGIA & FLORIDA.—*Application to issue certificates.*—This company has applied to the Interstate Commerce Commission for authority to issue \$1,600,000 of certificates of indebtedness of 8 per cent for three years, half to be used as collateral for a loan from the United States and half for the improvement of its property and to retire existing indebtedness.

INDIANA HARBOR BELT.—*Application to issue bonds.*—The Interstate Commerce Commission has authorized this company to issue \$579,000 of 5 per cent general mortgage gold bonds and to pledge them with the Secretary of the Treasury as security for a loan from the United States. As evidence of the loan the company will give its 10-year 6 per cent promissory notes secured by the pledge of the bonds and guaranteed as to payment of principal and interest by the New York Central, Michigan Central, Chicago, Milwaukee & St. Paul, and Chicago & North Western, which own the capital stock of the Indiana Harbor Belt, and the amounts to be guaranteed by each are substantially proportionate to their respective holdings.

Loan approved.—The commission has announced its approval of a loan of \$579,000 to enable the company to provide itself with miscellaneous equipment and other additions and betterments.

LONG ISLAND.—*Equipment trusts sold.*—Plympton, Gardiner & Co., Cassatt & Co., Paine, Webber & Co., of New York, and Strother, Brogden & Co., of Baltimore, Md., announce the sale of \$1,656,000 6 per cent equipment trust certificates, series "C," at prices ranging from 99.51 to 92.18, to yield 6¼ per cent.

LOUISVILLE & JEFFERSONVILLE BRIDGE.—*Authorized to issue bonds.*—This company has been authorized by the Interstate Commerce Commission to issue \$162,000 of 4 per cent first mortgage gold bonds and to pledge them with the Secretary of the Treasury as security for a loan.

LOUISVILLE & NASHVILLE.—*Authorizations asked.*—Application has been made to the Interstate Commerce Commission for authority to assume obligations imposed by a trust agreement and a lease of equipment, by which it agrees to pay to the United States Trust Company of New York, as rental and on account of the purchase price of equipment, \$14,933,379.22, of which approximately \$3,908,379 is payable in cash and \$11,025,000 in 15 annual instalments of \$735,000 each, from 1922 to 1936, with interest at 6½ per cent. It is proposed to sell the equipment trust certificates to J. P. Morgan & Co. at \$95.70. The equipment proposed to be purchased consists of 12 Pacific, 16 Mikado and 6 switching locomotives, 2,000 steel underframe box cars, 100 stock cars, 300 coke cars, 300 low-side gondola cars, 10 cabooses, 2,000 all-steel hopper cars, 3 postal cars, 8 baggage cars, 25 coaches and 7 dining cars.

This company has applied also for authority to issue \$3,500,000

of first mortgage 6 per cent bonds, dated March 1, 1921, and maturing March 1, 1971, secured by a mortgage on the Southeast & St. Louis Railway, to retire a similar amount of bonds issued by that company under its mortgage of 1881. It is proposed to exchange as many of the new bonds as possible for the old bonds and to sell the balance to J. P. Morgan & Co.

LOUISVILLE & NASHVILLE.—*Equipment trusts sold.*—An issue of \$11,025,000 6½ per cent equipment trust certificates. Series D, has been sold to J. P. Morgan & Co.

MAINE CENTRAL.—*Dividend passed.*—The directors have passed the quarterly dividend on the preferred stock, payable March 1. Similar action was taken in the previous quarter.

MICHIGAN CENTRAL.—*Authorized to guarantee note.*—This company has been authorized by the Interstate Commerce Commission to guarantee the 10-year 6 per cent promissory note of the Indiana Harbor Belt for \$173,000 as part security for a loan from the United States.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—*Equipment notes sold.*—Dillon, Read & Co. have sold \$2,500,000 6½ per cent equipment trust gold notes, Series "J," at par and interest, for 1926 to 1931 maturities, and increasing ¼ per cent for each maturity thereafter to 101, for 1935 maturity.

NEW ORLEANS, TEXAS & MEXICO.—*Loan approved.*—The Interstate Commerce Commission has approved a loan of \$234,000 to aid this company in providing itself with additions and betterments. The applicant itself is required to finance \$234,246 to meet the loan of the government.

Authorized to issue bonds and notes.—The Interstate Commerce Commission has authorized this company to issue eight promissory notes to the amount of \$25,000 each, payable to the order of the American Car & Foundry Company at 7 per cent, to execute an agreement for the purchase of five Russian locomotives from the War Department; to issue \$800,000 of first mortgage 6 per cent gold bonds, and \$530,000, or such amount as may be required, of 5 per cent non-cumulative income bonds, and to pledge them with the Secretary of the Treasury as security for a loan. The company is also authorized to issue \$280,000 of 5 per cent non-cumulative income bonds, and approval is given for the delivery of \$175,000 of voting trust certificates, representing an equal amount of capital stock to comply with the plan of reorganization, dated August 25, 1915, under which the company was organized.

NEW YORK CENTRAL.—*Authorized to issue bonds.*—The Interstate Commerce Commission has authorized this company to issue \$7,000,000 of 6 per cent refunding and improvement mortgage bonds and to pledge them with the director general of railroads as security for a demand note.

NEW YORK CENTRAL.—*Authorized to guarantee note.*—The Interstate Commerce Commission has authorized this company to guarantee a 10-year 6 per cent promissory note of the Indiana Harbor Belt for \$174,000 as part security for a loan of \$579,000.

PARIS-ORLEANS RAILROAD, FRANCE.—*Bond issue.* A. Iselin & Co., Hemphill, Noyes & Co., and Halsey Stuart & Co., are offering 5,000,000 francs, 6 per cent bonds, foreign series, of the Paris-Orleans Railroad (Compagnie du Chemin de Fer de Paris à Orleans). The bonds are offered at 92, which at the present rate of exchange is equivalent to \$65.50 per 1,000 franc bond. They are redeemable at par, by drawings, not later than 1956.

PENNSYLVANIA.—*Application for bond issue.*—This company has applied to the Interstate Commerce Commission for authority to issue the \$60,000,000 of 15-year 6½ per cent secured gold bonds, which were recently sold to Kuhn, Loeb & Co., subject to the commission's approval at 95.40, and also \$60,000,000 of 6 per cent gold bonds, series "C," secured by its mortgage, dated June 1, 1915, to be used as security for the 6½ per cent issue.

PICKENS RAILROAD.—*Application for loan.*—This company has applied to the Interstate Commerce Commission for a loan of \$10,000 to enable it to take up a note and pay an overdraft at a bank, and also to pay its employees back wages.

PITTSBURGH & LAKE ERIE.—*New director.*—James B. Yohe has been elected a director, succeeding R. B. Mellon.

RARITAN RIVER.—*Authorized to issue stock.*—This company has been authorized by the Interstate Commerce Commission to issue and sell at par 1,600 shares of common stock of the face amount of \$100 a share to reimburse its treasury for expenditures from income.

ROCK ISLAND SOUTHERN.—*Application for loan.*—The receiver has applied to the Interstate Commerce Commission for a loan of \$150,000 for two years for the purchase of one locomotive and improvements to roadway and equipment.

SEABOARD AIR LINE.—*Authority asked for bond issue.*—Application has been made to the Interstate Commerce Commission for authority to nominally issue \$713,000 of its first and consolidated mortgage bonds to be used, together with \$1,077,000 of the bonds already held in the company's treasury, as collateral security for loans from the United States.

UNION PACIFIC.—*May purchase Kansas City Northwestern.*—Unconfirmed reports are to the effect that this company is planning to buy in the Kansas City Northwestern for the purpose of acquiring terminal facilities at Kansas City. The Kansas City Northwestern ceased operating November 1, 1919. J. M. Lee is receiver.

VIRGINIA SOUTHERN.—*Authorized to issue notes and bonds.*—The Interstate Commerce Commission has authorized this company to issue 6 months' promissory notes to the amount of \$37,000 at 6 per cent, payable to the First National Bank of Richmond, Va., and also \$150,000 of its first mortgage 6 per cent gold bonds, of which \$76,000 is to be pledged as security for a loan from the United States and \$74,000 as security for a note to the bank.

WHEELING & LAKE ERIE.—*Authority asked for bond issue.*—This company has applied to the Interstate Commerce Commission for authority to issue \$884,000 of its 6 per cent mortgage bonds to reimburse the treasury for expenditures and to be used as collateral for a loan from the United States.

NAVAL NEWS.—It is stated that there are many skilled engineers and crews of railroad tugs and lighters in New York harbor now out of work who are more than eager for a return to the old ten-hour-a-day basis.—*Journal of Commerce.*

Railway Officers

Executive

J. P. Cowley has been appointed assistant to the vice-president of the Gulf, Colorado & Santa Fe with headquarters at Galveston, Tex., effective February 1, succeeding V. C. James, resigned.

Financial, Legal and Accounting

C. H. Bender has been appointed paymaster and assistant treasurer on the Minneapolis, St. Paul & Sault Ste. Marie, with headquarters at Minneapolis, Minn., effective January 1.

A. Hermany, auditor of disbursements of the Chicago, Rock Island & Pacific, with headquarters at Chicago, has been promoted to assistant general auditor with the same headquarters. R. H. Carleton, assistant auditor of disbursements, has succeeded Mr. Hermany as auditor of disbursements. A. A. Middleton has succeeded Mr. Carleton. These changes were effective February 1.

E. E. Lloyd, auditor of disbursements of the Canadian Pacific, has been appointed assistant comptroller with headquarters at Montreal, succeeding W. J. Moule, deceased. H. J. Dalton, assistant auditor of agencies, has succeeded Mr. Lloyd as auditor of disbursements. R. W. Urwin has been appointed assistant auditor of agencies to succeed Mr. Dalton. B. Arnum has been appointed assistant auditor of agencies, succeeding W. H. Blackaller, retired.

Operating

A. S. McNeese has been appointed assistant trainmaster on the Southern Pacific, with headquarters at Yuma, Ariz., and jurisdiction over the Yuma terminal, succeeding B. I. McNeil, who has been assigned to other duties.

Traffic

J. S. Rampacher has been appointed district freight agent on the Southern, with headquarters at Philadelphia.

J. G. Kitchell has been appointed commercial agent of the Southern with headquarters at Shreveport, La., effective February 1.

H. V. Wilmot has been appointed district passenger agent on the Northern Pacific, with headquarters at Chicago, effective February 1.

J. H. Fox has been appointed district freight agent on the Canadian Pacific, with headquarters at Edmonton, Alta., succeeding F. W. Sterling, who has resigned, effective February 7.

A. Johnson, chief of the tariff bureau of the Michigan Central, has been appointed assistant general freight agent with headquarters at Detroit, Mich. C. A. Hunt succeeds Mr. Johnson as chief of the tariff bureau.

W. C. Connor, Jr., general agent on the Denver & Rio Grand and Western Pacific, with headquarters at New York, has been appointed general eastern agent of the Chicago & Eastern Illinois with the same headquarters, effective February 14.

E. R. Oliver, whose appointment as freight traffic manager of the Southern, Lines West, with headquarters at Cincinnati, Ohio, was announced in the *Railway Age* of November 12, 1920 (page 863), was born in La Fayette County, Miss., February 25, 1883. He was educated in the public schools and was graduated from the Jefferson Law School, Louisville, Ky., with the degree of LL. B. in 1910. Mr. Oliver began his railroad career in 1898 as a clerk in the traffic department.



Photo by Ewing Galloway

Entrance to the Bergen Archways on the Erie at Jersey City

He held various positions in that department until January, 1906, when he was appointed traveling freight agent at Chicago. The following year he was promoted to soliciting freight agent at Louisville, Ky. In 1910 Mr. Oliver was appointed chief clerk to the assistant freight traffic manager and, in 1912, to assistant general freight agent at Louisville, Ky. On January 1, 1916, he was transferred to Washington, D. C., and on October 1 of the same year to Atlanta, Ga. He was promoted to general freight agent with headquarters at Cincinnati, Ohio, in March, 1920, and was occupying that position at the time of his recent promotion.

A. M. Farrell, whose promotion to general freight and passenger agent of the Chicago, Ottawa & Peoria, with headquarters at Joliet, Ill., was announced in the *Railway Age* of January 28 (page 310), was born on January 2, 1884, at Charlestown, W. Va. He entered railway service in 1900 as a clerk in the office of the general superintendent of the Ohio River Railroad, at Parkersburg, W. Va., where he served until 1903, when he was employed by the Western Terminal Trunk Line Association as an inspector. After three years of service in this capacity, Mr. Farrell was appointed chief clerk in the freight office of the Baltimore & Ohio at Huntington, W. Va. In 1908, he was made rate clerk in the division freight office at Parkersburg, where he remained until 1910, when he was appointed traveling freight agent, with headquarters at Elkins, W. Va. Mr. Farrell entered the service of the Chicago, Ottawa & Peoria in 1913. At the time of his recent promotion he was serving as chief clerk in the traffic department.



A. M. Farrell

Mechanical

C. J. Sevier has been appointed assistant to the superintendent maintenance of equipment of the Western Maryland, with headquarters at Hagerstown, Md.

H. W. Salmon, Jr., has been appointed acting fuel agent on the Missouri Pacific, with headquarters at St. Louis, Mo., effective February 1, succeeding **W. P. Hawkins**, who has resigned.

O. J. Greenwell has been appointed master car repairer on the Tucson division of the Southern Pacific, with headquarters at Tucson, Ariz., succeeding **A. G. Saunders**, who has resigned.

H. M. Allen, locomotive foreman on the Canadian Pacific, with headquarters at Alyth, Alta., has been promoted to master mechanic, on the Kenora Division, with headquarters at Kenora, Ont.

G. S. Goodwin, corporation mechanical engineer of the Chicago, Rock Island & Pacific, has been appointed mechanical engineer of the Rock Island System, with headquarters at Chicago, effective February 1.

A. J. Krueger, shop inspector of the New York, Chicago & St. Louis, with headquarters at Cleveland, Ohio, has been promoted to master car builder with the same headquarters, succeeding **R. W. Miller**, deceased, effective February 4.

H. A. Amy, locomotive foreman on the Canadian Pacific, with headquarters at North Bay, Ont., has been promoted to division master mechanic, with headquarters at Ottawa, Ont. **E. G. Freeman**, locomotive foreman, with headquarters at Cartier, Ont., has been transferred, succeeding **Mr. Amy**.

J. Gibson, locomotive foreman on the Canadian Pacific, with headquarters at Sutherland, Sask., has been promoted to master mechanic with headquarters at Moose Jaw, Sask., succeeding **A. Peers**, whose appointment as master mechanic was announced in the *Railway Age* of January 7 (page 174).

Engineering, Maintenance of Way and Signaling

C. C. Cunningham has been appointed division engineer of the Kansas division of the Chicago, Rock Island & Pacific, with headquarters at Herington, Kan., succeeding **F. Nugent**, who has been transferred, effective January 31.

G. W. Boschke, whose appointment as assistant chief engineer of the Southern Pacific, lines west of Ogden, El Paso and Portland, with headquarters at San Francisco, was announced in the *Railway Age* of January 7 (page 174), was born on October 10, 1864, at Boston, Mass., and was educated at Wilson College. He entered railway service in 1886 in the engineering department of the Southern Pacific, being engaged in construction work on the Portland route of the Coast division, and the Southern Pacific terminals at Galveston, Tex. During his service at Galveston, Mr. Boschke was employed by the city of Galveston to supervise the construction of the Galveston sea wall. In April, 1905, he was appointed chief engineer of the Oregon-Washington Railroad & Navigation Company, and in addition to his other duties he was appointed engineer maintenance of way on the lines of the Southern Pacific in Oregon. When the Union Pacific and the Southern Pacific were placed under independent operation, Mr. Boschke left railroad service to enter private practice as a consulting engineer. He was engaged in this work and as a contractor at the time of his recent appointment.

Purchasing and Stores

H. W. Salmon, Jr., has been appointed acting fuel agent of the Missouri Pacific, succeeding **W. P. Hawkins**, resigned, effective February 1.

Obituary

Lucius E. Johnson, until recently chairman of the board of the Norfolk & Western, died February 9, at Deland, Fla. Mr. Johnson retired as chairman of the board on January 1, under the pension rules of the company, as was announced in the *Railway Age* of January 21 (page 262).

Henry Hiden, general agent on the Chicago, Indianapolis & Louisville, with headquarters at Birmingham, Ala., died of pneumonia on the evening of February 1. Mr. Hiden had been general agent at Birmingham for the past 12 years, with the exception of a part of the period of federal control, when his headquarters were at Lafayette, Ind.



Photo by Underwood & Underwood.

Hungry Chinamen Leaving the Famine Stricken Areas for Regions Where Food Is to Be Had

EDITORIAL

Railway Age

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It would seem a fairly safe guess that if an observer wanted to find the real center of optimism in the United States in these times of business depression, he would save his time by starting his search at El Paso, Houston or at some of the other leading commercial centers along the Mexican border. It has been so long since conditions in Mexico were such, politically and commercially, that trade with that country could be carried on with facility, that we have almost forgotten how large Mexico really is or how great are its possibilities of trade and development. Conditions south of the Rio Grande are now, however, much happier than they were. The Mexican government has shown that it realizes the necessity of putting its transportation system back on a proper basis and there is no doubt that the agreement made with a number of American roads for the loan of cars and locomotives should prove of much benefit to that end. The effect, however, will not be all on the Mexican side of the border, for it is apparent that the American roads north of the border as well as the jobbing centers served by them will be benefited to an equal if not to a greater extent. These roads are in fact in the position of being prepared for the opening of a new country of great traffic possibilities and their earnings will presumably reflect that fact in coming months.

The situation existing in China today, which is being brought to the attention of the American people by the Committee for the Chinese Famine Fund, is one that has many serious aspects outside of the necessity for charity. The facts are that China in her five northern provinces is suffering from the worst famine in her history and perhaps in all recorded history. In an area of some 100,000 square miles, 45,000,000 are threatened with famine; 15,000,000 are literally starving and the reports tell us that deaths from starvation and disease are occurring at a rate of 10,000 a day. The reason for all this misery is that continuous drought for eighteen months has caused the failure of three successive crops. China is not a poor country; it has much wealth, although of a potential character, and its agricultural possibilities are not small. We are told, for example, that food in abundance can be purchased in Manchuria. The chief difficulty in China is that it lacks transportation and has not reached that stage of economic agricultural development that goes with the building of railway lines and highways. Each agricultural community presumably is in a measure an economic entity in itself. Such a community is not developed to the point where it can raise a surplus nor would it be worth while for it to raise such a surplus, because it could not dispose of it. China proper, exclusive of Mongolia and Tibet, has an area of 1,532,420 square miles and a population of over 300,000,000 as compared with an area of 2,973,890 in the United States and a population of 105,000,000. To serve its large area and enormous population China has but 6,000 miles of railway lines. It is plain enough that the need for assistance in the present emergency is most urgent, but it is equally plain that to avoid a recurrence of such disastrous conditions as

exist at present, China needs new railways and lots of them. It is certainly to be hoped that the eyes of the rest of the world will be opened to that fact, to the end that the many projects and proposals for extended railway development to make available China's great potential wealth may become actualities with less delay through international politics, diplomatic discussion and jealousy.

Several American financial institutions, known in financial circles as the "South American group," are offering to the public \$24,000,000 of 8 per cent gold, sinking fund bonds of the government of Chile. It is understood that the proceeds of this loan will be expended for the most part in this country in the purchase of equipment and supplies for the government railways. It is not proposed to expend any of these funds for the building of new lines but rather to use them for the rehabilitation of the present sections of the government system. The largest purchases by the railways will probably be rolling stock and locomotives, since Chile's present supply of this equipment is known to be inadequate. Aside from the fact that this loan will presumably result in orders for equipment and supplies for American manufacturers, it is interesting from another angle, since it is Chile's custom, as a general rule, to place these loans in London. In fact, it has been reported that an attempt was made in the present instance to place this loan in Great Britain, but that our bankers were able to offer more favorable terms than those in London. It is to be hoped that the New York market for such securities will be receptive. If it is, large loans to Argentina and Brazil will probably be placed here. The result will be a tendency to correct the unfavorable exchange situation and make it easier for American exporters to compete with foreign competitors, besides assuring certain definite purchases from the proceeds of the loans themselves.

The Coal Trade Journal says that the railroads have used the assigned car as a club to "beat down" the price of locomotive fuel. If it was possible to "beat down" the price of coal to 20 dollars a ton in New England last year, what would the railroads have paid had it not been for assigned cars? If it was necessary to confiscate thousands of tons of commercial coal during the previous year in order to keep the railroads running, how enormous would have been these confiscations had not the assigned car assured a certain fixed supply? If hundreds of cars shipped to the railroads during recent years contained coal that was unfit for locomotive use, what would have happened had it not been possible for the railroads to place assigned cars at mines where they were assured a suitable grade of coal? The railroads did accept great quantities of inferior coal but this does not indicate, as claimed by the Coal Trade Journal, that this coal was acceptable. *Inferior coal was never acceptable*, but the railroads took it in order to avoid confiscating commercial coal and to keep running. When the Boston & Maine recently

Traffic
to
Mexico

Chile
Borrows
\$24,000,000

A Country
Without
Railways

Accepted Coal
Not Always
Acceptable

rejected 400 cars of inferior coal it did not sell this coal to the Commonwealth of Massachusetts on competitive bids as stated by the Coal Trade Journal, but even if it had done so it would not have proved the coal to be fit for locomotive use. Furthermore, contrary to the statement in the Coal Trade Journal, the "one shipper" who voluntarily admitted that this rejection was justifiable was, as a matter of fact, involved in the original transaction for which that publication first attacked the railroad.

It is difficult to find an argument not already advanced for the more careful selection and training of railroad shop foremen. The present situation, however,

Selection and Training of Foremen

warrants a reconsideration of these arguments. Efficient, capable foremen could overcome to a certain extent the effect of indifferent workmen but far too few efficient, capable foremen are available. Failure to select and train carefully an adequate number of these men in the past is now costing the railroads dearly. Four years are considered necessary for an apprentice to learn the machinist's trade and yet a machinist is promoted to the position of foreman, directing men instead of machines, and is expected to make good in four weeks or less. The selection of men for prospective foremen should not be left to chance, as past experience has amply demonstrated the possibility of keeping personal efficiency records whereby the master mechanic, or shop superintendent, is enabled to tell at a glance which one of his employees will probably best fill a vacancy among the foremen. Incidentally, this system tones up the whole organization since it enables those in authority to know the work for which each employee is best adapted, and to encourage him to overcome individual weaknesses. Conceding the need for the careful selection of prospective foremen, the best and practically the only method of training them is by affording actual experience in directing the work of others. Every possible opportunity should be given ambitious, promising employees to work as acting foremen in the various departments, taking advantage of the absence of regular foremen on account of sickness, vacation or other cause. This will allow the man to break in under the guidance of more experienced foremen. Trying out a man as acting foreman affords a graceful means of returning him to the ranks should he not make good, thus avoiding the undesirable consequences of demoting him. The acting foreman should be coached carefully and be encouraged by his superiors to assign all possible detail work to subordinates, devoting themselves to the broader problems of managing departments, installing improved methods and developing team work and enthusiasm in the men who are under their direction.

As regards railways, Argentina is more intensively developed in proportion to its population than is our own country.

British Railways in Argentina

There are 28 miles of line for each 10,000 inhabitants in that country—as against 25 miles for each 10,000 of population in the United States. The total railway mileage of Argentina is approximately 20,370—something over 75 per cent of which is owned by British capitalists and operated by railway men from the British Isles. That these Britons have done and are doing their work well is amply testified by an article elsewhere in this issue—the first one of a series of three which will deal with the railways of Argentina. These articles propose to describe in some detail the extent to which these roads are developed by their British managers and to give a general idea of some of the practices and equipment

of the lines. The penchant of British railway managers to buy British equipment and supplies is well known. The fact that Argentina is not one of the most promising markets for American railway supplies, therefore, scarcely needs to be commented upon. The lines not owned by the British, approximately 5,000 miles, of course offer opportunities for orders to the American concerns which can, in spite of the unfavorable exchange situation, meet the prices of foreign competitors. The strength of the British position in Argentina bears eloquent testimony to the truism that "trade follows the invested dollar." Argentina is growing rapidly and such growth will soon necessitate great increases in railway mileage. The answer to America's foreign trade difficulties in the Argentine, then, is the investment of capital in the enterprises of the country. A loan of \$24,000,000 has, according to press reports, just been arranged in this country for the Chilean government to aid in the rehabilitation of the Chilean railways. Such a loan, besides assuring certain definite purchases in this country, facilitates general buying in America because it tends to correct the disadvantageous exchange situation. A similar loan to Argentina is said to be under consideration. If the report is true the opportunity exists for taking a decided step in the right direction.

Discipline without suspension is not discipline at all unless it is managed systematically and one of the points used in arguments against the Brown system is

Brown's Discipline that small offenses cannot be or at
on the least are not, carefully weighed,
Canadian Pacific recorded and made to take their proper
place in the summing up of merits and
demerits by which a man is finally judged. From a recent
monthly record of one district of the Canadian Pacific we
copy some entries giving evidence that this criticism is not
in all cases justified:

EXTRACTS FROM RECORD OF DEMERITS, JANUARY, 1921

- | | | |
|-----------------|-----------------------|--|
| 1 Conductor | ... 10 Demerit marks. | Not seeing that his trainman was in his proper position, on passenger train, to cut engine off train on arrival at terminal. |
| 1 Conductor | ... 20 Demerit marks. | Not reporting an occurrence in tourist car on his train, after same had been called to his attention. |
| 2 Conductors | ... 20 Demerit marks. | Carrying an ex-employee on their train without transportation. |
| 1 Conductor | ... 20 Demerit marks. | Failing to register train at end of double track, two offenses. |
| 1 Conductor | ... 15 Demerit marks. | Overcarrying an elderly lady who was traveling in day coach on his train. |
| 1 Sec. foreman. | 10 Demerit marks. | Worked unnecessary overtime. |
| 1 Sec. foreman. | 30 Demerit marks. | Not completing patrol of section on m-rning inspection, having to send one of his men over same territory twice; wasting time unnecessarily. |
| 1 Trainman | ... 20 Demerit marks. | Sleeping on duty while approaching terminal on passenger train, and not being on hand to cut engine off train. |
| 1 Trainman | ... 10 Demerit marks. | Repeatedly failing to present watch for comparison. |
| 1 Yardman | ... 5 Demerit marks. | Not uncoupling air hose on cars before starting switching operations. |

These and other items in the record indicate that "Brownies" can be made to fit the offense, without difficulty, if the superintendent is determined to do justice. It is not possible of course to make comparisons with certainty at this distance; but where entries are put into the record for such minor faults as lack of promptness in cutting off an engine, or wasting an hour's time of a few laborers, or failing to report an incident (in a passenger car) which was of questionable moment, one may feel confident that discipline is being administered with discrimination and care. It is for those who would discredit "book discipline" to set forth how such offenses would be dealt with effectively under the old system. Would they not very likely be turned off with an admonition or a reprimand which would never be mentioned in the record? "Be fair and you can be firm." This well-settled maxim works both ways. The officer who does not carefully make record of the smaller offenses is not fair to the

employer. Having made such record he is the better prepared to be generous—intelligently generous—to the employee, whenever generosity may seem to be advisable.

The rapid growth in the aggregate hauling capacity of railroad motive power, amounting to an increase of 150 per cent

A Check on Locomotive Development

The rapid growth in the aggregate hauling capacity of railroad motive power, amounting to an increase of 150 per cent in the last 17 years, has heavily overloaded the available maintenance facilities. The effect which the shortage of facilities seems to have had on the serviceability of locomotives was suggested in an article appearing in last week's issue in which it was pointed out that since 1903 there has been a decrease in the annual train miles per locomotive now equivalent to two months' service in 12. But there is another aspect of this situation which may prove even more serious in the future than the decrease in locomotive mileage. Appliances designed to increase the efficiency or the capacity of the locomotive as a power producer, or to facilitate its operation, generally add to the volume of maintenance work. In few cases can the operating economies or other advantages of these appliances be fully realized if their care is neglected. But it is not infrequently necessary to keep the locomotive in operation at the expense of neglecting these appliances in order to do the work which must be performed if the locomotive is to move at all. Such conditions result in failure to realize a full return from these important features of the modern locomotive, a loss of economy not only detrimental in itself but inevitably tending to check the development and practical application of all such improvements. One railroad officer has expressed the opinion that it is useless to consider the application of additional devices to the locomotives on his road until it is possible to maintain adequately the equipment as it now exists. The inability to take advantage of every practical development for increasing locomotive efficiency may readily become even more serious than reduced locomotive serviceability unless a reasonable balance between shop and terminal facilities and the amount and character of equipment to be cared for is restored. If \$100,000,000 to \$200,000,000 be accepted as an approximation of the investment in idle locomotives required to offset the reduction in mileage performance which has taken place since 1903, the failure to realize a possible saving averaging only two or three per cent on the railroad fuel bill would cause a loss on this item alone as great as the carrying charges on the unproductive investment. From whatever angle this subject is approached, it is evident that the provision of adequate shop and terminal facilities is as important and inseparable a part of the motive power problem as the locomotive itself.

The Labor Board's Decision

THE DECISION rendered by the Railroad Labor Board on February 17 on General Atterbury's suggestions to it has been interpreted as a defeat for the railroads. However that may be, the decision establishes certain precedents which, if the board scrupulously follows them in future, will promote orderly procedure and fairness in the handling of matters over which it has jurisdiction.

One suggestion which was made by General Atterbury, speaking as chairman of the Labor Committee of the Association of Railway Executives, was that the board should approve at once the restoration of the rules and working conditions in effect on each railroad on December 31, 1917. He pointed out that the financial situation of many railways, due to an excessive pay roll and the heavy decline of traffic, was becoming very serious. Spokesmen of the labor unions immediately replied that the board could not regulate wages and working conditions according to the financial condition

of the companies—that the needs of the railways was a matter to be determined by the Interstate Commerce Commission, and that the board's authority extended only over wages, rules and working conditions. The Labor Board, in its decision, recognized that while its authority extends only to fixing reasonable wages and working conditions, it cannot ignore the fact that rules and working conditions affect operating expenditures, and that unreasonable rules and working conditions must impose an undue burden upon the railroads and the public. At the same time, however, it said that the general condition and needs of the railways were matters not for its consideration, but that of the Interstate Commerce Commission.

In effect the board refused to accept facts regarding the financial condition of the railways as evidence having any bearing upon the reasonableness of rules and working conditions. But the board cannot consistently refuse to accept evidence regarding the financial condition of the railroads as having a bearing upon the reasonableness of rules and working conditions, and at the same time allow the labor leaders to take up hours and days of its time with charges, or even evidence, to the effect that the railroads are financially controlled by a few banking houses, that they have wasted money by having repairs to locomotives and cars made in outside plants, and that they are engaged in a conspiracy to break up the labor unions. If the financial condition of the railroads has no bearing on the subject of rules and working conditions, then certainly the sort of Plumb plan propaganda with which the brotherhood leaders have been deluging the board has no bearing upon it. If the board will in future, as its decision indicates, strictly confine those appearing before it to evidence and arguments regarding only the matters over which it has jurisdiction—that is, railway rules, working conditions and wages—its hearings will become solely a means to the rational settlement of the questions over which it has jurisdiction, instead of so largely a vehicle for the airing of wild, reckless and scandalous misrepresentations by the labor leaders.

The board refused to accept General Atterbury's suggestion that it immediately authorize the railways to pay the current wages for unskilled labor upon the ground that no controversy between any railway and its employees upon this subject had properly and legally been brought before it. It is undoubtedly in accordance with the spirit of the Transportation Act that no question shall be brought before the board which has not previously been the subject of conference and become a matter of controversy between the railways and their employees. But while this is the spirit and even the letter of the Transportation Act, it has not always been recognized by the board itself, and has in some cases been completely ignored by the labor unions. The railways individually have desired to negotiate with their own employees regarding every difference arising between them. The labor unions have tried to manoeuvre matters so as to force all negotiations to be carried on by the national labor organizations and the railroads as a whole. They forbade their local chairmen to negotiate at all with individual railways regarding the continuance of the present national agreements, rules and working conditions. The result was that jurisdiction of these agreements, rules and working conditions was taken by the Labor Board practically without any such previous conferences being held, and controversies arising regarding them, as are contemplated by the Transportation Act.

It will be best for all concerned in the long run that every reasonable effort shall be made by the individual railways and their own employees to settle all disputes arising between them before they are carried to the Labor Board. If the board should begin at once to make itself a court of original jurisdiction, instead of a court of appeal, all hope of having a large portion of labor disputes settled locally without its intervention would be destroyed. But here again the board

must recognize the principle that what is sauce for the goose is sauce for the gander. Having refused to allow the railways to make it a court of original jurisdiction, consistency will require it in future to refuse to allow the labor leaders to bring before it any matter which has not first been taken up with the managements of the railways.

Railway employees opposed the passage of the labor provisions of the Transportation Act. They sought at the national election the defeat of every member of Congress who voted for it. Now, in a period of declining prices and wages, they are finding and using it as a protection to them. But for the labor provisions of the Transportation Act, practically all the railways of the country would today be paying much less for unskilled labor than they are. It is to be hoped that in future, when the Transportation Act may serve as a protection to the railway companies, the employees will not forget the benefits they are now deriving from it.

Meantime, it is highly desirable that the railway companies shall comply with all the provisions of the Act, in letter and in spirit. While it is now protecting labor, the time will come, if it is not broken down, when it will protect the railways. It would be very unfortunate if the railways in the present period of stress should break it down and thereby deprive themselves of the protection which, under different conditions, it would afford to them. The railway companies should be at least as consistent and law-abiding as they demand that labor shall be.

The Labor Board's Responsibility

THE RAILWAYS in many parts of the country are now in the somewhat unusual position (for them) of paying considerably more than the prevailing wages for unskilled labor in many localities. Because of this fact and prompted by the urgent necessity for a reduction of expenses, certain roads have taken it upon themselves to announce reductions in these rates. In its reply to the suggestion presented by General Atterbury for immediate reductions of the wages of unskilled labor the Labor Board stated that the question was not properly before it for consideration and indicated the manner in which it must be brought before it. On February 14, it further ordered one of the roads which had announced a reduction in wages to rescind it, and set a date for a hearing on this question. The entire matter will be thrashed out before the board in the very near future.

In passing on this question the Labor Board bears a peculiar responsibility to the public because of the fact that the wages in question are now higher than those paid by competing industries and because of the amount of money now involved and the even larger amount which will be involved when the more intensive season of maintenance of way work opens. While this question has been raised with reference to all unskilled labor it relates principally to that employed in maintenance of way work where probably 300,000 men are now enrolled, this number increasing to over 400,000 in the summer. At the present time the wages for such labor are fixed at rates ranging from 40 cents to 48½ cents per hour with time and one-half after eight hours, a large part of the men receiving the highest rate. In contrast, unskilled labor of the class employed in railway service can now be secured in large quantities in many places at from 10 to 15 cents per hour less than is now being paid by the roads, and is being employed at these lower rates by contractors and other industries without penalty overtime. It is therefore evident that the railways are now paying over \$250,000 more each working day than is necessary to secure the needed labor.

While the law creating the Labor Board outlines those conditions which must be given major consideration in fixing

rates of wages, and rates paid in other industries constitute only one of these conditions, the Labor Board must be prepared to defend its action before the public if it fixes railway wages above market rates. We do not contend nor do we believe it economical that the railways should pay the lowest market rate at which they can secure men. Rather, they should pay those rates which will enable them to compete on an equality with other industries for efficient labor of the class required. This does not, however, necessitate the payment of the present wages, and the board can hardly do otherwise than to authorize large reductions in the present rates.

Is the Real Issue Labor Unionism Versus Efficiency?

THE SPOKESMEN of the labor unions before the Railroad Labor Board constantly repeat the charge that in seeking to set aside the national agreements, rules and working conditions established under government control the railways are trying to break down the labor organizations. They allege that the policy of the railways is part of a general movement initiated by Wall street financiers to establish the "open shop."

In this the leaders of the labor organizations are overplaying their hand. The railways have presented a large amount of evidence showing that the present agreements, rules and working conditions cause much inefficiency and large waste. They contend this is due to the facts, first, that no uniform rules and working conditions can be applied to the widely varying conditions of the entire country without producing inefficiency and waste, and, second, that the particular agreements, rules and working conditions now in effect are unreasonable in themselves.

The spokesmen of the labor unions have not presented a scintilla of evidence, or a single argument, either to show that these arrangements actually promote efficiency or that they do not promote inefficiency. If the contention of the railroads that they promote efficiency is correct, and the implied contention of the labor leaders that their abolition would weaken the labor organizations also is correct, what conclusion must be drawn? Just one conclusion, namely, that maintenance of the present power of the labor organizations is incompatible with rules and working conditions which will promote efficiency.

If this is the position the labor leaders mean to take, some evidence which apparently supports it can be produced. As already has been shown in the *Railway Age*, there was no increase between 1917 and 1920 in the number of employees engaged in the actual operation of trains on the road. Meantime, there was an increase of 141,000, or 47 per cent, in the number of nine classes of employees in the shops. These facts are very significant in view of the further fact that no radical changes were made in rules and working conditions in road service, while a national agreement was made with the shop crafts. The huge increase in these classes of shop employees did increase the numerical power of the labor unions to which they belong. Rules and working conditions which increased efficiency in the shops would reduce the number of men it is necessary to employ in them. This undoubtedly would reduce the number of these classes of railway employees belonging to certain labor unions, and thus the numerical power of these unions would be reduced.

Is this what the leaders of the labor unions really have in mind when they say that the attempt of the railways to destroy the national agreements is an attempt to break the power of the labor unions? If so, then the leaders of the labor unions are raising a direct issue between labor unionism, on the one side, and railroad efficiency, on the other.

If this interpretation is correct, they are trying to maintain the numerical strength of their organizations regardless of the fact that this would mean perpetuating the employment of an excessive number of men, the maintenance of an excessive railroad pay roll and excessive operating expenses, and, in consequence, higher freight and passenger rates than would be necessary under reasonably efficient operation.

There are many people who claim that the increase of the labor unions in numbers and in power is absolutely incompatible with increases in the efficiency of production and reductions of the cost of production. They say that one of the fundamental principles of unionism is curtailment of the average output per man, upon the erroneous economic theory that the less each workman does the more men there will be employment for. They resist the growth of labor unionism because they believe the stronger the unions grow the more the cost of production will be increased, the less total production will become and the less of the necessities and comforts of life there will be made available for the use and consumption of all classes of society, including the working class itself.

Are Frank P. Walsh, B. M. Jewell, and other spokesmen of the railroad labor organizations, who are appearing before the Railroad Labor Board, trying more or less unconsciously to prove the correctness of the views of those who oppose the growth of labor unionism upon the ground mentioned? If so, they are playing directly into the hands of the most uncompromising enemies of labor unionism. The public welfare demands steady and large increases in the total volume of things produced. Every student of economics, every man in public life who is entitled to be there, every intelligent man, knows this. Railroad transportation is one of the essential processes of production. Therefore the public welfare demands that railroad transportation shall be conducted as efficiently and economically as is consistent with railway employees being paid reasonable wages and not overworked. Every intelligent man knows this. Labor union leaders will, in the long run, bring disaster upon their own organizations and their members by making an issue between industrial and transportation efficiency, on the one side, and labor unionism on the other.

Labor leaders would, in the long run, promote the interests of their organizations and their followers by defending the rights of their followers and at the same time doing all they can to increase industrial and transportation efficiency. It is a notable fact, however, that while they have been charging that the railways and other employers are trying to break down the labor unions, they have not advanced a single rational and concrete suggestion for increasing transportation and industrial efficiency.

The Problem of the Sea Water Structure

THE PROGRESS of civilization is being constantly opposed by a multitude of animal and vegetable pests, many of which seem to thrive with increasing vigor under the new conditions set up by man as he changes his primitive surroundings to the highly developed agricultural or industrial community. Noxious weeds and destroying insects become more virulent as a new country is subjected to settlement. Likewise, marine borers have become an increasing menace. Thus, the reports of the many investigations which have been made to learn the truth about these pests are a unit in showing an increase in their inroads as the use of timber in marine harbors provides a greatly increased field for their operation.

The report on marine borers in San Francisco bay abstracted elsewhere in this issue is of interest to railway engi-

neers as it throws further light on this problem. It presents a fund of information on the nature and functioning of these various organisms, the influence of salinity of the water as affected by the tides, floods, droughts, etc. However, the greatest emphasis is placed on the importance of a high degree of perfection in the treatment of timber that is to be submerged in sea water and of sanitation in keeping the harbor waters clear of all untreated timber which will serve to encourage the growth and spread of these troublesome pests.

As regards the efficacy of preservative processes for the protection of timbers placed in sea water, the present state of the art is in much the same position as that of concrete subjected to sea water. Examples can be cited of both eminent successes and hopeless failures in the use of both materials. Yet in most cases of failure of both concrete and treated timber, some defect in workmanship or material can usually be pointed out to which the failure may be ascribed with more or less accuracy. In the case of each it is clear that much more experimentation and study must be carried on before the full facts can be known. But in the meantime it will be necessary to build docks, trestles, piers, etc., with their supporting portions submerged in sea water, and the prospective builder is compelled to select the material of construction with the facts now at hand.

This determination must be made in each individual case on the basis of the local service records, taking into account the relative availability of the materials in the particular locality.

New Books

Fuel Oil In Industry. By Stephen O. Andros. 240 pages, 6 in. by 9 in. Illustrated. Bound in cloth. Published by the Shaw Publishing Company, 910 South Michigan Boulevard, Chicago.

The use of fuel oils by the railroads is by no means new and the problems involved in its application to the locomotive have been carefully studied by railway engineers for many years; in fact, the value of this book to the railway mechanical or civil engineers might be questioned if it were not for the tremendous expansion in the use of fuel oil in all industries within recent years. Thus the increased price of bituminous coal has assisted in promoting the use of fuel oil both in maritime service and in many hundreds of stationary plants along the eastern seaboard. This in turn has introduced new problems relating to its transportation in bulk and storage in large quantities. Moreover, it must be admitted that refinements bearing upon the handling and burning of fuel oil are generally given more consideration in stationary and maritime service than in railroad use. For this reason, there is a field for a book of this character in railroad as well as industrial service which outlines, as it does, not only the principles of fuel oil combustion and the properties of fuel oils, but the methods of testing, storing and burning it together with a full description of its application to industrial and domestic furnaces. For instance, the book not only describes many of the details involved in the construction of steel storage tanks but refers to an interesting development in concrete oil storage tanks and describes at length all of the pipe setting and auxiliary machinery involved. While the book describes many types of burners that would not be applicable to locomotive service, still there are many points in connection with this subject as outlined in this book that will prove of particular interest to railway fuel engineers. The use of fuel oil in the manufacture of iron and steel and the heat treating furnaces is also described and illustrated in an interesting way.

Letters to the Editor

70-Ton Acid Tank Cars Built in 1912

CLEVELAND, Ohio.

TO THE EDITOR:

In the description of a sulphuric acid tank car of 70 tons capacity in your issue of January 14, the following paragraph appears:

"With the exception of two cars built for the General Chemical Company in 1916, the 50 cars on this order are, so far as known, the first 70-ton acid tank cars constructed."

It may be of interest to your readers to know that we owned and operated tank cars for the transportation of sulphuric acid with a marked capacity of 70 tons and with an actual carrying capacity of 75 tons of acid, as early as the year 1912.

The first car was put in operation in August, 1912; the second car in October, 1912. The next 13 cars of like capacity were added in 1915. In January of this year, we added 10 and we have at the present 15 more coming through the shops, all with a marked capacity of 70 tons, but with an actual carrying capacity in excess of this marked capacity.

JOHN HART,

Traffic Manager, The Grasselli Chemical Company.

The Importance of Supervision

TO THE EDITOR:

I have read with much interest the editorial in the issue of December 3, 1920, entitled "Will Railway Employees Help Reduce Operating Expenses?" I should like to answer this by stating most emphatically that they will not, unless they are properly supervised. The efficiency in railroad operation, or any other industry, depends entirely on the manner in which labor is directed. I make this positive statement basing it on the unalterable fact that the human race, taken as a whole, is inclined to be lazy, selfish and laden with a desire to govern, rather than submit to government. Not only this; the average man or woman is burdened with erroneous beliefs. This fact makes it an absolute necessity to have labor closely supervised and directed by the very highest quality of mind.

It has been the writer's experience that labor is just what is demanded of it; that is, if it is supervised and directed by one who is truthful, honest, upright, unselfish, energetic and, above all, not lacking in moral courage, there will be no lagging or lack in efficiency. Efficiency is needed more today than anything else, because the loss in this respect is costing the railroads of the United States at least a half-billion of dollars each year. For instance, take the loss in labor efficiency; the loss in material and supplies due to the spirit of "I don't care, it all belongs to a railroad corporation." To sum up this waste in dollars and cents would astound anyone except a deep thinker who has been in railroad work for a number of years.

Supposing the great army of railroad officers and employees, composed of about 2,000,000 of men and women, would get down to real work, a saving of at least ten cents per day each could be made, which would amount to \$60,000,000 per year. Think of the vast number of non-producers now in controversy made up of representatives of labor, capital and the government, who are drawing large wages for engaging in battle royal for what each claims is just and right. The loss to the railroad stockholder, the labor organi-

zation and to the public, which is the government, is enormous and is beyond the conception of the average citizen.

The National Agreement, entered into by the government and the railroad employees during government control, has cost the railroads and the public millions of dollars for service that has never been performed. Parts of this agreement are the greatest pieces of error ever concocted. It is like a house built upon the sands; it has no solid base, and anything that is not based on principle cannot stand. The rules laid down in the National Agreement contain provisions that force the railroads to pay for service that is not performed. A rule that will force a government, a railroad, a private corporation or individual to pay for service that is not actually performed is not based on principle; its foundation is faulty and it cannot stand.

The abolition of piece-work was one of the greatest mistakes ever made because it is the only real protection that the railroads and the energetic man have against laziness, indifference, etc. The farmer, who is the base of our existence, the salesman, the engineer, the trainman, the coal miner all work on a piece-work basis; then why not the mechanical workmen on railroads? It is the only method that can be used to put "pep" in some men and keep up human interest.

The United States is today starving for industrial peace. The cry of "Peace, peace," when there is no peace, causes me to think that those who are responsible and who indirectly or directly supervise labor have not the moral courage to enforce the rule which is contained in the agreement between the railroads and organized labor. The National Agreement says that eight hours shall constitute a day's work, which I understand to mean that each man working under this agreement will work faithfully for eight hours, taking as much interest in the work as if the business wholly or partially belonged to him. Are the parties to this agreement doing this? I will let someone else answer this very important question.

During my many years of railroad service, having met and associated with many railroad officers and employees, I have met almost the universal thought, which to my mind is erroneous, "We must get along with the men; a railroad officer who cannot get along with the men will not last very long." This statement is correct. The officer who cannot get along with the employees will not last very long, but the real meaning is many times misconstrued by those who think that to follow the line of least resistance is the ideal way of getting along with the men; or, in other words, to permit some, or the whole to break the rules; to come and go and work when it pleases them. This is buying peace at a great price and it is a peace that is no peace.

In thinking of organization, I have often thought of the human body. What a wonderful organization it is! Governed by mind, the most powerful force known to the human race, the body and members thereof are directed by a mental force called desire. The railroad employees of this country are like one great human body; they will move quickly or slowly, efficiently or inefficiently; they will help reduce operating expenses or not, just in proportion to the quality of mind governing.

J. A. ALEXANDER.

THE CANADIAN PACIFIC has taken a lease for 21 years of the first two floors and basement of a new 21-story building at Madison avenue and Forty-fourth street, New York City, and the building is to be known as the Canadian Pacific building. The passenger departments of both rail and shipping interests, lands, colonization, and development work will be brought together here, but the freight department will continue to have an office at the Woolworth building. Negotiations are under way with other transportation interests for space in the Canadian Pacific building.



Virginian Gondola Car of 120 Tons Capacity

Operating Economies Effected by Using 120-Ton Cars

Virginian Increases Gross Trainload from 7,950 to 13,200 Tons—
First Application of New Six-Wheel Truck

THE VIRGINIAN RAILWAY has recently received from the Pressed Steel Car Company at Pittsburgh, 1,000 steel gondola coal cars of 120 tons capacity. This equipment is the heaviest in the history of transportation and is notable for two reasons: first, because it is the first instance where a large number of cars of such extremely high capacity have been placed in service, and, second, because the

water coal, the normal operation of the road depends upon the ability to dump cars promptly on arrival at the pier. In order to secure the maximum capacity of the pier, duplicate unloading facilities have been provided. Two separate car dumpers, one handling a 55-ton car and the other, two 55-ton cars, or one 120-ton car, dump into electrically operated conveyor cars. The conveyor cars from one dumper are drawn



The First Application of the Lamont Truck Was Made on Ten of These Cars

equipment has been developed especially to meet the operating conditions on the Virginian.

Of the total traffic handled by the Virginian, 92 per cent is coal moving to tidewater and inland points from mines west of Princeton, West Virginia, the greater portion of which moves to Sewalls Point pier, 342 miles from Princeton. The profile consists principally of slight descending grades; thus the tonnage that can be handled in a single train is limited over a large part of the line, not by the tractive capacity of the locomotive, but by the difficulty of securing proper operation of the air brakes in the handling of long trains on descending grades to avoid break-in-twos.

Since such a large proportion of the traffic consists of tide-

water coal, the normal operation of the road depends upon the ability to dump cars promptly on arrival at the pier. In order to secure the maximum capacity of the pier, duplicate unloading facilities have been provided. Two separate car dumpers, one handling a 55-ton car and the other, two 55-ton cars, or one 120-ton car, dump into electrically operated conveyor cars. The conveyor cars from one dumper are drawn

Under normal conditions the Virginian moves a large proportion of its traffic in its own equipment, consisting principally of gondola and hopper cars of 55-tons capacity and, latterly, 120-tons capacity. Two of the former cars can be handled on the two-car dumper, or one 120-ton car, from which it will be noted that the adoption of a car carrying a heavier load will have the effect of increasing the capacity of the dumper and the efficiency of the pier. With this in

mind, plans were made for the development of equipment having twice the gross weight of the 55-ton cars. In 1917 four sample 120-ton cars were placed in service to determine whether the use of such equipment would be practical and economical, and as a result of these experiments, the order for 1,000 cars of this capacity was placed in the spring of 1920, immediately after the roads were returned to private control.

The advantages of the 120-ton car under the conditions prevailing on the Virginian Railway can be judged by the comparison of this equipment with the 55-ton cars. The new cars with a capacity of 240,000 lb. weigh 78,900 lb., making the ratio of load to dead weight 75.3 per cent. The gondola and hopper cars with a capacity of 60 tons weigh 41,000 lb. and 44,000 lb. respectively, making the ratio 74.5 and 73.2 per cent.

The 120-ton cars are 49 ft. 6 in. long inside, while the 55-ton hopper cars are 32 ft. 6 in. long and the gondolas 40 ft. long. Thus the gross weight per foot of length for

wide inside and has a depth at the center of 8 ft. 5 $\frac{1}{8}$ in. and at the ends over trucks of 7 ft. 4 $\frac{1}{4}$ in. The cubical capacity is 3,850 cu. ft. level full or 4,450 cu. ft. with a 30 degree heap. This latter figure, with coal at 54 lb. per cu. ft., is equivalent to approximately 240,000 lb. The cars are stencilled 218,000 lb. capacity, but adding a 10 per cent overload brings the capacity to approximately 240,000 lb., the load which the car is designed to carry both from the standpoint of strength and as to dimensions.

The size of the car, coupled with the fact that it is deeper at the center than at the end, gives it the general appearance of one of the modern quadruple hopper cars. However, it is not a hopper car as it has no hoppers, drop doors or means of discharge other than from the top. It is to be operated solely on the lines of the Virginian and dumped only in car dumping machines. These facts suggested the design finally adopted.

The sides, it will be noted, are entirely free from outside side stakes or other projections beyond the plane of the side sheets. The car presents a smooth, straight surface throughout the depth of the body at all points to engage the blocking and clamps in car dumpers, thus avoiding concentrated stresses on side stakes, top angles and other projections while the car is being dumped. This construction also admits of using practically all of the clearance width of the road for the inside or available loading width of the car and provides the required cubic capacity in a minimum length and height.

The sides are formed of $\frac{1}{4}$ in. plates sloped in near the top at an angle of approximately 15 degrees and then flanged out, overlapping the horizontal leg of the top angle to which they are riveted. The top angles are standard 4 in. by 4 in. by $\frac{1}{2}$ in. rolled angles with the vertical flange outside in line with the plane of the side sheets. On the inside of the side construction 14 stakes are provided on each side and the connection between these stakes and the side top angle is effected through malleable iron castings, as is shown in the drawing of the car body. The side



Interior of the Car Body, Showing Gusset Side Stakes, Bolsters and Cross Bearers

the 120-ton car is 61.7 per cent greater than for the 55-ton gondola, and 31.0 per cent greater than for the hopper. For a given length of train, the net tonnage that can be handled in the larger cars is even greater.

It has been found entirely practical to handle trains of 120-ton cars, but no extensive tests have been made so far because of adverse weather conditions. It has been demonstrated, however, by actual test that the gross load behind the tender in these trains averages 13,200 tons, compared with 7,950 tons hauled with the smaller equipment. It is the opinion of the operating officials that with favorable weather conditions, a train haul of 14,000 tons gross or 10,540 tons net load will be secured by the use of the 120-ton coal cars.

Construction of the Cars

As already mentioned, these cars have been made extremely wide and high in order to keep down the length as much as possible. The car body is 49 ft. 6 in. long by 10 ft. 2 $\frac{3}{4}$ in.

stakes consist of reinforced triangular gussets and 5 in. rolled bulb angles all directly connected to bolsters, cross bearers and floor supports, all of which are located inside of the car body. Along the bottom the sides are reinforced by 3 $\frac{1}{2}$ in. by 3 $\frac{1}{2}$ in. by $\frac{3}{8}$ in. rolled angle, which also supports the floor. This angle extends to within approximately 2 ft. 4 in. from either end. At these points the plane of the side sheets is dropped back into the car to bring the ladders inside the clearance limits and also to afford these a certain amount of protection in car dumpers and elsewhere. The assembled side construction forms an efficient girder which will carry the weight of the lading as well as the dead weight of the car at a low fiber stress and leave the center sills to take care of the buffing stresses.

The center sills are made up of two 13 in., 37 lb. standard rolled channels applied with the flanges toward each other and reinforced at the top by a cover plate and at the bottom by 4 in. by 3 $\frac{1}{2}$ in. by $\frac{3}{8}$ in. rolled angles. Five hundred cars are equipped with Westinghouse N-12-A draft gear and

Lewis or Lamont trucks, being known as Class G-4 cars, while the remaining 500 cars have Cardwell duplex draft gear and Buckeye trucks. These are known as Class G-3 cars. On the Class G-4 cars the center sills are spaced $18\frac{1}{2}$ in. apart and on the Class G-3, the standard $12\frac{7}{8}$ in. spacing is employed. The center sills develop an effective buffing area of over 30 sq. in. and the ratio of stress to strain figured according to A. R. A. practice is below .05.

The ends are formed of $\frac{1}{4}$ in. plates reinforced at the top

middle of one of the cross bolsters, the ends of which in turn are carried on the longitudinal equalizers under the side frames. The principal feature of the equalizing system is the location of the springs at the journal boxes instead of over the equalizer. The journal boxes are of special construction in which seats are provided for coil springs on either side of each box, the truck frames resting directly on the springs of the end journal boxes. The springs at each of the middle journal boxes are spanned by a spring cap; on



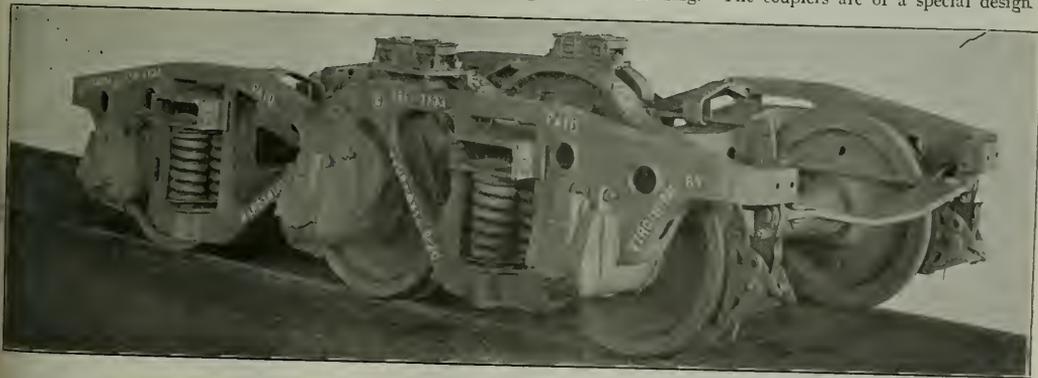
The Buckeye Six-Wheel Truck

by a 5 in. by $3\frac{1}{2}$ in. by $\frac{3}{8}$ in. rolled bulb angle, intermediately by two pressed steel braces extending the full width of the car and at the bottom by the floor sheets which are flanged up to engage the ends and riveted thereto. The floor sheets are all $\frac{1}{4}$ in. plates and all floor supports, including bolsters and cross bearers, are of built up construction.

The trucks are of the six wheel type with cast steel frame, three designs being used as previously mentioned. They are equipped with A.R.A. standard 6 in. by 11 in. axles, 33 in. rolled steel wheels, Stucki side bearings and clasp brakes.

the middle of this cap bears an equalizer, from the ends of which are hung the inner ends of the main equalizers. The other ends of the latter are hung from the truck frames.

Westinghouse empty and load schedule KDE-4-10-16 brake equipment is used for the power brake and for braking the cars by hand a special screw type of hand brake is provided, as the ordinary type would not be suitable for spotting these cars on dumpers and in handling them about the mines where at points it is necessary to drop them down steep grades after loading. The couplers are of a special design.



The Lewis Truck

The first application of the Lamont six-wheel truck, which has just been developed by the American Steel Foundries, has been made under ten of these cars. The outstanding features of this truck are its short wheel base of 8 ft. 3 in., the arrangement of the springs and equalizing system, and the three piece bolster which uniformly distributes the load over the four points of support.

The bolster is made up of a central or equalizing member and two cross bolsters. The central bolster carries the center plate and side bearings and at either end rests on the

having A.R.A. type D heads and slots for connecting to the draft gear with 2 in. by 6 in. forged keys and cast steel yokes.

The completed cars are 10 ft. $11\frac{3}{4}$ in. high from rail to top of sides. The Class G-3 cars weigh 78,800 lb. of which 41,600 lb. represents the weight of the body and 37,200 lb. the weight of the Buckeye trucks. The Class G-4 cars weigh 78,900 lb., the body weighing 43,200 lb. and the Lewis trucks 35,700 lb. These dead weights make the ratio of revenue earning load to total weight hauled 75.3 per cent.

Scenes from the Railway Metropolis of South America



1—British Monument in Park Facing Retiro Station. 2—Mon ument to George Washington in Palermo Park. 3—Colon Park, with Railway Building at Left. 4—A Typical Subway Entrance. 5—Retiro Station, Terminus of the Central Argentine. 5—Buenos Ayres' Great Southern Station. 7—The Capitol



"El Rapido"—the Buenos Ayres-Rosario Limited on the Central Argentine

British Railways Predominate in Argentina

Most of Argentina's Lines Are Ably Operated by Britons with
British Methods and Equipment

By John P. Risque

Part I

ARGENTINA has approximately 20,370 miles of railways, most of which radiate fan-like from Buenos Ayres, and the American tourist who travels on almost any of them will find himself in the care of English railway men, for more than 75 per cent of the railways of Argentina are owned and operated by Britons.

On leaving Chile for the Argentine, Great Britain (in a railway sense) is entered immediately. The Transandine, which the traveler takes at Llai-Llai in Chile, is British throughout. At Mendoza, in the Argentine foothills of the Andes, the tourist leaves the Transandine after an interesting ride over the Andes and changes to the Buenos Ayres & Pacific, a 5 ft. 6 in. gage line, also of British ownership. The tiny Transandine train when it pulls up under the train shed at Mendoza at 7:45 p. m. alongside the waiting 20 car, double-headed Mendoza-Buenos Ayres express on the 5 ft. 6 in. gage track of the Buenos Ayres & Pacific, makes a comparison in which there is something of the ludicrous. It presents to the stranger, however, his first object lesson in gages, for varieties and extremes of which no other country excels the Argentine.

Anxious for a closer look at each car of the long train on which he expects to spend the night, the traveler will find three express cars, two baggage cars, three first-class day coaches, a dining car and 11 "dormitorios"—as the huge sleeping cars are called in that country—all resembling our own in design, with the exception of the "dormitorios," which

contain private compartments of from two to four berths each, arranged crosswise of the car. The car roofs are arched, giving the train an appearance of uniformity in its entire length.

The cars are of wooden construction; four wheel trucks seem to be in general use; wheels are spoked and have steel tires on them—they are spelled "tyres" on the requisitions; vestibules as well as the doors seem unnecessarily narrow; couplers are of the screw and hook type, and the absence of foot plates exposes them to a considerable degree under the feet of the passenger who passes from one car to another. Large buffers, supported by springs, keep the cars apart and on the start of this exceptionally heavy train the passenger will unconsciously make a mental note that the start is easy compared to the start at home, where, under similar conditions, there would be a yank and thump of the drawbar that seems to indicate the withdrawal of one end of the car.

If the traveler had not noticed the drums under the cars as he peered under them in the dark for a look at the brake equipment, he would not be aware that the train was not being controlled by air brakes; the vacuum brake system seems to handle the train perfectly. The heavy train on its way from Mendoza in the Argentine foothills to Buenos Ayres, 24 hours away, has the slope in its favor. There is sufficient difference in elevations of the two terminals of this line to enable the double-header to attain a speed of 54 miles an hour. Stations all have an appearance of neatness; they

are well painted and clean, indicating constant attention. Crossing gates are numerous and quite elaborate. The names on the stations along the line are hard to pronounce, being Spanish, but trying it is good practice. If the traveler would get the full benefit of the ride, let him write down the names of the stations as he passes them. It is likely that following such names as Monte Redondo and Tamangueyu (or easier ones like Uribelarrea) there will occur such refreshing and familiar names as Newton, Monroe or Musters. Like the sprinkling of towns whose names end in "field" all over the United States, Argentina has some 50 "villas"—Villa Adeline, Villa Dolores, Villa Trinidad; the possibilities are enormous.

If the passenger has been careful enough to avoid missing any of the names, sooner or later he will write one down that will open a train of thought and conjecture as to its origin: "Open Door"—its significance is a mystery. From his observations of the English lines so far, he may as well decide that the name has nothing to do with the railway supply market on these roads, but though this door may be ajar, allowing an occasional order to sneak through to an American firm, it is not wide open enough to let through any volume of encouragement.

As he approaches Buenos Ayres if it were not for the distinctiveness of the architecture which proclaims the entrance to a foreign city, through miles of suburbs, the American could easily imagine himself entering the outskirts of a large city at home. The terminal of the Buenos Ayres & Pacific in Buenos Ayres is a wooden affair which it is expected to be replaced some day by a permanent structure. The arrival at this station places the interested railroader in a position to make some observations in regard to the arrangements of railway stations. Stepping out of the station in which he has just arrived, he sees the passenger station of the meter gage Central Cordova fronting on the same street; adjoining the latter is the beautiful \$10,000,000 monument of the

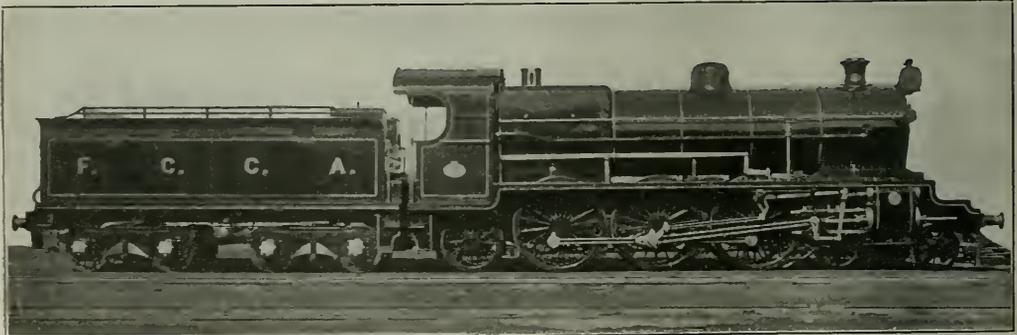
stations he will commence to get an inkling of the size of the railroad layout that confronts him. If he has less than six months in which to make a study of these railways—and nothing has as yet been said of the Argentine government's system radiating from Santa Fe in the northern province of that name—it would be advisable to single out any one of the British broad gage railways and quote his observations from that line. To all intents and purposes, his story of this line will be, to those who are unfamiliar with the details of



A Typical Crossing Gate in Argentina

the railroads and the ways of the railroad men of that country, quite characteristic of all the other railway lines.

The Retiro station is the starting point of a great 3,000 mile line. It has had lavished upon it an apparently unlimited amount of money and the brain work of engineers who seemed to have seen far ahead of the present requirements. Opened for business in August, 1915, the Retiro station's weekly record of trains in and out is 2,225, while the claim for the number of passengers handled yearly amounts to 24,000,000 incoming and outgoing. The principal dimen-



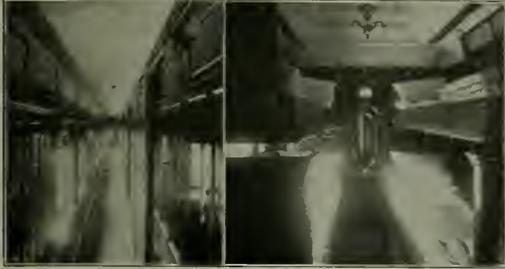
The Prevailing Type of Power in Passenger Service on the Central Argentine

5 ft. 6 in. gage Central Argentine Railway, "Retiro Station," the photograph of which is said to have been admired all over the world. As the spectacle of the three large railway stations, standing close together on the same street, gradually becomes more familiar, the question as to why they did not combine to build a common terminal, as in Washington or St. Louis, comes to the visitor's mind.

Having assimilated the situation sufficiently at these three stations, the tourist will find that further logical preparation for a trip out into the country is suggested by a visit to the other two large passenger terminals in the city—one, the Plaza Once station of the Great Western; the other, the station of the Buenos Ayres Great Southern at Plaza Constitucion. By the time the visitor gets through studying these

sions of this terminal show that the total area occupied by the main building and train sheds is approximately 800,000 sq. ft. The frontage along Avenida Maipu and in line with the other two terminals previously referred to, is 525 ft. with a glass covered carriage entrance to the ticket office which measures 200 ft. in length by 60 ft. in width and the ceiling of which is 65 ft. 6 in. from the floor. Leading from the ticket office, there is a magnificent grand hall 480 ft. long by 82 ft. wide and with 62 ft. between the floor and the ceiling. The floors throughout are laid in mosaic patterns of tile and polished concrete and the lower 7 ft. of the walls in the ticket office and grand hall are tinted in olive green. Above this belt, the walls are finished in imitation stone and the ceilings are decorated with plaster of Paris mouldings.

The dining hall measures 90 ft. by 40 ft. and has stairways leading to private dining rooms overhead, which have balconies looking out over the grand hall and the train gates which line the rear. There is also an additional dining room, called a first-class refreshment room, measuring 98 ft. by 60 ft. which corresponds to an American "lunch counter." Three of the eight train platforms measure 1,150 ft. in length; the remaining five are 820 ft. long, and all track-ends are equipped with hydraulic buffer stops. The station is complete with all facilities such as an information bureau, telegraph offices, parcel checking rooms, telephone booths, hair dressing parlors, retiring rooms and lavatories, barber



A Corridor and a Stateroom in a Central Argentine Sleeping Car or "Dormitorio"

shops, a post office and all of the miscellaneous adjuncts which contribute to the comfort of passengers.

From one end of the grand hall to the other, there is a display which is well worth the time of the railroader who would profit by the lesson of "the other man's ways." Of particular interest to the intending traveler in the country, will be found the entertaining arrangement of photographs, maps and clearly printed and understandable descriptions of points of interest out on the line, with time-tables, all of which are neatly framed and protected by glass on the "sandwich boards" distributed along the passageway. From four to six of these boards stand on either side of the ornamental, four-faced clock in front of the ticket office, with long double benches in between. Two or three of these same boards are located in front of the ticket office at the entrance; on every hand, the most interesting kind of advertising attracts the traveler. The advertisements of places are supplemented by large photographs of interiors and exteriors of the kinds of trains that will carry him. The lesson is so obvious that an American will perhaps wonder why his own lines do not try to a greater extent to capitalize in a similar manner the attractions of their own lines.

The second part of this article will appear in an early issue of the *Railway Age*.

Reduction in Western Live Stock Rates Asked

WASHINGTON, D. C.

A PETITION asking a general reduction in the advances in rates on live stock in the Western district allowed by the Interstate Commerce Commission in Ex Parte 74, and attacking the general policy of the rate-making provisions of the transportation act as applied by the Interstate Commerce Commission in that case, has been filed with the commission by S. H. Cowan, Clifford Thorne, Graddy Cary and S. C. Rowe on behalf of the National Live Stock Shippers' League, the American National Live Stock Association, the National Wool Growers, the Cattle Raisers' Asso-

ciation of Texas, the Corn Belt Meat Producers Association and the Kansas Live Stock Association. The petition particularly attacks the allowance of one-half of 1 per cent in addition to 5½ per cent as authorized by the law in the discretion of the commission. This, it is declared, is not a part of a lawful rate and is not for transportation service, but a tax against the shippers beyond the power of Congress or the commission. The amount allowed to the railroads of the Western district as a whole by reason of the addition of one-half of 1 per cent to the return proposed to be provided by the new rates, the petition says, amounts to \$40,500,000 per annum. A reduction in the rates is asked by the amount of one-half of 1 per cent, which, it is declared, would effect a reduction of 30 per cent in the Western group and 20 per cent in the Mountain group of the advance allowed. It is also asked that a maximum advance in cents per 100 lb. shall be fixed by the commission. A large part of the petition is devoted to a showing as to the unfavorable condition of the live stock industry, which is said to be aggravated by the high rates.

It is alleged that the effect of the advance is to permit some railroads to earn in excess of 6 per cent on their value for the creation of a general railroad contingent fund and to provide for a reserve fund which is declared to be an unlawful, unjust and unreasonable basis of making rates, compelling the shippers to pay in addition to the reasonable rate for the service performed an unjust tax. The petition says the rates were made unreasonable by the percentage of advance and the complaint is directed to the advance rather than to the specific rates. It is stated that the petitioners will ask of the commission a special ruling allowing the case to proceed as against the principal Western systems and their subsidiaries for the purpose of determination of the issues in the case on the ground that the great bulk of the live stock traffic in the Western district is carried by the principal systems of railroads which will earn and do earn in excess of 6 per cent of their fair value.

It is asserted that no value of such systems was found by the commission nor was any basis named upon which the sum could be estimated. For this reason the position is taken that the shipper is deprived entirely of his right to reasonable rates "if this enormous advance is to be made to meet alone the requirement that the aggregate earnings of the Western district shall equal 6 per cent on an aggregate value of all lines at the excessive figures used in Ex Parte 74 as the basis of the calculation, without any basis of value of the system or systems of roads, which the shippers must use or quit business, as many will be compelled to do because of the conditions herein detailed, coupled with these exorbitant rates on live stock, feed and farm products." The petition asserts that in rendering its rate decision the commission was not acting in accordance with the provisions of the law, which required that rates shall be just and reasonable and that the requirements of the law as the commission construes it are impossible to carry out, "as has been proven by operation since August 26 because traffic is insufficient and the expenses of operation are too great."

The commission never having found what should be taken as the valuation of the properties separately, the petition asserts, there exists no basis for the advances of 25 and 35 per cent in the Western district, and it is also asserted that the valuation used by the commission for the district as a whole exceeds the value of the railroads by \$25,000 a mile.

TRANSPORTATION COURSE AT COLUMBIA.—Government regulation and operation of railroads will be dealt with in a course in railway traffic management to be given by the Department of Extension Teaching, Columbia University during the spring semester.

Freight Car Loading

WASHINGTON, D. C.

THE FREIGHT CAR LOADING, according to reports compiled by the Car Service Division of the American Railway Association, continued to decline during the week ending February 5. The total number of cars of revenue freight loaded was 696,997, as compared with 699,936 during the week before and 762,680 for the corresponding week of 1920, but it was greater than for 1919 or 1918, when the figures were 692,614 and 686,621, respectively. The coal movement loading shows a decrease of over 20,000 cars as compared with the previous week. The summary follows:

have been reported. The lessening demand for open cars is one of the prime factors in stimulating the return of such equipment to the home roads, and an unusually large percentage of this equipment is returning home in bad order. This should be a period of rehabilitation; a definite car repairing program at this time is most necessary if the heavy transportation demands of the near future are to be satisfactorily met.

Flat Cars.—Requirements have practically been protected. Surplus cars should be sent to owning lines in accordance with Car Service Rules.

During the period since the car shortage has given way to a large car surplus there has been more or less friction

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS
Summary—All Districts, Comparison of Totals This Year, Last Year, Two Years Ago, for Week Ending Saturday, February 5, 1921
Total revenue freight loaded Received from connections

Districts	Year	Grain and products	Live stock	Coal	Coke	Forest products	Ore	Mdse. L. C. L.	Miscellaneous	Total revenue freight loaded			Received from connections			
										This year	Corresponding year 1920	Corresponding year 1919	This year	Corresponding year 1920	Corresponding year 1919	
Eastern	1921	5,222	3,372	42,008	1,922	8,459	722	44,811	55,887	162,403	.....	.....	.....	187,294	.....	.....
	1920	4,817	2,832	45,409	3,617	7,236	1,881	28,883	75,881	.....	170,556	167,852	.....	216,139	191,208	.....
	1919	2,207	3,131	48,388	6,103	3,645	2,823	35,015	43,883	145,195	.....	.....	.....	98,241	.....	.....
Allegheny	1921	2,628	3,121	41,114	3,894	3,932	2,125	34,565	55,796	.....	147,875	150,862	.....	108,214	129,482	.....
	1920	161	123	14,769	159	1,504	56	2,712	8,005	24,492	.....	.....	.....	13,287	.....	.....
	1919	173	120	19,211	685	1,754	270	130	9,067	.....	31,410	27,844	.....	18,119	20,123	.....
Pocahontas	1921	3,681	2,133	22,804	574	13,165	1,333	32,705	33,882	110,276	.....	.....	.....	62,969	.....	.....
	1920	3,779	2,458	24,836	216	16,314	2,476	19,471	53,779	.....	123,329	106,039	.....	78,517	65,088	.....
	1919	1,902	1,136	6,022	1,256	17,703	1,219	23,584	26,530	96,350	.....	.....	.....	44,044	.....	.....
Southern	1921	9,825	8,448	14,225	1,196	19,459	1,784	18,929	38,694	.....	112,563	94,411	.....	60,139	45,587	.....
	1920	10,125	11,494	16,980	303	3,019	1,967	27,583	29,766	101,237	.....	.....	.....	43,258	.....	.....
	1919	9,450	10,385	23,355	392	4,576	2,780	21,681	41,836	.....	114,632	96,662	.....	67,028	56,087	.....
Northwestern	1921	4,579	1,888	4,946	64	6,571	381	15,811	22,804	57,044	.....	.....	.....	46,767	.....	.....
	1920	3,918	2,897	7,481	15	2,085	601	15,174	25,034	.....	62,315	48,944	.....	51,298	43,737	.....
	1919	36,775	31,277	155,917	10,381	54,066	8,501	182,221	217,759	696,997	.....	.....	.....	495,860	.....	.....
Central Western	1921	34,593	30,261	176,511	10,125	60,356	11,917	138,833	300,084	.....	762,680	.....	.....	599,454	.....	.....
	1920	5,902	29,948	149,868	.....	56,568	15,332	.....	110,244	.....	.....	692,614	.....	.....	551,312	.....
	1919	2,282	1,016	.....	256	.....	.....	43,388	.....	.....	.....	.....	.....	.....	.....	.....
Southwestern	1921	30,654	29,948	.....	.....	6,290	3,416	.....	82,325	65,683	.....	.....	.....	103,594	.....	.....
	1920	6,221	1,329	6,049	10,381	.....	.....	182,221	.....	4,383	.....	.....	.....	.....	.....	.....
	1919	.....	.....	.....	2,502	6,831	.....	.....	192,485	.....	.....	.....	.....	55,452	.....	.....
Total all roads	1921	36,775	31,277	155,917	10,381	54,066	8,501	182,221	217,759	696,997	.....	.....	.....	495,860	.....	.....
	1920	34,593	30,261	176,511	10,125	60,356	11,917	138,833	300,084	.....	762,680	.....	.....	599,454	.....	.....
	1919	30,654	29,948	149,868	.....	56,568	15,332	.....	110,244	.....	.....	692,614	.....	.....	551,312	.....
Increase compared	1920	2,182	1,016	.....	.....	.....	.....	43,388	.....	.....	.....	.....	.....	.....	.....	.....
Decrease compared	1920	.....	.....	20,594	.....	6,290	3,416	.....	82,325	65,683	.....	.....	.....	103,594	.....	.....
Increase compared	1919	6,221	1,329	6,049	10,381	.....	.....	182,221	.....	4,383	.....	.....	.....	.....	.....	.....
Decrease compared	1919	.....	.....	.....	.....	.....	.....	.....	192,485	.....	.....	.....	.....	55,452	.....	.....

L. C. L. merchandise loading figures for 1921 and 1920 are not comparable, as some roads are not able to separate their L. C. L. freight and miscellaneous of 1920. Add merchandise and miscellaneous columns to get a fair comparison.

January 29	39,630	32,668	162,652	9,749	53,677	7,693	179,123	214,844	699,936	803,332	718,297	499,184	589,838	577,709
January 22	.....	.....	.....	.....	.....	.....	176,581	207,804	703,115	204,866	734,293	491,640	539,000	608,750
January 15	.....	.....	.....	.....	.....	.....	173,500	207,860	709,888	840,524	758,669	509,708	627,293	609,250
January 8	39,690	31,494	190,284	11,479	42,982	10,717	169,093	210,674	706,413	830,673	723,801	492,817	596,859	543,265

In a summary of general conditions as of February 14, the Car Service Division says:

Box Cars.—Requirements for box cars are being satisfactorily protected. Reports indicate improved demand for this equipment, surplus box cars for week ending January 31st showing a decrease for the first time since the surplus developed. Special attention should be given to the return of grain cars to their owners to avoid a shortage of cars in this service.

Auto Cars.—Cars should be disposed of in accordance with Car Service Rules. Where loaded with freight other than automobiles, care should be exercised to avoid commodities which leave a residue which will damage the finish of autos when later used in that service.

Stock Cars.—Practically all requirements being protected. Surplus cars should be disposed of according to Car Service Rules.

Refrigerator Cars.—There is an adequate refrigerator car supply in all sections. There is quite a fair movement of perishables from Florida and California, principally citrus fruits. Our information is that potatoes are still being quite generally held back in potato producing sections on account of unfavorable markets. Railroads are still permitted to load refrigerator cars with suitable non-perishable freight in the direction of the empty movement.

Open Top Cars.—A very decided improvement has been noted during the past few weeks in the movement of open top cars under the Car Service Rules. There exists on the part of most of the railroads a disposition to interpret and apply the rules liberally and this has resulted in minimizing to a large extent such temporary difficulties as

between railroads as to the disposition of empty cars and almost as great a scramble to avoid the necessity for paying per diem on idle cars as there was formerly to obtain possession of cars which could be loaded. To meet this condition, the Car Service Division has announced in a bulletin to all railroads that reciprocal arrangements are being made between certain railroads for the storage of surplus cars where the equipment is not needed by the owner and where facilities permit holding the cars, per diem being waived while cars are held out of service.

Empty Car Mileage

By this arrangement there is saved the expense of empty mileage for the return of cars to owners, with the prospect that loading may develop for the cars a little later or in the direction of the home road.

"In view of the fact that many roads have now on their rails ample number of home cars for local needs and to fully supply the repair forces," the circular says, "it is our recommendation that consideration be given to making arrangements of this kind wherever the conditions justify. A plan of this kind does not conflict with car service or per diem rules, and where it results in the mutual reduction of transportation expense it would certainly seem highly desirable under present conditions to encourage the practice."

The number of surplus freight cars continues to increase. For the week ending February 8 the average was 358,065 as compared with 324,186 the previous week.

The percentage of home cars on home lines on February 1 had reached 58.9. On March 1, 1920, when the roads were returned by the government, 21.9 per cent were at home.

Employees Seek to End National Agreements Case

B. M. Jewell Asks Labor Board to Refer Dispute Over Working Rules to Joint Conference

B. M. JEWELL, appearing before the Railroad Labor Board at Chicago on February 17 in the resumption of hearings in the controversy over National Agreements, asked that the Board take the following steps immediately:

"First: That the Board refer the National Agreements which are now before it to a joint conference of the representatives of the railroads and of the labor organization with the recommendation that their disagreements be adjusted by negotiation as soon as possible—the Board agreeing to pass immediately upon any points of difference which may arise from the negotiations.

"Second: That the Board request the representatives of the railroads and representatives of the labor organizations to meet the Board in conference to consider the establishment of boards of adjustment as contemplated by the Transportation Act.

"Third: That in reply to Mr. Atterbury's notice to the board and his subsequent letter to the chairman advising him that he contemplates filing a flood of individual complaints to reduce the wages of unskilled employees, the Board recommend to Mr. Atterbury that he meet in general conference with the representatives of the employees affected so that the existing General Agreements will not be impaired and the matter brought to the board in the form of a single complaint."

Mr. Jewell declared his constructive proposals were brought forward with the following objects in view:

"1. To insist upon the fundamental principle of collective bargaining which is now the real issue before the Board in our pending cases.

"2. To expedite the cases which otherwise will absorb a vast amount of time and effort.

"3. And to restrain Mr. Atterbury and the railroads from preventing the proper functioning and destroying the effectiveness of this Board by flooding it with a large number of individual complaints which it cannot handle."

Mr. Jewell also asked that a conference be called immediately between the railroad labor chiefs in Chicago and the members of the Association of Railway Executives who are meeting in Chicago on February 18.

"We do not wish to perpetuate any unreasonable rules or working conditions," Mr. Jewell asserted. "We do not wish to cause the railroads unreasonable expense. We shall not now advocate—and never have supported—any rules that do this."

"In closing, I wish to emphasize the fact that we are not asking you to render a decision. Neither are we requesting that you secure the consent of the railroads to the procedure we suggest. It is clearly within the province of the Board to make a recommendation even on its own motion. We are asking you to make these recommendations because of the fundamental principles involved in the pending cases to which the question of the propriety or reasonableness of certain rules is secondary, and in order that the work of the Board may be accelerated and the status and functions of the Board conserved."

Mr. Jewell presented as an alternative the necessity for postponing the case until March 14 to allow time for the preparation of a reply to the carriers' presentation.

Atlanta, Birmingham & Atlantic Case Continues

The efforts of the Atlanta, Birmingham & Atlantic to secure authority to reduce the wages of its employees below

the rates set by the Board's decision of last July have attracted more attention, the case coming before the Board simultaneously with the introduction of General Atterbury's evidence in the National Agreements hearings outlining the precarious financial condition of many of the carriers. The case is also viewed with interest inasmuch as the rulings of the Board in this case will undoubtedly establish precedents which will serve to guide the Board, the carriers and the labor organizations in preparing, submitting and arguing future cases of this character. It is not, however, considered in the light of a test case by railway executives.

The opening of the case was described in the *Railway Age* of February 4, (page 319). The carrier had ordered a cut in the wages of its employees effective on February 1 because of its inability to meet its operating expenses. Despite drastic reductions in working forces and in train service the carrier was losing about \$100,000 a month. The employees objected to the wage cut and, when conferences were held between their representatives and representatives of the carrier, a controversy arose as to whether the wage reduction could be made effective, under the terms of the Transportation Act, pending a decision by the Labor Board. The representatives of the carrier held that the wage cut was unavoidable and would have to be made on the date announced even though the Board had not reached a decision on the employees' appeal. The employees held that the existing rates of pay should be continued until the Board had made its ruling.

When the case came before the Labor Board on January 25, the employees refused to present evidence in the case until the Board had instructed the carrier to rescind its wage cut order. The representatives of the carrier after presenting voluminous evidence showing the financial condition of the road, held that they had not violated the spirit or letter of the Transportation Act in cutting their wages first and then coming before the Board. Subsequently the Board passed a resolution upholding the employees' contention and ordering the carrier to rescind its wage cut order. This resolution was reproduced in full in the *Railway Age* of February 4, (page 319).

Hearings in the Atlanta, Birmingham & Atlantic case were completed on February 15, both sides closing their presentations. The Board then took the case under advisement.

Another case similar in many respects to that of the Atlanta, Birmingham & Atlantic was also brought before the Board on February 15. The Missouri & North Arkansas, through an order issued by the receiver of the road, C. A. Phelan, reduced the wages of its employees on February 1. The employees protested to the Board and as a result the case was docketed. In the meantime the employees of the road walked out and their places have been filled with "imported labor."

Mr. Phelan in making his presentation on behalf of the carrier took the position that the carrier is not legally before the Board because, not being a party to the controversy which ended with the Board's decision number 2, it has never been heard on the subject of wages and has not therefore violated the Board's award in reducing the wages of its employees. The rates of pay fixed by decision number 2 had been applied on the Missouri & North Arkansas only on the condition that the road could earn enough to pay them. M. C. Carry and Charles MacGowan, appearing in the case on behalf of employees, asked the Board to refuse to hear the case because the company had violated the Board's ruling by

putting into effect a wage cut without authority from the Board.

The urgency of the Atlanta, Birmingham & Atlantic and the Missouri & North Arkansas cases has caused the Board to hold extra sessions during the vacation from consideration of the National Agreements case. The evidence of the employees and representatives of these two roads being completed, February 17 was set as the date upon which hearings in the controversy over the National Agreements would be resumed.

W. S. Carter Presents Employees' Case

The case was reopened on February 10 when E. P. Curtis, vice-president of the Order of Railway Conductors, and W. S. Carter, president of the Brotherhood of Locomotive Firemen, presented the employees' side of the controversy. Mr. Carter attacked as irrelevant the carrier's contention of inability to pay the existing rates as justification for the wage cut. The financial condition of the road was a subject for the consideration of the Interstate Commerce Commission and not the Labor Board, according to Mr. Carter. In discussing this phase of the controversy, Mr. Carter stated that the application of the consolidation provisions of the Transportation Act would eliminate the financial difficulties of the carrier and that in his opinion the Atlanta, Birmingham & Atlantic would be consolidated with the Louisville & Nashville.

B. L. Bugg, president of the Atlanta, Birmingham & Atlantic, replied to Mr. Carter's statements by reiterating that the financial and operating statistics and evidence presented to the Board at the session on January 25 dealt only with the road's inability to pay the wages fixed by the Railroad Labor Board.

The hearings in this case were continued in the evening of the same day, and Chairman Barton, in opening the extra session, pointed out to both the carrier and its employees that the Transportation Act empowers the Board to fix just and reasonable wages upon seven considerations and suggested that the additional evidence presented to the Board in this case deal, as far as possible, with these seven considerations. The representatives of the carrier reiterated their position, i. e., that the road cannot continue to operate unless its payroll is reduced.

The hearings were continued on February 14, when Mr. Bugg, acting in accordance with Chairman Barton's suggestion presented a large amount of data regarding the decline in the cost of living in the territory served by his line and the wages paid for similar work in outside industries. This data showed that, whereas the road is asking for reductions of from 20 to 25 per cent in its wage rates, the cost of living has decreased about 33 per cent. Similarly the wages paid in outside industries have decreased from 25 to 50 per cent while the road's wage scales have remained unchanged. Representatives of the employees protested the introduction of this new evidence without avail, inasmuch as Chairman Barton had specifically requested the presentation of such evidence.

Board Halts Erie Wage Cut

Following the precedent established in the Atlanta, Birmingham & Atlantic case the Board issued an order on February 14 directing the Erie to rescind its recent order reducing track laborers' wages, re-establishing the seven day week for train dispatchers and deducting the January 31 earnings of telegraphers. The order was to have been effective on February 1. The United Brotherhood of Maintenance of Way Employees and Railroad Shop Laborers and the American Train Dispatchers Association filed a complaint with the Board, and the following resolution was passed by the Board as a result:

I

Resolved, in case of disputes which have arisen between the Erie Railroad and its employees by reason of the said railroad having reduced the wages of track men to 30 cents per hour, effective February 1, and having ordered that train dispatchers work 7 days per week without relief and having ordered the deduction of January 31 earnings of telegraphers whether they work or not on that day, that objection having been made by the United Brotherhood of Maintenance of Way Employees and Railroad Shop Laborers and by the American Train Dispatchers' Association and a dispute having arisen in regard to the proposed reduction and deduction and the matter having been brought before this Board, the Board decides that no change of any kind in the rates of pay or in the rules and working conditions shall be made, except by agreement between the parties, until the disputes are heard and opportunity given for this Board to decide. The Board will proceed with the further hearing and consideration of these disputes and sets February 23, 1921, as the date of such presentation of evidence and arguments as the parties may desire to offer.

The Board suggests further conference between the parties and an effort on their part to agree upon a settlement.

II

Whereas, this Board having reason to believe that Decision No. 2 of this Board has been violated by the Erie Railroad in that the said carrier on or about January 31, 1921, directed the reduction of wages of the trackmen, employees of the said carrier, to 30 cents per hour, contrary to Article III, Section 6, of Decision No. 2 of this Board, and also having directed the deduction of January 31 earnings from the January earnings of all monthly rated employees and of all daily rated employees classified as monthly rated employees prior to Decision No. 2 of this Board.

Resolved, that pursuant to Section 313, Transportation Act, 1920, notice be given to the chief executives of the Erie Railroad and to the organizations of employees directly interested in such orders of the said carrier of a hearing to determine whether in the opinion of the Board a violation of the decision of this Board has occurred.

The Board sets February 23, 1921, as the day of the hearing.

Board Decides Norfolk & Western Dispute

The dispute between the Norfolk & Western and its conductors and trainmen, reported in the *Railway Age* of January 7, (page 126) and of January 14, (page 202), was ended by the Board in a decision dated January 29 and announced on February 14. There were 25 points in controversy in this case, 13 of which were decided by the Board in favor of the carrier and 10 of which were dismissed either because of lack of jurisdiction or improper presentation. But one point was decided in favor of the employees and one point was dismissed with recommendations for further negotiation.

The Board held that the railway was within its rights and complied with the provisions of Supplement 25 to General Order No. 27, in changing the home terminal from Columbus, Ohio, to Portsmouth. The employees objected to this on the ground that it was arbitrary and designed to inconvenience them. The railroad was sustained also in the employees' request for reclassification of service, which, if granted, would have the effect of increasing the present rates of pay for "shifter" and "mine run" service. On the subject of yardmen's seniority, in which the union leaders asked for a new rule that "when a foreman forfeits seniority as such as provided in Section (e) he may displace any junior helper," the Board denied the request, with the explanation that the existing rule and practice is just and reasonable. Discrimination between white and black workers was not recognized by the Board, which denied the employees' request for a new rule as follows:

"Any vacancies occurring in the ranks of yardmen will be filled with promotable men. This in no way to interfere with the rights of yardmen in the service of the company. The or-

ganizations represented in this agreement will be insured not less than 85 per cent of the men employed in the yard, and will be given preference in the employment of yardmen available."

Testimony during the hearing of the case showed that "promotable men" meant white men, since no white man could be expected to give place to a negro superior, and that the request for 85 per cent Brotherhood of Railroad Trainmen in the yards' employees was to exclude many negroes from the yards, since they are not eligible for union membership.

Among the other points in the controversy decided in favor of the carrier are the following:

Controversy over rates of pay in branch line service, i. e., the proper application of the provisions of Supplement 16 to General Order 27 of the Railroad Administration.

The request for a new rule in the trainmen's schedule regarding the "duration of agreement."

The request for a new rule stating that yardmen riding cars on hump yards will not be required to control more than one car unless they are coupled.

The request for a new rule giving preference in filling switchtenders' positions to former yardmen and trainmen.

The request that yardmen handling work or wreck trains in yard limits be paid yard rates instead of road rates.

The request that a self-propelled clam shell used on main track by masonry forces be classed as a work train.

The employees' request for a rate to be incorporated in the trainmen's schedule for baggagemen handling express was decided in favor of the employees.

Some Suggestions on Office Correspondence Filing

General, Unit and Sub-Files and File Book for Cross Reference Facilitate Locating Letters

By Grant Gibson

IS YOUR CORRESPONDENCE file a real file system or a fill system? When you need a particular file, can you put your hands on it immediately or do you "dig," and if so, how much time do you lose in "digging?" When you call for a file, does your file clerk bring you the entire subject file or the individual piece you need?

One railway officer termed his correspondence file "a barrel system" and by way of explanation added that from the difficulty he had in getting the proper file quickly, he assumed all the correspondence was thrown into a barrel and his file clerk had to burrow into it every time a file was called for.

The file is the heart of office organization, and with a weak heart the office cannot function properly.

The system described in the following was put into effect

number as a suffix in addition to the general file number.

As example, refer to sketches given in Figs. 2, 3 and 4. The subject file in Fig. 2 is "Engine Failures." It is given general file number 1 and the first engine failure is given suffix number 1, making this unit File 1-1; the second failure is given suffix number 2, or File 1-2, etc.

"Accidents to Trains" is the subject in Fig. 2 and this is given general file number 2.

Each subject has a general or prefix number and each case coming up under the subject is given an individual number.

Recording of Files, Incoming Mail

To be a first-class file clerk, a man must have a good memory. On the other hand, a first-class file system is one

The diagram shows a rectangular file book layout. The top edge is labeled "15" and the right edge is labeled "6". The layout consists of a grid of small squares. The top row of the grid is divided into three main sections: "Received" (left), "Sent" (middle), and "File No." (right). Below these sections are several rows of smaller squares, representing individual file entries. The "Received" section has 10 columns, the "Sent" section has 10 columns, and the "File No." section has 1 column.

Fig. 1

in a master mechanic's office; it has since become a standard in all mechanical department offices on the road, including that of the superintendent of motive power, and doubtless the ideas presented would prove of value in other departments.

In addition to absolutely solving filing difficulties, this standardization has many virtues. It permits of transfer of file clerks from one shop to another, makes it much easier in the event of a transfer of chief clerks, and last but not least, makes for economy in stationery and printing. The file book is standard and the file boxes are standard. For permanent storage of old files, a cheap, heavy, telescopic cardboard box is used.

The Unit System

A unit file system does away entirely with "generalities," as it gives to each batch of correspondence an individual

that does not tax the clerk's memory. Therefore a "fool proof" system necessarily requires written records.

The mail should be opened by the file clerk, stamped with a dating stamp and immediately entered. The clerk quickly becomes familiar with his general numbers and where the correspondence is voluminous, he usually first marks his general file number on all the mail (using a colored pencil) and next sorts numerically, in sequence, by this number. He is now ready for entries.

The index tags, as shown in Fig. 5, show the file number and subject. Having already marked his general file number, the clerk quickly turns to the corresponding number on the tag. The clerk enters the date of the letter and, by abbreviation or initial, from whom received is noted in one of the squares allotted for this under the caption "received" at the left hand side of the file page.

He uses the wider space to the right of the "sent" space

for miscellaneous information such as car number, locomotive number, date, location, division, etc. This gives the advantage of quick location of specific cases. Figs. 2, 3 and 4 give examples of this. The large space on the right of the sheet allows an opportunity to give brief information as to the sense of the letter. On the right is the general file number and the unit number, which unit is marked on the correspondence in the ordinary way.

The numbers applied are the permanent identification mark for this piece of mail and any subsequent letters sent

File 1-1: A letter from the general manager dated November 25 was received, pertaining to the failure of engine 200 at Marion, Ohio, on November 23, on account of a bursted flue. A letter was sent to the master mechanic on November 27, that he replied on December 1 and the case was closed out to the general manager on December 3.

File 1-2: Received letter from general manager November 27, wrote master mechanic November 29, received reply December 1, but case not closed out to general manager as no entry is made under "Sent" for general manager. Thus al-

Train Delay and Engine Failures - Division No.1.									
Received		Sent		Eng. No.	Date	Location	Cause	File No. 1	
11-25	11-30	11-27	12-3	200	11/23/20	Marion O.	Bursted Flue	1A-1	
GM	MM	MM	GM	300	11/25/20	Dayton O.	Hot Driving Box	1A-2	
11-27	12-1	11-28		400	12/1/20	Cincinnati O.	Hot Trailer Box	1A-3	
GM	MM	MM							
12-3									
GM									

Fig. 2

out are marked with this same number, in addition to which a small rubber stamp is used which reads "In answering this letter, kindly refer to file number" Before long the majority of letters on old subjects which come in have a file reference which simplifies the clerk's work.

While the clerk is entering, he sorts the mail in two baskets, one for the new cases just coming in, and the other for "look ups"; that is, referring to a case on which there are some previous papers. When all the letters are entered he takes his "look ups," secures his papers from the files, attaches them to the new letter, places these cases with those of new cases and places the entire lot on the chief clerk's desk for perusal, disposition, etc.

This, at first hand, may appeal to the reader as a slow process, but in the office of the superintendent of motive power on one of the largest mid-west railroads it consumes only from one and one-half hours to two hours each morning, so by 10:00 a. m. the chief clerk has the day's mail before

most at a glance the file clerk can tell just how the case stands.

Filing

Two sets of file boxes are used, one for closed files and one for open files, or files on which an answer is expected. The closed file simply consists of one file box for each general file number and the units are filed numerically therein, the lowest number being on the bottom, this to permit of ready access to papers as one usually refers to the latest cases.

The outside of the file box contains a small receptacle in which a card is placed. The card identifies the box thus:

File No. 1
From No. 1 to

As the box is filled, the number of the last unit is written on the card and the box is ready for storage. The open file can usually be handled in one box. This is handled numeri-

Accidents to Trains - Division 6.									
Received		Sent		Eng. No.	Train No.	Date	Location	Cause	File No. 2
11-22	11-28	11-25	11-29	1001	102	11/19/20	Sandusky	Eng. Derailed - Broken Track	2-1
S	MM	MM	S	4002	105	11/21/20	Cleveland	C.B. & Q. 150123 - Derailed - Broken Flange	2-2
11-25	11-29	11-26		1005	36	11/29/20	Dayton	Collision	2-3
S	MM	MM		1123	57				

Fig. 3

him, and he rarely finds it necessary to go back at the file clerk for additional papers.

Outgoing Mail

The outgoing mail is sent out three times a day: namely, 11:30 a. m., 3:00 and 5:00 p. m. This mail is collected by the office boy, who encloses the originals and turns over to the file clerk all carbons as well as closed cases and statements that have served their purpose. On new cases, the file clerk sets up new file numbers, but on old cases he has the file reference on the letter. In entering the old case, he merely puts the date and to whom sent under the caption "Sent." On new cases, he enters under the same heading and fills in the entire item in the same manner as described in "Incoming Mail." Thus a complete written record is maintained.

A moment's study of Fig. 2 reveals:

cally also, filing, first by general file number, then by unit number. The advantage of the open file is to permit of tracing for answers and for a ready reference when matching up incoming mail. The open files are usually kept on the file clerk's desk.

Cross Filing

The greatest bugaboo encountered in a subject file is brought about by one letter referring to more than one subject. As example, refer to Fig. 3, the second item, File 2-2, in which C. B. & Q. car 150123 is concerned. This case naturally is entered under "Accidents to Trains" as the car was derailed. Months hence, an inquiry relative to this car may come in with no reference to its being in an accident. To guard against inability to locate entry of this kind, two entries are made in the file book, the first under accidents and the second in the "Foreign Car" section of the file book

but it would also carry a mark "Circular Letter X-1." Each circular issued demands an acknowledgment.

All papers pertaining to this letter are filed under the circular letter number and cross filed to the subject covered, one copy of the circular letter (without any attachments) being filed in a separate box. By this method, the file clerk has three means of locating his file.

The foregoing describes the system as it has been applied in the mechanical department, but the application of it could be made general in railroad practice. A study of the particular subjects in the various departments for the purpose of applying general file numbers is all that is necessary.

Gasoline Explosion at Memphis*

ON JANUARY 24, 1921, vapors from a tank car of gasoline on the Union Railway spur on Front street, Memphis, Tenn., became ignited and resulted in a blast that killed 11 people and badly injured 19 others. Probably 40 or 50 men, women and children received slight injuries from falling debris or from burns. The explosion wrecked an oil plant, levelled a block of frame buildings and broke window panes within a radius of five blocks, the estimated loss being \$200,000.

The gasoline contained in the car was a volatile product known as absorption gasoline with a gravity of 81.5 deg. Baumé, initial boiling point of 80 deg. F. and end point of approximately 360 deg. F. The car was spotted on Saturday, January 22, and the following Monday morning, January 24, a negro workman at the plant opened the tank car without relieving the pressure within. The pressure of vapors that existed in the car is not known although it has been said that the relief valves had been giving off vapors previous to this time. This statement has not been verified but



Fig. 1. View Showing Dangerous Fire Following Explosion of a Tank Car of Gasoline

probably there was a pressure of nearly 25 lb., at which the valves popped. The removal of the dome cover resulted in the sudden relief of pressure and gasoline vapor and liquid gasoline boiled out of the dome head in large quantities. The wind from the west in carrying these vapors across the street, mixed them with air and formed readily ignitable mixtures. The vapor became ignited by open fires in the frame buildings on that side of the street and instantly there was a terrific explosion which demolished every house on the west half of that block, as well as destroying buildings

*The account of this explosion is taken from a special bulletin issued by the Bureau of Explosives and the report of an investigation conducted by the Department of the Interior, Bureau of Mines.

in the blocks north and east. This explosion was followed by a second and more muffled one which was made by the flame flashing back to the tank car where vapors issuing from the dome caught fire and burned as they came out. The damage on the west side of the track in the oil plant itself was due largely to the fire that followed. This fire caused the destruction of a garage containing four automobiles, the ruin of a warehouse of sheet iron construction and the loss of several hundred barrels of oil and grease stored therein. These drums of oil caused several minor explosions and, upon breaking, burned with intense heat.

To add to the danger of the fire, there were seven 11,000-



Fig. 2. Wreckage of Homes in Immediate Vicinity of Explosion

gal. tanks filled with gasoline and kerosene, which stood opposite the garage in the oil plant, and five more tanks elevated against a concrete wall at the west side. A second car of absorption gasoline, spotted at the same time as the one which exploded, was vented and the escaping vapors burned as shown at A, Fig. 10. The storage tanks also were vented at the top with nipples enclosing wire gauze and as vapors formed and passed out of these vents into the air, they burned quietly. Neither the second tank car nor any of the tanks, shown in the background of Fig. 2, were damaged in any way. It is interesting to note that after the fire had been extinguished, the car from which the explosion originated was still about half full of gasoline. The car was damaged only slightly and the wooden foot boards were only partly burned.

The serious results of this explosion demonstrate once more the need for ceaseless vigilance in handling tank cars of gasoline or other volatile liquids which may explode. In handling gasoline, the Interstate Commerce Commission regulations require that a car, when loaded, must have a certain voidance above the gasoline. This voidance is to take care of any expansion of the liquid which may occur if it becomes heated in transit. Safety valves are provided which will relieve any pressure above 25 lb. within the car. These valves should always be opened before the tank car is unloaded. In case pressure develops, the car can be sprayed with water and the resultant cooling will condense the greater part of these powerful vapors, thus reducing the pressure measurably.

Another way to relieve the pressure is by leaving the valve open and allowing the gas to dissipate slowly. In addition, there are in the dome cover several holes above the threads which will allow the escape of vapors before the cover is entirely removed, thus warning a man when there is pressure within. In no case should the dome cover be removed until this pressure is relieved.

Hearing on Burlington and Lackawanna Financing

Interstate Commerce Commission Hears Oral Arguments on Proposals to Capitalize Expenditures from Surplus Earnings

WASHINGTON, D. C.

THE INTERSTATE COMMERCE COMMISSION enjoyed a brief respite on February 14 and 15 from its usual procedure of listening to the "hard luck" stories of needy railroads by turning its attention to the problems of two of the most successful and prosperous companies, the Chicago, Burlington & Quincy and the Delaware, Lackawanna & Western, that have applied to the commission for authority to capitalize improvements and extensions made during past years out of surplus earnings and to distribute the new securities or their proceeds to the stockholders. The applications have been under consideration for some time by the commission's Bureau of Finance and its Division 4, consisting of Commissioners Daniels, Eastman, Meyer and Potter, and both hearings and arguments had been held before the director of the Bureau of Finance, but it was announced on February 10 that the two cases had been assigned for oral argument before the commission itself and that discussion was desired of the following questions among others:

1. To what extent, if any, should the applicant be permitted to capitalize its surplus (a) into stocks, (b) into interest bearing obligations?
2. In what way will granting the application benefit, or, denying it, injure (a) the applicant, (b) any other common carrier, (c) the public?
3. What special or emergency features are there in the application which would warrant exceptional treatment in granting or denying it?

As these are the first cases since the commission opened its finance docket to go to the full membership of the commission, their assignment for special argument was taken to indicate a difference among the members of Division 4, but the cases also represent the most important that have come before the commission under its new function of regulating the issuance of securities. The questions asked by the commissioners during the argument indicated no particular hostility to the proposals of the two carriers but it was apparent that some of the commissioners desired a full discussion as to one or two points involving the relation of the applications to the specific requirements of the statute. There were no signs that the commissioners were particularly impressed by the arguments advanced by the representatives of the Nebraska state commission that the possession by the Burlington of a large surplus is evidence of excessive rates or that it constitutes a trust fund belonging to the public, but questions were asked intended to bring out clearly what benefit the Burlington would derive from the plan of financing proposed as distinguished from the benefits to be derived by the Great Northern and Northern Pacific companies, its two principal stockholders, that desire the proposed dividend from the Burlington to help retire the joint 4's which mature on July 1.

The argument in support of the Burlington application was made by Hale Holden, president of the Burlington, and by C. W. Bunn, general counsel of the Northern Pacific and E. C. Lindley, general counsel of the Great Northern. The application was opposed by John E. Benton, general solicitor of the National Association of Railway and Utilities Commissioners; Hugh LaMaster, assistant attorney general of Nebraska, and B. C. March, executive secretary of the Farmers' National Council.

Arguments for the Burlington Application

The Burlington's application is for authority to create a new general mortgage and to issue \$109,000,000 of 50 year, 6 per cent bonds, of which \$29,000,000 would be held in

the treasury and \$80,000,000 sold to provide funds for a cash dividend. The company also asks authority to issue \$60,000,000 of additional capital stock as a stock dividend and it has been stated that the rate of dividend would be reduced from 8 per cent to probably 6 per cent.

Mr. Holden made the opening argument outlining the history of the Burlington and the facts in the case. He pointed out that the acquisition of the Burlington by the two northern lines in 1901 had accomplished the same purpose as an extension of the Burlington to the Pacific Coast and an extension of the northern lines to Chicago and the great markets of the Burlington territory, and was, therefore, a logical development, the wisdom of which has been demonstrated by its success. The Burlington then proceeded with a program of intensive development of its own property, which has now reached a mature condition under honest, efficient and economical management. The capitalization has not been increased, but has been actually reduced and a surplus has been accumulated wholly beyond any need of a surplus, as that term is commonly understood, for the purpose of a reserve. He agreed that a prudent reserve should always be maintained if possible and stated that the company proposed to reserve about \$114,000,000. He pointed out that this is a special case based on a special set of facts and entitled to special consideration.

He gave figures showing the enlargement of the plant called for by increasing tonnage and pointed out that substantially none of the \$200,000,000 expended for improvements has been devoted to non-productive improvements. Also, he said, the company has not used its funds for extraneous enterprises. The ton mileage of freight handled per mile of road has increased 197 per cent with a decrease of 20 per cent in train miles per mile of road. He said that the expenditures have produced results in the public interest and the company is still in the stage of increasing returns. Moreover, the company is not likely to stand still; the great Mississippi Valley is capable of much greater development and even with the increased capitalization, Mr. Holden said, there can be no sensible argument that the company should not be able to continue to accumulate a surplus. Under its present financial structure, however, Mr. Holden said, the company is headed into the jaws of a tight situation because its present general mortgage is limited to \$300,000,000 and to 5 per cent interest. Five per cent bonds cannot be marketed except at a discount and under the mortgage they could not be retired before maturity. The company proposed a ratio of bonds to stocks of three to one, but that represents a maximum and the commission has power at any time to restrict it in connection with its decision on any part of the bond issue.

Chairman Clark said he had been hearing for years that too large a proportion of bonds in relation to stock represented dangerous financing and he asked why there is an apparent change of view in this case. Mr. Holden said he agreed with the general proposition that it is better to finance with stock than with bonds, if possible, but that the stock of the Burlington could not be sold at a fair price at this time. The company's fixed charges have been reduced in 20 years by \$422,000 a year and the additional bond issue will in no way impair the credit of the company. The purpose of the bond issue is to provide cash to aid the stockholders in meeting a very heavy maturity, the joint 4's secured by the Burlington stock as collateral, and if it were not for this situation the company probably would not be proposing a

bond issue at this time. In reply to a suggestion by Commissioner Eastman that the Burlington ought to be able to issue stock, Mr. Holden said it would be possible, but it would be more expensive than an issue of bonds. Commissioner Potter remarked that the proper ratio to consider is not the ratio between bonds and stock but the ratio between bonds and stock plus surplus. Mr. Holden also pointed out that the company might have now had the money in the bank available for cash dividends because it might have issued bonds to represent the improvements.

In reply to a question as to the benefit of the proposed issue to the Burlington, Mr. Holden said it is just as important to preserve the present relation of the Burlington to the Great Northern and the Northern Pacific as it has been for the last 20 years. Commissioner Meyer asked if the approval of the proposed financing plan would in any way affect the commission in connection with its consideration of consolidations. Mr. Holden said that the companies would hope that the commission would approve of the relation of the three companies, but that it would not be foreclosed in any way from taking such action with reference to a consolidation as might seem advisable at the time.

C. W. Bunn, general counsel of the Northern Pacific, pointed out the importance to the Burlington of having a new general mortgage because to issue the amount of bonds that have already been approved by the Illinois commission would practically close the mortgage and the Burlington would then have three closed mortgages covering practically all its lines and would have no credit for a new mortgage. Referring to the proposed \$60,000,000 stock dividend, Mr. Bunn said that it was conceded that bonus stock should not be issued, but that this stock has been paid for in advance by the earnings which have been devoted to improvements instead of to dividends. He also declared that the stock dividend would be totally valueless to the stockholders because it would result in a lower dividend rate and simply dilute their stock. Its purpose is merely to provide a proper base for the bond issue and the two northern lines have not the slightest intention of disposing of it. He also pointed out that the capitalization of the Burlington is only about \$31,000 a mile, or not more than half that of other roads in its territory. The \$119,000,000 of bonds that have been authorized by the Illinois commission, he said, had not been issued because of the disturbed conditions created by the war and because of the low rate of interest. The company could have issued bonds during the 120 days after the passage of the Transportation Act before the provisions relating to the issuance of securities became effective, but it was thought more becoming to put the question up to the commission. Mr. Bunn said that the plans for meeting the maturing of the joint bonds on July 1 cannot be fully matured until the commission renders its decision but it is proposed to use the proceeds of the \$80,000,000 Burlington bond issue to pay off that amount of the joint bonds and that it has been planned to refund the balance of \$135,000,000 to \$140,000,000 either by new joint issue or by the issuance of separate bonds by the two companies. He pointed out that the Burlington stock can no longer be used as collateral at \$200 a share as it was for 20 years because under present laws only one-third of the collateral behind a collateral trust bond can be stock. The northern lines would have to use mortgage bonds to the extent of two-thirds. Without the proposed dividend from the Burlington, Mr. Bunn said it would probably cost 8 per cent to refund the joint bonds with a new joint collateral trust obligation and the interest charge would, therefore, be about \$17,000,000. If \$80,000,000 can be retired the balance could be met by issues of mortgage bonds at 6½ per cent, on which the interest charge would be only \$13,500,000 so that the plan would result in a total saving of about \$3,500,000 in interest.

Opposing Arguments

B. C. Marsh, executive secretary of the Farmers' National Council, opposed both the Burlington and the Lackawanna applications on the ground that they would require the public to pay rates on fictitious capitalization.

J. E. Benton, general solicitor of the National Association of Railway & Utilities Commissioners, used a similar argument, saying that the stockholders of the Burlington have always received reasonable dividends so that the surplus represents excessive earnings. He also discussed the surplus as if it were a reserve fund and said that the accretions of a reserve belong to the fund and not to the stockholders. He also argued that it had not been shown that the proposed issue would be of any benefit to the Burlington itself. Commissioner Eastman said that one of the strongest arguments in favor of the plan was that the issue of \$80,000,000 by the Burlington would enable the two northern lines to retire that amount of bonds and to make a total saving of interest charges. Mr. Benton said that the needs of the northern lines have nothing to do with the cost and that any issue by the Burlington must be for the proper purpose of that company.

Hugh LaMaster, assistant attorney general of Nebraska, said that his brief had raised the point that the Transportation Act seems to contemplate that the Interstate Commerce Commission shall consider the law of the state in which a railroad has been chartered, but he did not press the point in his argument. He opposed the application on the ground that the applicant is only nominally a party at interest and that the exigencies of the Great Northern and the Northern Pacific are not proper ground for granting the application. He took the position that the Burlington surplus represented the contributions of the people in the Burlington territory through excessive rates. Commissioner Daniels insisted that the people have merely paid for service rendered and that they have received what they paid for. He also said it made no difference if dividends had been paid at the rate of 100 per cent on the stock; the question involved is whether the owners of the road have received more than a fair return on the value of the property. Commissioner Potter asked what should have been the company's policy in providing improvements and whether they should have been paid for by bond issues. Mr. LaMaster said that securities should have been issued for extensions and when the surplus got sufficiently large the rates should have been reduced. Commissioner Potter asked why if the company should have issued securities from time to time it should not be allowed to issue securities against the expenditures now. Mr. LaMaster said that in the former case the money would have been furnished by the markets of the world instead of taken from the people who paid the rates. He also asserted that the surplus represents a trust fund belonging to the people and that its disposal after the rates have been collected is a judicial and not a legislative function. He admitted that there is no question that the legal title to the property is with the railroad. He also argued that the Burlington has not shown any need of additional capital and that it has always been able to provide for its requirements out of earnings.

When E. C. Lindley, general counsel of the Great Northern, began his closing argument, Commissioner Ford asked particularly for discussion as to the relation of the proposed issue to the necessities of the Burlington as distinguished from the necessities of the stockholders. Mr. Lindley referred to the Burlington's need for a new mortgage and pointed out that the Illinois commission had already authorized \$119,000,000 of bonds and that when the Transportation Act substituted the judgment of the Interstate Commerce Commission for that of the Illinois commission the company naturally proceeded to try to make the bonds just as liquid as they were before. The law does not require,

he said, that there must be an affirmative benefit to the Burlington provided the issue is consistent with its purposes, compatible with the interests of the public and will not impair the ability of the company to serve the public. It is to the interest of the Burlington, he said, that the \$60,000,000 should be permanently capitalized and it is also to its interest, as well as that of the two northern companies, that the relation between the three companies, which has been beneficial to all three, should be continued. He pointed out that the Gould lines had built to the Pacific coast and had been bankrupted; also that the extension of the Chicago, Milwaukee & St. Paul to the coast had resulted disastrously, whereas the plan adopted by the Burlington and its two northern connections had been a tremendous success. It is to the interest of the Burlington that the two northern lines remain its avenues to the Northwest and enable it to compete with the Union Pacific and other lines. It is also to the interest of the Burlington, as well as to all other railroads, that so large an issue as \$215,000,000 should not be refunded at 8 per cent as this would affect the credit of every railroad in the country. The proposed plan is the best one that the companies have been able to think of because it uses the credit of all three roads to make a saving of \$2,500,000 to \$4,000,000 in interest charges. It is also to the interest of all railroads that the rights of stockholders shall be protected. For the commission to deny this application, he said, would serve notice on all roads that they could no longer retain surplus earnings without running the risk of never being able to get them out and would result in every railroad paying out every dollar of net earnings in dividends currently.

In reply to assertions that the surplus represents excessive rates, Mr. Lindley said that the total return on the investment in the Burlington had been less than the 6 per cent which the law declares to be a fair return and its rates throughout the greater part of the period under discussion have been largely made by the interstate or state companies.

In concluding, Mr. Lindley pointed out that the time for taking care of the joint bonds is rapidly approaching and that it would be practically impossible now to develop any other plan. It would take 75 days, he said, to give the necessary legal notice and prepare for a special shareholders' meeting. The proposed plan has already been approved by 99 1/3 per cent of the stockholders, including holders of three-fourths of the minority stock, and none of the minority stockholders voted against the plan.

Lackawanna Application

The application of the Delaware, Lackawanna & Western for authority to issue additional stock to the amount of approximately \$90,000,000 or approximately twice the amount of the present issue, was discussed briefly by W. S. Jenney, general counsel of the company. After reviewing the history of the road and its finances, he said that the Lackawanna is one of the very few roads in the country that should be able to continue to earn over 6 per cent on its value and that the capitalization should be made more consistent with the value. He said that to increase the number of shares of stock would be of benefit to the stockholders, although in fact representing no more property, because the additional pieces of paper bearing a lower rate of dividend would sell for more in the markets than the present issue bearing a high rate of dividend.

Alfred P. Thom, general counsel of the Association of Railway Executives, closed the argument with a discussion of the broad principles involved, asserting that if the public interest is not injured, the method to be adopted is for private management to decide. The question for the commission, he said, is whether the proposed plan will in any way operate against the public interest. If it will not, it is not necessary

for the commission to inquire as to whether the carrier is affirmatively benefited. That question comes within the domain of private management. The statute should not be construed to allow the commission to usurp the functions of private management. The issue of stock dividends to represent actual investment already made, he said, is a lawful purpose within the corporate powers of the company and in the case of the Lackawanna the proposed plan will tie \$40,000,000 of assets to the company that are not tied to it now because the amount may be declared as a cash dividend. Mr. Thom argued at length that the carrier has absolute title to its earnings under lawful rates and said that "no accumulation of earnings have ever been declared by a "respectable" court anywhere to belong to anyone but the lawful stockholders.

Maturities of Railway Funded Debt

THE BUREAU OF RAILWAY ECONOMICS has made a compilation from the annual reports of the carriers to the Interstate Commerce Commission showing the total maturities of the funded debt of the Class 1 carriers. The details are given as to maturities on mortgage bonds, collateral trust bonds, income bonds, miscellaneous obligations and total for each year to 1949 and from then on by decades. The compilation follows:

RAILWAY FUNDED DEBT (ACTUALLY OUTSTANDING) MATURING EACH YEAR FROM 1920 TO 1949, AND EACH TEN YEAR PERIOD THEREAFTER. Railways of Class I - United States

Year of maturity	Mortgage Bonds	Collateral Trust Bonds	Income Bonds	Miscellaneous Obligations	Total
1920	\$102,098,600	\$23,083,000	\$1,898,000	\$15,090,160	\$134,174,760
1921	73,904,815	227,015,900	-	22,254,288	323,174,773
1922	57,983,500	44,579,000	-	33,633,260	136,195,760
1923	77,657,000	6,836,000	-	234,597	84,527,597
1924	9,068,000	3,000,000	-	7,612,447	19,680,447
1925	142,423,976	44,991,830	-	49,193,252	236,609,057
1926	97,112,000	24,260,000	-	12,468,597	133,840,597
1927	55,793,441	7,240,000	-	26,979,882	89,013,324
1928	121,773,100	38,497,500	-	44,597	160,315,197
1929	15,927,754	99,293,000	10,852,002	63,014,953	289,087,609
1930	86,376,600	-	\$ 542,807	12,275,853	115,395,260
1931	158,103,520	4,705,000	10,000,000	15,044,597	177,853,117
1932	32,629,800	3,060,000	80,000,000	50,420,397	112,029,297
1933	112,454,515	-	-	72,000,517	184,455,032
1934	228,453,000	16,000,000	9,104,000	80,143,744	333,700,744
1935	55,068,000	-	13,849,250	115,263,315	184,180,565
1936	10,518,000	-	-	109,465,597	120,000,597
1937	119,573,717	6,840,000	-	5,246,697	126,660,414
1938	120,557,445	3,345,000	1,347,500	1,004,997	125,650,342
1939	187,998,339	-	890,450	9,505,682	193,394,431
1940	145,872,840	-	-	5,044,597	150,917,437
1941	115,264,150	-	-	44,597	115,318,747
1942	75,942	-	-	51,245,597	51,321,539
1943	105,538,149	-	2,000,000	44,597	107,576,746
1944	89,532,000	-	-	44,597	89,576,597
1945	100,518,660	-	284,250	44,597	100,807,507
1946	69,328,500	40,275,000	270,000	44,597	109,918,097
1947	157,320,000	-	-	10,038,597	167,358,597
1948	164,207,805	7,272,000	-	38,265,997	210,045,802
1949	234,868,800	34,100,900	23,007,000	44,597	292,018,897
1950 to 1959	1,376,507,704	126,059,700	69,370,640	68,037,746	1,640,195,821
1960 to 1969	778,048,300	-	49,158,753	10,071,000	837,278,053
1970 to 1979	51,350,000	-	-	-	51,350,000
1980 to 1989	640,810,000	20,118,000	16,092,000	-	677,020,000
1990 to 1999	1,000,000,000	9,143,000	3,348,500	-	1,012,491,500
2000 to 2009	154,750,000	11,180,900	24,861,123	5,100,000	195,932,023
2010 to 2019	100,000,000	-	-	-	100,000,000
Not distributed	5,137,743	-	7,615,000	-	12,752,743
Total entire period	8,886,278,767	612,733,130	310,641,110	704,063,135	9,513,715,142

* Does not include equipment obligations amounting to \$471,121,225 and also \$11,790 receipts outstanding for funded debt. Adding these amounts to the total of \$9,795,036,142, the total funded debt actually outstanding of the railways of Class I amounted to \$10,266,857,317 as of December 31, 1919, which is approximately 65% of the total funded debt of all steam roads in the United States. Forgoing returns do not include data for the Pittsburgh, Shamokin and Northern R.R.

T. O. EDWARDS, auditor of the Southern Pacific, discovering that a number of employees of the road have lost liberty Bond savings and other "nest eggs" through misrepresentation of unscrupulous promoters, has issued the following warning: "No matter how attractive the proposition may seem to be on the surface, employees, before investing their savings, should consult with some responsible banker in their community who will gladly give them frank and unbiased advice, whether they are a patron of the bank or not. There are many opportunities for sound and profitable investments at the present time, but attempts are being made every day to defraud the public and impose upon the credulous."

Marine Borers Invade Piling in San Francisco Bay*

Serious Losses to Railway and Other Structures Along Waterfront
Threatened by Teredo

EARLY in 1914, the activity of marine borers was noticed in the dykes of the Mare Island Navy Yard, at the upper extremity of San Pablo Bay, which is the northern arm of San Francisco Bay, as well as at two nearby points on the east shore of that bay. One of the latter was a dock between Crockett and Vallejo Junction and the other a dock at Oleum, a mile or so south of Crockett. Sporadic attacks of marine borers are reported to have been observed in that region at isolated times running as far back as 1870. In any case, these attacks were of short duration and did no serious damage. The waterfront structures erected by the industries were



Dock at Oleum, Calif., Which Failed in 1919 and Plunged Several Cars into the Bay

all built on untreated piling, because of the absence of marine borer activity in those waters and the belief that the fresh water discharged into San Pablo bay from the combined flows of the Sacramento and San Joaquin rivers would probably prevent any invasion of San Pablo bay by salt water, which would carry with it the various forms of marine borers.

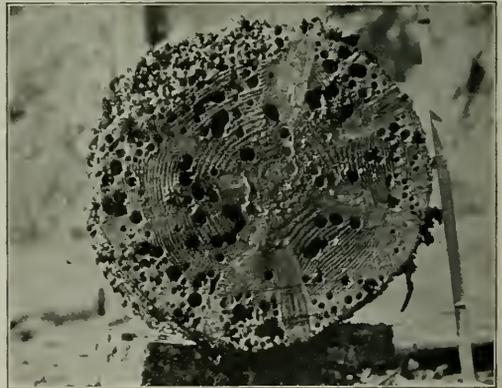
The attack of 1914 appeared to be sporadic, like the earlier ones. But at Mare Island in 1917 attacks by the same shipworm, which was identified as a teredo, again appeared, and during the following years spread very rapidly. In 1920 these failures assumed such proportions and became of such frequent occurrence that the critical nature of the local situation was brought to the attention of the officials of the American Wood Preservers' Association on June 16, 1920. As a result, a special committee was appointed on July 22, 1920, to study the marine piling problem in San Francisco bay, with instructions to report at the seventeenth annual meeting of the association at San Francisco in January, 1921. The committee began its active work late in July, 1920.

Shortly before June 16, 1920, but practically coincident with the above action, the Forest Products Laboratory of the United States Forest Service at Madison, Wis., had proposed a plan for the study of the marine piling problem covering the entire coastal waters of the continental United States. It was the logical step to unite both proposals, and the San Francisco Bay Marine Piling Survey became, therefore, the first unit of the proposed nation-wide program of the Forest Products Laboratory, under joint co-operation with the American Wood Pre-

servers' Association. The committee was organized with Frank D. Mattos, manager treating plant, Southern Pacific, Oakland, Cal., chairman, and included some 20 engineers connected with industries and railways interested in this problem.

The objects of the survey were to determine the extent of the damage from marine borers in San Francisco bay, especially that of excessive severity which has occurred within the last three years in the northern portion of the bay; to determine the present distribution of the several marine borers and as much of their past history in the bay as it was possible to learn; to increase the present knowledge of the dissemination, growth and habits of the borers; to study the factors influencing the rate of attack and amount of damage from them, including the effect of climate and river discharge upon the salinity conditions in the bay; to throw more light upon the effectiveness, both in physical life and economic advantage, of the various methods of protecting wooden piling, and of the substitutes for it, together with the best methods of construction which have been developed; and to correct data on the relative costs of the different methods of protection and construction.

The name "San Francisco Bay" is technically applied only to the larger and more important southern arm of the body of water which has its connection with the Pacific Ocean through the Golden Gate. The name is more often



Action of *Xylotraya* (Large Holes) and *Teredo* (Smaller Holes) in Pile After 2½ Years' Service

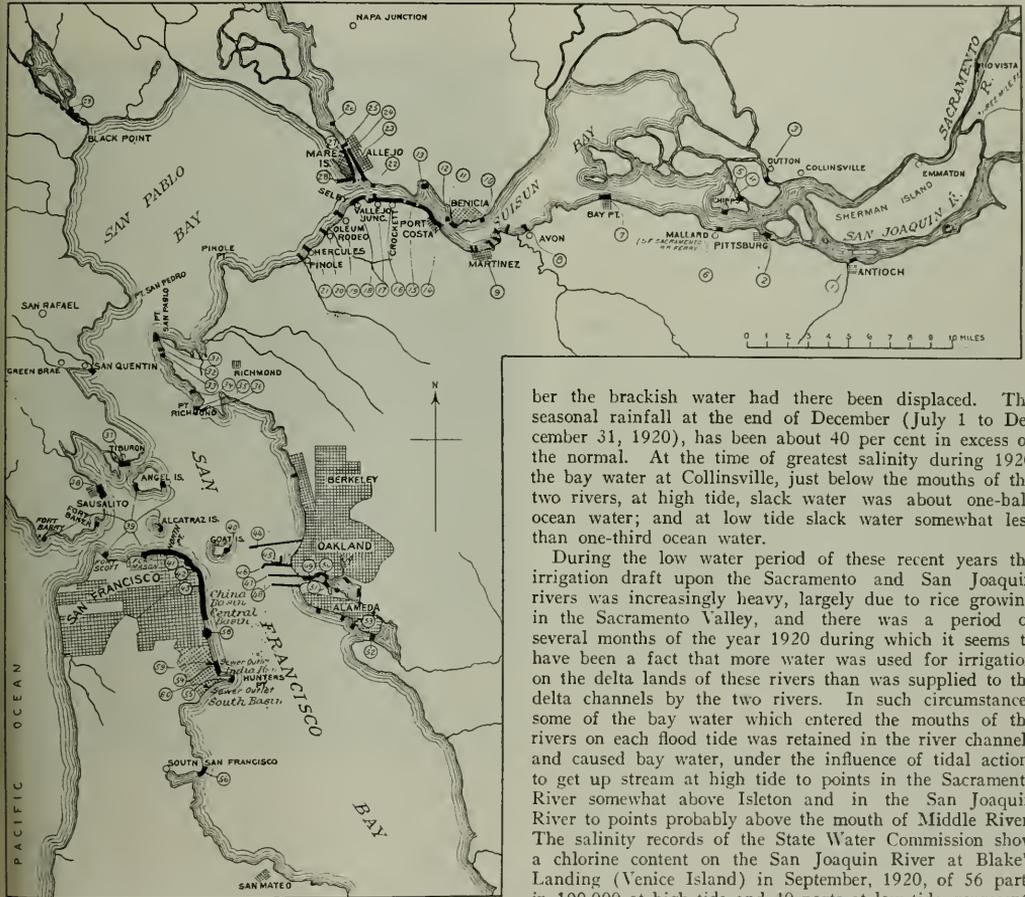
used than any other, however, when it is desired to indicate the entire body of water. This larger bay has its longer dimensions closely parallel to the seacoast. It is 52 statute miles in its greatest length in a single direction, and has a maximum width of slightly under 12 miles. The outlet through the Golden Gate is at a point about three-fifths of the total length of the bay from south to north. At a point about one-half of the remaining distance north from the Golden Gate the width of the bay is reduced to a little over one mile, and that point marks the division between San Francisco Bay proper and the upper area known as San Pablo Bay.

*Abstracted from an elaborate report of the San Francisco Bay Marine Piling Committee of the American Wood Preservers' Association, and presented at the annual convention of that association in San Francisco on January 2.

At the eastern end of San Pablo Bay there enters a channel known as Carquinez Straits, through which the combined flow of the Sacramento and San Joaquin rivers is discharged into San Pablo Bay. The Carquinez Straits are from seven to eight miles in length and above them is a large area of water composed of many tidal flats and salt marshes known as Suisun Bay. At a point about 18 miles above Carquinez Straits is the junction of the Sacramento and San Joaquin rivers.

Destruction from marine borers in San Francisco Bay

structures, although built wholly of untreated wood, had stood from 30 to 40 years. The destruction there since 1917 by the teredo has been swift and unusually severe. Every waterfront structure as far upstream as Antioch has been attacked by the teredo. This year (1920) the waters of Suisun Bay had reached their maximum salinity about the middle of September and, a few weeks later, particularly after the winter rains commenced, the increasing flow of the rivers accelerated the freshening of the water in the upper end of Suisun Bay, so that by the middle of Novem-



Map of San Francisco Bay

has been most active in the regions nearest the Golden Gate, where unprotected timber is destroyed within a few months. Destruction is nearly as rapid southward around the San Francisco waterfront. On the Oakland side destruction is somewhat less rapid, unprotected piling lasting from 18 months to three years. In the Oakland estuary the activity of limnoria is greater than that of the xylotrya and piling may be destroyed in as short a time as six months.

In the northern area, including the lower course of the Sacramento River, Suisun Bay, Carquinez Straits and the adjacent portions of San Pablo Bay, many of the piling

ber the brackish water had there been displaced. The seasonal rainfall at the end of December (July 1 to December 31, 1920), has been about 40 per cent in excess of the normal. At the time of greatest salinity during 1920 the bay water at Collinsville, just below the mouths of the two rivers, at high tide, slack water was about one-half ocean water; and at low tide slack water somewhat less than one-third ocean water.

During the low water period of these recent years the irrigation draft upon the Sacramento and San Joaquin rivers was increasingly heavy, largely due to rice growing in the Sacramento Valley, and there was a period of several months of the year 1920 during which it seems to have been a fact that more water was used for irrigation on the delta lands of these rivers than was supplied to the delta channels by the two rivers. In such circumstances some of the bay water which entered the mouths of the rivers on each flood tide was retained in the river channels and caused bay water, under the influence of tidal action, to get up stream at high tide to points in the Sacramento River somewhat above Isleton and in the San Joaquin River to points probably above the mouth of Middle River. The salinity records of the State Water Commission show a chlorine content on the San Joaquin River at Blake's Landing (Venice Island) in September, 1920, of 56 parts in 100,000 at high tide and 40 parts at low tide, representing about 92 parts of high and 66 parts of common salt, respectively. The highest salinity was shown by the samples taken on November 22. The chlorine content of the water was then 66 parts in 100,000. This is equivalent to about 99 parts of common salt in 100,000 parts of water. The situation relating to the up-river penetration of bay water is aggravated by the fact that the work of channel enlargement in progress since 1913.

The Xylotrya

The cosmopolitan character of the distribution of the marine borers depends upon the ease with which their larval stages may be carried by currents of the sea, or in the water tanks of steamers, and upon the facility with

which the borers themselves may travel long distances in driftwood, in exposed wood of vessels or in timber rafted by sea. This makes it a biological certainty that all great ports are subject to repeated invasions by borers from other localities.

The xylotrya is the largest of the three borers found in the bay. When full grown in our waters it measures as high as two feet in length and has a diameter at the head or shell-bearing end of three-fourths of an inch. Tubes over three feet in length and seven-eighths of an inch in diameter have been found in old piling on the San Francisco waterfront. Its burrows differ from those of the two species of teredo found in San Francisco Bay in two important particulars. They are larger and they present continuous minor deviations from the straight or curved course which teredo pursues. Their burrows are therefore less symmetrical and regular than those of teredo. The burrow of xylotrya enters the pile at right angles to the surface as a small pin hole and turns obliquely, usually downwards, enlarging rapidly within two inches of the surface to one-quarter inch and within four inches to three-eighths to one-half inch. It does not restrict its course to sap wood, and in cases of sparse seeding of the borers, often bores obliquely deep into the wood before turning to run with the grain of the timber. For this reason, surface samples may not reveal lightly infected piling.

Xylotrya is generally found in association with limnoria in our waters and the two invade the pile together, although it is probable that when once limnoria gets possession of the surface, xylotrya has a small chance to get into wood. However, creosote-treated piling hollowed out by limnoria sometimes has a few xylotrya at work within creosoted shell but not traversing it.

The rate of growth of xylotrya under existing conditions in the bay is seen in the fact that piles in the dolphin off the Alameda Mole, driven in February, 1919, were so weakened at the mud-line, mainly by xylotrya, that they had to be removed in November, 1920, that is in about 20 months. Piling in the neighborhood of the Golden Gate last only six months, owing to the combined action of xylotrya and limnoria. In so far then as our data go, it appears that the principal molluscan borer to be guarded against in the main and lower parts of San Francisco Bay and on the ocean front where salinities are those normal to the sea or approach it is xylotrya.

The Teredo

The teredo navalis is the ship-worm of the dykes of Holland. This species is the medium-sized species of the three molluscan borers occurring in this region. It is, when full grown in the autumn, from 4 to 10 in. in length, generally 6 to 8, and the diameter of the head end is from $\frac{1}{4}$ to $\frac{3}{8}$ in. The body lies in the burrow which enters the pile horizontally, and generally, but not always, turns downward at once and expands within one or two inches to a nearly uniform diameter throughout the rest of its course.

The tubes or burrows of teredo differ from those of xylotrya in our timbers in being smaller and somewhat more thickly set or crowded. They enter the piling less deeply than xylotrya, whose burrows, whether few or many, are wont to enter the pile even to the center, while teredo enters deeply by reason of crowding. Moreover, xylotrya works in shallow water less readily than teredo. When crowded the burrows are often only $\frac{1}{8}$ in. in diameter. The burrows enter by minute holes 0.008 in. in diameter when first made, but enlarged to as much as 0.03 as the animal grows older. The burrow runs a curved or straight course, often with the grain and downwards

when not crowded, or more or less obliquely across it when crowded.

The burrows twist and turn to avoid crossing each other and the direction of the tube may even be abruptly reversed in a short turn, or the inner end abandoned and a new course established at a point above it. They are generally straighter or more regularly curved, and have smoother course established at a point above it. They are subject walls.

The degree of destruction of the timber by excavation is a function of the density of settlement and penetration. In piling with a fairly heavy infection from Port Costa, we



Penetration of Teredo Four Inches Into Green Douglas Fir Pile in Four Months

find that in four samples the average per cent excavated was 45.5 per cent. In densely attacked timber, the percentage of excavation will run somewhat higher than these figures.

In December, 1919, it was found that teredo had penetrated the piling of the Southern Pacific slips at Port Costa and Benicia two to three inches, and in some instances had almost completely eaten the pile through at the mud-line. A pile pulled at Vallejo Junction in June, 1919, and sawn in two-foot sections, did not contain teredo, nor was it found in surface sampling at low tide on Southern Pacific structures in the upper bay in June, with surface salinities of 3.3 parts per 1,000, but was detected in great numbers on October 15, 1919, in surface and bottom salinities of 22 parts per 1,000, at Vallejo Junction when a steamer broke off some piling, and shortly thereafter at Port Costa and Benicia, in surface salinities of 12.1 and bottom of 17.6 parts per 1,000, in pulled piling. By the autumn of 1920 they spread up stream until they had reached Antioch on the San Joaquin, 25 miles above Carquinez Straits and 50 miles from the Golden Gate, and up the sloughs of the Delta to Dutton.

This progressive invasion was the direct result of the continued shortage in the annual rainfall and run-off during these years, which permitted the settling of the larval stages on unprotected piling during the breeding season of midsummer and the survival of the borers in the wood during the brief season of the spring freshets of these years. In the upper bay from Pinole through Oleum, Mare Island, Vallejo, Crockett, Port Costa, Benicia, Martinez, to Moccoco and Avon, the destruction of piling by this teredo in the summer of 1920 reached a climax which left little or no untreated piling undamaged and not a little of it wholly destroyed by penetration to the center or near it, at the mud-line.

In the meantime the invasion had spread elsewhere to unprotected structures, such as those above Black Point on Petaluma Creek, to the wharves at Richmond, and to the unprotected piling of the dolphins of the Alameda Mole, to some points in the Oakland Estuary, to the Bay Farm Island bridge, and to the Dumbarton cut-off at the southern end of the bay. It was also found during the survey at South San Francisco, in the Bay View sewer outlet, and at the sewer outlet at Hunter's Point, in new piling in the boom at Islais Creek, and sparingly at Pier 7 on the San Francisco waterfront in treated piling which had been opened up by the attack of limnoria. From the distribution thus shown it is to be inferred that all unprotected piling in San Francisco Bay may be expected to show upon examination an attack by this borer.

The Limnoria

In addition to the molluscan borers attacking marine structures described above, there are three others belonging to the crustacea of general distribution, namely limnoria, sphaeroma, and chelura. Limnoria and sphaeroma only have been found as yet in San Francisco Bay. These borers owe their efficiency as destroyers of wood to their powerful biting jaws by which they cut their way into the hardest of wood. They both belong to types of crustaceans adapted to life in the zone of extreme environmental conditions, between tides where moisture, light, salinity, temperature, food supply, and stability of the substrate are subject to rapid and extreme change. The body of the limnoria is small, the largest individuals attaining a length



Failure of a Corbel on Pile Cut Off Too Close to Water, Barnacles Indicate High Water Line

of $\frac{1}{4}$ in. and one-third as wide. It is elongate slipper-shaped, flattened dorso-ventrally, and has rounded ends.

Limnoria is found on both the Atlantic and Pacific shores of the United States, north to Bering Island, and has been reported on European coasts from the Adriatic to Norway. It is common along the California coast in piling on the ocean front. In San Francisco Bay it is very destructive in the Golden Gate, on the Oakland and San Francisco water fronts, at Dumbarton cut-off and at Sausalito, Tiburon and Richmond. It was not found north of San Quentin and San Pablo Point and took no part in the invasion of the Upper Bay with teredo. It is thus abundant where salinity is not much reduced by fresh water.

Limnoria destroys piling by gnawing its interlacing branching burrows into the surface of the wood. We have found from 200 to 240 burrows per square inch in heavily

attacked timber. These burrows are from 0.050 to 0.025 in. in diameter and follow the softer zones of spring growth between the more resinous harder zones of the annual rings. Piling infested by limnoria thus has an outer scurf of $\frac{1}{8}$ to $\frac{3}{16}$, rarely $\frac{1}{4}$ in. of perforated somewhat laminated wood, which is readily broken or falls away as the attack proceeds. In square timbers the attack progresses rapidly through the harder zones of the annual rings on radial sections, leaving these resinous strips as projecting ribs.

The borer is particularly insidious in its attacks upon creosoted piling because of its habit of creeping into small crevices. If cracks open through the saturated zone of a creosoted pile or if bolt or dog holes or peavey holes or other breaks in the continuity of this protection occur, limnoria is sure to find its way into the retreat thus offered and to begin its destructive work. It will reduce such a pile to a mere shell. It is sometimes found in such piles actually at work in the creosoted zone itself. Whether it does this because it slowly becomes acclimatized to the repellent substance or because of defective creosoting, low grade oil, or progressive leaching out of the toxic elements of the oil, is unknown.

The proportion of the wood removed by limnoria in its burrows is somewhat less than that removed by teredo. Teredo-eaten piling has a firmer consistency because of the thicker partitions between the burrows. Limnoria-eaten wood is more friable or spongy because of the numerous small burrows and the more or less elastic resin zones left somewhat intact by these borers.

A test of the average amount of excavation in five pieces of Douglas fir squared timber eaten by limnoria from Tiburon showed an average of 42.8 per cent. The considerable number of borers remaining in the burrows somewhat reduces the apparent volume of the excavation. The probability is that it is often in excess of 40 per cent.

The Sphaeroma

The sphaeroma is a larger, stouter form than limnoria, but with the same general structure. The body is broadly ellipsoidal in outline seen from above with rounded ends. It is one-half inch long and one-quarter inch wide and rolls up into a ball about a quarter of an inch in diameter when disturbed. Its color is dark olive to slightly reddish brown. It is often mottled or blotched with lighter dull yellowish areas on the middle of the back. The eyes are prominent and lateral in position.

Sphaeroma is very often found in crevices or other sheltering nooks outside of its burrows and is evidently something of a forager. It does not appear to depend upon the wood eroded from its burrow for food, for its stomach contents are made up of the minute vegetable and other growths which cover the surface of the piling.

The excavations made by sphaeroma pentodon in marine structures are very characteristic in size, distribution and location. They have circular openings up to nearly one-half inch in diameter, enter the wood horizontally or turn more or less abruptly and run with the grain in the softer layers of the wood. They do not exhibit the expansion characteristic of the molluscan burrows.

Sphaeroma works mainly between high and low tide, though found at all levels on piling. Its workings are obscured in deeper water by the more intense activities of limnoria and the growth of other marine organisms. Between tide levels it gives to the piling a pitted appearance with its large, open, dark-colored burrows. Its work is erratic in that often only certain piles are subject to its attacks while neighboring ones may be untouched. It sometimes runs channels on the surface of wood, especially in the more deeply submerged piling.

The sphaeroma has a wide range of distribution in our locality. It has been found at Sausalito, Tiburon, Black

Point, the Mare Island dikes, in Napa Creek, along Carquinez Strait and upstream to Antioch in water of low salinity. It also occurs along the western water front and Oakland Estuary and in the southern part of the bay to South San Francisco and the Dumbarton cut-off. It is known to occur northward to Alaska.

Exterior Indications of Marine Borers

The crustacean borers work upon the surface of submerged wood and leave an open record of their destructive activities in the erosion caused by their burrows. *Limnoria* and *chelura* erode so rapidly that few other forms of marine life can obtain, or long retain a foothold on the wood in which these borers are working.

In the case of the molluscan borers, the case is different. They enter the wood as minute larvae and leave only a pinhole to mark the places. There is nothing to indicate to the casual observer either their presence or the degree of destruction which they have accomplished.

The survey of the Sacramento River to Sacramento brought out the fact that certain forms of marine life had gone up the river as far even as Walnut Grove, and that these same forms were luxuriantly thriving on piling attacked in Carquinez Straits, as salt water had invaded that territory. They serve, therefore, as indicators to the uninitiated that the sea with its fauna is invading new territory. These marine organisms are the barnacles and the hydroids. The former are well-known crustaceans encased in an armor of shelly plates which cover piling, rocks, ships' bottoms, and any available substrate with hosts of more or less close-set, whitish, angular bodies ranging up to a hazel-nut in size. The hydroids are moss-like plant-animals which form a grayish or brownish mass or, when dead, hair-like growth over piling.

There is fortunately another marine animal of cosmopolitan distribution, the European edible mussel, *mytilus edulis*, whose somewhat angular black shell is attached to rocks, piling and any stable or floating substrate. The occurrence of young mussels on marine piling is a danger sign for the engineer to look out for teredo.

There is one outstanding feature of the present outbreak of marine borers in San Francisco Bay and of this survey which affects State and Federal supervision of navigable waters and of shipping and engineering practice in the construction and maintenance of marine structures, such as wharves, moles and piers. It is this, namely, that within the area infested by marine borers all unprotected wood-work is a potential breeding ground for harboring these pests, increasing their numbers, and sending forth their migrating larvae. In every case an infected bit of wood is a contagious spot. A single infected pile in 25 ft. of water and its 100 sq. ft. of surface affords shelter for upwards of 150,000 teredos, and each of these is capable of producing more than 2,000,000 larvae per year. Each pile, barring the death rate of larvae, thus produces enough young to seed 2,000,000 other piles.

The Engineering Problem

To the engineer responsible for the design, construction and maintenance of structures in sea water, accurate information on the relative cost and the permanence of various kinds of piling and pile protections is of the greatest importance. After describing the various methods of protecting piles in some detail, the committee concluded that:

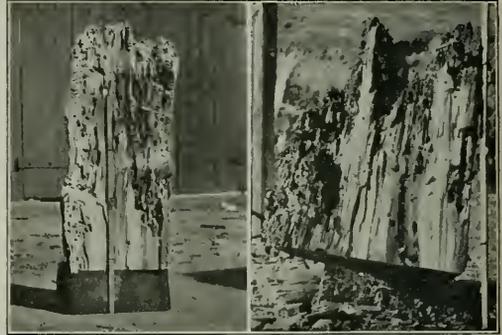
(1) Marine borers are very active in San Francisco Bay, and in places where their attack is severe will destroy untreated piling in as short a time as six to eight months. In other places the untreated piling may last two to four years.

(2) The information secured indicates that it is reasonable to expect a life of five to eight years from paint and

batten protections if the work is well done. If it is not well done or if the covering is damaged by careless handling this range of life cannot be expected.

(3) When carefully handled so that there is no injury extending through the shell of treated wood within the water section, it appears possible for properly creosoted Douglas fir bearing piling to give a life of 25 to 30 years in San Francisco Bay.

(4) Most of the attack on creosoted piling by marine borers, which the committee has observed throughout this survey, appears to have begun in spots where untreated wood has been exposed by damage in handling the piles or placing the superstructure. It is urgently recommended that improvements be made in the methods of handling



Section of Untreated Douglas Fir Pile After 7 Years' Service Pile Broken from Pier After 2½ Years' Service

creosoted piles and building structures upon them, so that damage to the surface of the piles may be reduced to a minimum.

(5) Precast reinforced concrete piles and pile casings have not been in use in San Francisco Bay a sufficient length of time to determine their ultimate life. A detailed examination of those structures which have been in service for 10 years shows no evidence of deterioration and they seem capable of a long further life.

(6) Cast in place concrete pile jackets and cylinders may be expected to give satisfactory results if properly constructed of suitable materials. The difficulties of this type of construction, however, are of such a nature that the probability of securing a maximum length of life is less than in the case of precast concrete piles or pile coverings.

(7) The selection of a type of piling or pile protection for a given structure must be made upon the basis of cost and permanence of the materials under consideration, the character of the structure and the probable need for future alterations to meet the changing requirements of commerce. When a comparatively short increase over the life of green wooden piling is sufficient, the surface protections will often be found economical in waters not exposed to severe storm action; if a moderately long physical life approximating the average economic life of marine structures in this harbor is desired, a good creosote treatment will provide it at the lowest annual cost so far as present knowledge goes; if conditions warrant building for the greatest permanence, with less regard for first cost, concrete construction may be useful. For the protection from further damage of wooden piles already in place and showing attack by borers, not yet severe enough to require condemnation, the concrete casing, precast or poured in place, is the only means of salvage so far found by the committee.

Reading Dissolution Plan Filed at Philadelphia

In Conformance with Supreme Court Decision, Court Asked to
Defer Central of New Jersey Sale

THE PLAN FOR THE SEGREGATION of the Reading Company and affiliated corporations decreed by the United States Supreme Court, and modifications suggested by the government were filed with the Federal District Court at Philadelphia on Monday, and March 1 has been fixed to hear argument on the plan.

The plan provides that the Reading Company, a holding concern, will assume the \$93,524,000 general mortgage 4 per cent bonds, which are the joint obligation of the Reading Company and the Philadelphia & Reading Coal & Iron Company. The coal company will pay the Reading Company \$10,000,000 in cash or current assets at market value and \$25,000,000 in 4 per cent mortgage bonds of the coal company. The \$25,000,000 bonds to be issued by the coal company to the Reading will mature on January 1, 1997, the same date as the general mortgage bonds. These bonds shall be subject to redemption at par and accrued interest on any semi-annual interest date.

The Reading Company will merge the Philadelphia & Reading Railway Company under the authority of the present charter of the Reading Company and will subject the railway property to the direct lien of the general mortgage. The name of the Reading Company after the merger will not be changed and the company will be subject to federal and state regulations as a common carrier. If and whenever the general mortgage bondholders' committee shall determine to declare the plan of exchange effective the Reading Company shall execute a refunding and improvement mortgage which shall constitute a direct lien upon all the railroad's railroad property, railroad equipment and railroad stocks and bonds then owned by the Reading Company, or thereafter acquired by means of bonds issued thereunder. Deposited general mortgage bonds will be kept alive under said refunding and improvement mortgage until the general mortgage is released.

Plan Asks Court to Defer Jersey Central Sale

The proposed plan asks the court to defer the actual sale of the stock held by the Reading Company in the Central of New Jersey, pending the grouping of railroads by the Interstate Commerce Commission under the Transportation Act, but subject to the further order of the court.

To this last proposal the government has entered an objection and has suggested that the Reading Company shall, "with all due diligence," offer for sale at reasonable price and upon reasonable terms the stock of the Central of New Jersey now owned by it, for a period of years to be named by the court. If at the expiration of such period a sale of the stock has not been made, then, on application of the attorney general, the court may decree a sale at public auction at a price not less than a minimum price to be agreed upon between the Reading Company and the attorney general.

The government's opposition to the proposal to place the Reading Company's interest in the stock of the Jersey Central in the hands of trustees pending the working out of the regrouping of railroads by the Interstate Commerce Commission is because it "means in practical effect a continuance of the status quo indefinitely." The government contends that the consolidation of the railroads of the country would take such a long time that the effect upon the companies involved in the dissolution plan would be to maintain their present status for an indefinite time.

A plan submitted separately provides that the Central of New Jersey shall dispose of all its capital stock of the Lehigh & Wilkes-Barre Coal Company now owned by it to persons

or corporations who are not its own stockholders or stockholders in either the Reading Company, the Philadelphia & Reading Railway Company or the Philadelphia & Reading Coal & Iron Company, and who previous to or at the time of the purchase shall qualify as purchasers by a duly executed affidavit. Should all of the said stock not be disposed of before the expiration of six months after entry of this decree or previous to any date which may be fixed by the court, the remainder shall be transferred to the Central Union Trust Company of New York, as the custodian and depository of the court, subject to the provisions of this decree and to the further orders and decrees of the court.

In accepting this plan, Judges Buffington, Woolley and Davis modified a decree previously entered enjoining the Central of New Jersey receiving dividends from the Lehigh & Wilkes-Barre Coal Company so as to permit the railroad company to receive such dividends pending the sale of the coal stock.

Separation of Coal Company

The greater part of the plan is taken up with the dissociation of the coal company from the holding company. It provides that the mortgage under which the \$25,000,000 4 per cent bonds are to be issued may contain provisions for the issue of additional bonds to provide for additions and betterments to a limited amount, to be determined by the Reading Company and the coal company prior to the creation of the mortgage. The bonds are to mature January 1, 1997, the same date as the general mortgage bonds.

With certain exceptions general releases of all claims and liabilities as between the Reading Company and the coal company, including the claim of approximately \$70,000,000 carried on the books of the Reading Company as an asset and on the books of the coal company as a liability, will be exchanged.

The Reading Company agrees to obtain the release of the coal property from the lien of the general mortgage and the discharge of the coal company from liability on the general mortgage bonds, provided such release and discharge can be secured by payment by the Reading Company to the bondholders of a premium not exceeding 10 per cent upon the par value of the outstanding general mortgage bonds. The Reading Company will make payment of the premiums on the order of the committee to be formed in the interest of the bondholders.

"It is assumed," the plan says, "that the attorney general will ask the court to direct the release of the stock of the coal company from the lien of the general mortgage on such terms as the court may fix. If practicable the coal company will consolidate with the Delaware Coal Company, of which it owns the entire capital stock and the consolidated company will issue stock without par value to the Reading Company. If that is not practicable, a new corporation will be created to acquire from the Reading Company the stock of the coal company or the interest of the Reading Company therein, and such new corporation will issue no par value stock. The number of shares to be issued by the consolidated coal company or of such new corporation may be 1,400,000.

"Such no par value stock will be sold to the stockholders of the Reading Company, preferred and common, share and share alike, for \$3,600,000, or \$2 for each share of Reading stock. It is proposed to carry out this sale, in accordance with the precedent established by the Union Pacific-Southern Pacific case, by distributing to Reading stockholders, assign-

able certificates of interest in the coal company stock, exchangeable for such stock only when accompanied by an affidavit that the holder is not the owner of any stock of the Reading Company. Any further steps which may be deemed necessary by the court will be taken to the end that an independent board and management to be approved by it will be maintained by the coal company, so that the independence of this company shall not await the necessarily gradual process of distribution of the stock of the coal company among persons not holders of stock in the Reading Company."

The government in a memorandum filed by Assistant Attorneys-General Myers and Nebeker has given its approval to the plan except as to the parts of it relating to the separation of the Reading and Central of New Jersey as above noted and except as to the proposal to convert the stock of the coal company into stock of no par value. Concerning the latter, the government is not altogether satisfied that no other plan is practicable nor is it certain just what the consequences of the proposed plan might be. In general, however, the government is inclined to the view that this is not a matter of consequence as regards the ultimate desire for a complete dissolution between the several corporate defendants, but "at the same time the government cannot refrain from expressing its belief that, if practicable a much better solution would be to secure a fair appraisal of the value of the coal properties and issue capital stock in that amount, and fix the par value per share at an amount which would result in the issuance of a number of shares approximately equal to the number of shares of Reading Company outstanding."

The Reading Company is a proprietary and not a holding company. It owns the entire outstanding capital stock of the Philadelphia & Reading Railway Company, the Philadelphia & Reading Coal & Iron Company, the Philadelphia & Reading Terminal Company, the Reading Iron Company and \$14,504,000 of the outstanding \$27,436,800 stock of the Central of New Jersey, etc. It also owns \$20,000,000 purchase money bonds of the Philadelphia & Reading Railway together with certain real estate, part of which was the property of the old Philadelphia & Reading Railroad Company and rolling stock and floating equipment leased to the Philadelphia & Reading Railway Company. The Central Railroad of New Jersey in turn owns \$8,489,000 of the \$9,212,500 capital stock of the Lehigh & Wilkes-Barre Coal Company.

The Reading Company has stock outstanding amounting to \$70,000,000 common, \$28,000,000 4 per cent first preferred and \$42,000,000 4 per cent second preferred. Of this total of \$140,000,000 stock, over \$60,000,000 is owned by the New York Central and Baltimore & Ohio as follows: Baltimore & Ohio, \$6,065,000 first preferred, \$14,265,000 second preferred and \$10,002,000 common; a total of \$30,332,000; New York Central, \$6,065,000 first preferred, \$10,002,000 second preferred and \$9,852,500 common, a total of \$30,182,500.

The case in connection with which the present dissolution plan was filed, was begun in the form of a bill in equity instituted by the United States government in the district court for the eastern district of Pennsylvania in September, 1913, alleging violations of the anti-trust law, the commodities clause of the Interstate Commerce Act, etc.

In a decision in July, 1915, the court refused to sustain the government's contentions with the exception of that relating to the control of the Lehigh & Wilkes-Barre Coal Company by the Central of New Jersey. The court said, "In the carriage of coal the Reading Railway and Central Railroad are not competitors" yet "they reach the same general field, the same general source of supply and carry a similar article to many of the same markets." The court held "the union of these interests in the holding company

is condemned by the rule laid down in the Northern Securities Case." The court stated, however, that it was not disposed to disturb the ownership of the Reading Company in the Central of New Jersey "unless the friendly and mutually advantageous alliance of the two railroads in this particular (with respect to traffic other than coal), must be destroyed in order to reach the unlawful combination in another particular that would otherwise escape."

The case was appealed to the Supreme Court by the defendant companies and also the government. In its decision on April 26, 1920, adopted by a vote of 4 to 3, the court sustained the government's contention that the Reading Company controls railroads and coal companies in violation of the anti-trust laws, and declared that the Reading Company and its associates constituted a monopoly in anthracite coal and ordered its dissolution. The decree ordered a dissolution of the combination of the Reading Company, the Philadelphia & Reading Railway Company, the Philadelphia & Reading Coal & Iron Company, the Central Railroad of New Jersey, and the Lehigh & Wilkes-Barre Coal Company. The court held that "the great power lodged in the Reading holding company, which is the combination of railroads and coal companies, is a flagrant violation of the anti-trust laws of our country." It further held that the organization of the holding company was an attempt to evade the anti-trust law and the Constitution of Pennsylvania.

The effect of the decision of the Supreme Court was to affirm in part and reverse in part, the decision of the lower court, and to remand the case with a direction to enter a decree in conformity with the opinion. The District Court has affirmed "as to the Lehigh Coal & Navigation Company, the Lehigh & New England Railroad Company, the Lehigh & Hudson River Railway Company as to the restrictive covenant in mining leases with respect to the shipping of coal, as to the dissolution of the combination between the Philadelphia & Reading Coal & Iron Company, and the Lehigh & Wilkes-Barre Coal Company, maintained through the Reading Company and the Central Railroad Company of New Jersey." As to the Wilmington & Northern Railroad Company and as to the individual defendants, the bill was dismissed without prejudice. As to the Reading Company, the Philadelphia & Reading Railway Company, the Philadelphia & Reading Coal & Iron Company and the Central Railroad Company of New Jersey, the decree of the District Court was reversed and the case remanded with direction "to enter a decree in conformity with this opinion, dissolving the combination of the Reading Company, the Philadelphia & Reading Railway Company, the Philadelphia & Reading Coal & Iron Company, the Central Railroad Company of New Jersey and the Lehigh & Wilkes-Barre Coal Company, existing and maintained through the Reading Company, with such provision for the disposition of the shares of stock and bonds and other property of the various companies, held by the Reading Company, as may be necessary to establish the entire independence from that company and from each other of the Philadelphia & Reading Railway Company, the Philadelphia & Reading Coal & Iron Company, the Central Railroad Company of New Jersey and the Lehigh & Wilkes-Barre Coal Company, and also that such disposition shall be made by the decree of the stocks and bonds of the Lehigh & Wilkes-Barre Coal Company, held by the Central Railroad Company of New Jersey as may be necessary to establish entire independence between these two companies to the end that the affairs of all these now combined companies may be conducted in harmony with the law."

Judges Buffington, Woolley and Davis in the U. S. District Court at Philadelphia on October 8, 1920, filed an order fixing 90 days from that date for the filing by the Reading Company of a plan of dissolution in conformity with the decision of the U. S. Supreme Court, but the time was later extended.

Some Present Day Problems of the Railroads*

Magnitude of Railroad Business Difficult to Comprehend— Necessity of Reducing Operating Costs

By Daniel Willard

President, Baltimore & Ohio

THERE ARE MANY PROBLEMS confronting the railroads, and many confronting all of us. The railroad problems are seasonal; they are periodic; and they are economic. I think, however, that the most constant and persistent problem that confronts the railroads at all times, through all seasons and all periods, is the problem that grows out of being misunderstood. The railroads are such a large undertaking and we have to talk in figures that we so little comprehend that this difficulty is ever present.

First of all, we talk about an American railroad system, and there is not any such thing as an American railroad system in the sense that there is an American telephone system, for instance, which has wire communication under the same general control from one part of the United States to another. No one ever visualized the railroads in that sense, because their development has been quite unlike that of the telephone. The railroads helped to develop the country. The telephone came in after the country was developed.

Billions Are Hard to Comprehend

When we speak of the American railroad system we, of course, have something in mind, and while it is not a concrete system under one control, like the Pennsylvania Railroad, we will say, it is in a general way a system that coordinates with itself, but is made up of more than 1,800 separate and independent companies. Now those 1,800 companies have altogether about 260,000 miles of main line. They own about 2,300,000 freight cars and about 60,000 locomotives, and something like 55,000 cars designed for passenger train service. So far I have been able to discuss the matter and keep within terms of millions. But immediately we begin to discuss the earnings, the costs and performance of the property, we get into terms of billions. But we cannot discuss the railroad problem without talking in billions. For instance, the books of the carriers show that this great property has cost something like twenty billions of dollars to start with. It depresses many people when they think how much money we must have in the property and how much of it probably we did not get properly. It is because the size is so great that that feature is misunderstood in the beginning.

Then we try to talk about the performance of the railroads. Immediately we say they earn six or seven billions of dollars a year and some one says that is as much as the value of all the farm crops in a certain period and consequently there must be something wrong about it. But the railroads not only carry the crops from the farms, but they perform a general service for all the people in the United States that can only be put in concrete terms when we say they carry 448 billions of ton miles a year. No one understands, certainly I do not, what is meant by this figure. I have no definite conception of 448 billions of ton miles. I can put it in another way and comprehend it a little better. For instance, it works out this way: the railroads carry 4,000 tons one mile every year for every man, woman and child in the country. Putting it another way: they carry ten tons 400 miles for each inhabitant of the country. Then in addition to that they carry billions of passenger miles, which no one under-

stands, but again when these passenger miles are resolved into somewhat simpler terms, they are the equivalent of 400 miles of travel annually by every man, woman and child in the country. Now when we consider the amount of traveling for every individual to me it does not seem so unreasonable when it is said the railroads tax each person, if it is a tax, some fifty or sixty dollars a year. My own investigation leads me to think that the people get more for \$50 or \$60 a year which they pay the railroads, than they get from any other concern or undertaking to which they pay money.

The trouble is that we talk in such big figures all the time that no one understands what we are talking about. When we get into billions, millions become minimized. They lose their relative value. To illustrate: I saw not long ago a statement by the statistician of the director general of railroads—he was pointing out the accomplishments of federal control—and he said that one of the outstanding accomplishments was this fact: the director general was able to re-route the business so as to cut out circuitous routes which had saved the movement of 17,000,000 car miles a year. Well, 17,000,000 car miles is a great many car miles to save a year, and if we were in the habit of discussing this problem in terms of millions, no doubt it would have a relative value of some importance, but when you consider that the total car miles which the railways moved in the year was 23,000,000,000, then your 17,000,000 becomes .07 of one per cent.

The Seasonal Problem

The other problems I have said are seasonal, periodic and economic. Take the seasonal problem. One of them which I call seasonal was the situation that confronted the railroads last summer. We had just come out of a war. There was banked up, so to speak, a great amount of goods to be moved. During the war the government had not been able to keep up increasing the facilities of the railroads. During the war there was a most prodigious increase of all kinds of productive capacity in our country. Farmers cultivated more land, old factories were enlarged, new factories were built, and all that sort of thing; but the railroads stood still. It happened that in spite of the fact that some people said they had broken down, they were, nevertheless, able to move all the things necessary to carry on the war, and consequently nothing was done to increase their facilities—that is to say, nothing of real permanent value.

Heavy Requirements and a Depreciated Plant

For instance, the director general during the 26 months' period of federal control, bought 100,000 freight cars. Now 100,000 freight cars is a lot of freight cars, but we wear out almost a hundred thousand every year—50,000 anyway—and he bought in the 26 months only what the railroads themselves were in the habit of buying every twelve months. So you can see at the end of the war, after having sustained unusual service, the railroads were not only inadequately equipped, but their equipment was in an impaired condition. I do not speak of that to criticize at all. I am simply telling you the facts so you will understand the situation. When the roads were turned back to their owners on March 1 of last year, the owners of the properties were called upon to perform the largest service of transportation ever performed

*An address delivered before the annual meeting of the National Civic Federation at New York.

and with this plant which had been allowed to depreciate.

During the war movement of materials for road building, for house building and for other projects not necessary in conducting the war was virtually stopped. When the war was over, everybody wanted to ship all at once. The railroads were confronted with a difficult task and their immediate problem was a very vital one, at least from the standpoint of those who favor the continuation of private ownership and control. So from that point of view, this particular problem developed last spring: Is it possible for 1,800 different railroad companies to so function and work together that they can, under private ownership with government regulation, perform in the aggregate as great an amount of service as they could perform if they were unified under one general manager or director general?

Last summer the roads—the 1,800 separate companies working together in a common interest—appreciated that it was expected of them that they should do as much as had been done with the same plant under government control. The result was that the combined tonnage carried by all the railroads was 448 billion ton miles, as I have stated. The largest sum ever carried before was 440 billions. So the railroads showed that, acting independently under the present law, they could realize the benefits of unified control just as well as they could be realized under government operation, and as a matter of fact within the same period of time and with the same plant, they carried eight billion ton miles more than the plant had ever carried before. Now, that was one of the problems. I think we got away with that problem rather successfully.

Today's Problem Concerns Net Earnings

Today the railroads are looking for tonnage to carry. I suppose the business the railroads are carrying today is 30 per cent in volume less than it was last summer. And the problem now is no longer how can we give the maximum service with a given plant, but how can we obtain necessary earnings to maintain the institution of private ownership. That is the problem today. It shifts. The problem is never the same from one time to another, except the difficulty of being understood. That is always there. Today the problem is one of net earnings.

Increased Percentage of Gross

Earnings Paid for Labor

This matter brings in the cost of operation and leads us immediately to another problem, and a very important one, and that is the labor problem. Now the labor problem is very important with the railroads because so large a part of all the money collected by the railroads is immediately paid out for labor. I suppose at the moment—but I do not know, and neither does any one else know because there are no general figures available at this time—that out of every dollar that the railroads collect at least 60 per cent is being paid out for labor. Before the war that percentage used to vary around 40 to 45. It gradually got up to 60. It is too high. It must come down. Just how it is going to be worked out, I do not know. The railroad rates are as high probably as they ought to be and certainly no one could recommend that they should be raised any more at this time. Still it is a matter of common knowledge that with the rates high as they are, many of the important railroads today are not earning their operating expenses and very few are earning their full interest at the present time.

Now, of course, that cannot go on as a permanent thing and if the rates cannot be increased and the volume of business does not increase, then the cost of doing business must be reduced, or the scheme will fail. I do not think the scheme will fail. I expect business will gradually get some better and finally get back where we would like to see it.

I am not one of those who wants to see conditions back as they were before the war. Take the labor matter. Before

the war, it was generally recognized that railway workmen were relatively not receiving as high wages as workmen in other undertakings. There are reasons for that which I need not go into. But the difference became accentuated as we got into the war. Some of the wages of the workers in effect today—many of them perhaps—will probably have to be readjusted downwards. I do not think that the time has come for that as yet. But there is a matter in connection with the labor of the railroads that is demanding serious thought. During the period of federal control the so-called National Agreements were entered into between the director general and the mechanical crafts.

In the working out of those National Agreements conditions arose which, in my opinion, are not right at the present time—if, indeed, they were ever right. The attitude of the railroads before the Labor Board is that those features in the national contract which have the effect of, we will say, discouraging efficiency—have the effect of paying men for work that is not performed—should be eliminated. It is a general thought, too, that the unskilled laborers upon the railroads are perhaps being paid more now than is justified under all the circumstances, because we must bear this in mind: whatever the wages paid by the railroads are, the public must pay through rates and charges. Not only that: if the public should be willing to maintain a rate of wages that is unreasonably high for a certain class of workmen, then the farmers and other employers of the same kind of labor would be obliged to pay similar wages, and that gets into the cost of living. No one wants to see any workman working for a wage that is not fair and is not reasonable, considering all the circumstances.

We will save a considerable sum of money in the purchase of supplies, the price in that connection having gone down materially in the last two or three months. The railroads are reducing their forces now because it is found with a lesser volume of business that so many men are not necessary, and then the older men who are coming back to their original jobs are more efficient, and fewer men do more and better work. This is enabling the railroads to reduce the labor charge somewhat.

Praise for the Transportation Act

Now there is only one other problem I will speak of just now although I might refer to many. That is the problem which must be ever present in the minds of those who favor private ownership and control of the railroads. It is this: does the Esch-Cummins Act make private operation possible? I believe it does. Whether private ownership and operation of the roads continue or not depends upon whether the people want it to continue, and will be satisfied with the service the roads give them. It gets back to the railway managers themselves. If they give the public a service that measurably meets the public requirements, then I believe the public will want private ownership to continue.

I think that perhaps what I have said is sufficient to give an indication of some of the problems that the railroads are trying to overcome at the present time. The most important of all is the difficulty of being understood. The second problem, which is always in reserve, and may be up for discussion at any time, is this: can the railroads, under 1,800 individual companies, co-ordinate their efforts so as to give the maximum service in times of emergency? I say they can because they have. The next is, can they so work out their operations, adjust their costs—labor, material and so forth—so as to live on the rates that the people in this country can afford to pay? At the moment that is our serious problem, but when I reflect that in the past the railroads in this country have paid the highest wages paid by railroads anywhere in the world and at the same time have moved their freight cheaper than it has been moved anywhere else in the world. I cannot help believing that we are going to do it again. I believe we will overcome that problem also.

General News Department

The Western Railway Club will hold a meeting at the Sherman Hotel, Chicago, on February 21, at which G. M. Basford will address the club on "The Foreman." Motion pictures entitled, "For the Good of the Commonwealth," distributed by the Commonwealth Steel Company, will be shown.

Ten Pullman conductors and three other persons have been arrested at Pittsburgh, Pa., on charges of stealing tickets of the Pennsylvania Railroad. It is said that discovery has been made of large thefts carried out by the conductors in taking up tickets and then, through third parties, having them redeemed as unused.

Governor Miller, of New York, has proposed to the legislature that New York harbor (which is also Jersey City harbor) be controlled, so far as State legislation is concerned, by a governor, or governing board, acting under the joint authority of the two states, New York and New Jersey, and that action be taken at once looking to the necessary agreement or treaty between the states.

W. J. Tollerton, general mechanical superintendent of the Chicago, Rock Island & Pacific and chairman of the Mechanical division of the American Railway Association, has been designated as American reporter to the International Railway Congress to be held at Rome, Italy, in April, 1922, on question No. VII—Passenger Carriages.

A list of other reporters and questions to be reported on appeared in the *Railway Age* of June 18, 1920 (page 1925).

The extinguishment of fires on Pennsylvania Railroad property, in the year 1920, by the fire brigade made up of the company's employees resulted, without doubt, in saving much property which, if dependence had been placed wholly on outside firemen, would have been lost. A record of fires put out with the company's apparatus before the arrival of the city fire department shows a loss of only about one-eighth of 1 per cent of the insurance value of the properties endangered. The number of fires thus extinguished was 223, and the loss amounted to only \$28,725, whereas the property saved had an insurance valuation of \$23,000,000.

Nathan L. Miller, Governor of New York, has proposed to the legislature new statutes radically reorganizing the public service commissions and providing for the relief of the subway and elevated lines in New York City, which are now operating at a loss, the fares being still five cents. The commission for the First District (New York City) would be made one of three members, instead of one member as at present, and would devote itself wholly to matters of "rapid transit." It would have broad powers in the regulation of fares. The commission sitting at Albany (Second District, five members) would regulate all other public service functions throughout the State. It is proposed to make the terms of members fifteen years, so as to minimize political influence.

Treasury Payments to Railroads

The Treasury Department announced on February 14 that it had paid out \$181,064,637 to railroads for loans from the \$300,000,000 revolving fund; \$262,514,874 for advances on account of the six months guaranty, \$1,311,700 as final payment of the guaranty, and \$841,812 to short lines for reimbursement of deficits during federal control.

Foreign Trade Convention

The National Foreign Trade Council will hold its eighth national convention at Cleveland, Ohio, on May 4, 5, 6 and 7. The present difficulties of our foreign trade will be discussed at length with a view of surmounting them. Particular attention will be paid to the unfavorable exchange situation and there will be, in addition, group sessions to discuss the various problems of those interested in particular phases of foreign trade.

Railroad Guaranty Bill in Senate

The Winslow bill, providing for partial payments to the railroads on account of their guaranty for the six months following the termination of federal control, was considered by the Senate committee on interstate commerce in executive session on Wednesday and it was decided to report the bill out at once with the amendment added when it was passed in the House, in lieu of the Townsend bill to accomplish the same purpose. Consideration of the bill in the Senate has been delayed by appropriation bills but it was expected to take it up and pass it on Thursday, probably at a night session, although Senator LaFollette was expected to oppose it. It is not now expected that the other Townsend bill, which is a substitute for Section 10 of the Clayton law, can be put through at this session but it was to be considered by the Senate committee on Friday.

Hearing on Clayton Law Substitute

A brief hearing was held on February 11 before the House Committee on Interstate and Foreign Commerce on the bill proposed as a substitute for Section 10 of the Clayton law, which was originally introduced by Representative Esch and Senator Frelinghuysen at the request of the Association of Railway Executives, but has been reintroduced by Senator Townsend. It has been favorably reported by the Senate Committee as modified in accordance with suggestions made by the Interstate Commerce Commission. Alfred P. Thom, general counsel for the Association of Railway Executives, and Chairman Clark of the commission advocated the passage of the bill and Chairman Clark urged that, because of the short period remaining of the Congressional session, the form of the Townsend bill be adhered to in the interest of expedition. He pointed out that the provisions of the Clayton law, which have been in effect since January 1, seriously interfere with transactions between railroad companies in a single system and that its application to security issues is inconsistent with the provisions of the transportation act which give the Interstate Commerce Commission complete jurisdiction over security issues.

Reduction of Rates and Wages Proposed in Congress

Representative Black of Texas on February 14 introduced in Congress a joint resolution directing the Railroad Labor Board to make further investigation of wages and salaries paid to railway employees under its decisions of July, 1920, and to make such changes and modifications in such decisions as it may determine are justified in the public interest and will at the same time award railroad employees just and reasonable wages. Mr. Black also introduced at the same time another joint resolution directing the Interstate Commerce Commission to review its decision of July 29, 1920, which allowed increased rates under section 15-a of the interstate commerce act, and to make such reductions, if any, in such rates as it may find to be just and reasonable. The resolutions were referred to the committee on interstate and foreign commerce. Mr. Black had previously made a speech in the House in which he asserted that railroad rates are now too high, but that they were necessitated by the increases in railroad wages made during the period of federal control and last year. He expressed the opinion that to get back to normal the question of rates and wages should be considered together.

Senator Trammell of Florida has also introduced a resolution in the Senate directing the Interstate Commerce Commission to investigate the present high freight rates on citrus fruits, vegetables and other perishable farm products with a view to bringing about early legislation that will result in a reduction of the existing rates on such products.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER AND TWELVE MONTHS OF CALENDAR YEAR 1920

Table with columns: Name of road, Average mileage during period, Operating revenues (Total, Passenger, Freight, Mail, Express, etc.), Maintenance of way and equipment, Trans-shipment, Traffic, Operating ratio, Net railway income, Net operating income (after rentals, less), and Increase (or decrease) comp. with last year.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER AND TWELVE MONTHS OF CALENDAR YEAR 1920—CONTINUED

Table with columns: Name of road, Average mileage operated, Operating revenues (Total, Freight, Passenger, Inc. misc.), Total, Maintenance of way and structures, Traffic, Transportation, General, Total, Operating ratio, Net railway operation, Operating income (or loss), Net after repairs, Increase (or decrease) comp. with last year.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER AND TWELVE MONTHS OF CALENDAR YEAR 1920—CONTINUED

Table with columns: Name of road, Average mileage operated during period, Freight, Passenger, Operating revenues, Total, Way and structures, Maintenance of equip., Equip. ment., Traffic, Trans- portation, Total, Operating ratio, Net operating income (or loss), Net railway operation, Net after rentals, Increase (or decrease) last year.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER AND TWELVE MONTHS OF CALENDAR YEAR 1920—CONTINUED

Table with columns: Name of road, Average mileage operated during period, Freight, Passenger, Operating revenues, Total revenues, Maintenance of way and equipment, Traffic, Trans- portation, General, Total, Operating ratio, Net from operation, Operating (or loss), Net at rentals, Net comp. with last year, Increase per cent.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER AND TWELVE MONTHS OF CALENDAR YEAR 1940—CONTINUED

Table with columns: Name of road, Average mileage operated during period, Freight, Passenger, Total operating revenues, Maintenance of way and structures, Equipment, Operating expenses (Traffic, Station, General, Total), Net from railway operation, Operating income (or loss), Net after rentals, Increase (or decrease) comp. with last year.

Civil Service Openings for Engineers

The United States Civil Service Commission announces an open competitive examination for senior mechanical engineers. Grade 1, salaries \$3,000 to \$5,000. A vacancy in the Bureau of Locomotive Inspection and vacancies in positions requiring similar qualifications at salaries ranging from \$3,000 to \$5,000 will be filled from this examination. Applications should be made on form 1312, which must be filed with the Civil Service Commission, Washington, D. C., not later than March 29.

December Earnings

The net operating income of 188 roads that have thus far reported to the Interstate Commerce Commission for December amounts to only \$14,807,000. On this basis the net operating income of all the roads could hardly exceed \$20,000,000, whereas to earn 6 per cent on the valuation used by the Interstate Commerce Commission in the rate case the December net operating income should have been approximately \$86,000,000. The returns available cover an average mileage of 215,000. The 188 roads had total operating revenues amounting to \$482,000,000, which was an increase of 21.6 per cent as compared with December, 1919. Their operating expenses were \$437,000,000, an increase of 20.2 per cent, and the net operating income represents an increase of 43.3 per cent as compared with December, 1919. The railroads reporting for the Eastern district had a net operating income of only \$1,660,000, those for the Southern district \$7,547,000 and those for the Western district \$5,599,000. The Western roads had earned over \$8,000,000 in December, 1919, but the roads in the other two districts made a better showing in 1920 than in 1919.

Hoover Appoints Committee on Waste

At the meeting of the executive board of American Engineering Council at Syracuse, N. Y., on February 14, Herbert Hoover announced the personnel of the Committee on Elimination of Waste. This is a continuation of the movement started by Mr. Hoover when he was elected president of American Engineering Council. The main points of his plan were outlined in his speech before that body at Washington, D. C., and appearing on page 933 of the November 26, 1920, issue of the *Railway Age*. The men composing the committee are representative of managerial, consultant, educational, editorial and other activities. The committee is as follows: J. Parke Channing, New York, chairman; Dr. Ira N. Hollis, Worcester, Mass.; L. W. Wallace, Baltimore, Md.; H. R. V. Scheel, Passaic, N. J.; L. P. Alford, New York; George D. Babcock, Peoria, Ill.; F. G. Coburn, Bethlehem Shipbuilding Company; Morris L. Cooke, Philadelphia, Pa.; Harrington Emerson, New York; E. E. Hunt, New York; C. E. Knoepfel, New York; Robert Linton, Fred J. Miller, J. H. Williams, New York, and Robert B. Wolf, New York. Mr. Hoover is also a member of this committee.

The council gave formal approval to the action of the committee on procedure requesting that President Harding put an engineer on the Interstate Commerce Commission. The procedure committee was authorized to name six qualified engineers when requested to do so. It was recommended that engineering efforts be extended to the whole question of government reorganization planned under a special congressional committee. The plan for the registration of engineers as presented in the council's report was endorsed and the appointment of another committee was authorized. The Russian Affairs committee was made a new committee on International Relations, the personnel of the old committee being retained. The council decided to recommend to President Harding that an engineer be appointed assistant secretary of war.

While other problems came up at this meeting, such as the betterment of patent office conditions by the passage of the Nolan bill and the establishment of a National Department of Public Works, the work of the meeting was confined chiefly to organizing and getting under way its first big task, that of eliminating economic waste. L. W. Wallace, Philadelphia, Pa., was elected permanent executive secretary and will have full charge of the New York and Washington office of the society. The April meeting of the board will be held in Philadelphia.

Traffic News

A permanent injunction restraining the state of Illinois from interfering with the collection by the railroads of the increased passenger rates was granted by the United States District Court of Appeals at Chicago on February 15.

Postmaster General Burleson has asked Congress for an additional deficiency appropriation of \$1,900,000 for the increased railway mail rates for the four months ending June 30, 1920. He had previously obtained an appropriation of \$8,000,000 for the period based on an estimate.

At the transportation discussion held by the Traffic Club of Chicago on February 15, H. C. Barlow, R. C. Ross, J. J. Pelley and Samuel O. Dnnn addressed the club on the subject of "Railroad Consolidations." Mr. Pelley, a member of the Car Service Commission, discussed the terminal feature of this problem.

The Miami Valley Traffic Club was organized at Dayton, Ohio, on January 25, with a membership of 175. A governing board was elected and on February 7 this board elected officers for the club as follows: W. E. Boyer, district representative, Pennsylvania Lines, Dayton, president; T. T. Webster, traffic manager, G. H. Mead Company, Dayton, vice-president; F. L. Marshall, traffic manager, Pioneer Pole & Shaft Company, Piqua, Ohio, second vice-president; H. T. Ratliff, traffic manager, Champion Coated Paper Company, Hamilton, Ohio, third vice-president; R. B. Mann, fourth vice-president; Maurice T. Otto, traffic manager, Dayton Chamber of Commerce, secretary; and R. H. Hagerman, treasurer.

American Railway Association—Traffic Division

J. E. Fairbanks, General Secretary, announces that the Traffic Division of the American Railway Association has been reorganized and that the membership of the General Committee is as follows:

Representing Traffic Executive Committee, Eastern Territory.—G. H. Ingalls (N. Y. C.); G. D. Dixon (Penn.); Gerrit Fort (B. & M.); F. Zimmerman (C. I. & L.).

Representing Western Traffic Executive Committee.—L. J. Spence (S.P.); H. M. Adams (U. P.); S. G. Lutz (C. & A.); C. E. Perkins (M. P.).

Representing Executive Committee, Southern Freight Rate Association.—Lincoln Green (Southern); R. A. Brand (A. C. L.); J. L. Edwards (A., B. & A.); F. B. Bowes (Ill. Cent.). G. H. Ingalls is chairman, and J. Gottschalk, secretary, with headquarters at 143 Liberty Street, New York City.

Iowa Legislature Objects to I. C. C.

Jurisdiction Over State Rates

Senator Kenyon of Iowa has presented to the Senate a concurrent resolution adopted by the Iowa legislature calling upon Congress "to so amend the transportation act and in such plain language that the authority of the states over intrastate traffic in their respective territories will be maintained without an opportunity for misrepresentation." The resolution says that the Interstate Commerce Commission in its recent decision in the Illinois case interprets the transportation act as giving it "complete authority over the railroads, the entire field of transportation, the traffic itself and of the instrumentalities and means of carrying it on." This, the resolution declares, means that "the laws of the states and their officers are defied and that the federal commission has assumed exclusive authority over the railroads." It is declared that the freight and passenger rates are already burdensome to the producers and consumers, "with the likelihood that the railroads will ask for further increase in rates, with no consideration apparently having been given in the recent raise in rates to the low cost of construction and operation in the prairie states."

Equipment and Supplies

Locomotives

THE KOPPERS COMPANY, Pittsburgh, Pa., is inquiring for 2 locomotives.

THE TEXAS-MEXICO is inquiring for some 0-6-0 and 4-6-0 type locomotives, to be equipped for burning oil.

Freight Cars

THE WAH CHANG TRADING CORPORATION, Woolworth building, New York, has ordered 20 flat cars of from 12 to 15 tons capacity, from the Magor Car Company, for export to Hong Kong, China.

Iron and Steel

THE LOS ANGELES & SALT LAKE is inquiring for 10,000 tons of rails.

THE GREAT NORTHERN has ordered 11 plate girder spans with a total of 367 tons of steel, from the Wisconsin Bridge & Iron Company.

Railway Construction

AHUKINI TERMINAL & RAILWAY COMPANY.—This company has applied to the Interstate Commerce Commission for a certificate authorizing the construction of a narrow gage line on the Island of Kanae, Hawaii.

ATCHISON, TOPEKA & SANTA FE HOSPITAL ASSOCIATION.—This company is asking for plans and specifications for a 100-room modern hospital, with two stories and basement and a separate building for a nurses' home at Albuquerque, New Mexico. Dr. J. P. Kaster, Topeka, Kan., is chief surgeon.

CHICAGO UNION STATION.—This company is accepting bids for the construction of a new railway mail terminal between Harrison and Van Buren streets and the Chicago river, Chicago.

GREAT NORTHERN.—This company, which was noted in the *Railway Age* of January 28 (page 308), as accepting bids for the erection of a 500-ton frame coaling station at Troy, Mont., has awarded the contract for this work to the Howlett Construction Company, Moline, Ill.

LOUISVILLE & NASHVILLE.—This Company has awarded a contract to the Union Bridge & Construction Company, Kansas City, Missouri, for the construction of foundations and masonry for a bridge across the Alabama river near Montgomery, Ala.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—This company contemplates the construction of a brick passenger station and a new freight house at Menasha, Wis., at an estimated cost of approximately \$100,000.

MISSOURI, KANSAS & TEXAS.—This company is making location surveys for the line it contemplates building from Austin, Tex., to San Marcos, a distance of 31 miles.

MISSOURI, KANSAS & TEXAS.—This company, which was announced in the *Railway Age* of February 4 (page 349), as accepting bids for the construction of a reinforced concrete inbound freight house at Dallas, Tex., with dimensions 50 ft. by 600 ft., with a second story office, 50 ft. by 100 ft., to cost about \$350,000, has awarded the contract for this work to Hickey & Montgomery, Dallas.

OREGON SHORT LINE.—This company contemplates the construction of a new timber-treating plant at Pocatello, Idaho.

THE REGAN AUTOMATIC TRAIN STOP has been tried on the State Railroad of France, under the direction of Joseph Beaumont, chief engineer of the Regan Company.

Supply Trade News

A. E. Brown has been appointed general manager of the railroad department of the **Truscon Steel Company** with headquarters at 22 W. Monroe Street, Chicago.

H. A. Kuehle, who has been engaged in the sale of power apparatus for the **Western Electric Company**, has been placed in charge of railroad sales in the Cleveland office. Mr. Kuehle graduated from the Case School of Applied Science in 1904 and has been with the Western Electric Company since 1914.

Harry L. Oviatt, has been appointed travelling representative of the **Armstrong Manufacturing Company**, Bridgeport, Conn., manufacturers of pipe threading tools and taps. Mr. Oviatt has been with the Bullard Machine Tool Company, Bridgeport, for the past 13 years; for the last 3 years connected with its advertising department.

Alexander England, who has been appointed chief engineer of the **Westinghouse Air Brake Company**, Wilmerding, Pa., as was announced in the *Railway Age* of February 11, has been



A. England

a member of the Air Brake organization for the past 22 years, and since 1914 he has served as assistant chief engineer. Mr. England was born in Dundee, Scotland, and was indentured at an early age with the Scotch firm of Pierce Brothers, engineers and shipbuilders, to serve an apprenticeship in marine engineering. After having completed his apprenticeship and finished a course of study that earned him a diploma in mechanical engineering from the City and Guilds of London Technical Institute, he entered the service of the Mercantile Steamship Company of London as an engineer in the Mediterranean and Black Sea trade. In 1887 he left the marine service and went to Pittsburgh, Pa., where he took a position as assistant superintendent of the firm of Thomas Carlin's Sons, manufacturers of hoisting engines, brick plant machinery, etc. Later he became superintendent of the Specialty Manufacturing Company, Allegheny, engaged in general machine building. He then went to the Jones & Laughlin Steel Company to assist in the reconstruction of the Eliza furnace plant at Pittsburgh, as engineer in charge of designs for special machinery and equipment for the handling of coal and coke. In 1898 he went to the Westinghouse Air Brake Company to take up special work under the chief engineer, and he has been in the service of the company continuously since that time. He was made chief draftsman in 1905, and remained in that capacity until 1914, when he was appointed assistant chief engineer.

P. F. Merritt, formerly assistant to purchasing agent, Central region of the Pennsylvania Railroad, in charge of coal purchases, has been elected vice-president of the Eastern Fuel Company, affiliated with the American Coke Corporation, the Georges Creek Coal Mining Company and the Reilly-Peabody Fuel Company. Mr. Merritt's headquarters are at the general offices of the company, Pittsburgh, Pa.

Max Grant, who has been associated with the Tropical Paint & Oil Company, Cleveland, Ohio, has been appointed manager of technical railway sales, of the **Glidden Company**,

Cleveland, and **M. F. Emrich**, formerly vice-president and general manager of the Campbell Paint & Varnish Company, St. Louis, a subsidiary of the Glidden Company, has been appointed general sales-manager of the industrial division of the Glidden Company, with headquarters at Cleveland.

N. B. Payne & Co., 25 Church street, New York, dealer in electric cranes and hoists, has extended its lines of material handling machinery to include the portable conveyors of the A. C. Warner Company, Philadelphia, Chicago Automatic Conveyor Company's coal elevators and the McKinney-Harrington Company's package pilers and car loaders. **Edmund Otto**, for several years secretary of the Hardware & Supply Company and prior to that associated with Manning, Maxwell & Moore, Inc., New York, is now associated with N. B. Payne & Co., in this branch of its business.

George J. Blanton, who for the past 4 years has been connected with the engineering sales department of the **Chain Belt Company**, Milwaukee, Wis., has been appointed New York district manager for this company. Mr. Blanton entered the service of the Chain Belt Company in 1917, previous to which he had been, for 8 years, with the General Electric Company, 3 years of which were spent in Schenectady, N. Y., and 5 in the Milwaukee office. Mr. Blanton is a graduate of the University of Michigan, College of Mechanical and Electrical Engineering, class of 1909.

At the annual election of officers of the Concrete Mixer Association of the United States, held at Chicago on January 28, Clifford S. Messinger, general sales manager of the Chain Belt Company, Milwaukee, Wis., was elected president; W. B. Knickerbocker, of the Knickerbocker Company, Jackson, Mich., was elected vice-president and A. T. Scannell of the Archer Iron Works, Chicago, was elected treasurer. H. E. Smith, president of the T. L. Smith Company, Milwaukee, Wis., was made chairman of the executive committee, while P. A. Koehring, secretary of the Koehring Machine Company, Milwaukee, Wis., and Z. W. Carter, sales director of the Austin Machinery Corporation, Chicago, were elected members of the executive committee.

Successful operation during the past year, under the Webb-Pomerene act, is reported by the Locomotive Export Association, New York City, in its annual report to the Federal Trade Commission. Large foreign orders were secured in Belgium and Roumania, and executed at the American plants which are members of the association. The report states that: "We believe the arrangement under which the Locomotive Export Association has been operating proved of decided advantage to the locomotive building industry, and is likely to be of still greater advantage when the locomotive builders of the United States will have to face the keen competition of European builders, which is already making itself manifest in South America and in the Far East."

"Before the war, Great Britain and Germany controlled the European locomotive market," the Commission says in a press notice in this report. "But in recent years the United States has been the only country prepared to ship locomotives in quantity, and our industry has made rapid strides. Total exports of steam locomotives from the United States in the year 1920 numbered 1,711, valued at \$53,629,847, showing an increase over the exports in 1919, which were 959, valued at \$30,275,728."

Locomotive Superheater Company Takes Over Locomotive Feed Water Heater

The Locomotive Superheater Company, New York, has acquired the patents and business of the Locomotive Feed Water Heater Company, also of New York. Feed water heating and superheating have many factors in common, and logically the former can best be perfected by a combined organization broadly experienced and trained in this field. During the past few years remarkable progress has been made in successfully adapting feed water heaters to locomotives, and if the thermal efficiency of the locomotive is to be further increased the development of the feed water heater should be conducted with a full knowledge of the engineering features of the superheater.

The Locomotive Superheater Company will conduct the further

application of the apparatus for preheating feed water through its regular engineering, inspection and service organizations, to which has been added the operating organization of the Locomotive Feed Water Heater Company. This consolidation of resources and effort promises more intensified development and better service to the railroads.

Baldwin Locomotive Works

The annual report of the operations of the Baldwin Locomotive Works for the year ended December 31, 1920, issued on Tuesday of this week shows that the company made a net profit for the year after Federal taxes and charges of \$4,428,518. After the deduction of the preferred dividends of \$1,400,000, there was a balance of \$3,028,518, equal to \$15.14 a share on the \$20,000,000 common stock as compared with \$4,376,243, or \$21.88 a share in 1919.

The gross sales for the year were \$73,542,666 as compared with \$84,307,776 in 1919 and \$123,179,251 in 1918. The profit in 1920 after the deduction of manufacturing costs, the addition of other income and the deductions of taxes, other than Federal taxes, etc., was \$8,407,269 as against \$8,871,243 in 1919. From this profit there was deducted in 1920 an amount of \$1,100,000 for Federal taxes and \$2,878,751 representing the entire manufacturing profit on the company's credit sales for the year. The item of \$1,100,000 for Federal taxes is the smallest for several years—deductions for this purpose in 1919 being \$3,095,000 and in 1918 \$12,509,817. Dividends on the common stock were paid at the rate of 7 per cent amounting to \$1,400,000. The total paid out in dividends in 1919 was \$700,000 and in 1918 and 1917 no common dividends were paid.

The consolidated balance sheet of the Baldwin Locomotive Works and Standard Steel Works Company as of December 31, 1920, follows:

Assets	Liabilities
Bald. Loco., 1920, real estate, etc. \$27,439,263	B. L. pf. stock..... \$20,000,000
Sid. Stl., real est., etc. 9,661,333	B. L. common stock.... 20,000,000
Patents and good will. 377,504	Bld. st. m. b. 19,000,000
Investments 377,504	Sid. S. 1st m. bonds..... 2,400,000
Inventories 20,182,280	Accounts payable..... 10,059,910
Accounts receivable..... 22,333,358	Bills payable..... 16,000,000
Bills receivable..... 6,574,987	Sav. funds..... 2,113,789
Securities, bonds, etc. 14,809,904	Empl. beneficial assn.
Cash 1,543,082	Special and Kus. deposit
Miscellaneous 307,351	Advances
Skg. fd. 1st mtge bonds. 1,403,425	Interest 726,564
Total \$104,532,487	Res. for den. cont., etc. 171,335
	Res. for tax..... 1,509,961
	Res. for def'd profits. 2,878,751
	Sinking fund..... 2,600,000
	Surplus 16,072,477
	Total \$104,532,487

Obituary

Raymond H. Pilson, third vice-president of The Ajax Metal Company, Philadelphia, Pa., died on February 4.

C. B. Schoenmehl, president and treasurer of the Waterbury Battery Company, Waterbury, Conn., died at his home in Waterbury on February 14.

Trade Publications

LOCOMOTIVE CRANES, CRAWLER CRANES AND CRAWLER SHOVELS.—Victor R. Browning, Cleveland, Ohio, has issued three eight-page bulletins describing the line of cranes and shovels and drag-line excavators manufactured by that company. The superstructure of these cranes may be mounted on double trucks or single trucks for operation on standard gage railway tracks or on caterpillar travelers. The use of grab buckets, shovel buckets and drag-line excavators is also illustrated.

BROWNLEE & GREEN, LTD., Manchester, England, have recently reprinted an article by David Brownlie entitled "Exact Data on the Performance of Steam Boiler Plants, Average Figures for the Performance of Some Different Types of Steam Boilers." The author points out that the figures usually taken in practice are entirely erroneous and presents data obtained as a result of investigations during ten years of nearly 500 boiler plants, giving the average figures for different types of boilers.

Railway Financial News

BOYNE CITY, GAYLORD & ALPENA.—*Authority to issue notes.*—This company has been authorized by the Interstate Commerce Commission to issue from time to time within two years, short term promissory notes to the amount of \$250,000, payable within two years with interest at 7 per cent, to secure loans to pay maturing short term loans, interest on funded debt, obligations for equipment, taxes and payments on interchange roads.

CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA.—*Authority to issue notes.*—This company has been authorized by the Interstate Commerce Commission to issue its 6 per cent promissory note for \$1,000,000 in renewal of a note of like amount to the Chicago & North Western and to repledge \$1,200,000 of debenture gold bonds as security therefor.

CENTRAL OF NEW JERSEY.—*Delayed dividend declared.*—A decree filed by Judges Buffington, Woolley and Davis in the Federal District Court at Philadelphia relative to the Lehigh & Wilkes Barre Coal Company (see article entitled Reading Dissolution Plan Filed at Philadelphia, on another page), reads in part as follows:

"It is hereby ordered adjudged and decreed that the decree heretofore entered in this suit and the injunction issued pursuant thereto be and hereby are modified so as to permit the Central Railroad of New Jersey to collect and receive any dividends upon the stock of the Lehigh & Wilkes Barre Coal Company owned by it which have been or may be declared previous to the disposal thereof, pursuant to the directions of this court."

Acting in pursuance of this order the directors have declared the semi-annual dividend of \$2 per share, payable February 25 to holders of record February 23. The postponement of the dividend was noted in the *Railway Age* of December 31, 1920, page 1182.

DELAWARE & HUDSON.—*Authority to issue stock.*—This company has been authorized by the Interstate Commerce Commission to issue not to exceed \$9,634,000 of common stock to be used for the conversion of its 5 per cent, 20-year convertible gold bonds.

GREAT NORTHERN.—*New Directors.*—W. P. Kenney, of St. Paul, Minn.; E. E. Loomis, president of the Lehigh Valley; Nicholas Terhune and H. F. Smith, of New York, have been elected directors to succeed A. D. Thompson, deceased, of Duluth, Minn.; J. E. Reynolds, A. B. Hepburn and Seward Prosser, of New York. The three last named were compelled to resign because of Section 10 of the Clayton Act.

HOCKING VALLEY.—*Authority to issue bonds.*—This company has been authorized by the Interstate Commerce Commission to issue \$2,037,000 of its general mortgage bonds and to pledge \$2,220,000 of its general mortgage bonds with the Secretary of the Treasury as security for a loan from the United States.

ILLINOIS CENTRAL.—*Authority to pledge bonds as security for loans.*—This company has been authorized by the Interstate Commerce Commission to pledge from time to time \$20,234,000 refunding mortgage 4 per cent gold bonds as security for the payment of current short term loans. Authority was also granted to issue \$3,708,000 Illinois Central and Chicago, St. Louis & New Orleans joint first refunding mortgage bonds to reimburse the treasury of the Illinois Central for advances made for additions and betterments to the property of the Chicago, St. Louis & New Orleans and the Canton, Aberdeen & Nashville, and to pledge the bonds as security for short term loans of the Illinois Central.

ILLINOIS SOUTHERN.—*Sale and reorganization.*—See Missouri-Illinois Railway.

MISSOURI-ILLINOIS.—*Application for purchase of another line.*—This company has applied to the Interstate Commerce Commission for an order authorizing the purchase and operation of the railroad and other property of the Illinois Southern Railway to be operated in conjunction with the Mississippi River & Bonne Terre Railroad.

MISSOURI, KANSAS & TEXAS.—*Reorganization plan.*—J. & W. Seligman and Hallgarten & Co., will proceed with the reorganization plan for this company without waiting for the approval of the Dutch bondholders. It is expected that the plan will be filed with the Interstate Commerce Commission within the next two weeks.

MOBILE & OHIO.—*Authority to pledge bonds as security for notes.*—This company has been authorized by the Interstate Commerce Commission to repledge \$500,000 of St. Louis Division 5 per cent gold bonds as security for a loan or loans to be represented by short term notes of less than two years' maturity.

NASHVILLE, CHATTANOOGA & ST. LOUIS.—*Authority to issue bonds.*—This company has been authorized by the Interstate Commerce Commission to sell \$495,000 of first consolidated mortgage 5 per cent gold coupon bonds now in its treasury, for the purpose of reimbursing the latter for moneys expended in retirement of underlying bonds.

NORFOLK SOUTHERN.—*Loan approved.*—The Interstate Commerce Commission has approved a loan of \$311,000 to aid this road in providing itself with equipment and in making additions and betterments to ways and structures at a total estimated cost of \$622,000. The carrier itself is required to finance about \$311,000 to meet the loan of the government.

NORFOLK SOUTHERN.—*Authority to pledge bonds and notes as security for loan.*—This company has been authorized by the Interstate Commerce Commission to issue and pledge \$222,000 of first lien equipment notes and \$200,000 of first and refunding mortgage 50-year gold bonds with the Secretary of the Treasury as security for a loan of \$311,000.

PEARL RIVER VALLEY.—*Authority to issue notes.*—This company has been authorized by the Interstate Commerce Commission to issue promissory notes for \$25,000 to be dated as of November 3, 1920, and \$111,400 to be dated as of the date of issue, to take up outstanding notes, to cover open accounts and to provide funds for construction work in progress.

PITTSBURGH AND LAKE ERIE.—*Authority to issue notes.*—This company has been authorized by the Interstate Commerce Commission to issue \$750,000 of six months, 6 per cent promissory notes, dated February 4, 1921, and a similar amount to be dated February 26, 1921, in renewal of notes for like amounts to the Union Trust Company of Pittsburgh.

READING COMPANY.—*Protective Committee for Preferred Stockholders.*—A protective committee composed of Adrian Ilesin, R. B. Dodson, trustee of the J. A. Garland estate; E. G. Merrill, president of the New York Life Insurance & Trust Company, and W. A. Law, president of the First National Bank of Philadelphia, all of whom hold or represent substantial amounts of the first and second preferred stocks of the Reading Company, has been formed to protect the rights of the holders of these issues in the forthcoming Reading reorganization. See article on another page of this issue entitled "Reading Dissolution Plan Filed at Philadelphia."

SOUTHERN.—*Authority to issue bonds.*—This company has been authorized by the Interstate Commerce Commission to issue and sell at not less than 80 per cent of par and accrued interest \$950,000 of first consolidated mortgage 5 per cent bonds maturing July 1, 1924, for the purpose of retiring a like amount of Virginia Midland serial mortgage 5 per cent bonds, maturing March 1, 1921.

WISCONSIN & NORTHERN.—*Authority to issue notes.*—This company has been authorized by the Interstate Commerce Commission to issue and renew short term notes to the amount of \$500,000.

Dividends Declared

CANADIAN PACIFIC.—Common, 2½ per cent, quarterly; preferred 3 per cent, semi-annually; both payable April 1 to holders of record March 1.

CENTRAL OF NEW JERSEY.—2½, semi-annually, payable February 25 to holders of record February 23.

CINCINNATI NORTHERN.—3 per cent, annually, payable March 1 to holders of record February 1.

CRIPPLE CREEK CENTRAL.—Preferred, 1 per cent, quarterly, payable March 1 to holders of record February 15.

READING COMPANY.—2nd preferred, 1 per cent, quarterly, payable April 1 to holders of record March 28.

SOUTHERN PACIFIC.—\$1.50, quarterly, payable April 1 to holders of record February 2.

USON PACIFIC.—Common, 2½ per cent, quarterly; preferred, 2 per cent, semi-annually; both payable April 1 to holders of record March 1.

Railway Officers

Executive

W. H. Ogborn has been elected president of the Dayton, Toledo & Chicago with headquarters at Dayton, Ohio, succeeding John Ringling.

S. E. Cleage, general manager of the Knoxville, Sevierville & Eastern, with headquarters at Knoxville, Tenn., has been appointed receiver, with the same headquarters, effective Feb. 1.

Financial, Legal and Accounting

J. H. Lane has been elected secretary of the Dayton, Toledo & Chicago succeeding Richard Fuchs.

Parks C. Archer, assistant general claim agent of the Chicago & Alton, with headquarters at Chicago, has been promoted to general claim agent, succeeding J. H. Howard, who has resigned, effective January 20. He was born in Warren County, Mo., on May 2, 1877, and was on the editorial staff of a newspaper at Hannibal, Mo., before engaging in railroad work. He entered railroad service on July 1, 1905, as chief clerk to the district claim agent on the Illinois Central at Memphis, Tenn. A few months later he was promoted to division claim agent and served in that capacity until March 15, 1909, when he was appointed division claim agent on the Chicago & Alton, with headquarters at Mexico, Mo. In September of the same year, he was transferred to Chicago. On November 1, 1912, he was appointed chief clerk to the land, tax and claim agent. Mr. Archer had been serving as assistant general claim agent since February 1, 1917. During the war he was appointed acting general claim agent of the Chicago & Alton, the Chicago, Peoria & St. Louis, the Peoria & Pekin Union, and the Peoria Railroad Terminal Company.



P. C. Archer

this capacity, he was made auditor of disbursements. He was holding this position at the time of his recent promotion.

Operating

C. B. Gorsuch has been appointed superintendent of the Wheeling division of the Baltimore & Ohio with headquarters at Wheeling, W. Va., effective January 1, succeeding E. V. Smith, deceased.

C. F. Urbutt, assistant superintendent of the Iowa and Dakota divisions of the Chicago, Milwaukee & St. Paul with headquarters at Chamberlain, S. D., has been appointed trainmaster of the Iowa division with headquarters at Perry, Ia., succeeding F. A. Maxwell who has been transferred to Madison, Wis., effective February 15.

Traffic

H. L. Purdy has been appointed division passenger agent on the Wabash, with headquarters at Buffalo, N. Y., effective February 10.

J. M. Horn, general freight agent of the Canadian National with headquarters at Winnipeg, Man., has been transferred to a similar position at Vancouver, B. C., with supervision over the territory from Lucerne, B. C., west, including the Grand Trunk Pacific Coast Steamship Company, succeeding A. Brostedt, temporarily assigned to other duties.

Mechanical

O. C. Cromwell has been appointed assistant to the chief of motive power and equipment of the Baltimore & Ohio with headquarters at Baltimore, Md., effective February 1.

E. C. McGann has been appointed master mechanic of the Pittsburgh division of the Baltimore & Ohio with headquarters at Glenwood, Pa., effective February 1, succeeding W. C. Burel, resigned.

E. R. Lewis, editor of the Maintenance of Way Cyclopedia, one of the publications of the Simmons-Boardman Publishing Company, has been appointed office engineer of the Michigan Central with headquarters at Detroit, Mich., effective February 15.

J. E. Gould, master mechanic of the Charlotte Harbor & Northern with headquarters at Arcadia, Fla., has been appointed master mechanic of the Cumberland & Manchester with headquarters at Barbourville, Ky. **F. S. Markett** has succeeded Mr. Gould at Arcadia.

G. W. Ray, master mechanic on the Western division of the Chicago & Alton, with headquarters at Slater, Mo., has been transferred to the Northern and Southern divisions, with headquarters at Bloomington, Ill., succeeding M. J. McGraw, who has resigned, effective February 1. **F. Stone** succeeds Mr. Ray.

Obituary

F. C. Donald, commissioner of the Central Passenger Association with headquarters at Chicago, died February 14 at his home in Hubbard Woods, Ill.

E. S. Draper, principal assistant engineer of the Boston & Albany, died at his home in Boston, Mass., on February 6. Mr. Draper was born at Wayland, Mass., on February 19, 1883. After attending the public schools at Wayland he entered Tufts College and was graduated with the class of 1904. In January of the following year he entered the service of the Boston & Albany as a rodman and subsequently served the company in various capacities in the engineering department until March, 1912, when he resigned to become a draughtsman for the Stone & Webster Corporation at Boston. In April, 1913, he re-entered the employ of the Boston & Albany as assistant engineer and was appointed engineer of structures in January, 1918. In May, 1920, he was promoted to principal assistant engineer in which capacity he was serving at the time of his death.

Alfred Hermany, whose promotion to assistant general auditor of the Chicago, Rock Island & Pacific, with headquarters at Chicago, was announced in the *Railway Age* of February 11 (page 393), was born at Philadelphia, Pa., on August 29, 1869, and entered railway service in 1884. His first assignment was in the operating department of the Philadelphia & Reading and he later served in the office of the auditor of receipts. He left the service of the Philadelphia & Reading in 1887 to accept employment in the traffic department of the Star Union Line at Philadelphia. In 1891, Mr. Hermany assumed charge of traffic matters on the Pacific Coast Railroad, but after a year of service with this company he was appointed secretary to the president of the Spokane Falls & Northern. He was promoted to assistant auditor of this road in 1895, and four years later was made auditor and assistant manager of the Pacific & Idaho Northern. Mr. Hermany came to the Chicago, Rock Island & Pacific as a clerk on June 22, 1903, and was shortly promoted to chief clerk to the controller. In 1905, he was appointed auditor of passenger traffic, and after seven years of service in

EDITORIAL

Railway Age

EDITORIAL

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Only a few months ago operating officers were exerting every effort to move the traffic which was threatening to overwhelm them. Campaigns were being conducted to load more tons per car, to move cars more miles per day and otherwise to increase the amount of freight which could be handled.

A Problem of Another Character

Within the last three months the traffic has declined so rapidly that operating officers are now hard pressed to re-adjust their organizations and methods to bring their expenditures within the greatly reduced revenues. This problem has developed with startling rapidity and is of at least equal difficulty in solution. It may be academic to say that these conditions require operating officers to scrutinize every detail of their operation from a new viewpoint to ascertain wherein their methods may be revised to meet these new and changed conditions. The situation is so acute that no officer can afford to overlook any detail which may help in bringing his costs into conformity with his revenues.

Serious delays often occur to freight trains after they have been made up because of poor facilities for the delivery of running orders to the train crew preliminary to their departure. Oftentimes delays are occasioned by the necessity for the conductor's walking some distance for orders and then back to his train. Very often such a delay will upset a despatcher's lineup and cause a number of trains to lose considerable time at meeting points. In order to overcome this condition, one road has installed telephones, connected to the despatcher's circuit, at the outgoing ends of certain busy yards so that when a train is made up and ready to leave the conductor can communicate directly with the despatcher who gives him his running orders. The conductor copies these orders and deposits one copy in a locked box provided for that purpose after the order is completed. Serious delay is avoided and the despatcher has a better opportunity to handle train movements more efficiently. These telephones can be installed at slight expense, and in connection with automatic signals will contribute to more expeditious train movements.

Bettering Train Movements By Telephone

With printed bulletins containing reports of seventeen committees in the hands of the members, the opportunity for a thorough discussion of the committee work at the twenty-second annual convention of the American Railway Engineering Association is assured.

Getting Ready for the Convention

Those who attended the meeting last year will recall that many who took part in the discussion confessed a lack of thorough preparation owing to the fact that the bulletins did not reach their hands until just before the convention. This criticism will not apply to the meeting to be held next month since the bulletin containing the first three reports was issued early in December and three others have followed at regular intervals so that all but seven committee reports are now in bulletin form. Owing to the fact that responsibility for a considerable portion of the delay

last year can be laid at the door of the printer rather than that of the association, the latter cannot claim full credit for this improvement in the convention preparations although much of it unquestionably has resulted from the efforts of the officers and directors in pressing the work of the various committees. Be that as it may, the prompt appearance of the bulletins should be an important factor in bringing about a successful convention.

The South African Railways are advertising in this country, through the High Commissioner at London, for bids covering the electrification of two sections of their lines, as is announced elsewhere in this issue. One of the projects involves the line from Capetown to Simonstown. It is understood that this

South African Electrification Bids

improvement will be primarily to relieve congestion in the suburban district around Capetown. The other section to be improved lies between Durban, on the east coast, and Pietermaritzburg, a short distance in the interior. This second project is said to be for the purpose of securing a more economical operation of freight traffic over heavy grades. Both installations may be regarded, however, as largely experimental. The railway management will have the opportunity to study the results of electrification in the two situations where thus far it has been most generally used, i. e., in suburban service and on heavy grades. If the original installations prove their value there is hardly any doubt that the program will be extended, particularly on some of the heavy grades which are so numerous in South Africa. It is well known that there is a considerable factor of inertia in any market. If buyers begin purchasing from a certain group of manufacturers and the goods they buy are satisfactory, other conditions remaining the same, the market will tend to favor the original source of supply. It is to be hoped, therefore, that American concerns will succeed in securing contracts for at least a satisfactory portion of the materials and equipment for the electrification. The fact that the railways are advertising in this country is a sign that other of our products have already found favor in South Africa. It is to be expected, of course, that a certain prejudice for British goods will be encountered and, too, the factor of exchange may interpose some difficulties. Earnest efforts on the part of our supply manufacturers should, however, be able to counteract these obstacles at least to the extent that some substantial portion of these orders be placed in America.

J. J. Mantell, manager of the New York region of the Erie, in his address on the transportation problem of the metropolitan district of New York, before the New York Railroad Club on February 18, was, to say the least, somewhat unkind to the proposals recently advanced by the New York and New Jersey Port and Harbors Commission. Mr. Mantell was in charge of the railroad terminals in the New York terminal district for the Railroad Administration; he can be regarded,

New York Terminal Development

therefore, as a real authority on conditions at that city. We do not wish in this brief comment to go into the matter of the criticisms made by Mr. Mantell as to the plan of the commission, except to note that he expresses the opinion that the proposals of the commission, or others like them, are impracticable and that the results would not warrant the expense. He suggests what he believes to be a simpler solution in the form of rail-head deliveries on the steamship piers for export freight, and for domestic shipments the use of specially arranged motor truck bodies or detachable containers along somewhat the same lines as used at Cincinnati for interchange l. c. l. freight. The advocacy of the container system by an authority of Mr. Mantell's standing is a thing of no small importance, particularly inasmuch as he proposes it as a solution of a very difficult problem at our most important seaport and commercial center. Further than that, it bears out the conclusion of many other authorities that the idea of using containers of this and similar character has now gone beyond the visionary stage and has proved itself practical and a real element of progress in transportation.

No one can successfully challenge the statement that railroad shop foremen and gang leaders, by their direct contact with the workmen, play an all-important part in securing good shop output. To an employee, his foreman represents the company; the effect of an incompetent, arbitrary, or unfair foreman in

Selection of Foremen

lowering the morale of men under his direction is hard to estimate. The business of being a foreman is in reality a profession which cannot be entirely learned in a lifetime. Foremen should be executives and the art of successfully managing men certainly is not less difficult to learn than that of operating machines. For this reason, the common method of selecting foremen from the ranks simply because of ability as master workmen is most unsatisfactory. A capable foreman will not allow himself to become buried in detail work but will assign all possible details to subordinates, spending a large proportion of his time outlining and planning the work of his department. Much thought and study should be given to ways of improving the relations between the workers and the managements. A foreman must be able to control himself and deal both tactfully and firmly with the workers under him, showing absolutely no partiality due to religion, politics or personal preference. It is becoming increasingly evident that to be efficient and handle his job intelligently, a foreman must be a good business man. He must know, or develop means of finding out, the cost of individual operations in his department; otherwise large amounts of money will be wasted in inefficient practices. For example, it often happens that the cost of repairing a certain locomotive part will be greater than the initial cost of a new part. This fact may not be self-evident and unless the foreman is business man enough to find out relative costs, the wasteful practice will continue. In view of the qualities outlined above, it is safe to say that most railroads at the present time do not make the position of foreman attractive enough to interest men of the required caliber.

Several Belgian newspapers have published articles, thought to have been maliciously inspired, which charge that the American locomotives delivered last year to the State Railways are inefficient and that the Ministry of Transportation displayed poor business judgment in purchasing them. An official statement in the Belgian "Chronique des Travaux Publics," a translation of which appears elsewhere in this issue, answers these attacks one by one and gives ample

Propaganda Answered by Service

testimony to disprove every criticism offered. Not only are the locomotives from America, says the statement, meeting all requirements, but they are actually giving better service than was expected of them. It is pointed out that the price, \$55,250 each, paid in bonds falling due in five years, was not exorbitant. If exchange approaches par at the time of the maturity of these bonds the engines will cost only 280,000 francs, instead of 795,000 as was alleged in the newspaper attacks. Even if the engines cost as much as 800,000 francs eventually, however, queries the statement, was it not at the time necessary that locomotives be obtained as soon as possible regardless of cost? European industry could not supply them, so the Ministry turned to America. The statement gives further details to prove that the American locomotives were satisfactory: The boiler is said to be perfect; the engines haul 1,409 tons with ease up a 0.5 per cent grade at a speed of 25 miles an hour, instead of at only 22 as called for by the contract. It is admitted freely that the locomotives have shown some minor defects, which, however, are easily remedied. It is disappointing to learn that propaganda so malicious on its face should have been launched against the products of American industry. On the other hand, it is extremely gratifying to learn that, as a matter of fact, the American locomotives are giving service which is eminently satisfactory—and this information comes, not by innuendo from questionable sources, but from the Ministry itself, which has the locomotives under constant observation.

"Think and Act" is the slogan for 1921 on the Minneapolis & St. Louis, as set forth by E. E. Nash, general manager,

Circulars Should Elicit Intelligent Responses

in a pamphlet issued to employees in January following a conference of officers at Albert Lea in December. This is a commonplace injunction; but the good advice contained in the pamphlet on how to think and how to act, for the promotion of the efficiency of the railroad, is anything but commonplace. In fact, this is one of the best things of the kind that we have seen and some of its paragraphs are quoted in other parts of this paper. It is brief and informal, but brevity and informality constitute one of its virtues. The boy who was challenged to name, if possible, something better than one of his Aunt Mary's pies replied promptly, "two of Aunt Mary's pies." Something of that kind might be said of this pamphlet; or, at any rate, that Mr. Nash has not put in all of the useful matter that he might profitably lay before his subordinates, while the duplication of the style of the pamphlet might be a valuable exercise for other managers. But, to drop the pie simile, the thing that would be better than this pamphlet would be the same pamphlet with a supplement containing notes on the "reaction" of the subordinate officers, and the employees, as they read it. The important question with all such brochures for trainmen, enginemen and other operating employees is, how much of the contents will they assimilate? The safety first "catechism" proposed in the *Railway Age* of February 11, page 358, contains valuable suggestions on this point. It is no simple matter to carry out the catechism idea, but the principle is an important one, and experiments in that direction would be well worth while. Asking questions and getting them rightly answered involves enormous work; but it is certain that a large percentage of most circulars of this nature fail of their purpose and that responses (of the kind most commonly seen in railroad circles) are often no better than none at all. American railroad officers have for 75 years been "instructing" their men in calm disregard (most of the time) of one of the fundamentals of pedagogy: namely, that the person taught is not surely in possession of an idea presented by his teacher (if it is at all complicated) until he himself has imparted it to some other person.

Reading and Jersey Central

The plan for the segregation of the coal properties of the Reading Company was filed at Philadelphia on February 14, and since that time the financial experts have been engaging their attention in trying to figure out the value of the stock of no par value which will be issued by the new coal company and a proper quotation for the rights which will be given to the present Reading stockholders. There is, however, another interesting feature of some importance in the segregation plan, and that is the government's attitude as to the divorce of the Reading's control over the Central of New Jersey. As noted in the abstract of the plan given in last week's issue of the *Railway Age*, the proposed plan asks the court to defer the sale of the Jersey Central stock now held by the Reading pending the grouping of the railroads by the Interstate Commerce Commission according to the clause relating to railroad consolidation in the Transportation Act. The government, however, has objected to this because "it means in practical effect a continuance of the status quo indefinitely." The consolidation would take such a long time, it contends, that the effect upon the companies involved in the dissolution plan would be to maintain their present status for an indefinite period. This state of affairs brings out an interesting distinction in the attitude of two branches of the government towards the regulation of railroads. Congress in the Transportation Act has expressed itself as favoring consolidations worked out on a comprehensive and proper basis. The government as represented by the department of justice, however, still seems to adhere to the older idea that consolidations of railroads should be looked upon with distrust and possibly disfavor. Bearing in mind that the Central of New Jersey is to give up its control of the Lehigh & Wilkes-Barre Coal Company, it is difficult to see what harm there can be from the standpoint of the law for the Reading to retain its control in the Jersey Central. In short, it would seem, speaking generally, that the government attorneys, in objecting to the postponement of the sale of the Jersey Central stock by the Reading were showing themselves about a year behind the wishes of the people as represented in the passage by Congress of the Transportation Act.

Standard Tie Specifications Becoming Established

ONE OF THE CONSTRUCTIVE MEASURES introduced by the Railroad Administration which bids fair to be perpetuated is the standard specification for cross ties. When first put into effect these specifications were opposed by many railway men and producers alike. However, as they have become more generally used this opposition has largely disappeared. It is particularly significant that the National Association of Railroad Tie Producers, which includes in its membership the manufacturers of nearly one-half the tie output of the United States, adopted standard specifications practically identical with the Railroad Administration specification, as it has since been revised by the Committee on Ties of the American Railway Engineering Association, for submission to the annual convention of that association next month. Since it is expected that the engineering association, which also comprises the Engineering Division of the American Railroad Association, will adopt these specifications, practical agreement is thus assured.

This action should do much to stabilize the cross tie industry to the benefit of both the producer and consumer. Prior to federal control when each road developed its own specifications there was no uniformity in sizes, grades or classifications. The result was that the producers were at the mercy of the railways in times of limited purchases and

over-production, while the railways were equally at the mercy of the producers in times of active buying and under-production. With a standard specification which fixes definitely the classification for every tie the only point to be determined is the price and this is a matter for negotiation.

Because the benefits of uniform standard specifications are so evident it is essential that the railway purchasing and engineering officers co-operate with the producers to make these specifications a success. This implies accurate, uniform and impartial inspection, for any specification serves simply as the basis on which inspection and acceptance of materials are to be made. Since any inspection brings into play the question of judgment to a greater or lesser extent, it is of vital importance that the railways recruit and train a corps of inspectors who will interpret and enforce the specifications in the spirit in which they were drawn. Such criticism of the uniform specifications which has been heard up to the present time has been directed almost entirely to inspection. Those in charge of the purchase of ties must therefore give attention to this problem sufficiently to insure that the inspection is reasonable. The cross tie producers and the railways have performed a constructive service in agreeing upon a common specification. It is to be hoped that they will unite their efforts in the further and almost equally important step of developing a uniform inspection of ties produced under these specifications.

Fundamental Issues in Labor Controversy Made Plain

DEVELOPMENTS last week made very clear the fundamental issues between the labor unions and railways in the controversy over national agreements. The unions directly concerned do not include the "Big Four" brotherhoods in train service. They include principally the shop crafts and other unions composing the Railroad Department of the American Federation of Labor. B. M. Jewell, head of the Railroad Department, demanded that the Railroad Labor Board arrange a national conference between the unions he represents and railway executives upon the subject of national agreements. He, Frank P. Walsh and W. Jett Lauck, made detailed arguments for this plan. The Association of Railway Executives met the day after this proposition was made, and adopted resolutions rejecting it and setting forth its reasons for doing so.

1. Collective Bargaining Under the Transportation Act

Messrs. Jewell and Walsh argued for a national conference on the ground that disputes between the railways and their employees regarding wages and working conditions should be settled by "collective bargaining." They claimed that the labor provisions of the Transportation Act contemplate "uniform wages and conditions of employment for railroad workers with the fundamental rights of a living wage and collective bargaining." Explicitly interpreting "collective bargaining" as meaning national collective bargaining "on the basis of organization (i.e., union) recognition," they declared "the Transportation Act of 1920 will be emasculated and rendered abortive" and "this Board will be destroyed insofar as its efficient functioning is concerned" unless the principle of collective bargaining as interpreted by them is accepted by the railways.

The railway executives rejected their plan upon the ground that "under normal conditions the adjustment of rules and working conditions and of basic wages cannot successfully be made the subject of national conferences and negotiations," because "this would result in requiring all railroads to operate under rigid and uniform rules and

working conditions, and under rigid and uniform wages," which would prevent economical and efficient operation.

It is difficult to see how anybody who has read the labor provisions of the Transportation Act, and who is not trying to mislead, can contend that they contemplate merely *national* collective bargaining on the basis of "organization recognition." Section 302 expressly provides that "railroad boards of labor adjustment may be established by agreement between any carrier, group of carriers or the carriers as a whole, and any employees or subordinate officials of carriers, or organization or group of organizations thereof." Section 307 says that the Labor Board may hear any dispute that is likely substantially to interrupt commerce "upon a written petition signed by one hundred unorganized employees," as well as upon the application of any carrier or group of carriers, or any organization or organizations of employees. It is doubtless true that these conditions contemplate collective bargaining; but it is plain that they contemplate such bargaining either by a single railway and its own employees, whether organized or unorganized, or by a group of railways and their employees, or by all the railways and their employees. If the law contemplated negotiations solely between railways and labor unions it certainly would not have provided that a dispute could be brought before the board by one hundred or more "unorganized" employees.

From a legal standpoint the unions have just as good a legal basis for contending for national negotiations as the railways have for contending for negotiations between each railway and its own employees—and no better.

Furthermore, the law clearly does not contemplate "uniform wages and conditions of employment." It authorizes agreements upon wages and working conditions by railways and their employees either locally, regionally or nationally. If railways and their employees in different parts of the country agreed to different wages and working conditions, the agreements would be perfectly legal, but then wages and working conditions would not be uniform.

The Labor Board itself, in fixing wages, is required to take into consideration, among other relevant circumstances, "the scales of wages paid for similar kinds of work in other industries" and "the relation between wages and the cost of living." Suppose the Board should find that in one part of the country the wages paid in other industries and the cost of living were lower than in another part of the country. It would then be bound by the law to make lower railway wages in the former part of the country than in the latter, in which case the wages fixed by the board itself would not be uniform.

2. The Real Objects of the Labor Leaders

Since Mr. Jewell and Mr. Walsh, in arguing for exclusively national conferences and absolutely uniform wages and working conditions, have not, from a legal standpoint, a leg to stand on, it is evident they are seeking ends other than that of scrupulous compliance with the letter and spirit of the law. What are these ends? They show beyond question what one of them is when they attempt to read into the law "uniform wages and conditions of employment." They show what another of them is when they constantly reiterate that by seeking abrogation of the present national agreements, with their uniform rules and working conditions, the railways are trying to break down the labor unions. Naturally the national leaders of these unions want to make the national unions as powerful as possible. This makes the national leaders as powerful as possible. The more power the national labor leaders have concentrated in their own hands the more dangerous they can make it for the railways and the public to refuse to comply with their demands, however unreasonable. The more power they have the more they can do to promote the Plumb plan of employees' operation of the railways, which is their ultimate goal.

The railways are opposed to exclusively national negotiations for precisely the same reasons the leaders of the labor unions want them. They know that in national conferences the union leaders would fight to the last ditch for uniform wages and working conditions throughout the country—that it is for the very purpose of perpetuating these things that the labor leaders insist upon national conferences. The railway executives believe that only by conferences and agreements between the various railways and their own employees can wages and working conditions be adjusted to local conditions and to the views of the individual managements and their own employees as to what is reasonable and just. They believe that uniform wages and working conditions throughout the country unavoidably result in great inefficiency and waste.

As the Association of Railway Executives said in the resolutions adopted by it, "one of the great advantages of private over government ownership and operation of railroads lies in the greater adaptability (under private operation) of individual railroads to the geographical, social, economic and operating conditions which vary greatly with different portions of the country," and "restoration and maintenance of this variation is essential to private operation and to its ability to furnish efficient and economical transportation at the lowest possible rates."

Since the leaders of the labor unions, in their arguments before the Labor Board, explicitly contended for "uniform wages and conditions of employment," it is not necessary to prove that in a national conference they would stand fast for these things. And since these things in this country, with its varying conditions, always have been and are now incompatible with economical and efficient railway operation, the position taken by the labor leaders upon this subject affords one of the best possible arguments against exclusively national conferences. In addition, however, the railway executives feel sure that in national conferences the labor leaders would go the limit to perpetuate rules and working conditions which are unreasonable, not merely because they apply throughout the country, but in themselves.

The labor leaders recently have said that they would not insist upon unreasonable rules and working conditions which prevent efficient and economical operation, thereby implying that they would give up in national conferences any unreasonable rules and working conditions now in effect. The railway executives take no stock in this talk because they know, first, that the very labor leaders who talk thus now are the same men who got these national agreements, with their unreasonable rules and working conditions, established by the Railroad Administration, and, second, that they are the same men who, from the time the railways were returned to private operation, have demanded that these arrangements be perpetuated.

They got piecemeal abolished in all railroad shops under government control, although almost every experienced railway officer consulted by the director-general opposed this step. They got those reclassifications of employees, which have resulted in many cases in four to six men being required to do the same work that formerly was done by one or two. They got established the rule requiring employees who check in and out on their own time to be paid every week for an hour's work they do not do. They got established the rule which requires many thousands of employees to be paid for the time they use in eating their lunch. It has been asserted that there is not an unreasonable rule in these national agreements which was not previously in the schedule of one or more railways. But did the fact that one or more railways, probably under coercion, agree to an unreasonable rule make it reasonable for the labor leaders to secure the application of that same rule throughout the United States?

3. Record and Attitude of Labor

Leaders Show What They Want

These labor leaders have a past record, and are now taking a position, which makes perfectly clear why they do not want local conferences and agreements, and do want national conferences and agreements. They want national conferences and agreements because they want to perpetuate uniform wages, uniform working conditions, the prohibition of piecework, and other unreasonable and indefensible concessions they got under government control. But these things cannot be perpetuated under private operation without largely defeating the purpose for which Congress and the public returned the railways to private operation—that is, more economical and efficient operation.

Insofar as the principles and methods of government operation are perpetuated, the results of government operation necessarily will be perpetuated. The railway executives are trying to restore efficiency and economy under private operation, and they refuse to agree to settle the question of rules and working conditions by national conferences because they believe that the wrong and harmful principles and methods of government control can be got rid of only by the managements and the employees of each railway dealing directly with each other.

The fundamental issue is plain and unescapable. The labor leaders and the railway executives have joined in making it plain. It is whether rules and working conditions shall be determined by methods primarily intended to consolidate and increase the power of the labor unions, or by methods primarily intended to increase the efficiency and economy of railway operation.

The Silver Lining of the Railway Cloud

THE CLOUD HANGING OVER the railroad industry at the present time is very dark and angry looking. The tremendous decline of business since October and the high operating costs, if continued, would result in many railways being bankrupted. But the cloud has a silver lining.

In the three months of September, October and November, 1920, the railways moved the largest freight business they ever handled in those months. The business in September and October was especially heavy. In these months, however, the railways as a whole, and those of each of the three large territories, failed to earn the six per cent return it was expected they would earn under the new freight and passenger rates. They earned only about two-thirds of it.

The experience of those three months was enough to convince every student of railway operating and financial matters that if the costs of fuel, materials and labor then prevailing were not reduced the railways would be unable to earn their six per cent return, or anywhere near it. If, however, the business had continued to be heavy, the difficulties in the way of reducing the unit costs of operation and the total operating expenses in the near future would have been almost insuperable. The public would never have agreed to a further advance in rates. It is impossible to see how, in these circumstances, the railways ever could have been put on a prosperous basis.

The great slump in business came, however. Railway operating officers, who for months had been obliged to devote their attention almost exclusively to getting the traffic moved, became able to devote much more time to the study of economies. Prices of fuel, which is one of the largest items of railway expenses, began to yield. Coal is now being charged into operating expenses at the high prices for which it was contracted in the past, but when new coal contracts

are made it undoubtedly will be possible to get substantially lower prices. The depression in business is causing reductions in wages and in prices by manufacturers of railway materials and supplies. These reductions are not great, but in due time they will be reflected in reductions of operating costs.

The most recent statistics show that last August the number of railway employees had increased to the unprecedented figure of more than 2,200,000. This increase in employees was largely due to the fact that with the demand for labor in all industries greatly exceeding the supply, and with the railway managements bound hand and foot by all kinds of restrictive rules and working conditions, it was impossible to get efficient work from many classes of railway employees. The payroll was running at the unprecedented annual rate, according to the latest statistics, of more than \$3,800,000,000 a year. As long as business continued heavy it was practically impossible to reduce labor costs. Since September 1, the railways have laid off fully 300,000 men. The decline in the cost of living and in the wages of labor in other industries, and the tremendous decline of traffic and earnings, have enabled them to bring far more forcibly and effectively to the attention of the Railroad Labor Board and the public the necessity for reducing labor costs. Prospects for a substantial reduction in the near future in the wages of unskilled labor are good. Apparently, also, the prospects of securing relief from the iniquitous and burdensome national agreements, rules and working conditions are much better than they would have been if the present situation had not developed.

In consequence of all these things there seems to be good reason for believing that the operating expenses of the railways, and especially their unit costs of operation, will be reduced far more than they could or would have been if the present crisis had not come. If this should be the case, when traffic revives, as in time it is sure to revive, the railways will be able to handle it with lower expenses than they had last summer and fall when the business was heavy. This would mean larger net earnings obtained, not through advances in rates, but through reductions of expenses, and what the railways need is not merely larger net earnings, but that these larger net earnings shall be gained through reductions in expenses. When the railways begin to make larger net earnings, and only when they begin to do so, will they be able to enter upon a program of enlarging their facilities.

It will be recalled that Dickens' famous character, Mark Tapley, was always happiest when things seemed to be going worst, and was reduced to profound depression when everything apparently was going well. The *Railway Age* has no desire to acquire the reputation of the Mark Tapley of the railway business. It is plain that if the traffic of the railways should continue to be so abnormally small as now, and their unit costs of fuel, materials and labor so abnormally high, the result would be disaster. The reason why present conditions give cause for optimism is that apparently these very conditions are going to bring about the permanent reductions of expenses which it has been plain for months were essential to putting the railroads on a sound basis.

The industry never was on a more precarious basis than that disclosed by the statistics of earnings and expenses in September, October and November, showing that with the largest business ever known and the highest rates known for many years the railways were unable to earn anything approaching a reasonable return. The reason why present conditions probably will prove a blessing in disguise is that they probably will make possible the beginning of reductions in expenses which in the long run will make possible the earning of reasonable net returns under the present rates, or even under lower rates.

Letters to the Editor

The Stop and Proceed Rule

HERINGTON, KANSAS.

TO THE EDITOR:

In your issue of January 21 reference is made to a proposed change in the stop and proceed rule so as to permit a train to pass an automatic block signal at stop without stopping, under certain conditions.

It would be a mistake to give a stop indication a multiplicity of meanings. It seems to me extremely difficult to justify a line of thought that would permit a train to pass an automatic block signal at stop without stopping. These signals perform the same function that a burning red fuse or the explosion of one torpedo performs on non-automatic block territory. The responsible manager could well hesitate a long time before authorizing a train on single track to pass any of these signals without stopping.

If a change is necessary in certain places or on certain railroads, it would be preferable to change the indication of the signal so that it would give a caution indication instead of a stop indication.

E. H. HEATH.

[Mr. Heath agrees, evidently, with the majority. The majority do, indeed, hesitate long before relaxing the stop rule on single track. Our former correspondent would in all probability hesitate in like manner; but, while hesitating as regards single track, he might try the experiment on double track. Practically, a reduction to five miles an hour is as good as a stop; the question is whether enginemmen could be trained to obey a five-miles-an-hour rule as well as they obey a stop rule. The distant-signal rule which we referred to says, in effect, "If you shut off steam you may pass the signal;" the essence of the requirement being that (1) if the enginemman does something to indicate that he is alert, (2) has evidence that it is safe to keep moving and (3) is moving at a speed moderate enough to give him ample time to consider his action calmly and without hurry, he may save the delay and cost of a stop.—EDITOR.]

The Importance of Intelligent Inspection

ERIE, PA.

TO THE EDITOR:

On every side one hears a consistent and persistent denunciation of wasteful manufacturing methods as they concern both labor and material. There is one very prolific source of waste, however, that is rarely touched upon. When a manufacturer contracts to make a number of articles for a customer, the customer often insists on having his inspector resident in the manufacturer's shop to watch the progress of the work, and to pass on its acceptability, according to the terms of the contract. This is especially true of government and railway contracts.

Some of these inspectors are men of exceptional ability and intelligence, who try in a broad, common-sense, business-like way to protect their employers' interests without working any hardship or injustice to the manufacturer producing the articles contracted for, and who give and take in their decisions, considering always the impossibility of perfection, and appreciating the relative importance of details. Such men are important factors in industrial progress, and in the distribution of rewards they should not be overlooked.

There is another class of inspectors, however, who are narrow in their vision, arbitrary in their decisions, and arro-

gant in their conduct. Because of the authority invested in them for the time, these men become self-centered, and without any thought or consideration of the general welfare, take advantage of every slightest pretext to reject this or that article at various stages of its completion. This is done regardless of the value of the labor and material involved—which become a dead loss to the manufacturer and to industry in general, without benefiting the purchasers in any degree whatever.

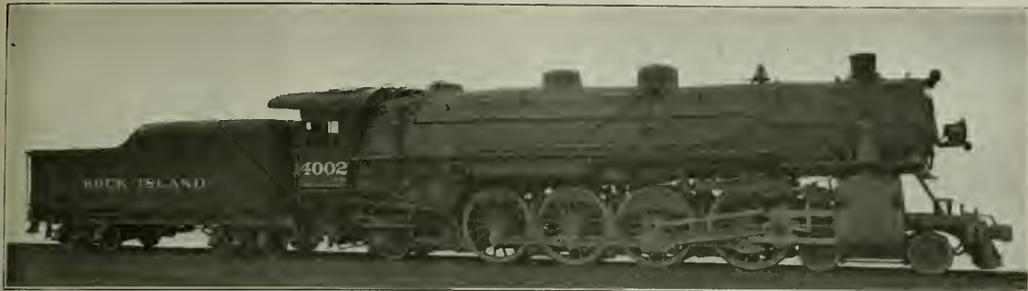
Inspectors of this type are far too numerous, and are a distinct detriment and hindrance to industrial progress. They not only strike terror to the hearts of the members of an organization so unfortunate as to have one thrust upon them, but they are directly responsible for immeasurable wastage which directly affects the cost of manufactured articles. They are a real menace, and every legitimate effort possible should be made for their elimination. Oftentimes the employers of such men are directly and avowedly responsible for their conduct, by placing strict limitations on the exercise of their sense of judgment, and insisting on a rigid observance and enforcement of the letter of contracts, ignoring that spirit of fairness so essential to the equitable fulfillment of any contract.

When an unjust inspector imposes unwarranted hardships on a manufacturing organization, the old law of self preservation gets into action, and inspires reprisals that often result in covering up errors and defects that would otherwise have been called to the inspector's attention and remedied. It also results in straining, perhaps to the breaking point, business relationships that had hitherto been most cordial and mutually profitable.

The gravity of this condition makes its correction imperative. Inspectors should be chosen with great care. Wherever possible they should be good mechanics, of an amiable disposition and natural good judgment, who have had sufficient training in the technique of the particular phase of manufacture in which they are interested. They should be given as wide discretionary powers as the exigencies of the work in hand requires. Their reports to their employers should cover the number of rejections, as well as the accepted articles, and when these rejections are greater than seems reasonable, the matter should be taken up with the manufacturer. He, being on the defensive, will undoubtedly reveal any unfairness or injustice to which he may be subjected by the inspector, and which, for fear of unpleasant and embarrassing contractual conditions which might arise, he would otherwise keep to himself.

G. GRIEG.

ACCORDING TO ESTIMATES prepared under the supervision of Ernest F. Buchard of the United States Geological Survey, 1920 was a record year in the production, shipment and gross value of Portland cement. The production is estimated at 100,302,000 bbl. and the shipments at 96,329,000 bbl., valued at \$193,548,000, compared with 80,769,378 bbl. manufactured and 85,596,616 bbl., valued at \$146,656,076, shipped in 1919, an increase of 24 per cent in production, 13 per cent in shipments, and 31.9 per cent in value of shipments in 1920. The stocks of finished cement increased from 5,852,497 bbl. at the end of 1919 to about 8,290,000 bbl. at the end of 1920, or more than 41 per cent. The average mill price in bulk at the mills for the whole country was \$2.01 a barrel in 1920, compared with \$1.71 in 1919, an increase of 17.5 per cent. The lowest average price reported by any group of plants in 1920 was \$1.77 a barrel in the Illinois-western Indiana district, and the highest average price was \$2.47 in Washington. These prices compare with \$1.62 and \$2.05 in 1919 in the same localities. There were 115 plants manufacturing Portland cement in 1920, compared with 111 active plants in 1919, one additional plant each having been operated in Alabama, Indiana, New York and Oregon.



Mountain Type Features New Rock Island Power

Greater Steaming Capacity and Larger Driving Wheels Indicate Trend in Development of This Type

UPON RETURN to private management, the Chicago, Rock Island & Pacific was one of the earliest to place large locomotive orders. These orders included 10 Mountain, 10 Mikado and 15 Santa Fe type locomotives all of which were purchased from the American Locomotive Company and constructed at their Dunkirk plant. None of these types is new to the Rock Island since this road has operated both Mikado and Santa Fe type locomotives of the same general design in freight service for several years and was one of the first railroads to adopt Mountain type locomotives for heavy passenger service.

The selection of these locomotives by a railroad that has had experience with each type is in itself significant and would indicate that the Mikado has made a place for itself which the advent of heavier power cannot usurp. It also serves to demonstrate that the Santa Fe type is here to stay and verifies the foresight of those who placed the Mountain type in passenger service on the Rock Island system seven years ago.

When the first Mountain type locomotives were placed in service on the Chicago, Rock Island & Pacific, they enabled the consolidation of the St. Louis and the Chicago sections of the Colorado trains into one train west of Phillipsburg, Kansas, where maximum and ruling grades of 1.0 per cent are encountered. The trains hauled by these locomotives usually consisted of 10 or 11 all-steel cars weighing from 675 to 750 tons although as high as 1,175 tons in 19 cars have been handled successfully over a division of 140 miles. Subsequent tests which demonstrated the high capacity of these first Mountain type locomotives were described in the April 16, 1915, issue of the *Railway Age Gazette*, page 829.

Pioneer and New Mountain Types Compared

The policy of the Chicago, Rock Island & Pacific with respect to the design and equipment of new locomotives has been consistently directed toward obtaining maximum efficiency in operation and economy in maintenance. Therefore, a comparison between the pioneer and the new Mountain type locomotives affords an interesting commentary upon the development of this type practically since its initiation in passenger service.

It will be observed from the specifications which are submitted in connection with this article that the rated tractive effort of both locomotives is nearly identical, but that the weight of the new locomotives is considerably greater than that of the original Mountain type. The new locomotives

weigh 29,000 lb. more on the drivers and are proportionately heavier throughout.

This increased weight is largely accounted for in the boiler dimensions as the total heating surface of the new locomotives, excluding the superheater, is nearly 600 sq. ft. greater. The greatest proportional increase occurs in the firebox heating surface of the new locomotives which is over 30 per cent greater than the firebox heating surface of the older locomotives. This increase is largely accounted for by the application of three thermic syphons to each locomotive as the other firebox dimensions, including the grate area, are practically the same.

The most striking difference in design, however, appears in the driving wheel dimensions, the new locomotives having 74 in. driving wheels as compared with the 69 in. wheels of the earlier locomotives. As the cylinder dimensions of the two locomotives are the same, it will be seen that the larger driving wheels tend to balance the larger boiler, which carries 200 lb. pressure as compared with 185 lb. on the original locomotives. These are the first Mountain type locomotives built with driving wheels as large as 74 in. and their ability to sustain high speeds with heavy trains will be watched with interest. It is to be hoped that the Rock Island will test these locomotives in the same thorough manner that the original Mountain types were tested so that comparative results will be available, as the development of a new type depends much upon such tests.

Special Features of the New Locomotives

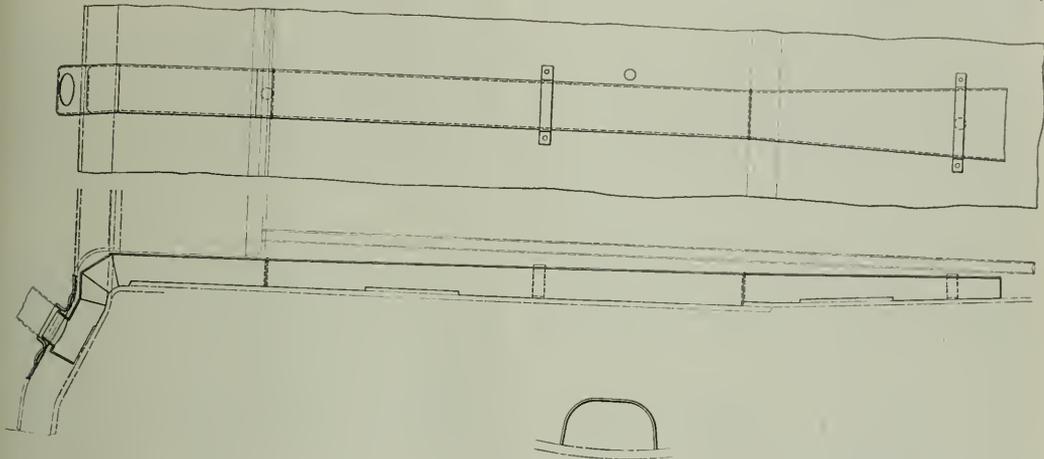
Among the novel characteristics applying generally to all three classes of the new locomotives is the short slope of the cab front which permits all of the wrapper sheet staybolts to be outside of the cab so as to facilitate inspection and removal. All the piping is arranged so as to interfere as little as possible with inspection and minor repairs to staybolts. The location of cab appurtenances was given special attention in the design of these locomotives from the standpoint of both safety and accessibility. An outside steam turret is provided with extension handles to the valves so that all pipes having boiler pressure are located outside of the cab. The injectors also are located outside of the cab. The detached water column is specified in accordance with the recommendations of the mechanical standards committee of the Railroad Administration. This arrangement was proposed as a result of the exhaustive tests conducted by the Bureau of Locomotive Inspection of the Interstate Commerce Commis-

sion which determined the advantage of mounting the gage cocks and gage glass upon a column so mounted as not to be influenced by the flow of water against the back head of the boiler.

The tenders of these locomotives are of the Franklin type with unit draw-bar attachments and Commonwealth cast steel

radius so as to eliminate the customary angle in the corners of the cistern to which the side and bottom sheet are attached and which usually give a great deal of trouble on account of leakage.

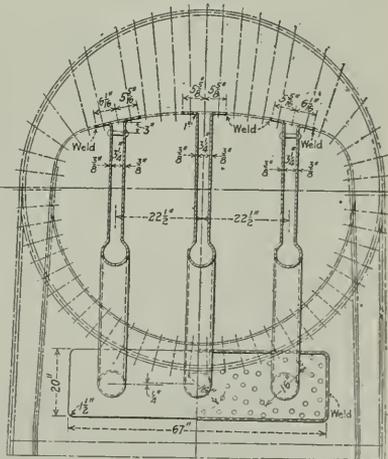
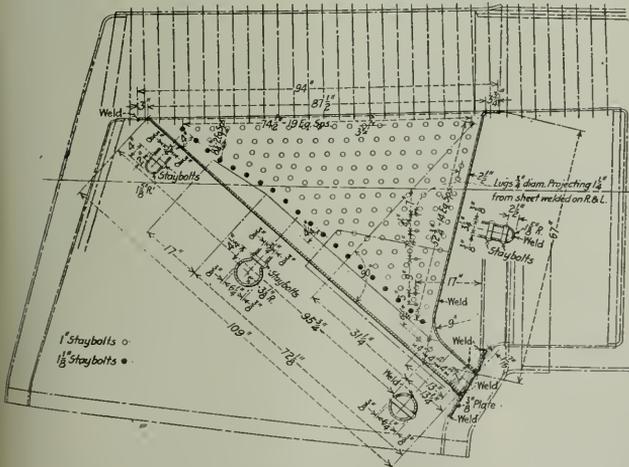
We are indebted to W. J. Tollerton, general mechanical superintendent, for the following statement relating broadly



Intake Channels for the Thermic Syphons Applied to New Rock Island Locomotives

underframes. This is in distinction to the Vanderbilt type of tender which was constructed for the first Mountain type locomotives and has characterized the Rock Island locomotives for many years. It should be noted in this connection that the new tenders for the Mountain type locomotives have

to the principles governing the design of these locomotives: "Many of the features on these locomotives were brought about by closely watching previous engines of similar design, and the idea has been to eliminate any weakness that may have developed; also the design is prepared with a view to



Detailed View of the Nicholson Thermic Syphons as Applied to Rock Island Mountain Type Locomotives

a water capacity of 10,000 gal. and carry 16 tons of coal in comparison to the tenders attached to the original Mountain type locomotives which had a maximum capacity of 8,500 gal. of water and 14 tons of coal. The locomotive tender has a low center of gravity with rounded bottom and corners bringing the side and bottom sheet connection above the

the greatest possible reduction of possible future shop labor when the engine is overhauled, by easy accessibility of the different parts, and the idea of making each part, if possible, run from shopping to shopping without renewal. It must be appreciated now, more than ever, that anything that can possibly be done to increase mileage and get a quicker turn

on the engine, both at the terminal and when passing through shop, should be anticipated at the time the design is made."

Special Equipment Applied to the New Locomotives

The most noteworthy addition to these new locomotives in the form of a specialty designed to increase economy and capacity is the Nicholson thermic syphon, the details of which are illustrated in connection with this article. While this device has been applied to locomotives on the Rock Island for over a year and is now giving satisfactory service on a number of other railroads, this is the first instance in which the syphons have been specified throughout on new orders of Mountain, Mikado and Santa Fe type locomotives. As will be observed from the specifications and drawings, the syphons add 141 sq. ft. of heating surface to the firebox and serve to support a brick arch in place of arch tubes. The purpose of the syphons is to increase the capacity of the locomotive by increasing the firebox heating surface as noted and to improve the circulation within the boiler resulting in a freer steaming and more economical locomotive.

Two other novel and interesting specialties applied to these locomotives are the wrist and knuckle pins. These designs are patented by the U. S. Metallic Packing Company and have the advantage of enabling the pins to be removed

has been found entirely practical to meet the maximum service requirements on Mountain and Mikado type locomotives by means of hand firing and it was thought that the application of syphons would further improve the free steaming qualities of these locomotives. However, the Mountain type locomotives are designed so that stokers may subsequently be applied if found necessary.

In addition to the Alco standard drifting valve these locomotives are equipped with an auxiliary saturated steam line to the cylinder. A manually operated quick opening 1 1/4 in. starting valve is connected to a 1 1/4 in. pipe extending from the turret to the front end of the boiler. From this point, 1 in. branch pipes lead into each steam pipe. A copper pipe, having its own connection from the hydrostatic lubricator in the cab, is led to this steam line. A 1 1/4 in. tee is also inserted near the cab for emergency oiling of the piston valves by the engineman in case the force feed oil pump fails en route.

Mountain Type Locomotive Dimensions

The Mikado locomotives purchased by the Rock Island last year do not differ materially in design from locomotives of the same type which have been in service on the railroad for some years and the new Santa Fe type locomotives are substantially the same in design as the locomotives of this type built for this railroad in 1918 and described in the December 6, 1918, issue of the *Railway Age*, page 993.

The Mountain type locomotives which were constructed for the Rock Island in 1913 and referred to in the foregoing were described fully in the January 9, 1914, issue of the *Railway Age Gazette*, page 86, but for convenience the principal dimensions of these locomotives are tabulated together with the dimensions of the new locomotives as follows:

General Data

	Chicago, Rock Island and Pacific Mountains Type Locomotives	
	Built in 1913	Built in 1920
Tractive effort	50,000 lb.	50,400 lb.
Cylinders, diameter and stroke	28 in. by 28 in.	28 in. by 28 in.
Weight in working order	333,000 lb.	369,000 lb.
Weight on drivers	224,100 lb.	253,000 lb.
Weight on leading truck	57,500 lb.	57,000 lb.
Weight on trailing truck	51,500 lb.	59,000 lb.
Weight of engine and tender in working order	490,500 lb.	559,000 lb.
Wheel base, driving	18 ft. 0 in.	19 ft. 10 in.
Wheel base, total	38 ft. 11 in.	41 ft. 0 in.
Wheel base, engine and tender	70 ft. 2 1/2 in.	79 ft. 3/4 in.
Ratios		
Weight on drivers ÷ tractive effort	4.48	5.02
Total heating surface ÷ grate area	6.66	7.32
Total heating surface ÷ grate area	65.4	74.4
Per cent firebox heating surface to evaporative surface	7.58	8.66
Per cent superheating surface to evaporative surface	22.9	26.6
Total evaporative surface ÷ volume of cylinders	206	234
Grate area ÷ volume of cylinders	3.14	3.15

Wheels

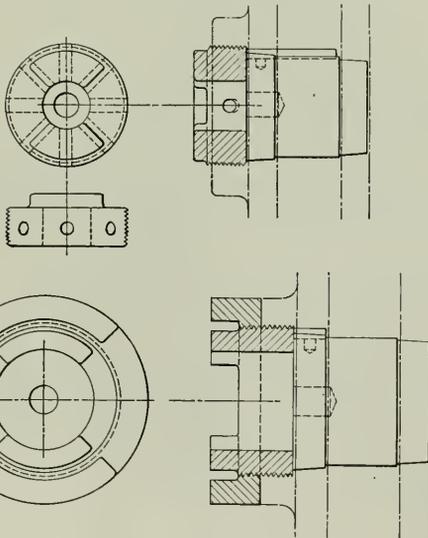
Driving, diameter over tires	69 in.	74 in.
Driving, thickness of tires	3 1/2 in.	4 in.
Driving journals, main, diameter and length	11 in. by 22 in.	12 in. by 22 in.
Driving journals, others, diameter and length	11 in. by 13 in.	11 in. by 13 in.
Engine truck wheels, diameter	34 in.	33 in.
Engine truck journals, diameter and length	7 in. by 12 in.	7 in. by 12 in.
Trailing truck wheels, diameter	42 in.	43 in.
Trailing truck journals, diameter and length	9 in. by 14 in.	9 in. by 14 in.

Boiler

Style.	Conical.	Conical.
Working pressure, pounds per sq. in.	185 lb.	200 lb.
Outside diameter, first ring	78 in.	80 in.
Firebox, length and width	107 1/2 in. by 84 in.	108 in. by 84 in.
Tubes, number and outside diameter	207—2 3/4 in.	216—2 1/2 in.
Flues, number and outside diameter	36—5 1/2 in.	45—5 1/2 in.
Tubes and flues, length	22 ft.	22 ft. 5 in.
Heating surface, tubes and flues	3,805 sq. in.	4,283 sq. ft.
Heating surface, firebox	312 sq. ft.	406 sq. ft.
Heating surface, total	4,117 sq. in.	4,689 sq. ft.
Superheating surface	944 sq. ft.	1,247 sq. ft.
Grate area	62.7 sq. ft.	63 sq. ft.

Tender

Tank	Cylindrical.	Rectangular.
Water capacity	8,500 gal.	10,000 gal.
Coal capacity	14 tons	16 tons



Removable Knuckle Pins Applied to New Rock Island Locomotives

from the outside and the rods taken down irrespective of their position.

The new locomotives are all equipped with force feed lubricators, Barco flexible steam heat and air brake connections, Alco power reverse gears, Baker valve gear, the Woodward engine truck, oscillating front driving box, Franklin adjustable driving box shoes and wedges, hollow main crank pins with internal grease lubrication and adjustable hub plates by means of which the lateral can be taken up without dropping the wheels.

The locomotive smoke-box is equipped with the Unit spark arrester which is cylindrical in form and can be readily removed through the front door. Franklin grate shakers are applied to all of the locomotives but stokers of the Duplex type are applied only to the Santa Fe type locomotives as it

Executives Outline Future Labor Policy

Employees' Plea for Joint National Conferences on Rules and Working Conditions Rejected

DEVELOPMENTS in the several controversies over wages and working conditions during the past week have been confined largely to the results of a meeting of the Association of Railway Executives at the Drake Hotel, Chicago, on February 18 at which time the attitude of the carriers in regard to proposals previously made before the Railroad Labor Board by representatives of the employees was clearly defined. Similarly the carriers' attitude toward the whole labor problem was definitely outlined.

The progress of the hearings before the Labor Board on the employees' demand for the perpetuation of the national agreements formed during federal control has been outlined in the previous issues of the *Railway Age* up to and including the hearing on February 17 when B. M. Jewell, vice-president of the Railway Employees' Department of the American Federation of Labor and chief spokesman for the employees, requested the Board to either recognize his interpretation of the principle of collective bargaining or grant a recess until March 14 in which he could prepare a reply to the presentation which has been made in this case on behalf of the carriers. Mr. Jewell was followed on the stand by Frank P. Walsh who said in part:

Statement by Frank P. Walsh

We submit that the Transportation Act contemplated three things:

1. Efficient and economical service to the public;
2. Uniform wages and conditions of employment for railroad workers with the fundamental rights of the living wage and collective bargaining;
3. A guarantee to the owners of the railroads of a fair return on their investment.

It was not an Act primarily and essentially for the relief of the railroads or their owners. None of the three purposes of the act shall take precedence over the others; none of the three parties in interest shall receive greater consideration than the others. Accordingly we believe that at the time has come to sound a solemn warning to this Board and to the country. If the purpose of the railway executives as reflected in the utterances and acts of General W. W. Atterbury, are not restrained, the Transportation Act will be emasculated and rendered abortive, this Board will be destroyed insofar as its efficient functioning is concerned, and we shall have endless turmoil and instability in the railroad industry.

In the circumstances we are constrained to ask that this Board before proceeding to a determination of any other causes now before it shall require the carriers to comply with the letter and spirit of the provisions of the law under which we are endeavoring to function as public servants. Failing this it shall be our earnest effort to inform the public and the Congress of the United States as to the real situation in this controversy to the particular end that Congress shall not enact into law the pending measures for the financial relief of the railroads. At this moment the carriers of the country are attempting to dip their hands into the United States Treasury and extract the enormous sum of \$750,000,000, which is only their initial effort. It is our contention that the merits of these colossal drafts on the revenue of the country should not even be considered by the national law makers so long as the carriers refuse to come before this Board with clean hands and demonstrate to the public that they will honestly comply with the law. The Winslow bill has passed the House and the Townsend bill is now on the Senate calendar. However, we do not apprehend that either bill can become a law until the railroads have kept faith with the public and with the railway workers.

This law was passed primarily at the instance of the carriers. It contains features against which we protested; but we are law-abiding, and since its enactment it has been our constant endeavor to comply with its every requirement. Nor have we sought to destroy the efficacy of the law or the efficiency of this Board by seeking special privileges and asking extraordinary decisions or ruling to further our selfish interests.

Meeting of Executives on February 18

The Association of Railway Executives, in its meeting on February 18, unanimously accepted a report from its Labor committee and unanimously adopted resolutions making clear that the railways will not accept the plan proposed by leaders of the labor unions to the Railroad Labor Board for national conferences between the labor unions and the railways regarding rules and working conditions and wages of unskilled labor.

The Association made clear that its opposition to the present National Agreements with certain classes of employees, and its opposition to national conferences, must not be construed in any way as an attack upon labor organizations themselves.

"What we have been trying to do, and all we have been trying to do," the Labor Committee said in the report adopted by the Association, "is to get the opportunity to deal with our own employees so as to restore the efficiency of labor on these railroads, and if possible avoid non-employment and defer serious wage reductions. The leaders of the labor unions by the position they have taken have directly raised the issue whether the maintenance and increase of the power of the national labor unions shall be placed above the public interest in the efficient and economical operation of our transportation system."

This statement referred especially to the demand made by Mr. Jewell, to the Railroad Labor Board on February 17. The report of the Labor Committee follows in part:

Report of Labor Committee of Executives' Association

Pursuant to the resolution adopted by the member-roads on January 7, 1921, the labor committee met in Chicago on January 27, 1921. For the information of the committee, each company had been requested by the chairman to give certain information regarding its earnings and labor conditions. The committee found the situation was even worse than it had anticipated; that there was grave danger that the necessities of the carriers and justice to the public would require the initiation of numerous cases for reduction in basic wages before the United States Railroad Labor Board—following its then procedure—could possibly render its decision on the abrogation of the pending national agreements and rules and working conditions; and that a situation would develop through which the Labor Board would be utterly unable to meet and promptly dispose of all the issues presented; and that the possibility of orderly procedure would be destroyed and superseded by confusion and chaos.

When the resolution instructing the labor committee to meet was adopted by your association, the general condition of the railroads, and especially their financial situation, was very unsatisfactory. The present freight and passenger rates were fixed late in August. On the basis of a 6 per cent annual return on the valuation of them, fixed by the Interstate Commerce Commission, in September, October and November, the railroads as a whole actually earned in these months, in which an unusually large business was handled, but two-thirds of the return expected.

Between the time the labor committee was instructed to meet and the date of its meeting, the railroad situation had rapidly become worse. There had been an unprecedented decline in traffic with most serious effects upon the net operating income. The net operating income it was estimated that on a 6 per cent annual basis the railways should earn in December was \$86,800,000. The amount they did earn was approximately \$17,000,000. The rate of return earned in September was 4.1 per cent; in October, 4.6 per cent; in November, 3.3 per cent; in December, only 1.4 per cent; in the four months, 3.35 per cent. Telegraphic reports received from individual railways throughout the country showed that the results of operation in January were even worse than in December. Many railroads were not earning, and with the current costs and traffic had no prospect of earning, their bare operating expenses, leaving them without any net return to meet their fixed charges.

Over 300,000 railroad cars were idle, as well as hundreds of

locomotives, compared with a year ago when there was a shortage of about 60,000 cars. Eliminating idle facilities and tracks it is estimated that at present prices over a billion dollars of equipment was unproductive. Possibly 280,000 men had been discharged by the railroads and the working time of those retained in service in many cases was reduced.

The time for recruiting unskilled labor forces for 1921 was at hand and the industries, the municipalities, and business generally had been employing unskilled labor at rates much below those established by the Labor Board. Meantime, important changes had taken place in other lines of business. The reduction of railway traffic reflected an extensive curtailment of production. In many branches of industry wages were being reduced. This was especially true as to wages of unskilled labor, which, except on the railroads, were being reduced throughout the country.

While regretting the informality, the labor committee decided that the situation required that its chairman should appear before the Railroad Labor Board on January 31, lay before it the acute situation of the railways, and make certain suggestions to it regarding matters over which it has jurisdiction under the Transportation Act.

National Agreements Limited to Federal Control

The question of continuance of the national agreements, rules and working conditions established under government control had been pending in one form or another ever since the railways were returned to private operation on March 1, 1920. They were limited by their nature and express provisions to the period of federal control. Immediately upon the expiration of federal control, demand was made by the labor organizations that the railroads as a whole accept and continue them in toto. The conference committee representing the railways definitely declined to discuss the question of national agreements, rules and working conditions with the national representatives of the labor unions because only the question of increased wages had been referred by the President of the United States to the bi-partisan committee representing the employees and the railways. The labor organizations then on April 28, 1920, presented to the railroad companies individually demands that these agreements be continued by them individually. Except in a few instances no bona fide conferences or negotiations were had because the local labor union officers presenting the national agreements did so under instructions from their national officers, which precluded these local labor representatives from agreeing with the officers of individual railways to a single alteration or modification.

Despite these facts in conformity with the demand of the labor organizations, and over the protest of the Conference Committee of Managers representing the railways, the United States Railroad Labor Board in its wage decision of July 20, 1920, took jurisdiction of the subject of rules and working conditions in the wage controversy. The labor organizations made their presentations in support of continuance of the agreements at the time they made their presentations for advances in wages. The following is from a letter from the United States Railroad Labor Board, dated December 18, 1920, to the heads of all the labor organizations:

"This Board has set Monday, January 10, 1921, as the date of the hearing on that portion of the dispute between certain carriers and your organizations submitted to this Board on April 15, 1920, which was not decided in Decision No. 2. The said portion of that dispute relates to rules and working conditions. *The Board understands that your organization submitted its presentation as to rules and working conditions as a part of its submission of said dispute.*"

When the hearings were renewed on January 10, the spokesmen of the labor organizations stated that they rested their case except for such rebuttal as they might make to the railroads' presentation. They had never up to that time presented a single argument or theory in support of the proposition that the same rules and working conditions should be applied to the railways throughout the country regardless of the wide variation in local conditions, although they had had ample opportunity to do so.

The conference committee representing the railways then began its presentation against continuance of the national agreements and had practically finished it when your labor committee met in Chicago on January 27. Therefore, when the chairman of your labor committee appeared before the Board on January 31, the main presentations had been practically finished, but the real seriousness of the situation had not yet impressed the public, nor did the labor organizations or the Labor Board feel the urgency for a prompt decision.

Unreasonableness of Existing Rules

The committee representing the railways had laid before the Board voluminous and conclusive evidence showing the unreasonableness of the existing rules and working conditions, and especially the unreasonableness, injustice and wastefulness of applying the same rules and working conditions to railways throughout

the country. Therefore, not only was there no impropriety whatever in asking that the Board should at once terminate these rules and working conditions, but your labor committee had decided that they would be derelict in their duty to the railroads and to the public to hesitate in presenting the actual condition of the railroads, and requesting the prompt action the situation demanded.

The financial condition of the railways made it imperative that no effort should be spared to increase the net operating income. This, as we pointed out to the Board, could only be done either by an advance in freight and passenger rates or a reduction in operating expenses, and "with declining prices and wages in industry and agriculture the country demanded that the solvency of the railroads must be assured by a reduction in operating expenses, and not by a further advance in rates."

Not only the evidence which had been presented by E. T. Whiter's committee on behalf of the railroads, but also statistics of the Interstate Commerce Commission, showed that the national agreements, rules and working conditions forced on the railroads as war measures were causing gross waste and inefficiency, and were among the main reasons why on the present high rates the railways were unable to earn a reasonable return. We estimated that the elimination of this waste would reduce railway operating expenses at least \$300,000,000 a year. This estimate was conservative, in view of available facts regarding the excessive increases in the number of employees and in the pay roll in every branch of railroad service to which the national agreements, rules and working conditions had been applied.

Between 1914 and 1917, before the wages, rules and working conditions of certain employees had been nationalized, the railways handled an increase in freight traffic of 31 per cent with an increase in the number of their employees of only 93,000, or 3,000 men per one per cent increase in freight traffic. On the other hand, while, between 1917 and 1920 the increase in their freight business was only about 13 per cent, the increase in the number of their employees, as shown by the statistics of the Interstate Commerce Commission, was 261,000, or over 20,000 men per one per cent increase in freight traffic.

It was because we believed the Labor Board had sufficient testimony and facts from the representatives of both the labor unions and the railroad companies to show that these national agreements, rules and working conditions were causing enormous wastes and inefficiency, and because the railway situation had become so acute as to make further continuance of this waste and inefficiency a menace to the solvency of many railroads and to the national welfare, that your labor committee instructed its chairman to appear before the Board on January 31 and suggest immediate abrogation of these agreements, rules and working conditions.

It has been charged before the Railroad Labor Board by spokesmen of the consolidation of labor unions that our suggestion that these national agreements, rules and working conditions be abrogated is a part of a huge plot originating in Wall Street, to break down labor organizations. The record of the proceedings as outlined shows that the railways began opposing a continuance of these arrangements immediately after their properties were returned to private operation, when production in the country was at its height, when the demand for labor in all lines exceeded the supply, and before the so-called "open-shop" movement in other industries was begun.

Railways Have Acted in Public Interest

The record demonstrates that the railways have acted throughout independently, primarily in their own interest, but also in the interest of the shippers, the farmers and industries.

That record completely disposes of the charge that we began and have continued the effort to prevent continuance of these working rules and arrangements as a part of any attack upon the labor organizations. What we have been trying to do, and all we have been trying to do, is to get the opportunity to deal with our own employees so as to restore the efficiency of labor on these railroads, and if possible avoid non-employment and defer serious wage reductions.

Our effort to do this cannot be construed as an attack upon the labor unions, except upon the assumption that efficiency of labor upon the railroads is incompatible with continuance of the strength and growth of the consolidation of labor unions, represented by Mr. Jewell and his committee.

The Railroad Labor Board rendered a decision upon our suggestions on February 10, holding that it could not approve the re-establishment at once of the agreements, rules and working conditions in effect upon each railroad as of December 31, 1917, because it could not assume without evidence that they were just and reasonable. The Board said that the duty is imposed upon it by the Transportation Act, of determining just and reasonable wages and working conditions for employees of carriers, and "all questions involving the expense of operation or necessities of railroads and the amount of money necessary to secure the suc-

cessful operation thereof are under the jurisdiction, not of this Board, but of the Interstate Commerce Commission."

It added: "This Board is not insensible, however, of the fact that the national agreements, rules and working conditions which are the subject matter of the dispute now being heard by the Board, do affect the expenditures of the railroads. If any of these rules and working conditions are unjust and unreasonable, they constitute an unwarranted burden upon the railroads and upon the public. It is, therefore, the duty of this Board to use the utmost practicable expedition, consistent with the necessary time for hearing and consideration, in determining whether any of the rules and working conditions now in effect are unreasonable."

The Board also denied our request that so much of its Decision No. 2 as fixed wages for unskilled labor be set aside and the prevailing rates for unskilled labor in the various territories served by any carrier substituted. The following is quoted from that part of its decision, relating to this matter:

"The boundaries of the power of this Board to decide controversies between railroads and their employees are set out in Section 307 of the Transportation Act. Section 307 (b) provides: 'The Labor Board upon the application of the chief executive of any carrier . . . shall receive for hearing, and as soon as practicable and with due diligence decide all disputes with respect to the wages or salaries of employees not decided as provided in Section 301.'

"Section 301 provides that it shall be the duty of all carriers and their officers, employees and agents to consider disputes in conference between representatives designated and authorized so to confer by the carriers or the employees or subordinate officials thereof directly interested in the dispute. If the dispute is not decided in conference, it shall be referred by the parties to the Railroad Labor Board."

The recognition by the Board of the fact that the national agreements, rules and working conditions affect the expenditures of the railroads, and that if any of these rules and working conditions are unjust and unreasonable they constitute an unwarranted burden upon the railroads and upon the public, is clear and helpful. We have proved that these arrangements are unjust, unreasonable, and are imposing an undue burden upon the railroads and upon the public.

The present railway situation is so acute that we also hope that the Board will, to quote the assurance given by it in its decision, "use the utmost practicable expedition, consistent with the necessary time for hearing and consideration." The Board in its decision said it is "endeavoring to perform this obligation (of acting expeditiously) and will be better able to succeed in doing so if it is not further interrupted by the introduction of unwarranted demands by either party." We take this to mean that the Board will require both parties in future to deal solely with the matters actually before it, and will not yield to demands of the spokesmen of the labor organizations that it permits them to introduce a large amount of entirely irrelevant matter about alleged "conspiracies" against labor unions—demands obviously made to divert attention from the real issues and to cause protracted delays.

The decision of the Board upon our suggestion regarding the wages of unskilled labor shows that before this question will be given formal consideration it must be brought before the Board in controversies arising from conferences between the railroads and their employees.

In one important respect the position taken by the Board regarding this matter is gratifying. It seems to mean that in future the Board will act, as it evidently was intended by the Transportation Act that it should act, as a court of appeal, and will not take original jurisdiction of any matter until it has first actually become the subject of controversy between the railroads and their own employees. The contention that the Board should not take jurisdiction of any matter until it had been the subject of conferences and controversy was taken by the conference committee of managers in opposition to the demands of the consolidation of the labor organizations that the Board, without such previous conferences and controversy, should take jurisdiction of the question of national agreements, rules and working conditions. The conference committee of railroads has contended throughout that the steps necessary to bring the question of national agreements, rules and working conditions properly before the Board never were taken. It is the earnest desire of the individual railway companies to confer and negotiate with their own employees regarding all questions affecting wages and working conditions before these questions are taken before the Railroad Labor Board; and this is in accordance with the letter and spirit of the Transportation Act.

The decision of the Board upon our request for immediate approval of reductions in the wages of unskilled labor relegates the initiation of action upon this matter to the individual railroads and their own employees.

The following resolution was later adopted by the association:

Resolution Adopted by Executives

RESOLVED, That it is the sense of the Association of Railway Executives that the following fundamental principles should guide the railroads of the United States in their relations with their employees:

1. That the conduct of modern transportation is a great co-operative enterprise requiring for its highest success the honest and loyal co-operation of both employer and employee.

2. That Section 301 of the Transportation Act requiring every reasonable effort and conference and negotiation between each carrier and its own employees to avoid disputes which might result in interruptions to traffic should be complied with in spirit and in letter.

3. That one of the great advantages of private over government ownership and operation of railroads lies in the greater adaptability of individual railroads to the geographical, social, economic and operating conditions which vary greatly with different portions of the country.

4. That the restoration and maintenance of this variation is essential to private operation and to its ability to furnish efficient and economical transportation at the lowest possible rates.

5. That in view of the foregoing facts it is in opposition to sound public policy to require all railroads to operate under rigid and uniform rules and working conditions or under rigid and uniform wages, not only because it prevents efficient and economical operation but equally for the reason that it inevitably results in injury to and dislocation in other industry and to farmers and stock raisers, who are brought into competition with the railways for labor.

6. That under normal conditions the adjustment of rules and working conditions and of basic wages cannot successfully be made the subjects of national conference and negotiation, as that implies by its very nature a violation of the differing needs of the railroads and of the territories which they respectively serve.

7. That any insistence by leaders of railway labor organizations that their claims to recognition shall be admitted in violation of the foregoing principles can only result in precipitating a clear cut issue between the interests of the public in the conditions essential to efficient and economical railroad operation and the alleged interests of railway employees in standard and uniform wages and working conditions, regardless of the differing needs of the various railroads and of the widely differing character, needs and resources of the various parts of the country which they serve.

Executives Ask Carriers to Negotiate With Employees

T. DeWitt Cuyler, chairman of the Association of Railway Executives, announced that, following the meeting of the member roads in Chicago on February 18, the following letter, signed by General W. W. Atterbury, chairman of the association's labor committee, had been sent to each individual road:

In previous correspondence numerous companies have indicated that the prevailing rate of wages of common or unskilled labor in their territory has greatly declined below the rates set by Decision No. 2 of the United States Railroad Labor Board of July 20, 1920. They have stated that they were being subjected to criticism because of failure to bring their wages for the same kind of labor into some fair relation to the now prevailing rate.

When I appeared before the United States Railroad Labor Board on January 31, urging the immediate abrogation of the national agreements, rules and working conditions, I also suggested some form of general permission which would enable the carriers to use the prevailing rate of wages for common or unskilled labor in other industries as a minimum rate for railroad employment. The decision of the United States Railroad Labor Board, dated February 10, holds that this matter can be raised only as a result of negotiations between carriers and their employees.

Accordingly, the adjustment of the wages of common or unskilled labor is a problem for each individual carrier to be handled by it in accordance with the conditions prevailing in its locality. Whether or not adjustment should be undertaken at this time, and what classes of common or unskilled labor should be affected, are questions of policy for the determination of each individual carrier. So, likewise, is the determination of the new rate of wages which the company attempts to negotiate. The only matter of common concern is that the procedure must be in strict accordance with Section 301 of the Transportation Act, and with the decisions of the United States Railroad Labor Board. This will in general require a thirty-day notice of a desire to meet and confer with duly accredited representatives of the classes of common labor proposed to be involved; the endeavor at such conference to negotiate a satisfactory reduction in wages; and, in event of failure, the certification of the dispute to the United

States Railroad Labor Board with such evidence as to prevailing rates of wages in other industries and decline in the cost of living as will in the opinion of the company tend to sustain the justness and reasonableness of the proposed reduction.

The Board Replies to Jewell

The Labor Board on February 19 announced in reply to the requests made by Mr. Jewell for either a continuance of the hearings on national agreements until March 14 or the remanding of the controversy to joint conferences, that representatives of the maintenance of way employees would reply to the carriers' presentation beginning on March 1, followed by similar presentations in support of the demand for the perpetuation of the agreements made with the clerks, firemen and oilers and signalmen. Mr. Jewell will, according to the Board's ruling, appear before the Board on March 10. Mr. Jewell's request to remand this controversy to joint conferences between the carriers and the employees was ignored by the Board in its ruling.

Decisions in A B & A and Missouri &

North Arkansas Cases

The disputes between the employes of the Atlanta, Birmingham & Atlantic and the Missouri & North Arkansas and these carriers—the hearings on which have been described in previous issues of the *Railway Age*—have been remanded to the parties involved, by decisions of the Board handed down on February 21. After reviewing the history of the case, the Board's ruling as to the Atlanta, Birmingham & Atlantic said:

In view of the fact that the record shows clearly that no conference has been held between the parties with reference to the justness or reasonableness of the wages fixed by decision number 2 of this Board, the Board does not deem it necessary to decide to what extent, if at all, a carrier's financial condition is a factor in the determination of just and reasonable wages to be paid by such carrier.

In the judgment of this Board the conferences heretofore held do not constitute a compliance with section 301 of the Transportation Act, for the reason that no conference has been held between the parties with reference to the justness and reasonableness of the present wages.

It is the decision of this Board that it is without jurisdiction to determine the present dispute until section 301 had been complied with by conference of the parties, the subject matter of which conference shall be whether the present wages are just and reasonable.

The Board further decided that further consideration of this dispute be deferred until it shall be made to appear that the parties have conferred and determined on the question of whether present wages are just and reasonable, based on the relevant circumstances as required by the Transportation Act, 1920, or until parties have refused to enter into conference on the said question.

A similar ruling was made in the Missouri & North Arkansas dispute, the following being added to the decision:

It is the opinion of this Board that the action of the carrier in reducing wages February 1, 1921, after an application for a hearing had been filed by the organizations interested was improper. However, extenuating circumstances exist in this case, particularly in that this Board failed to act in the premises prior to February 1. For this reason the Board does not deem it judicious to proceed under section 313 of the Transportation Act.

It is the decision of the Board that all employees, including those who have been laid off, on their being returned to service accept under protest the wages offered.

If the parties do not reach an agreement in the conference required by this decision the Board will set March 5 as the date of a further hearing of the dispute and will determine what wages are just and reasonable with reference to the carrier and will make its decision effective as of February 1, 1921.

If conference is refused by the carrier, this Board will proceed under section 313 of the Transportation Act, 1920.

FOREIGN TRADE amounting to more than 1,000,000 pounds sterling was carried by British commercial airplanes from the inception of the service in August, 1919, to the end of November, 1920.

A Municipally-Operated Mountain Railroad*

By A. J. Cleary,

Assistant General Manager, Hetch Hetchy Railroad

THE HETCH HETCHY RAILROAD, owned and operated by the city of San Francisco, Cal., begins at a junction with the Sierra Railroad, 26 miles east of Oakland and continues eastward for a distance of 68 miles to the Hetch Hetchy water supply and power project dam site. Its primary object is to transport construction materials for this dam. The railroad is standard gage, with a maximum grade of four per cent and a maximum curvature of 30 deg. Its cost was approximately \$30,000 a mile, or \$2,000,000 for the entire road.

For motive power we first experimented with engines of the Shay type, since the grade was regarded as steep for rod engines, and the curvature seemed to be rather excessive but the cost of maintaining geared locomotives was found excessive. Accordingly, specifications were prepared for a 90-ton Mikado locomotive which would be built to negotiate our grades and curves. This was furnished by the American Locomotive Company and is provided with a special lateral motion driving box. It has given no trouble whatsoever. It can make the trips much faster; it can haul as big a load, and its upkeep is much less.

Before the railroad was built hauling was done in that part of the country by motor truck and the cost was approximately 60 cents per ton mile for all types of freight. With a distance of 68 miles and 258,000 tons of freight to be moved, the difference between the cost of truck haul, the cost of hauling this freight by railroad at six cents under present conditions means a saving of several million dollars in hauling the city's construction materials alone. There are possibilities for hauling a great deal of freight which will be obtained from the timber interests that are now building mills along the railroad. That will be back-haul and will practically be clear profit, as we would have to build the railroad anyway, for handling our own materials. The tariffs which we put into effect at the start may appear excessive, but the cost of the railroad will have to be written off within a period of 10 years, and consequently the rate which we charge for carload lots is 12½ cents per ton mile.

From a passenger standpoint the Hetch Hetchy also has good possibilities. When the Hetch Hetchy dam is built the valley will be converted into a lake, seven miles in length and about a mile wide, which will have all of the beauties of Lake Tahoe together with the scenery of Yosemite. Over-tures have been made to the Southern Pacific and the Santa Fe to take over the operation of the Hetch Hetchy Railroad eventually.

For hauling passengers we have used motor vehicles equipped with flanged wheels. We also do a great deal of our freight hauling, such as express service for meat and perishable provisions for the various camps by flanged wheel motor trucks. We find that we save a great deal of the cost of operation by handling all light freight in this same manner.

PUBLIC OWNERSHIP IN CANADA.—Unless the Dominion Government Cabinet gives the board of directors of the Canadian National Railways substantial support and a free hand in the broad principles of management and operation, public ownership of railways in Canada is doomed to failure. The board cannot be held accountable for the successful operation of the enormous railway property unless it be given sufficient financial help to buy needed equipment and to make necessary replacements and repairs.—*Canadian Engineer*.

*Abstract of an address before the Pacific Railway Club.



The Montana Canyon as Seen from a St. Paul Observation Car

The Use of Helpers in Electric Train Operation*

Helper Cut in 100 Tons Ahead of Middle and Operated for Braking Over Summit and Down Grade

By W. F. H. Hamilton

Railway Equipment Department, General Electric Company

OPERATING WITH HELPERS is the common method for handling freight trains. The practice on the Chicago, Milwaukee and St. Paul was to put the helper (where only one was used) at the rear of the train just ahead of the caboose. The helper could thus be easily cut off to take water, and could be readily cut in to the train at the start and cut out the train at the summit of the grade. This method leaves one or two cars in the train, at the location where the drawbar stress changes from pulling to pushing, which are very nearly free and can change the slack either way easily. This causes trouble in handling the train and may be termed "floating slack."

It was also the practice with steam power to run helpers from the bottom of each grade to the summit; there they were cut off, turned, and then returned to their original stations, only occasionally being run clear over the hill.

Electric operation was started on much the same basis. The helpers were put at the rear of the trains while ascending the grades but were cut off at the summit and run around to the head-end of the train. There the two locomotives were connected in multiple unit and were used to control the operation down-grade.

This method of operation was tried for a month or so but the results were not entirely satisfactory. Signaling between locomotives was difficult because the trains were longer and the whistles on the locomotives were not as powerful as those on the steam locomotives. The road (leading) locomotive could not slack the entire train, which was necessary in case the helper was not ready to start and, when stopping, the engineer on the helper did not always realize it promptly. This resulted in drawbars being damaged to such an extent

that they were pulled out when starting again. Much of this trouble came from the "floating slack" near the middle of the train referred to above, and also because electric locomotives do not slow down as much with the application of load as do steam engines.

How Helpers Are Now Used

The method was then tried of cutting the helper into the train about 100 tons ahead of the middle. This insures the slack being stretched out on all cars and makes starting easier because each locomotive handles practically its own tonnage. Also it was found practicable to keep the helper locomotive in the train while descending and allowing it to regenerate to assist in holding the train. This method of operation proved successful and has been used ever since.

The helpers all operate out of one station and normally run clear over the hill, returning with the next train in the opposite direction. Occasionally it is necessary on account of traffic movement to cut the helper out at the summit and let the road locomotive take the entire train down the grade. At such times both regeneration and air brakes have to be used in combination as previously described. Operating the helpers out of one station reduced the number of crews and locomotives required.

When ready to start on an ascending mountain grade with a helper in the train, the train brakes are released and the train is held by the independent brakes on the two locomotives. The engineer on the road locomotive "whistles off" and the engineer on the helper locomotive answers if he is ready. These whistles are not always heard, however. When the engineer on the road locomotive hears the helper "whistle off" or after waiting a reasonable length of time, he brings the controller onto the first or second notch and releases the independent brakes. This keeps the locomotive from roll-

* This is the third of a series of three articles on this subject. The first (Railway Age, January 21, 1921), dealt with passenger service requirements and passenger train operation. The second (Railway Age, February 4, 1921), dealt with general requirements of freight train operation.

ing back against the train and as soon as the brakes release the controller is moved out slowly until the train starts, or until the current is as near the wheel slipping point as it is advisable to go. This stretches all the slack in the train as far back as the helper locomotive. The engineer on the helper locomotive watches the drawbar of the car forward of his locomotive and as soon as this stretches out brings his controller onto the first or second notch and releases the independent brakes on the locomotive. As soon as they have released he notches the controller out slowly and carefully until the train starts, or until his locomotive has reached as close to the wheel slipping point as it is desirable to go. After the train has started both engineers watch their ammeters and accelerate as close to the wheel slipping point as desirable until they have reached the full parallel position of the controller.

If, however, the train does not start in what the engineer on the road locomotive considers a reasonable time he notches back his controller slowly and allows the train to drop back gradually against the helper locomotive. This is a signal to the helper locomotive to be ready to start and as soon as the engineer on the road locomotive feels the jolt of the train bunching against the helper locomotive he again attempts to start as before. In cases where several attempts are made to start, this "rolling back" operation is usually repeated with increasing severity each time so that the engineer on the helper locomotive will have no doubt as to what is required. When the latter sees the train dropping back against him as shown by the drawbar of the car ahead, he brings the controller on the first or second notch and releases the independent brakes so as to be ready to start when the leading locomotive pulls the slack out of the train ahead.

In stopping the train, the engineer on the road locomotive notches his controller off slowly. This becomes apparent on the helper locomotive by the ammeters indicating a higher value of current and the helper locomotive engineer noticing this, notches back his controller to hold a slightly lower value of current than was required by the train while running. This process is continued until the train comes to rest when he applies the independent brakes and shuts off the controller. The engineer on the road locomotive does the same and sometimes applies the automatic air brakes to assist in stopping. This process of stopping requires as much or more care than starting and the control must be designed to give the proper steps both when turning off as well as when turning on.

It is really surprising how much information can be obtained from the ammeter on the helper locomotive and from the action of the drawbar of the car ahead. With a little experience and a reasonable knowledge of the profile so as to know where slowdowns may be expected it is possible to tell practically everything that the engineer on the road locomotive is doing.

When descending a grade the helper locomotive also regenerates to assist in holding the train. If the start down the grade is made at the summit and the train has to be pulled in order to start it, the helper locomotive engineer commences regeneration when he notices the drawbar on the car ahead show in. If the start is made from rest on the descending grade he commences regeneration when the first airbrake application is made at the same time as the road locomotive. The helper locomotive is only supposed to regenerate enough so that the road locomotive can readily control the train speed. This means that about 30 to 40 per cent of the load is taken by the helper and 60 to 70 per cent by the road locomotive. In case the helper does not regenerate enough the engineer on the road locomotive makes an application of the airbrakes and releases soon afterwards. The helper locomotive engineer notices this and knows it is a signal to increase the amount of regeneration.

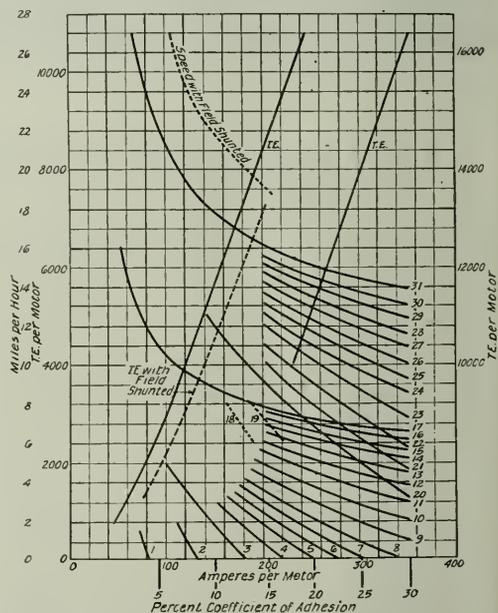
When stopping, the road locomotive engineer makes an

application of the automatic brakes and then shuts off his controller when the line current has dropped to about zero. The engineer on the helper locomotive does likewise and both allow their driver brakes to apply. After the train has stopped, the brakes are released on the helper locomotive and the train is held by the independent brakes on the leading locomotive only.

At the bottom of the grade the helper locomotive is cut out. The brake pipe pressure is also dropped from 90 lb. which is carried on mountain grades to 70 lb. A wise engineer applies and releases the brakes on the train twice, making heavy applications each time before starting as otherwise the brakes will stick due to what is virtually an overcharged brake pipe.

Cold Weather May Cause Many Difficulties

The operation of starting on a mountain grade is fairly easy in good weather but in cold winter weather after the train has been standing an hour or so and the oil has con-



Speed-Tractive Effort Curves of Resistance for the Electric Freight Locomotives Used on the C. M. & St. P.

gealed in the journal boxes it is no easy matter. Care must be taken not to apply so much power that a drawbar will be pulled out of some car weaker than the others; this danger is always present in merchandise trains. One is often between "the devil and the deep sea," for if enough power is applied to really get the train going in good shape a drawbar or "lung" may come out; if less power is applied the train accelerates slowly and there is the possibility of not being able to accelerate to a running position of the controller before the rheostats overheat.

The friction after the train has been running for an hour or so is about the same as it is in warmer weather but it is very high when starting. Then too there is usually more or less ice and snow on the track which makes the locomotives slip their wheels easily and requires good sanding of the track and careful watching by the engineer. It is possible by notching back a couple of notches to catch wheels that have just started to slip but once they are allowed to

spin it is necessary to shut off and start over again. Wheel slipping, especially if it occurs suddenly on mountain grades, is dangerous in that the sudden shifting of load which takes place between the two locomotives is liable to pull out or push in a drawbar. Wheel slipping can usually be detected before it becomes serious by the "fluttering" of the ammeter needle and when this occurs an application of sand must be made promptly. This "fluttering" is noticeable whether the ammeter is in the circuit of the particular motor which is slipping or not.

The airbrakes give a great deal of trouble in weather colder than 10 deg. F. The hoses freeze stiff, usually when the train is standing more or less bunched; when it is stretched out again they leak badly or open up entirely. This often causes the brakes to stick and their action is uncertain at best. When the brake pipe is leaky the feed valve chatters because of the large volume of air passing through it and this is not only very disagreeable to one who has to listen to it continuously but the valve usually manages to freeze up in time and must be thawed out. Sometimes it freezes shut, in which case the brakes apply at once due to the leaks in the brake pipe; sometimes it freezes open and admits main reservoir pressure to the brake pipe. This means that the brakes will stick after it has been thawed because of the brake pipe being overcharged. In such cases it is best to attempt to keep the train moving, although it is sometimes necessary to shut the controller off in case the additional load due to the brakes dragging causes the current to go too high.

When an application of the automatic airbrakes is made on a long train, there is first a high pitched whistle which is caused by the air exhausting from the equalizing reservoir and this is followed, in maybe a second or less, by the deep roar of the air exhausting from the brake pipe itself. With a very leaky brake pipe the leaks may draw down the pressure faster than the equalizing valve in the brake valve can. In such cases only the first high pitched whistle is heard. This usually means a damaged drawbar before the train is stopped as in such cases the brakes apply hardest at the rear of the train and the train is stretched out. To counteract this an effort is made to draw down the brake pipe pressure faster at the brake valve by making as heavy an application as possible without actually going into emergency.

Train Slack

Train slack is very peculiar and in a long train seems to give trouble in three sections; the head, middle and rear. The cars in these sections seem to run closely bunched together with considerable slack between the sections and this more or less free slack is always ready to start trouble. This is especially the case on lighter grades or nearly level stretches. There was a certain station on the C. M. & St. P. where there was a sag in the track with about 2,000 ft. of not over .4 per cent grade on each side of the sag. When running through this sag the controller had to be moved back to series in order to prevent too high a speed being attained, but still power was being applied to the train. Twice while the writer was instructing on this particular section of the road trains broke-in-two near the middle while passing through the sag. Apparently the rear end speeded up enough to overtake the head or middle portion and some cars came together enough to either uncouple, or else when the train stretched out again as it started to ascend the grade there was enough of a shock to pull out a drawbar or break a knuckle. These two cases happened within a short time of each other and give some idea of the unforeseen and unavoidable incidents which happen in freight train handling.

There was a certain canyon on the St. Paul where there were many curves on about an .8 to 1 per cent grade—just enough so that the train had to be held back a little at times

when descending and yet not enough to require heavy applications of the airbrakes. Application less than 8 to 10 lb. usually mean that the brakes will stick more or less after releasing so that with steam locomotives more or less trouble was experienced in taking trains through. With the electric locomotives regeneration is used instead and the need of the light applications is eliminated and operation is thus made easier.

Locomotive Design

To meet the conditions of train handling, as outlined above, successfully the control equipment of the locomotives must be carefully designed so that sufficient rheostat steps and ample rheostat capacity will be provided. The acceleration curves on resistance of the C. M. & St. P. freight locomotives are shown on the chart. It will be noted that the change in tractive effort between notches when accelerating to a maximum of 25 per cent coefficient of adhesion is about 21,000 lb. for the total of 8 motors on a locomotive. The rheostats are designed to allow an acceleration at an average value of 210 amp. corresponding to about 16 per cent coefficient of adhesion for 25 minutes and 300 amp. corresponding to 25 per cent for 15 minutes. These capacities have proven ample in service but are not too large for winter work. It will be noted, too, in examining the curves that the steps are close together from the fourth notch to the eighth, inclusive, and are then spread out more. This provides steps close together at the most critical time in starting a heavy train. The increments in tractive effort between steps have always been satisfactory so that it may be assumed that the proper increment to use with this size locomotive is about 20,000 lb. to 25,000 lb. per step after the train is in motion.

The field shunting position gives about 50 per cent shunting which is about the maximum which can be used on account of the commutation of the motors.

It is necessary that the traction motors be so designed that they can have currents up to 20 to 25 per cent coefficient of adhesion applied for about five minutes with the locomotive stationary without injury to the commutator. This is often required in starting heavy trains. No trouble from this cause was ever experienced on the C. M. & St. P. locomotives.

Direct current locomotives using series motors for freight service have a great advantage as far as this work is concerned in that the tractive effort developed depends only on the current input and does not vary with the voltage. Therefore, variations in voltage do not affect the ability to pull the train or the current input but simply change the speed. There is some increase of heating due to slower speed of the blowers but this can be neglected for short periods. In case of reduction of voltage for any reason the trains can still be kept moving. The auxiliaries were designed to operate at a minimum of one-half normal voltage (1,500 volts) and some will operate as low as 1,000 volts, although at this voltage the air compressors will not pump up a long train. This feature is also made use of by the power limiting system which was described in the April 9, 1920, issue of the *Railway Age*.

They also have an advantage in that the speed during regeneration can be varied over quite a wide range especially if the train weight is below the maximum. This allows the lighter trains to make faster time and helps in getting trains over the road. When operating full tonnage trains on the mountain grades, practically only one speed is available ascending or descending, but there are usually stretches of lighter grades or nearly level track between mountain grade sections where it is desirable to use higher speeds.

Freight service in mountain railroading is far more fascinating than passenger service although, of course, it involves much longer and harder hours. It requires at times

the greatest skill, patience and resourcefulness on the part of the engineer, and this is not always appreciated by those who have not followed the work on the road, particularly in winter.

The writer would like to express his thanks to the engineers and others on the C. M. & St. P. with whom he was associated, particularly in the early days of the electrification, who worked out many of the methods described in this article and who also showed him many practical "kinks" in train handling that in considerable measure made the writing of this article possible.

Freight Car Loading

WASHINGTON, D. C.

FREIGHT CAR LOADING during the week ending February 12 continued to decrease, showing a reduction of over 15,000 cars as compared with the week before, according to the weekly report of the Car Service Division of the American Railway Association. The total number of cars loaded with revenue freight was 681,627, as compared with 786,633 in the corresponding week of 1920, and 687,128 in 1919. The summary follows at the bottom of the page.

The number of surplus freight cars continues to increase and for the week of February 15 averaged 392,550. There were also scattering shortages amounting to 388 cars.

The Car Service Division announces that effective March 1, 1921, the district embargo zones with headquarters at Atlanta, Boston and Philadelphia will be consolidated into one zone with headquarters at Washington, D. C., under the supervision of the Car Service Division as district representative. The following will thereafter constitute the district embargo headquarters:

District embargo headquarters	Representative	Address
1. Washington, D. C.	Car Service Division	718 18th street, N. W.
2. Montreal, Que.	C. P. Riddel, District Embargo Chairman	263 St. James street.
3. Chicago, Ill.	J. Pelley, Chairman, Car Service Commit- tee	431 So. Dearborn street.
4. Winnipeg, Man.	E. J. Stone, District Embargo Chairman	Union Station.
5. Ft. Worth, Texas...	R. L. May, District Em- bargo Chairman	11 Touraine Building.

To minimize the expense incident to the present method of handling embargoes, some of the smaller roads which heretofore received embargo notices from district embargo head-

quarters at the points mentioned have been assigned to a designated trunk line connection for the purpose of receiving embargo information issued by other roads. There will be no change in the present method of placing embargoes by the roads affected. Where a road is shown as being assigned to a trunk line connection that road will receive all notices of placement of embargoes, modifications, extensions or cancellations direct from the designated trunk line connection which will promptly transmit such embargo information in the manner provided for in Circular CSD-37 and Supplement No. 2 thereto, due regard being given to the utilization of railroad wires where facilities are available.

NO SITUATION can possibly arise to excuse lack of good manners on the part of any employee. Courtesy is due every patron with whom we come in contact, rich or poor, well dressed or poorly dressed, no matter who he is. You will find that good treatment on your part to the patron will bring good treatment on the patron's part to you. He will treat you as well as you treat him. Courtesy always brings big dividends. It pays you, and it pays the company. It pays you, because it makes friends for you and saves complaints against you by patrons, thus raising your standing with the company. It pays the company, because the company is always judged by the conduct of its employees. Courtesy is simply the exercise of kindness and helps make life go smoothly. Nothing makes so many friends as kindness. Nothing adds so much to our own equipment and character. We can all be kind if we choose. It is true that kindness never fails of its reward. It is also true that discourtesy toward a patron under any circumstances is a betrayal of the company's interest. Practice courtesy, not some of the time, but all the time. Your record will speak for itself, should you be reported for some seeming grievance by a patron. If you are courteous to all patrons, the company will soon hear of it, because the public, as a rule, will find pleasure in praising your work. If your manner is discourteous, the public takes equal delight in doing all it can against you, and then the company's interests, as well as your own, suffer. Look above the weaknesses of individuals in the crowd and meet discourtesy with courtesy, impatience with patience. We can do much towards educating the public by example.—*E. E. Nash, general manager, Minneapolis & St. Louis.*

PENNSYLVANIA RAILROAD STOCKHOLDERS on February 1, 1921, numbered 134,743, an increase of 1,675, compared with that of January 1, and of 14,434, compared with the totals of February 1, 1920.

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO AND FOR WEEK ENDED SATURDAY, FEBRUARY 12, 1921

Districts	Year	Grain and grain products	Live stock	Miscellaneous	Coal	Coke	Forest products	Ore	Merchandise L.C.L.	Miscellaneous	Total revenue freight loaded			Received from connections		
											This year	Corresponding year 1920	Corresponding year 1919	This year	Corresponding year 1920	Corresponding year 1919
Eastern	1921	4,492	2,877	42,603	959	8,434	844	45,521	53,381	159,113	171,546	160,610	183,665	216,214	187,121	
	1920	4,949	2,848	49,524	3,952	6,090	1,994	32,676	46,710	141,591	161,164	144,412	98,536	116,145	119,632	
Allegheny	1921	1,856	2,867	46,327	5,265	3,248	2,642	2,416	33,495	62,534	23,216	32,983	26,400	12,867	18,309	
	1920	2,698	3,055	49,738	3,204	4,024	2,642	33,495	62,534	23,216	32,983	26,400	60,998	79,893	64,989	
Poebentans	1921	167	94	13,957	139	1,451	51	2,460	4,897	23,216	32,983	26,400	12,867	18,309	19,315	
	1920	176	99	20,041	71	1,864	302	36,464	9,614	107,406	125,950	108,939	43,587	61,731	47,640	
Southwestern	1921	3,184	1,796	21,830	660	12,866	942	24,245	27,633	97,478	114,778	103,199	42,369	67,290	55,616	
	1920	3,904	2,454	24,682	321	16,709	2,524	20,151	55,205	125,950	108,939	103,199	42,369	67,290	55,616	
Northwestern	1921	10,042	8,214	5,856	1,166	20,464	1,582	20,274	39,934	114,778	103,199	103,199	42,369	67,290	55,616	
	1920	10,006	7,804	15,518	1,166	20,464	1,582	20,274	39,934	114,778	103,199	103,199	42,369	67,290	55,616	
Central Western	1921	8,937	9,817	16,557	290	2,934	2,078	27,374	28,796	96,783	118,018	94,074	46,961	50,749	42,796	
	1920	9,872	9,969	23,764	463	5,630	2,798	22,082	43,440	118,018	94,074	94,074	46,961	50,749	42,796	
Southwestern	1921	4,201	1,791	4,654	96	6,214	401	15,952	22,731	56,040	62,224	49,494	488,983	610,331	537,109	
	1920	3,974	2,553	7,104	140	6,931	567	16,469	24,486	62,224	49,494	49,494	488,983	610,331	537,109	
Total, all roads...	1921	32,879	27,456	151,786	9,026	53,882	8,094	184,892	213,612	681,627	786,633	786,633	687,128	848,126	786,633	
	1920	35,579	28,782	188,371	9,977	61,712	12,183	173,577	312,452	786,633	786,633	786,633	687,128	848,126	786,633	
	1919	33,839	33,369	140,999	951	57,120	14,822	406,919	501,000	786,633	786,633	786,633	687,128	848,126	786,633	
Increase compared 1920		2,700	1,326	36,585	951	7,830	4,089	47,315	98,840	105,000	105,000	105,000	121,348	148,126	148,126	
Decrease compared 1920		2,700	1,326	36,585	951	7,830	4,089	47,315	98,840	105,000	105,000	105,000	121,348	148,126	148,126	
Increase compared 1919		960	5,913	10,787	926	3,238	6,788	193,307	5,501	5,501	5,501	5,501	5,501	5,501	5,501	
Decrease compared 1919		960	5,913	10,787	926	3,238	6,788	193,307	5,501	5,501	5,501	5,501	5,501	5,501	5,501	

L.C.L. merchandise loading figures for 1920 and 1919 are not comparable as some roads are not able to separate their L.C.L. freight and miscellaneous of 1919. Add merchandise and miscellaneous columns to get a fair comparison.

Year	1921	1920	1919
January 5	36,875	31,277	155,917
January 9	39,830	32,368	162,652
January 15	46,695	35,255	168,453
January 22	44,861	35,125	183,228

Getting Better Results from Railroad Organizations*

Subordinate Officer Occupies a Strategic Position, but Is Not Properly Trained to Fill It

By George M. Basford

DISCUSSIONS ON REDUCING COST of transportation do not really begin before someone mentions the real key to the situation, which is effort of the individual all along the line to improve his production, to save. The next thing mentioned is the foreman and supervision. The foreman today is the most vital influence on the road.

Giving my conclusion first I am going to suggest what seems to me to be an absolutely unquestionable necessity on railroads today. I am going to suggest a foreman for a new job. The job is to take charge of the whole railroad organization, as an organization, as a general foreman of personnel, but the man would have a title and standing that places him next to the chief executive of the road. This officer would supply a missing link in our troubled days. The chief executive was formerly so close to the small organization that he could know every man. Not only did he know every man, but he handed to them, by contact, his ideals, his desires and his inspiration. As organizations grew this link was lost. It must be found again. At this precise point in the development of railroads, and in the present complication of their problems there is nothing to be done that will net as much as securing the co-operation of the rank and file for increased production and the reduction of cost of transportation. The minute the men in the ranks, on the track, in the shops, yards, terminals, trains and engines center their minds to the fact that the best thing they can do for themselves, for the railroads, and for the public, is to get busy to save dollars, the railroads will be saved.

It is not enough that some should be striving or that some departments should be organized for effective effort of the individual. It is necessary that the effort should be general, bringing departments into combined efforts. Now we hear men say, "I should worry, the coal is not charged to my department." To answer this there must be some way for these men to learn the policy of the road with respect to coal, and the policy with respect to everything they use.

It Takes a Shock to Wake Us Up!

Is it radical, is it revolutionary to suggest a high officer for the exclusive administration of the organization as an organization, who will himself be a part of the policy of the company and whose duties are to see that everybody from himself down to unskilled labor understands that policy? Sometimes it takes a shock to wake us up. Right now we are having one. Until organization questions receive some sort of consistent attention we shall continue in trouble and in trouble that has a remedy.

How can anyone defend such a thing as this? An important department of one of our fine big railroads has not once in 30 years been presided over by an officer who grew up on that road and in that department, but in this time many importations have been made. All have been able officers but they came from "outside." Think this over!

Another big road recently had a narrow escape. A vacancy in a high position was about to be filled by an outsider when the president's attention was called to a man already in the service, who for years had been preparing for exactly that position. He was promoted. He has made good. Some say, "We need new blood." The answer is you already

have it. Circulate it. Every time a stranger is imported to a high position notice is served on the entire organization that it is useless for the individual to exert himself. This is just what has happened on many of our railroads. When foremen and men see this why should the men desire to be foremen and why should foremen wish to go higher?

"Give me a bunch of good foremen and the yard will run itself," says the ship builder.

A Picture

Two years ago a large industrial organization started such a plan. It involves 15,000 men in a number of plants and includes a very large office and sales force in this country and abroad. A remarkable man was selected to manage personnel, training and promotion. He reports to the board of directors and works with the executive assistant to the president. Policies are established by conferences in which the personnel officer has a part. He carries these policies out through and with the organization, everybody knowing that he represents the highest authority. He has begun with recruiting, training and promotion questions, is developing co-operation such as is seldom seen and has made remarkable headway in better understanding among not only the different plants of the company but among the officers and men of individual plants.

To succeed the policies must be definite and the objects of the organization must be known. This officer is supplying through the organization itself that which was lost when great growth came. He is bridging the distance that was rapidly increasing between the executives and the men. He has established apprentice schools, workmen's schools and foremen's schools, which means that the foremen are studying men and methods of dealing with them and are becoming managers of men. The work he is doing is entirely applicable to the railroad, the small road as well as the large one. The railroad needs the facts he is collecting. Who have we got in our employ? What is he doing? What is he capable of doing when trained to do it? The roads need the job analysis he is making for his company and the system he is working out to find and fit men to the jobs.

Chief Clerk

Let us think a moment how chief clerks are selected. It is a personal matter with the officer. Chief clerks sign the officer's name, take action for him in his absence. I have seen over one hundred officers of a certain road in conference for several days at headquarters here in Chicago—while the chief clerks ran the road. Because this is personal service these men are selected with personal care and from men who have been through long periods of training. Naturally they make good. We should therefore think of two things in this case.

First, these men are often good material for promotion. Think of this—the chief clerk is close to his superior. He absorbs from his superior the things that made that superior successful. He grows by his contact with a bigger man. This is training, of the sort that we are talking about. Moreover, the chief clerk is in an exposed position where good work shows up quickly and clearly. Let us get the obscure men up into a brighter light and see what happens.

Second, every man on the road must and does act for the

*From an address before the February meeting of the Western Railway Club.

boss in his absence and should be selected with equal care and should be trained as well. Every man signs the name of the boss on every job he does and the railroad is about 150 ft. to 200 ft. wide and perhaps 2,000 miles long. The boss is away most of the time from most of his subordinates.

Biggest Job on the Road

Someone has said that "the foreman is the top sergeant of industry." Nothing is more true or more important in any industry than this. The character of an organization is up to the character, ability and progressiveness of the foreman. No matter who or what the captain is, the company is practically useless unless the top sergeant is right. If the foreman is a timeserver, as sometimes he has been taught to be, the men will be timeservers also and the result is well known. Who on a railroad ever gets shop foremen or yard foremen together to tell them how important their jobs are and to show them that to their men they represent the railroad? Are they encouraged to know the manhood, ability and possibilities of their men? Does the foreman look with his own eyes alone or does he look with the eyes of the management? Does he know his men when off the job? Is he their friend and advisor?

How is a new foreman selected when a foreman leaves? He may be most skilled with his hands and may be most proficient with his own work, but he must know how to manage and operate the most complicated, most delicate machine in the world—a human organization with intricate problems always present. Is he usually told about the management of men and is he helped and supported as he should be in that management?

Foremen's Schools and Meetings

Some big successful industries are getting to a point of appreciating what foremen can do and are already holding foremen's schools and foremen's meetings to bring these important men to see their own possibilities. Remarkable results are being obtained by leading the foremen to realize that they are really administrators of human affairs, that they require wisdom as well as ability, that an army is what its commander makes it, that the gang reflects the leader and that the leader must know and have the confidence of the men he leads.

In the question of shop foremen a new situation developed instantly when piecework was abolished. It is not true that piecework furnished the incentive to the individual worker, whereas incentive in earlier days had been supplied by the foremen? Under piecework the foremen deteriorated, in some cases to the mere checking of work. Foremanship received a knockout when, by piecework, men received more than the foremen did. When piecework disappeared this left many roads with foremen who were not trained at all and did not know how to furnish the incentive to the men. This is not the fault of the foremen, but of the system of things which changed. It confirms the opinion that the loss of inspirational contact has been serious.

The Traveling Engineer

Is it possible that these vitally important men can get closer to the men on the engines and represent to them the ideals and the humanity of the wonderful organization of a railroad? There is no finer body of men than those who run our engines, but as a body what do they know, what do they see of the management? It is represented to them by rules, the breaking of which means trouble. These men can affect the treasurer's figures more than any other class of men on the road. For instance, they can improve ton-mile figures more than anyone else can. I believe that a 10 per cent saving in fuel lies in the hands of these men whenever the desire to save it is made an ideal with them and when the idea of saving is "sold" to them.

Here is the man who must be the manager of his men. He is often isolated and must rely on himself and frequently faces great difficulties of weather, lack of facilities, even of conveniences, and without sufficient subordinate supervision in his work. His work is a continuous emergency. A big roundhouse job is as big as the head of the department had a generation ago.

The new officer we are talking about would give the roundhouse foreman great encouragement, would help him get the facilities he needs inside and outside of the roundhouse. This officer would be able in a short time to provide him with trained men. Here is a good place for a start to be made in reducing idle time of engines. Here is where industrial intelligence counts heavily. Co-operation counts most of all. Dispatchers should understand the roundhouse. Traveling engineers should spend enough time there to understand how engines come in off the road.

Track Foremen

Here are men who work alone. Weather, flood and unexpected trouble add to daily routine. Here training and encouragement count, as everybody knows who has had occasion to rely on these remarkable men in emergencies. In the case of track foremen industrial intelligence is of great value because of the nature and conditions of their work. These men have a wonderful opportunity to effect small savings that in the aggregate are huge.

Recruiting Offices

Without a systematic method for taking recruits into employment, without insisting that employing officers should work to a certain plan or system the character of recruiting will depend largely upon and will be limited by the ability, the personality and methods of those who do the hiring. Various manufacturing plants employ highly trained recruiting officers in employment offices. Some concerns go so far as to employ psychological tests, others use intelligence tests, means for selecting recruits having become a science. We may hold different opinions as to the tests suggested and used, but it seems decidedly necessary that greater care in some form should be exercised, especially in recruiting for permanence. Those who have made exhaustive study of employment offices and recruiting offices in industries say that there is no case on record of this work having been abandoned when once started.

Employment management in industry has become a profession, devoting itself to getting and keeping men through uniform, consistent policies.

Recruiting Along the Road

Let us select for various jobs young men and boys who are recommended because of character, physical ability and the necessary intellect. One way to select them is to enlist the aid of local officials along the line of road. Station and local officials of all departments may be asked to recommend those they know about or whose parents they know. The headmaster of the grade school or the principal of the high school, the clergy, and even the local judge may and will recommend the best material when they are interested to do so. Having in mind office boys, apprentices and young men it stands to reason that living along the line of the road they will already have an interest and an embryo undeveloped loyalty to the property from which the loyalty so greatly needed under present conditions may have promise of development. Wherever this is done the results have justified the plan and it seems worthy of consideration.

Labor Turnover

To engage new men, teach them their duties and launch them into service costs a lot of money. To engage, train and then lose them in large numbers is a very serious loss. It is

one of the biggest leaks in industry. To hire and lose a skilled man costs from \$250 to \$300 in one industry which has been studied. It must cost railroads more than that because in many cases great damage is done by such men. I know of one large railroad shop which for three years in fairly busy times had not found it necessary to go beyond its own apprentice graduates to supply all the skilled talent needed and in that period no skilled workman was hired from outside.

Inspiration

A large majority of men take pleasure in accomplishment of a good piece of work. Making something, repairing something or making a good run over the road brings satisfaction and is in itself an inspiration. Praise is often in order but must be used with discretion, so also censure. Notice taken in either case indicates that the company cares whether work is done well or not and most men will respond.

A road had three shops far apart and a flue job at each. One of the flue gangs had made a record. The leaders of the gangs at the other shops were sent to investigate. They went back and beat the record. This was not all. All three flue jobs were overhauled, new machinery installed and a lot of money saved. Mere expression of interest inspired those men to do good work and they were happier for doing it. It is a part of training of men to show them that the job they are doing is of great importance to the road.

Friends

Everybody needs a friend. Every young man finds a turning point in his career, a point in his life when he wakes up to a realization of his responsibility and his opportunity. It may be that a word of advice, of caution, of recommendation given at the right time will make, and the absence of it will break a career. It is most fortunate if this friend is his employer or the representative of his employer, the foreman, the general foreman, the master mechanic, the train master, the chief dispatcher. In older days when organizations were small it was the boss himself. In these days of big things it is the representative of the boss. The most important thing a big organization can do is to provide the thing that bigness has outgrown—personal contact with big unselfish minds, minds big enough to give a point of view to an individual. The employer is really the best friend of the employee. If this is not true in any case it must be made true. Then it must be understood by every officer and every workman. How shall this be done? It must be somebody's business to get it done.

Good Soldiers

Nobody ever wanted "good soldiers" as railroads want them now. Railroad men are good soldiers, but who are their leaders and why? Most men are followers, in fact everyone is a follower of some sort. We worship heroes and ideals. We follow leaders more able, capable or perhaps more dominant than ourselves. Shall we follow our superior? That depends upon their leadership and we are "company men" or "organization men" depending on the influences and their strength.

What is to be done about it when others lead our people away? Is there nothing we can do? Let us remember that the "old man" used to be the leader, and let us consider the possibility of regaining some of his leadership in the days that are to come. It will be needed. Men always have followed and always will follow those whom they think "get" them most. It is important to find a way to discover, recognize and reward individual ability.

Discussion

Talking things over brings co-operation. When people get together for discussion responsibility is necessarily forced upon those present and the natural tendency is to look at

the question from the other man's point of view. This is the value of meetings, especially when the object is to reveal and develop the importance of the person who has a tendency to consider himself obscure and overlooked. Nothing in any organization helps so much as for this man and that man to stand up and tell in his own way what or who is holding him back. When the accused must answer the chances are that more complete understanding will be reached. The chief who is present is not the only one who will begin a liberal education from discussions with his foremen or his men.

Apprenticeship

I use the word apprenticeship with hesitation simply because to most people it suggests merely "trades." It really represents training, thorough training of the hands, of the mind and of the morals of the lad. What we need today is a modern up-to-date substitute which will fit the times and the change from an employer with one employee to the multiple employer with thousands of employees. The principles involved remain the same. Let me quote from a report of a Massachusetts Commission on industrial training:

"In many industries the processes of manufacture and construction are made more difficult and more expensive by a lack of skilled workmen. This lack is not chiefly a want of manual dexterity, though such a want is common, but a want of what may be called industrial intelligence. By that is meant mental power to see beyond the tasks which occupy the bunch for the moment, to the operations which have preceded and to those which follow it—power to take in the whole process, knowledge of materials, ideas of cost, ideas of organization, business sense and a conscience which recognizes obligation."

Consider what the sort of training this suggests would mean in saving money for the railroads, applicable as it is to every department, every office, the track, the yard, the terminal, the roundhouse and of course the shop. Apprenticeship of this kind should not, by any means, be limited to the shops. Some roads, notably the Santa Fe, have faithfully developed apprenticeship and have enjoyed wonderful results. This road should be proud of the 1,506 graduates of its apprenticeship courses. What has been done with shop trades should now be extended to every department, every office and every job.

Selling an Idea

Experience in selling something to people who think they do not want it would help the leaders of big organizations more than they know. An organization must have ideals. To succeed these must be sold to those who are to carry out the principles—to the official staff and by them they must be sold to the rank and file. Is the ideal of reduced cost of transportation sold to the men in the ranks? Do many of the men say, "What do I care? There is more coal, more material, and more time where this came from." When the ideal that the roads are working for is sold to the men the present labor problem will be simplified. Foremen and subordinate officials can and I believe will accomplish this in the future, but selling necessarily involves something to sell—which in this case is not lacking—and ability to bring the purchaser's mind to the need to buy.

Looking Ahead

How are we to look ahead when we have so many troubles in hand? Troubles we shall always have and if years ago we had looked into the future on the personnel question our difficulties today would be less. If we do so now they will be less ten years from now.

In the development of railroads a lot has happened since the day when a road was so small that the superintendent was the only operating officer—when the master mechanic and everybody else, having to do with operation, reported to

the superintendent. The old "Czar" system has gone. In that system the "Old Man" held everyone's job in the palm of his hand, hired and fired as he liked, rewarded and punished as the old time head of the family rewarded and punished his children and there was no one to question him. In those days the captain of a ship held little more power than the railroad official.

There was something fine about the old method when the highest operating officer knew everybody. In spite of the faults of the system, which really was the best system for the time, it has left us some of the best traditions and has given transportation service some of the best of men. It gave co-operation. Co-operation had to be because there was someone on hand to enforce it. This effect of co-operation has probably done more than any other one thing to tie railroad men together and make so many of the old time railroaders feel that any man in railroad service was, in a large sense, a member of his own family. This feeling is not as strong today, co-operation is not as common, but it is, and will remain, a factor that we cannot do without. It must be provided.

Another feature of old time railroading was the training of men. I refer not only to apprenticeship, but to the careful training of every new man for his job. As a matter of course boys entering the shops were apprentices, so also were firemen, brakemen and switchmen and all the rest. In those days somebody had time to instruct new men. Whatever else we say of those days, certain features of the times indicate a thoroughness which we do not get today. In days of old, promotion was controlled by prejudice, by favoritism, sometimes by family ties, but with all the faults of the early days, men were seldom imported from other roads.

No one wants the old days back, but it is fitting to consider features of the old which should be provided with the new.

Some of these are the careful selection and training of new recruits, the spirit of the railroad men of older days, co-operation and the intimate knowledge of the men in the ranks on the part of someone in authority. Of all the things we need to take out of the past and apply to the future, the things we need the most are the selection, the training and the knowledge of men. Railroads are too big, even departments are too big to permit the operating officers to know who are working for them, but some substitute for these features of old times must be found. A way must be found for foremen at least, or sub-foremen, thoroughly to know the men working for them, their personalities, their capacities, their abilities and their qualifications for promotion. This and the selection and training of men may be supplied under present conditions and may yet make railroad service as happy as it ever was, but to accomplish this requires a lot of thought, a lot of time and a definite plan which will enlist the co-operation of the men. It calls for a high officer whose job it is to see it done.

When specially trained men were wanted in 1918, C. R. Dooley and staff delivered 100,000 trained men to the army in six months and had 40,000 more nearly ready when the armistice was signed. About 70,000 of them went across, men trained in 67 different trades. These men were selected as well as trained. Nothing that lies before the railroads is as difficult as that. The report which outlines the problem, the plan, the organization and the execution will open the eyes of any man who does not know about it.

When railroads start in to tackle their production problem in as thorough a fashion and with as complete a plan, cost of transportation will come down. Nothing will influence the workers as a real plan will do it. When they understand the plan, its objects and the country's need of it the workers will want to do their part and without their earnest efforts in co-operation success is out of the question.

There is no other way. An enlightened mind is the greatest asset on earth.

Our high official in charge of personnel cannot be expected to change the atmosphere of the organization quickly. He will not himself attempt to make the change. He will not himself attempt personally to train everybody. He will see that everybody on the road is trained, that every officer trains his own successor. He will see to it that men are specified and treated as carefully as steel and iron are. He will use the entire organization and will inspire everyone in it by concentrated effort to bring out the best in every individual in the direction of enlightened team work.

Propaganda Against American Locomotives

AN UNUSUAL TRIBUTE to the locomotives supplied to the Belgian Government by the United States builders and some interesting comments on their assistance to Belgian railway transport because of their prompt delivery have recently appeared in the Belgian official publication—"Chronique des Travaux Publics." It appears that there has been current in Belgium some malicious criticism or propaganda against these locomotives to the effect that they have proved unsatisfactory in service and that the government committed an error in securing them at an exorbitant price. The remarks in the "Chronique des Travaux Publics" deny these allegations and show on the contrary that the American locomotives have proved eminently satisfactory and have given even better service than was called for in the contracts. It is further pointed out in the article in question that the contract calls for a deferred payment over a five-year period during which time exchange may return to par in which case the price of the locomotives will be anything but unreasonable—and, most important of all, it is further shown that the prompt delivery in much shorter time than deliveries have been made by Belgian or British firms has enabled the government lines to restore efficient service in a much shorter time.

The locomotives in question numbered 150. They were built by the Baldwin Locomotive Works and the American Locomotive Company. The contract for their construction was signed in Brussels on December 13, 1919. The first engine was completed at the Schenectady works of the American Locomotive Company on March 1, 1920. All of the engines were completed by June 15 and stripped and packed. All of them were in service by the first days of December, 1920. These engines have been described in the *Railway Age* in articles which appeared in the issues of April 9, 1920, (page 1144) and December 17, 1920, (page 1069).

The complete statement which appeared in the Belgian "Chronique des Travaux Publics" and which disproves the charges of inefficiency made against the locomotives built in this country is published herewith in translation:

The press has a great deal to say about the American locomotives recently acquired by the Belgian government. Those who publish the news speak of these engines in such terms that their absolute ignorance of the situation is evident. Several journals echo the ideas of the narrators who are spreading the opinion that the Minister of Railways has been tricked and has bound our railways under a ruinous contract.

The origin of these rumors apparently goes back to a report from Charleroi. It is said there that the government in buying American locomotives made a poor business deal and let itself be trapped by the promise of quick delivery.

In the first place it is said that the government, following the armistice, found in its shops only German engines constructed under different designs from our own. Furthermore, it is said that after having heard the advice of engineers the government decided to make certain changes in the design of these engines, viz., replace the original fireboxes and tubes with others of copper—more resistant to oxidation. This information is not cor-

rect, for it has never been proposed to make such changes. The government, on the contrary, is using steel tubes more and more for all its steam engines. It has recourse to brass tubes only when it finds it advantageous from a point of view of price or maintenance.

These journals have next resorted to a criticism of the American engines. Contrary to what has been said, it is the government itself which took the initiative in ordering these locomotives from America. It ordered 150 of them and they were all delivered on time. It is not true that they cost 795,000 francs each, because it is necessary to take into consideration the factor of exchange. Their purchase price was \$55,250, including tender, c. i. f. Antwerp. They were paid for in Belgian treasury bonds, payable in five years. There is a good chance that the dollar at the end of five years will approach par. If the dollar were at 10 francs, the cost of the locomotive would be 552,000 francs, and if the dollar returns to par this cost will be reduced to 280,000 francs. Moreover, even supposing that the price eventually paid is even 800,000 francs, did the government do wrong in giving the order? Yes or no, following the armistice, did we need locomotives? To ask the question is to answer it. On the other hand, was it possible to get them immediately from Belgian or English concerns? No.

Another untruth. The statement has been made that not only were the American locomotives purchased at a high price but that they do not give the service that was expected of them. If we are well informed, the American locomotives measure up to the most optimistic expectations, inasmuch as we are using them on the Luxembourg line, the hardest division of our railways—and all are giving the best of service. If a fault is brought to light from time to time, it can be excused by the fact that our own class "10" and "36" locomotives are not exempt from fault, either. The good quality of the American engines is proved by the significant fact that they are used in passenger service. The most important part of the locomotive—the boiler—is perfect. There is another important consideration which proves to what flights of fancy these critics have gone; that is, the manner in which they disregard the fact that the American locomotives were built according to the specifications of the mechanical department officers (du Service de la Traction), who have specialized along this line; Messrs. Corteil and Dasse and other engineers of the railways.

The conclusion of these critics is as far from the facts as the foregoing—that we have not sufficient motive power after having spent considerable sums to acquire it. The facts are that the amount of motive power has been increased sufficiently so that the government has proposed to let Rumania have 32 of our Consolidation type engines, 12 of the "35" class and 6 of the "30" class. The administration has, in addition, offered for sale 93 engines of the "28" class.

It is alleged, also, that the government, about to repeat its mistake, has instructed its engineers to draw up new plans. This is not true. It is said, moreover, that in ordering engines from the United States, the government injured the industry of the country. Now, the industry of the country has not been injured at all, because 100 locomotives were ordered in this country—to be delivered within the first six months of the new year—yet without anyone cherishing the hope of actually receiving them at that time. The same can be said of the English railway supply industry from which 200 engines were ordered to be delivered before December 15, 1920, and of which order no one expects even the first ten until April, 1921.

When all motive power is newly placed in service there are always certain modifications suggested by actual operation.

In operation the American locomotive measures up to the conditions of the contract agreed to by the builder. These conditions were: to haul 1,000 metric tons (1,409 short tons) at a speed of 36 kilometers (22 miles) an hour up a continuous grade of 5 millimeters (to the meter, or 0.5 per cent). It has hauled, however, with ease the load called for by the contract, not at a speed of 36 km., but at 42 kilometers (25 miles) an hour. It has shown great durability in road service and it operates on a curve of a radius of 120 meters (370 ft.).

It is only just to admit that in service the engine under consideration betrays some minor imperfections, due notably to the use of a metal of insufficient hardness for the brass work, to the absence of habbit on the bearings of the side and main rods and their insufficient lubrication. These are slight inconveniences which are easily remedied.

In a word, the American locomotives are giving entire satisfaction. They conform to the technical requirements imposed and they have today already given considerable service. Some have been in service since May and June, 1920. The last were put into service in December.

We will close these comments by directing attention to the following: We shall always defend the interests of our national industry, but there are unusual situations which call for immediate solution and which we must face squarely. This is the case of the order given to American concerns. Those who today permit

themselves to criticise blindly the course we have taken would cry still more loudly if, for lack of locomotives, the paralysis of our transportation system had remained of long duration. The exigencies of domestic commerce—the national economic rehabilitation—not being able to wait until our own industry could furnish the indispensable material, the state did well to acquire the locomotives from the United States as soon as possible.

Thanks to their being placed in service at an early date the government has been able to realize earnings from them at a similarly early date. This detail is not the least interesting feature of the question.

President-Elect Harding Confers With New York Central Head

THE IMPORTANCE of the transportation question of the country, its effect favorably or adversely to the manufacturer, farmer and business generally, prompted Senator Harding to call into conference on February 18, A. H. Smith, president of the New York Central, who during government control was director of the eastern region. Senator Harding has been well acquainted with Mr. Smith for a long time.

They reviewed the conditions of operation and the financial status of the railroads at present, and prospects for the future, as related to the public need. Mr. Smith, after his conference with Senator Harding, said:

"Mr. Harding appreciates deeply the basic importance of transportation to the country's welfare. He intends to go into the situation in such manner as may enable him to determine so nearly as possible what it is that causes the recurring difficulties in the transportation situation.

"The measure of regulation as related to management is to be weighed. Where there is division of authority there must necessarily be joint participation also in responsibility.

"The fact is that large improvements and additions, as well as equipment, were added by the government during the war, at war-time prices, costing approximately one and one-half to three times normal prices, and have been placed upon the railroad carriers and capitalized into freight and passenger rates instead of being paid for by the government, as other war costs were paid for, together with the added costs of labor, and the national working agreements which were applied during the war and are still in effect—these things have forced the rates on freight to such a high figure in some instances that it is slowing down production and distribution.

"At the same time, railroads are meeting great difficulty in paying their obligations and are laying off men and stopping repairs and betterments in order to keep themselves out of bankruptcy, when they should proceed with such work so that the roads and equipment will be in readiness for use when required.

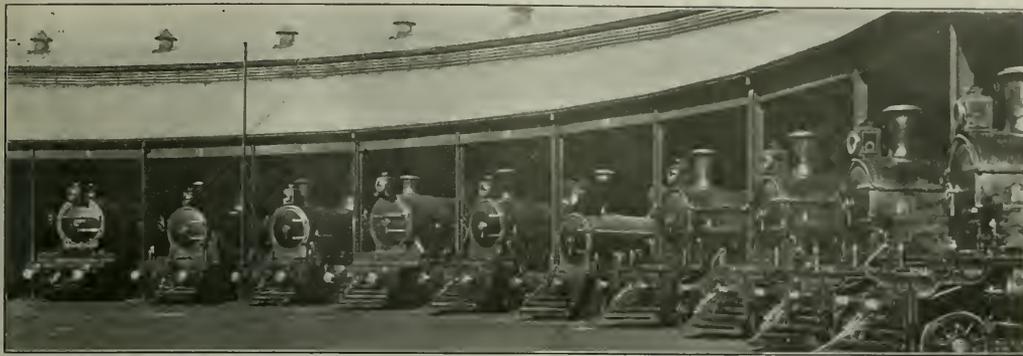
"For these reasons, Mr. Harding wished to be informed as to the causes of the present transportation situation."

ON THE PENNSYLVANIA SYSTEM alone about 95,000 tons of new steel rails and 5,300,000 new cross ties were used last year. Of the 95,000 tons of new rail laid in 1920, 82,500 tons, or 87 per cent, was heavy 130-lb. rail. The use of heavier than 100-lb. rail was commenced by the Pennsylvania in 1915 and at the present time only a small percentage of rail used on the system is less than 130 lb. Steel rails for 1920 use cost approximately \$48 a ton, an increase of \$8, or 20 per cent over the previous year's cost and 63 per cent more than the cost of rails ten years ago. Cross ties cost the Pennsylvania Railroad 32 per cent more in 1920 than in 1919 and 153 per cent more than ten years ago. Since 1910 the Pennsylvania Railroad has laid 1,347,289 tons of new rail and 56,230,904 new cross ties.



Some Scenes on the Central Argentine

- 1—Ticket Office at Retiro Station, Buenos Ayres; 2—Concourse at Retiro Station; 3—Model of Fast Passenger Locomotive, Retiro Station; 4—Train Shed at Retiro Station; 5—Platform Ticket Vending Machine; 6—Passenger Coach; 7—Parlor Car



San Martin Roundhouse of the Central Argentine

British Railways Predominate in Argentina

The Central Argentine—A Typical Line—Is Well Equipped for Handling All Classes of Traffic

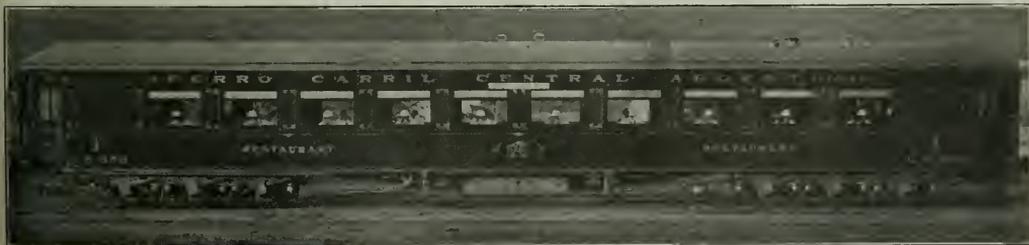
By John P. Risque

Part II

THE FIRST PART of this article, which appeared in the *Railway Age* last week, was, in the main, a general discussion of the railway situation in Argentina as a whole. In the present installment it is proposed to select a typical road and describe it in some detail, inasmuch as it would be impossible to give similar information about all of them.

The road that is chosen as being typical is the Central

Argentine, the tenderest and most important of all good-byes. The revenue from the sale of these tickets is said to contribute about \$30 a train to the coffers of the company—an item worthy of consideration at any large terminal. The tickets are dispensed by vending machines which work both day and night without any apparent interruption aside from the time required to refill them. One of the most interesting objects in Retiro station is the 1½ in.



Standard Dining Car of the Central Argentine

Argentine. We start our investigation of it at its New Retiro station in Buenos Ayres, which was described briefly in the first installment of this article. Before leaving that description, however, mention should be made of the feature of platform tickets and of the unusually interesting miniature Pacific type locomotive No. 191.

There is probably no country in the world where the institution called "platform tickets" has met with a greater response than in Latin America. Particularly is this true where ample platforms will admit of allowing, in consideration of ten cents a person, almost any number of people to pass the train gates to speed a parting friend on his way. For all Latin America counts that final "despedida," the last

scale model of the Pacific type passenger locomotive No. 191. This diminutive locomotive is mounted upon a mahogany base about three feet from the floor and enclosed in a glass case. Typical rails, ties and ballast support the machine the driving wheels of which are sufficiently raised from the rails to allow them to turn if one inserts a ten cent piece in the slot indicated for the purpose. All money collected is turned over to the orphan asylums of Buenos Ayres and in the little over five years during which this faithful little collector has been working, it has taken in the sum of over \$14,000 and is said to have turned its wheels sufficiently to have carried it all over the system and back. The coin makes an electrical contact which starts the motor, driving

the wheels and turning on a reflected lighting system which shows the engine details well. The reproduction is perfect and the model is well finished. Lagging and jacket on the left side of the boiler and the cylinders have been left off, as well as that of the dome, for the benefit of the critical, and an open front door of the smokebox reveals that the same attention to detail as that which marks the rest of the machine is shown in the layout of the superheater pipes and front end arrangements. The model is the product of the tool room at the Rosario shops of the line, mention of which is made below.

A map of the Central Argentine Railway reveals a tendency to extend in a northwesterly direction from Buenos

The passenger receipts of this line are aided by an extensive movement to the hills of Cordoba and Alta Gracia at certain seasons of the year, where at the latter resort, the company maintains the Sierras Hotel with accommodations for 300 guests. The almost perfect climate of this region is



A Pressed Steel Grain Car on the Central Argentine—
Equipped with Manholes for Roof Loading

Ayres, the longest stretch being 694 miles from Buenos Ayres to Tucuman, the capital and largest city of the northern province of that name. Here connection is made with the Argentine Government Railways which extend to the potentially important town of La Quiaca, on the Bolivian frontier. A majority of the network of other lines operated by the Central Argentine parallel those which run from Buenos Ayres to Cordoba and Rio Cuarto. There are many branches crossing these lines at various angles, all of which combination well serves the rich agricultural and stock raising provinces of Cordoba and Santa Fe, as well as a certain section of the province of Buenos Ayres. The principal freight traffic of the line is made up of all varieties of agricultural products, live stock, hides, wool, flour, firewood, charcoal, timber and lime, which comes from the center of



Front View of Central Argentine Pacific Type

an attraction in itself, to which asset the railway has contributed a rifle range, tennis courts, golf links and facilities for other sports. Tucuman's mild winter climate permits many who can afford the expense of escaping from the rigors of Buenos Ayres' winter, and Rosario de la Frontera, a point



Old "Goods Wagons" on the Central Argentine Converted to Refrigerator Cars

that industry's activities in Cordoba, as well as sugar from the district of Tucuman, which is said to produce 100,000 tons per year. Large grain elevators are owned and operated by the company at Buenos Ayres, Rosario, Villa Constitucion, San Nicolas, Cerana and Santa Fe.

further north and milder still, attracts invalids to its thermal baths. Fast express service is maintained between Buenos Ayres and the outlying cities; the time to Rosario being 4 hrs. and 30 min.; Santa Fe, 9 hrs. and 25 min.; Cordoba, where the company recently completed a new passenger sta-

tion, 13 hrs; Alta Gracia, 14 hrs.; Santiago del Estero, 21 hrs. and 30 min.; and Tucuman, 23 hrs. and 15 min. The actual mileage under operation is 3,305 and there are 409 stations on the road. The equipment comprises 679 locomotives, 787 passenger cars, 18,592 freight cars and a miscellaneous assortment of service cars amounting to 836.

Apparently, the "crack" train of the Argentine is the famous "Rapido" on the run from Buenos Ayres to Rosario, a distance of 182 miles. This train maintains a speed of about 42 miles an hour for 4½ hours, the running time between the two points. The relatively short ride on this train is typical of the best that the country affords; the trip is recommended for those whose limited time would interfere with a longer absence from Buenos Ayres. The line is double tracked and stone ballasted all the way and the train generally is made up of a baggage car, a kitchen car, a 68-seat dining car, a parlor car and two first-class day coaches with seating capacities of 82 and 72, respectively, each with from two to three private compartments in the centers of the cars. The train is vested throughout and the dining arrangement is worthy of special mention. All food is prepared in the kitchen car and carried back to the diner. Meals are excellent and are served on the table d'hôte plan by a well organized squad which has been trained to see that passengers get the best of service. Good wines and beer are obtainable as "extras."

The Central Argentine has not been excepted from the struggle with the fuel problem; quiebracho, that famous hardwood of the country, is the principal item on the fuel bill. Oil, recently tried out on the Rapido's run, is scheduled for adoption, and preparations are being made to convert engines on a broad scale for oil burning. Conditions got so bad at one time, not so long since, that the locomotives on this line were compelled to burn corn, on the ears or otherwise—any way they could get it was agreeable.

The heavy passenger locomotives on the road are principally Pacific types of British manufacture, equipped with outside rods, pilots and headlights. The Briton's inevitable "streamline" design of the running board, extending from the front end to the windowless cab of reduced proportions, as well as the omission of sand box and bell and all of the other miscellaneous fittings that go on the boiler of the American locomotives, give these engines a trimness that is attractive. The locomotives are kept as immaculately clean as the interiors of the cars themselves and, while it is contended elsewhere that such details do not increase their effectiveness or show up on the balance sheet to an advantage, yet it must be admitted they show a pride of ownership in a manner which is entirely admirable. Of course, the labor cost of such maintenance in Latin America is low enough to make such care and attention possible. The freight locomotives are just as carefully designed from the standpoint of attractiveness as those in passenger service, and the best ones are of the 4-8-0 type, also with outside rods, and some have inclined cylinders. Superheaters are common but, due to the difficulties of securing replacements from England during the war, a number of the engines are said to be running at the present time on saturated steam. Rectangular running sheds (engine houses) are popular as locomotive terminals and are called "galpones."

The third and concluding part of this article will appear in an early issue of the *Railway Age*.

PENSIONS ON THE LACKAWANNA.—Since the operation of the pension system was started in June, 1902, the Delaware, Lackawanna & Western has paid a total of \$1,684,450 in pensions to 970 of its employees who were retired either for length of service or because of disabilities received in the service of that company. On December 31, 1920, there were 457 pensioners on the Lackawanna's retired list.

88 Railroads Operated in December at a Deficit

WASHINGTON, D. C.

EIGHTY-EIGHT RAILROADS, operating 79,151 miles, failed to earn their operating expenses and taxes during December, according to a preliminary compilation made by the Bureau of Railway Economics of the returns of 202 Class I roads and large switching and terminal companies to the Interstate Commerce Commission. These 88 roads had a deficit of \$20,173,000, while 114 roads, operating 153,289 miles, earned a net operating income of \$37,210,000. The 202 roads therefore had a net operating income for the month of only \$17,037,000, which was at the rate of only 1.17 per cent on the valuation fixed by the Interstate Commerce Commission for the purposes of the rate case. For the four months since the increased rates went into effect the net operating income of the roads has been \$233,147,000 or at the rate of 3.4 per cent instead of the 6 per cent which is frequently referred to as having been "guaranteed." In September the net operating income was \$75,000,000, in October it was \$85,000,000 and in November it was \$55,000,000. In September 49 roads failed to earn operating expenses and taxes, having a deficit of \$3,471,450. In October 41 roads operated at a deficit, amounting to \$2,586,733, and in November 64 roads had deficits, amounting to \$7,056,598.

According to the Bureau's compilation, the 202 roads in December earned total operating revenues amounting to \$550,608,000, an increase of 21.5 per cent as compared with December, 1919. Operating expenses amounted to \$498,265,000, an increase of 20.2 per cent. The net operating income of \$17,037,000 represents an increase of 24.1 per cent as compared with December, 1919. These figures do not take into account lap-over items growing out of settlements with the Railroad Administration.

For the calendar year 1920 the Class I railroads had a net operating income of only approximately \$72,000,000, which represents a return of only a fraction of one per cent on their valuation. Moreover this includes about \$50,000,000 which was included in the January accounts by the Railroad Administration as an estimate of the back mail pay owed by the Postoffice Department which has not yet been paid but for which an appropriation bill is pending. For the first eight months of 1920 the roads will ultimately receive a guaranty at the rate of \$70,000,000 to \$75,000,000 a month, or around \$600,000,000 after allowing for the deficits. Since September 1 the roads have earned about \$233,000,000 net which added to the guaranty would give the companies a return for the largest year's business they ever did of something less than the amount of the annual guaranty for the period of federal control.

Out of 194 roads whose returns for December and 12 months were published in last week's issue of the *Railway Age*, 95 had deficits for the year after paying expenses, taxes and rentals.

The preliminary report of revenues and expenses for December as compiled by the Bureau of Railway Economics is as follows:

	1920	1919	Per cent of increase 1920 over 1919
Total operating revenues:			
Eastern District	\$254,351,000	\$199,744,000	27.3
Southern District	87,790,000	73,657,000	19.2
Western District	208,467,000	179,903,000	15.9
United States	550,608,000	453,304,000	21.5
Total operating expenses:			
Eastern District	237,007,000	191,459,000	23.8
Southern District	77,104,000	65,023,000	18.6
Western District	184,154,000	157,936,000	16.6
United States	498,265,000	414,418,000	20.2
Net railway operating income:			
Eastern District	1,943,000	def 1,756,000	
Southern District	7,676,000	5,812,000	32.1
Western District	7,418,000	9,668,000	d 23.3
United States	17,037,000	13,724,000	24.1

December Freight Car Performance

WASHINGTON, D. C.

THE NET TON-MILES of freight handled by the railroads in December aggregated 34,722,365,000, according to the monthly bulletin of freight car performance compiled by the Bureau of Railway Economics. This represents a decrease of about 2,700,000,000 ton-miles as compared with November, but an increase of 3.3 per cent as compared with

December, 1919. The corrected cumulative figures for the year have not yet been compiled, but the total ton-mileage for 1920 was approximately 445,000,000,000, which breaks all previous records for a year.

The average carload, 31.2 tons for December, was the largest ever recorded for a month, but the average miles per car per day fell to 24.8 and the percentage of unserviceable cars increased to 7.9. The summary of the report of the Bureau of Railway Economics follows:

Region	Net ton-miles (thousands)	Frt. car-miles (thousands)			Freight cars on line daily		Efficiency ratios		
		Total	Loaded	Per cent loaded to total	Total	Unserviceable	Car-miles per day	Tons per car	Per cent of unserviceable cars
	1	2	3	4 = 3 ÷ 2	5	6	7 = $\frac{2+5}{31}$	8 = 1 ÷ 3	9 = 6 ÷ 5
New England Region.....	929,146	54,551	35,658	65.4	101,811	10,849	17.3	26.1	10.7
Great Lakes Region.....	6,351,575	335,475	205,914	61.4	418,243	37,555	25.9	30.8	9.0
Ohio-Indiana-Allegheny Region.....	8,709,822	402,998	234,711	58.2	568,875	39,452	22.9	37.1	6.9
Poconantas Region.....	2,166,941	83,425	48,342	58.2	92,166	6,764	30.9	44.4	7.3
Southern Region.....	4,453,501	253,141	153,705	60.7	293,139	27,233	27.9	29.0	9.3
Northwestern Region.....	3,846,157	215,293	134,696	62.6	346,822	28,437	20.0	28.6	8.2
Central Western Region.....	5,613,883	336,304	200,862	59.7	356,500	27,708	30.4	27.9	7.8
Southwestern Region.....	2,651,240	159,015	97,972	61.6	219,142	11,492	23.4	27.1	5.2
Grand total—all regions.....	34,722,365	1,845,202	1,112,360	60.3	2,396,768	189,490	24.8	31.2	7.9

Great Increases in Number and Wages of Employees

Statistics Show There Were 2,200,000 in August and Wages Running at Annual Rate of Over \$3,800,000,000

STATISTICS RECENTLY compiled by the Interstate Commerce Commission and the Bureau of Railway Economics throw new light upon the extent to which the number of railway employees and their wages have been increased, especially under government control, and the actual cost of the advances in wages which were made during the period of federal control and later by the United States Railroad Labor Board.

The Commission's statistics showing the number of employees on Class I railroads and their total compensation for the two quarterly periods from January, 1920, to March, and from March to June disclose that the average number of employees during this six months' period was 1,999,142. Their total compensation, exclusive of the compensation received as back pay under the provisions of the Labor Board's award of July 20, was \$1,596,680,238. Using the latter figure as a basis, multiplying by two to obtain the yearly payroll, exclusive of the Board's wage award, and adding \$417,000,000, the estimated wage increase in eight months of 1920, it will be found that the railroad's total payroll in 1920 was about \$3,610,000,000.

In 1917 the average number of employees on Class I railroads was 1,732,876. Their total compensation was \$1,739,482,142. According to estimates based upon the Commission's figures, therefore, there was an increase of 266,266 employees and an increase in the annual payroll of \$2,078,517,858 between 1917 and 1920.

Again, using the yearly payroll figure, indicated by the statistics for the first six months of 1920, and adding \$625,000,000, a full year's wage increase under the Labor Board's award, it will be seen that the railroads' payroll following the wage award was at the rate of \$3,818,000,000.

These estimates are made upon the assumption that the number of employees remained the same throughout the year. This, however, was not true. Beginning in April the number of employees in service increased each month, the highest mark being reached in August when, according to figures prepared by the Bureau of Railway Economics, there were 2,210,000 employees. This represented an increase over the April number of 257,554 employees and over 1917 of at least 500,000 men.

Beginning in September the carriers, pressed with the necessity to reduce operating expenses in the face of a rapidly declining traffic, began to curtail their forces. By the end of the year approximately 300,000 men had been laid off. From this it can be seen that the reductions which were made in the working forces were almost offset by the increases which had been made earlier in the year.

The statistics which have been prepared by the Bureau of Railway Economics and which are given in the accompanying table, show in detail form the increases which have occurred in the number of the various classes of railway employees and in their total and average annual compensation. In general they illustrate the enormous increases in compensation and in number of certain classes of railway employees which work under the national agreements and which are now seeking their continuance. The data which are shown for 1920 is estimated on the basis of returns covering the months of January, February and March, 1920, to which has been added the additional compensation which would accrue to each class under the increased wages.

It will be seen from this table that the largest increases in the number of employees took place among foremen in the mechanical departments, machinists, boilermakers, blacksmiths, electricians, air-brake men, car inspectors, car repairers and mechanics, helpers and apprentices, hostlers and enginehouse men, all employees who work under the national agreement formed during federal control between the shop crafts and the Railroad Administration. These same classes of employees have received in the majority of cases increases ranging from 70 to 126 per cent.

Another interesting fact disclosed by these statistics is that every class of railway employee, with the exception of messengers and attendants and other unclassified workers, now receive at least \$1,200 per year. Six groups, namely, general mechanical foremen, train dispatchers and directors, yardmasters, road freight engineers and motormen, road freight conductors, and road passenger engineers and motormen, receive over \$3,000 per year. Of these the road freight engineers and motormen are the highest paid, receiving an average annual compensation of \$3,579. Again, 39 classes of employees out of 66 now receive \$2,000 per year or more.

EMPLOYEES AND THEIR COMPENSATION—CLASS I RAILWAYS, 1917 AND 1920

1917 (Including wage award for entire year)

Increase, 1920 over 1917

Class of employees	1917			1920			Employees			Aggregate compensation			Average annual compensation		
	Average number of employees	Total number of employees	Average compensation per annum	Average number of employees	Total number of employees	Average compensation per annum	Amount	Per cent	Amount	Per cent	Amount	Per cent	Amount	Per cent	
Gen. officers, \$3,000 and up.....	4,230	28,569,387	\$6,734	6,045	\$34,471,280	\$5,702	1,815	42.9	\$5,901,993	20.7	d 13,052	d 15.6			
Div. officers, \$3,000 and up.....	3,486	6,263,608	1,797	2,256	4,776,664	2,117	d 1,230	d 1,487,034	d 23.7	d 1,230	d 17.8				
Div. officers, \$1,000 and up.....	1,300	4,999,032	3,832	9,930	12,253,632	2,957	d 4,981	d 17,533,632	d 34.6	d 2,619	d 49.9				
Div. officers, \$500 and up.....	184,603	171,491,931	1,932	234,838	359,313,681	1,700	50,835	d 27.6	227,816,518	132.8	768	82.4			
Managers, superintendents, and assistants.....	8,506	4,375,157	514	11,032	11,191,622	1,013	2,546	29.9	6,816,515	155.8	499	97.1			
Assistant engineers and draftsmen.....	11,989	13,722,480	1,145	10,217	19,227,124	1,882	d 1,772	d 14.8	5,504,644	40.1	d 737	64.4			
Section foremen.....	8,038	9,619,238	1,197	8,198	19,646,402	2,411	1,110	13.4	10,026,971	104.2	d 1,214	101.4			
General foremen—M. E. department.....	40,369	35,541,153	865	41,859	5,648,832	3,039	1,310	20.0	3,076,543	19.6	d 1,378	80.6			
Managers other foremen—M. E. department.....	18,043	24,386,351	1,352	25,488	51,015,312	2,786	23,749	57.8	46,638,957	191.2	7,445	1,434			
Boiler makers.....	12,931	57,321,897	1,394	64,861	154,515,701	2,382	23,749	57.8	97,193,804	169.6	988	70.9			
Mechanics.....	8,115	18,423,117	1,425	28,504	50,706,999	2,472	7,573	58.6	32,283,882	175.2	1,048	73.5			
Hacksmen and bricklayers.....	1,891	10,210,390	1,238	10,807	24,180,539	1,912	2,222	d 23.2	15,701,303	156.7	979	104.9			
Structural ironworkers.....	53,084	49,870,186	919	586	1,295,408	2,195	d 329	d 33.8	388,688	43.7	1,181	11.5			
Painters and upholsterers.....	11,087	10,537,323	950	12,223	30,690,603	1,956	d 1,086	d 2.0	51,823,314	103.9	1,017	108.3			
Electricians.....	9,564	9,855,748	1,030	14,460	37,764,056	2,335	4,896	51.2	14,259,710	135.3	1,079	113.6			
Air-brake men.....	5,904	6,412,801	1,086	8,064	18,380,541	2,330	2,160	36.6	23,910,087	252.7	3,405	126.7			
Car inspectors.....	19,601	22,673,120	1,093	89,239	188,833,280	2,116	22,708	34.1	122,761,419	185.8	1,123	113.1			
Other skilled laborers.....	52,989	56,440,502	1,065	59,733	133,170,385	2,229	6,744	12.7	76,739,483	135.9	1,164	108.3			
Mechanics' helpers and apprentices.....	86,021	70,718,313	822	129,757	212,536,734	1,638	43,736	50.8	141,808,411	200.5	816	90.3			
Section men.....	241,425	145,164,191	601	255,526	310,585,913	1,215	14,691	5.8	105,437,722	114.0	814	102.9			
Other unskilled laborers.....	107,564	74,773,997	695	120,460	166,623,383	1,385	12,070	d 4.0	91,958,753	135.9	1,379	133.0			
Women of coast, gangs and work teams.....	46,759	22,957,221	1,625	20,588	30,300,978	1,472	d 16,161	d 12.0	7,352,537	32.0	847	135.5			
Traveling agents and solicitors.....	5,979	9,806,571	1,640	1,811	4,005,708	2,212	d 4,168	d 69.7	5,800,863	d 59.2	d 57.2	63.9			
Employees in outside agencies.....	1,741	1,855,028	1,065	1,020	1,817,396	1,782	d 2.0	d 7.1	37,562	d 2.0	d 71.7	61.3			
Other traffic employees.....	6,613	9,815,275	1,330	4,055	9,014,483	2,226	d 208	d 33.9	8,673,713	101.6	896	97.8			
Train dispatchers and directors.....	7,694	7,435,629	1,961	8,149	16,370,024	2,009	4,555	57.9	9,011,401	122.5	1,053	110.0			
Telegraphers and telegraphers' helpers.....	20,526	18,813,933	917	21,917	41,940,016	1,914	1,391	6.2	23,126,083	122.9	997	108.7			
Telegraphers (not telegraphers).....	3,463	2,946,378	851	3,901	7,285,873	1,868	438	12.6	4,339,095	147.3	1,017	119.5			
Verbal communication (not telegraphers).....	11,250	10,037,611	892	12,193	23,217,069	1,904	943	8.4	13,179,458	131.3	1,012	111.5			
Agent-telegraphers.....	19,452	18,414,953	948	19,882	28,690,270	2,097	d 590	d 4.9	13,645,716	140.7	1,028	98.9			
Station service employees.....	14,522	764,333	1,292	631	1,253,672	1,992	39	6.6	491,839	64.3	700	54.2			
Station service (not telegraphers).....	117,454	83,389,697	1,210	128,566	187,607,793	1,494	8,072	6.2	104,218,096	135.0	784	110.4			
Yardmasters.....	3,719	6,702,730	1,802	4,258	14,022,978	3,294	539	14.5	7,328,248	109.3	1,492	82.8			
Yardmasters' assistants.....	2,507	4,274,626	1,705	3,608	10,611,975	2,945	1,099	37.4	8,065,623	196.6	981	116.0			
Yard engineers and motormen.....	19,516	21,348,464	1,094	23,821	51,471,521	2,161	4,305	22.1	51,333,399	184.8	1,740	52.6			
Yard conductors (or foremen).....	18,703	29,650,752	1,585	23,146	59,481,348	2,559	6,638	23.8	30,123,117	141.1	1,067	97.5			
Yard brakemen (switchmen or helpers).....	48,451	64,282,899	1,327	56,767	131,284,226	2,313	8,316	17.2	67,001,327	104.2	986	74.3			
Yard switch tenders.....	4,848	4,102,855	6,661	6,661	12,168,478	1,827	1,813	37.4	8,065,623	196.6	981	116.0			
Other yard employees.....	3,083	16,655,360	1,294	17,402	27,460,788	2,236	4,199	51.9	17,409,528	173.2	992	95.8			
Roundhouse men.....	55,133	46,024,605	835	79,482	126,569,848	1,636	22,269	40.4	80,545,243	175.0	800	98.8			
Road freight engineers and motormen.....	34,155	72,013,998	2,108	33,625	120,350,164	3,579	d 530	d 1.6	48,336,166	67.1	1,471	69.8			
Road freight firemen and helpers.....	36,828	46,949,280	1,225	35,933	92,999,834	2,587	d 875	d 2.4	46,050,554	98.1	1,312	102.9			
Road freight conductors.....	27,152	30,364,497	1,835	27,797	1,904,189	2,484	d 71	d 0.1	85,389,792	104.7	1,262	105.0			
Road freight brakemen (switchmen or motormen).....	13,297	29,668,951	2,233	12,801	44,526,732	3,478	d 496	d 3.7	14,837,901	50.0	1,245	53.8			
Road passenger firemen and motormen.....	13,105	17,745,404	1,334	12,396	32,951,056	2,658	d 709	d 5.4	15,205,622	88.7	1,304	96.3			
Road passenger conductors.....	10,655	20,947,221	1,966	10,654	33,233,845	3,119	d 1	d 1.5	12,286,654	55.7	1,153	58.6			
Road passenger brakemen.....	5,524	6,489,322	1,175	5,598	13,493,703	2,390	528	3.0	16,201,361	119.5	1,748	104.8			
Road passenger baggage men and flagmen.....	3,538	2,809,479	1,817	3,656	5,738,828	1,570	108	3.0	2,839,351	97.9	753	93.2			
Crossing flagmen and gatemen.....	15,976	8,548,073	535	23,123	28,254,488	1,222	7,147	44.7	19,706,715	230.5	687	128.4			
Flotting equipment employees.....	1,329	1,011,674	761	1,587	2,358,283	1,486	619	5.6	1,346,609	133.1	722	77.8			
Express carrier employees.....	11,110	10,314,174	928	11,729	19,552,993	1,650	1,017	9.1	9,041,819	97.7	1,017	101.4			
Police and watchmen.....	11,314	10,130,760	188	13,444	17,552,692	1,311	954	7.6	7,881,462	72.8	545	60.8			
Police and watchmen (not carriers).....	5,790	4,889,080	846	5,489	7,200,416	1,312	d 219	d 5.0	3,211,962	47.3	360	55.1			
All other employees.....	19,632	13,015,350	663	19,881	20,931,312	1,053	d 249	d 1.3	7,919,535	60.8	390	58.8			
Total.....	1,732,876	\$17,739,482,142	\$10,004	1,993,524	\$3,808,386,405	\$1,910	\$200,648	13.0	\$2,068,904,263	118.9	\$900	90.2			

d Denotes decrease. a Less than one-tenth of 1 per cent.

States to Attack Constitutionality of Transportation Act

WASHINGTON, D. C.

THE CONSTITUTIONALITY of the transportation act, not only as to its provisions under which the Interstate Commerce Commission has been increasing state rates to prevent discrimination against interstate commerce, but also as to the rate-making rule which provides for a 6 per cent return on the aggregate value of the railroads, is to be attacked in the Supreme Court by representatives of the state authorities on February 28 in connection with the argument on the Wisconsin rate case. This case is the first of the state rate cases which have arisen from the Interstate Commerce Commission's orders under the provisions of the transportation act to get before the Supreme Court. It comes up on an appeal by the Wisconsin state authorities from the decision of the federal court for the Eastern district of Wisconsin, which granted an injunction asked by the roads restraining interference with the Interstate Commerce Commission order advancing the Wisconsin intrastate rates. The Interstate Commerce Commission now has rendered its decision in the cases arising from the failure or refusal, in whole or in part, of a dozen states to put into effect the percentages of increase authorized by the federal commission in Ex Parte 74 and it has uniformly ordered increases by the amount of the percentages applied to interstate rates, with certain minor exceptions such as commutation or short distance coal rates.

Conference of Attorneys General

A conference of attorneys general and rate counsel of the several states having cases pending before the Interstate Commerce Commission in which the commission is proceeding to advance state rates, or having litigation pending in the courts growing out of orders lately made by the commission attempting to advance state rates, was held at the office of John E. Benton, general solicitor of the National Association of Railway and Utilities Commissioners, in Washington, on February 16 and 17, to consider pending rate litigation and whether they should file a brief in the Wisconsin rate case.

Attorneys general or state counsel were present in person or by representative, or sent written approval of the objects of the conference, representing the states of New York, North Carolina, South Carolina, Florida, Ohio, Indiana, Illinois, Michigan, Wisconsin, Iowa, Kansas, Missouri, Louisiana, South Dakota, Nebraska, Texas, Montana, Utah, Nevada, and Arizona.

It was unanimously determined by the conference to file a joint brief in the Wisconsin case together with the state commissions represented by Mr. Benton.

The following statement was issued by the conference:

"The attorneys general and counsel present severally represent states whose sovereign rights to regulate their own internal commerce, and the rates and charges imposed upon the public for transportation of the same, have been already invaded, or are now threatened with invasion, under the Transportation Act of 1920. It is their duty to enforce the laws of their respective states, and to protect their peoples in the enjoyment of those rights and powers which were reserved to each state under the federal constitution.

"They believe that the Transportation Act of 1920 under which the Interstate Commerce Commission claims to exercise power to set aside the state statutes, and orders, rules and regulations in force under state laws ought to be declared unconstitutional for the following among other reasons:

"1. As construed by the commission, it is destructive of our dual form of government and contrary to the spirit of our institutions. From the very formation of the government there has been no question as to the constitutional right of the

people of the several states to control purely intrastate traffic. This principle was upheld by John Marshall and has been uniformly admitted by all the courts of the United States to this time. The construction placed upon the Transportation Act, if sustained by the Supreme Court in the Wisconsin case, will overturn this established principle of constitutional law, and will centralize in a body of 11 men sitting in Washington power over the entire commerce of the United States, both interstate and intrastate.

"2. It prescribes a fixed return on railroad capital regardless of business conditions. Under such a law, if prices fall and traffic grows less, railroad rates increase. The commission is commanded to make rates that will yield a fixed return without regard to the value of the transportation service rendered. This is not only economically unsound, but it is violative of fundamental law.

"3. Under the group plan it commands the commission to fix an aggregate value and make rates that will yield in the aggregate the fixed return thereon. The worthless roads of the country, ill-considered ventures, duplicated lines, speculative enterprises, roads that have served their useful purpose and outlived the industries that once justified their construction—roads that perform no sufficiently useful service in the actual movement of traffic to enable them to earn—are valued with the good, and the roads that can earn, because they are the highways of commerce and traffic must move over them if it moves at all, regardless of the rate imposed, are given by this law the right to earn on their own value and the values attributed to the other roads as well. In the exact words of the act, this will enable such carriers 'to receive a net railway operating income substantially and unreasonably in excess of a fair return upon the value of their railway property.' One-half of the unreasonable excess is to be taken by the government, to be loaned to carriers or expended for equipment to be leased to them. The half that the government thus takes is an unjust tax to be expended for a selected class. The half that carriers are permitted to keep is in excess of the fair return they are entitled to by the common law. Both the half which nominally goes to the government and the half that the carriers keep represent an excess burden laid on shippers, whose right to a fair rate under the constitution is equal to the carrier's right to a fair return on its property. Because the law aims to compel the commission to disregard this right it violates again the fundamental law.

"For these and other reasons the public officials here represented deem it their duty in the first case before the United States Supreme Court involving the Transportation Act to challenge both the construction which the commission has placed upon the Act and its constitutionality as well."



A Head-on Collision on the Cambrian Railway, Wales, Resulting from Failure of Employees to Obey Rules Under Staff System of Operation

What Determines Adequacy of Railway Maintenance

A. R. E. A. Formula Offers Basis for Arriving at Settlement for
Federal Control Period

By J. P. Hallinan

THE RETURN OF THE RAILROADS of the United States to their owners under the Transportation Act of February 28, 1920, brought the necessity of an early settlement of accounts with the Government for its occupancy of the proprietors, and in this adjustment some questions are being raised which seem to merit the attention of owners.

It will be recalled that the sequence of events preceding the execution of a contract between the various roads and the Government was as follows:

1. By a proclamation dated December 26, 1917, the President, acting under the powers conferred on him by the Constitution and laws of the United States, by the joint resolutions of the Senate and House of Representatives, bearing date of April 6, and December 7, 1917, respectively, and particularly under the powers conferred by Section 1 of the act of Congress approved August 29, 1916, entitled "An act making appropriations for the support of the Army for the fiscal year ending June 30, 1917, and for other purposes," took possession and assumed control, on December 28, 1917, through a director general of railroads, of all the railroads of the United States.

2. By an act approved March 21, 1918, called the Federal Control Act, Congress authorized the President through such agency as he might determine, to enter into an agreement with the owners for the maintenance and upkeep of the properties previously taken over, as well as for the determination of compensation and respective rights and obligations.

3. By a proclamation dated March 29, 1918, the President authorized director general of railroads to execute agreements in accordance with the Act of March 21.

At the time the Government assumed control of the roads, which, it is evident from the foregoing, was a wartime measure, the necessity for immediate and complete command of transportation facilities was recognized by the owners of the roads as well as by the authorities of the government. Difficulties of transport and of financing had arisen which could be solved only by consolidation of resources under unified direction backed by competent authority.

After the assumption of control had been recognized by Congress, a general form of contract was prepared. Investigation into the conditions attending the operation of individual roads, which under ordinary business procedure would be entered into prior to formulating a contract, was precluded by the urgency of the situation, with the result that the contract, as entered into, dealt only with average conditions and was expressed along very general lines. Condensed in a single statement, the contract provides that the government take over the railroads as of midnight of December 31, 1917, at an annual rental equal to the average annual net earnings for the three-year period ending June 30, 1917, and will return them in substantially as good condition as when taken over, subject to degree of use. The measure of compensation is clearly stated and the amount of compensation was readily ascertainable from the records of the Interstate Commerce Commission.

The intent of the government to return the properties in as good condition as when received is stated with equal clearness but no measure of maintenance is provided and none

was available from the records of the Commission beyond general comparisons of expenditures, affording no means of determining the character or adequacy of maintenance of road and equipment in detail with due regard to use, nor of the appurtenant facilities. Under these conditions and in view of the evident necessity of setting up some standard of maintenance, the upkeep section of the contract provides: "that the annual expenditures and charges—or the payment into funds of an amount equal in the aggregate—to the average annual expenditure and charges during the test period—shall be taken as a full compliance" with the agreement to return the property in substantially as good condition as when taken over. It further provided that: "due allowance shall be made for any difference that may exist between the cost of labor and material—and the average for the test period and—for any difference in use—so that the result shall be, as nearly as practicable, the same relative amount, character and durability of physical reparation."

It is apparent that upon the settlement of accounts, no difficulty need be experienced in adjusting the claims for compensation. A fixed rental per annum for a definite term is a purely accounting matter. The application of accounting values, however, to physical reparation, requires comparison of the physical condition of the property at the beginning and at the end of the period covered. Unfortunately, the exigency of the situation did not permit a joint inspection at the beginning of federal control, and it was not provided for upon the return of the property, so that the roads now find themselves in many instances confronted with a statement of over-maintenance in point of money expended on a property clearly in need of immediate physical repairs. In such circumstances, it seems proper to examine further into the equities involved and to arrive, if possible, at some measure of maintenance that can be fairly applied, and that will take into consideration the degree of use.

If we consider a property that is comparatively new, on which the cycle of wear has not come fully into operation, a property still in the development period, with its traffic rapidly increasing, it is evident that its expenditures for maintenance during any three-year period will have been less than normal—and the question then becomes, not what amount per annum had been expended on maintenance during the test period, but what amount should normally have been expended, with relation to its traffic, had the rate of wear been then determined. Fortunately, this subject has previously been investigated, though from a different angle and for an entirely different reason. It was studied in detail by J. B. Berry in 1902, when considering the effect on maintenance charges of contemplated reductions in grade on the mountain divisions of the Union Pacific, and was carried on by other engineers through the committee on Economics of Railway Location of the American Railway Engineering Association. In 1913 this committee under the direction of A. K. Shurtleff, chairman, made an exhaustive investigation of the maintenance accounts for 1911, of 53 of the leading railroads, and as well of the accounts by divisions of a single system having 8,000 miles of track, for a period of four years. From the average values thus ascertained a formula was deduced which permits the scientific operation of wear due to age or decay from that due to traffic,

and the consequent calculation of the additional amount required for adequate maintenance by reason of increased use, under average conditions, on the average road.

The full report of the committee is published in the Proceeding of the American Railway Engineering Association; but as the formula has been found peculiarly applicable to the situation under discussion, the basis is stated briefly. Mr. Shurtleff departs from the sole factor of freight ton-miles generally used as a traffic comparison, and takes into consideration all other factors of mechanical wear, arriving at a basis termed equivalent ton-miles, composed of the following:

- (1) Net freight ton-miles (including company freight).
- (2) Freight train car miles times average weight of empty cars, excluding caboose.
- (3) Passenger train car miles times two times average weight of cars and contents.
- (4) Freight locomotive-miles times two times average weight of locomotives.
- (5) Passenger locomotive-miles times four times average weight of locomotives.

This assumes, based on evidence accumulated by the Association, that a freight locomotive exercises twice the destructive effect on the tracks of a freight car, a passenger locomotive four times and a passenger car twice the effect of a freight car.

The factor of use was arrived at by taking the average life of materials in each account considered and comparing this with the average life under the definite volume of traffic reported. In the case of the renewals, for example, the proportion of renewals due to decay was found on the roads considered, to be 6.5 per cent of the total in the track, and the additional renewal due to traffic was found to be 0.3 per cent per million equivalent ton-miles or an addition of 0.046 per cent (per million equivalent ton-miles) to the 6.5 per cent annually renewed because of decay. Where the ties decay faster, the additional percentage due to traffic remains approximately correct. The proportion of wear in sidings, as compared with the main line for the average road is, of course, subject to increase on roads having a dense mining or manufacturing traffic where the sidings come into greater use.

It is believed that by the use of the A. R. E. A. formula in combination with the average values and rates of wear from which it was deduced, a fair basis may be established for comparison of expenditures for maintenance on all primary accounts affected by traffic. Necessarily, account must be taken, in applying average values, of important differences in physical characteristics, as of excess curvature when considering rail wear.

A concrete instance that has recently come under the writer's observation is that of a short line put into operation in 1910. The cycle of wear on this property did not come into full operation until 1918 and 1919, the period of Federal Control. Based on expenditures during the test period, properly equated in accordance with the language of the contract, the government rendered a bill for over-maintenance amounting to nearly a million dollars. Legally, the position of the government was perhaps sound, but in equity it was decidedly unsound, as it was very apparent that the property was under-maintained. Upon investigation of primary accounts, it was found that on accounts affected by traffic (which had nearly doubled during the period of federal control), the actual renewals were but slightly greater and in some instances less than during the test period, although during that period the cycle of wear had just commenced to operate. Application of the A. R. E. A. formula to these accounts, and taking as a base the less than normal expenditures during the test period, developed a standard of maintenance which, when applied to the expenditures during the period of Federal Control, showed a

net deficit of more than half a-million dollars, a situation more in keeping with the actual physical condition of the property.

On maintenance of equipment accounts, a similar difficulty was experienced in arriving at a measure of maintenance, the condition as to money spent and actual upkeep being as irreconcilable as in the accounts of maintenance of way. This was finally solved by the application of the factor of car-days of home cars in use for comparative expenditures on rolling stock and that of locomotive-miles per 100 tons weight per 100 man-hours repairs, as the factor most clearly indicating the adequacy of maintenance of locomotives.

In this investigation an interesting sidelight was thrown on the effect on efficiency of an administration highly centralized and detached from individual responsibility. In this case the result was a progressive loss in efficiency and in morale in all departments, although the organization was practically the same as under corporation management, a condition which the writer believes, from experience in other countries, is inherent in all government operations of a civil character.

In applying any measure of maintenance, it is held that quantities, or materials applied, should be considered wherever possible, instead of money or book values, on the principle that the return of a property in equivalent physical condition for equivalent physical use can only be accomplished by the continued physical replacement of materials worn out, and the practical conclusion that a property cannot be said to be maintained if the rate of wear is allowed to become excessive.

For a short time—a very short time on a railroad under heavy traffic—financial equivalent may take the place of physical betterment, but eventually actual materials are required in constantly increasing quantities as maintenance is deferred, up to the point where traffic ceases, and maintenance becomes reconstruction. Accounting values can be a criterion only when taken in connection with application of materials at the time and in the quantity required to keep pace with the rate of wear.

The suggestion to apply the A. R. E. A. formula and average replacement quantities in the adjustment of accounts for the use of the railroads by the government does not proceed from a partisan viewpoint. As a matter of fact, its use will be found in many cases to justify an apparently excessive expenditure during federal control on roads where in the test period. It may be made to serve, also, as a re-transportation plant had not been fully maintained durable guide for appropriations for future maintenance (the purpose for which it was originally designed) and as a rather eloquent measure of administrative efficiency.



Photo by Gilliums Service

Construction of a Railway from Dover, England, to Folkestone, the First Step in the Building of the English Channel Tunnel

Railway Terminal Problems of Greater New York*

Freight Terminals in New Jersey and Rail-Head Piers Proposed to Eliminate Waste of Water Transport

By J. J. Mantell

Manager, New York Region, Erie Railroad

THE TRANSPORTATION PROBLEM in the metropolitan district is one about which considerable has been said and written. We have seen the business which moves through the port of New York increase to such proportions that the imperative need of improvement in the situation has become apparent, even to the layman. Only by the co-operation of transportation, commercial, industrial, civic, state and national bodies for a common purpose will some real practical solution of the problem be forthcoming. The matter cannot be dwelt upon in its entirety, as burdensome detail and statistics would necessarily have to be furnished, and while such data is interesting to show the uneconomical conditions which exist, it is my purpose to treat the subject in a general way on account of the limited time; then, too, there are many who are not intimate with the transportation details of the port, and statistics, at the best, are rather dry.

Importance of the Port of New York

The port of New York presents the largest, most difficult and expensive freight handling problem in the world today; there is no other port like it. The New York district leads any other port district in the Western Hemisphere in population by nearly 200 per cent. Substantially 45 per cent of the foreign commerce of the United States passes through this port, and within the district are located more manufacturing industries than in the cities of Chicago, Philadelphia, St. Louis and Cleveland combined.

In speaking about transportation we have two branches of service in mind; passenger and freight. The passenger problem is by no means as momentous as that of supplying a congested scene of industrial activity with the articles which must have an inlet and an outlet. With a population of approximately eight millions in the metropolitan district we must consider, first, an uninterrupted movement of food-stuffs in their original or manufactured state; second, the raw, fabricated and finished products required to supply the industries of the district. Then we have traffic of the same character transient to the New York district, but which is dependent upon the port; namely, the large volume of import and export business, the New England business that moves via rail and water and the coastwise steamship traffic.

Importance of the New Jersey Terminals

To give you an understanding of the volume of freight that is moved through the New Jersey shore terminals of the various railroads, approximately 90 per cent of the export and 85 per cent of the domestic freight passes through these terminals. With these few figures before you, the general plan of the railroads terminating in New Jersey may be explained as embracing large outer classification yards where the road trains are brought in, broken up and the freight grouped for various destinations in the metropolitan district. These outer classification yards are connected by freight running tracks with switching and holding yards maintained along the water front which are used for the purpose of serving lighterage piers, freight stations, float bridges, grain elevators, coal piers, industrial sidings, team tracks, etc., and the freight is moved from the outer classification yard to the waterfront yard by drag service.

Classes of Service

To effect the delivery of freight in New York, both for domestic use and for export, the railroads maintain two classes of service; namely, car-float and lighter. Car-float service is used principally for the handling of cars from New Jersey terminals to New York pier stations and for transfer service in the harbor. Most of the domestic business is handled in cars on car-floats to the various pier stations and to the few team yards which are maintained. At the various stations the freight is unloaded and cars utilized for outbound loading. You appreciate that New York is a consuming city, with the result that a very large proportion of the cars unloaded are moved back to the New Jersey shore empty.

The export, import and coastwise steamer traffic is conducted by lighter service. A small amount of domestic freight, such as lumber, other building materials and rough or bulky freight is also handled by lighter to private or public docks. The difficulties attending the uneconomic transportation service of the port can be better understood when it is realized that almost all of the freight is divorced from a rail route and must be transported by water to reach its destination. The lighter service in New York Harbor dates back to 1862. The Erie and New York Central Railroads entered into competition for business on both sides of the North River; the Erie met the Manhattan competition by lighterage; the New York Central met the New Jersey competition in the same manner. This was actually the beginning of lighterage.

Handling Steamship Freight

Handling steamship freight by lighter service involves a highly specialized routine. On arrival of freight for export, it is necessary to secure from the consignee documents permitting delivery of freight to a certain steamer, space for which has been engaged in advance, and the railroad company is obligated to make delivery of particular consignments not later than a specified date, the time of receipt by the steamer being gaged by its ability to handle every consignment comprising its cargo and being further dependent upon the nature, size and weight of shipments.

The railroad companies have provided storage piers for what is known as covered dock freight, or freight that must be protected from the elements. They also provide storage ground for what is known as open dock freight, which does not need such protection. These facilities enable the prompt release of equipment while awaiting disposition orders on lighterage freight. Delivery of freight to steamer's side is made in covered or open lighter as best suits the individual needs, and before final delivery by the railroad company is accomplished under the present scheme, a minimum of two physical handlings of the freight have been performed. Where the freight is located on the pier or on the ground at the time delivery orders are lodged, it means that three or four handlings are required before final delivery to the steamer.

To carry on the lighterage and car-float service in this port, the railroads terminating on the New Jersey shore where their service should rightfully cease, maintain 150 tug boats, about 1,800 barges and lighters and about 300 car-floats, or nearly 2,300 pieces of lighterage equipment which is owned

*A paper read before the New York Railroad Club on February 18.

by the railroads and, in addition, there is chartered for the transportation of coal, grain and other commodities, considerable more craft. The railroads entering this port are assuming very great obligations in effecting deliveries of freight to New York and when you consider that it costs as much to move a ton of freight from the outer classification yard previously described to a pier station or steamship sling, as it does to pull that ton of freight from Buffalo or Pittsburgh to the classification yard, which is located within a few miles of the New York City Hall, you wonder what is wrong.

The Real Cause of Congestion

You have heard and read many stories of railroad congestion at the port of New York during the war and most people were led to believe that it was due to inability of the railroads to take care of the business moving through the port on account of insufficient terminal yards and other railroad facilities. I happened to be in charge of railroad terminals in the New York terminal district for the Railroad Administration during the war, and while some yards were crowded and congested, it was not due to lack of proper railroad terminal facilities. The congestion and backing up was the result of the poor steamship facilities which obtain at this port.

A commission was created in 1917 by the concurrent action of the legislatures of the states of New York and New Jersey to study the problem of the port as a whole and recommend a policy to be pursued for the best interests of the entire port. It has just completed and submitted a joint report with comprehensive plans and recommendations.

The Port Commission's Report

The commission has made sixteen specific recommendations and I want to take enough time this evening to dwell on the three principal recommendations which cover the comprehensive physical plan; that is, the improved railroad system which it is claimed will be the backbone of a rational port development and the formal adoption of which, in conjunction with the compact, the commission urges upon the legislatures.

There is no question that a belt line from a point near Little Ferry on the West Shore railroad to the lower end of Newark bay, as recommended by the commission, will be constructed some day, with the industrial development that is bound to take place on the large expanse of meadow land back of the Palisades, or between the Palisades and the Hackensack river. This line would be used for industrial purposes as well as to serve steamship piers and warehouses which will follow on both sides of the Hackensack river and Newark bay in connection with the plans that Jersey City has for its west side development, and the city of Newark has for its development. This line of railroad is practicable and could be utilized for several different purposes. In addition to serving the industries and docks, it could also be used as a belt line between the outer classification yards of the different railroads.

The outer belt line which the commission plans to begin at Piermont, N. Y., on the Hudson river to pass southwesterly to the west of Paterson, N. J., and the Orange mountains, comes through the Orange range near Summit and continues in a general easterly direction to termini on deep water. A railroad of this kind would be little used; it is impracticable and does not justify present consideration. We may need a railroad of this kind in the distant future, but I doubt it.

The Automatic-Electric Railway

We now come to the most important recommendation made and that is number 2, or the so-called "automatic-electric system. The commission has evolved a plan which will release the Hudson river waterfront from pier station occupancy, will afford some relief to the New Jersey waterfront,

will dispose of the New York Central's surface tracks, will provide ample capacity for the future and will still effect a large saving in terminal costs.

The plan is based on the general principle of a moving platform or a continuous conveyor placed underground. This system will resemble a railroad in appearance but will function more as a conveyor. The idea of the scheme is to link up the New Jersey railroads by a belt line along the eastern margin of the Hackensack meadows and build a joint yard and transfer station. The automatic-electric tracks will start from this station in New Jersey, pass under the Bergen hill and the Hudson river to a point in Manhattan at about 47th street. The tracks will then pass under certain streets and would serve some nine or ten warehouses and run south to a point near Battery Place where the tracks enter another set of tunnels under the Upper bay to the joint yard.

To carry out a scheme of this kind it is estimated will cost at least \$240,000,000. Who is going to finance the project and how can a facility of this kind be made to pay? It would be confined only to certain kinds of domestic freight, or, in other words, small package freight, and would not be able to take care of the heavy pieces of structural steel, building materials of various kinds, machinery and other heavy articles which are so essential in our city. It would simply be a small package railroad to release waterfront piers; the overhead expense would be so prohibitive that a project of this kind could not be capitalized.

Use of Containers a Solution

I will separate my recommendations into two classes: first, the handling of domestic freight; second, the handling of export freight.

Under existing conditions the handling of domestic freight, both from a railroad and merchant standpoint, cannot be done economically. There is pier congestion; there is waiting in line; there is loading and unloading. The average truck in New York is only moving from 25 per cent to 30 per cent of the time. There is duplication and cross-haul. The problem can be solved and this would be advantageous both to the merchants and railroads, and my recommendation is that we give serious thought to a plan which would provide for the handling of freight from existing and centralized freight stations in New Jersey to warehouses and store-door delivery in New York on practically all carload business, which amounts to at least 40 per cent and create inland stations in the metropolitan district suitably located in proper zones for receiving and distributing l.c.l. freight. These inland stations would be equipped with specially arranged bodies or containers where the assortment for particular consignees and particular destinations could be made, the stations to be equipped with proper mechanical appliances for prompt handling of these removable bodies to and from tractor trailers. In other words, you can do your business on wheels, keep your motor tractor turning over, increase its efficiency, do away with the waste of rehandling on the railroad and the trucking waste which at present exists in New York and effect a real store-door delivery. A tunnel connection via Staten Island should be made to Bay Ridge and thus link the New Jersey shore with Long Island.

For the handling of export traffic, we have the beginning of a splendid steamship pier development with the rail-head deliveries planned by the Cunard line on the New Jersey shore at Weehawken. There should be a gradual development by railroad and individual enterprises of multiple-story steamship piers, properly equipped with modern machinery for the direct handling of cargo between railroad and vessel. The railroads could get together and fix switching rates for the interchange of cars between their respective terminals via rail routes instead of lighterage, and it would only require a small expenditure to develop the existing switching facilities.

Tie Producers' Convention Discusses Specifications

Meeting at San Francisco Approved Proposed Requirements of
the A. R. E. A. Committee

THE PRINCIPAL ACTION taken by the National Association of Railroad Tie Producers at its third annual convention at San Francisco on January 27-28 was the adoption of standard specifications for cross ties. These specifications differ in only a few particulars from those which the Tie committee of the American Railway Engineering Association will recommend to that organization for adoption at the annual convention at Chicago in March.

The Tie Producers' Association suffered a grievous misfortune just two weeks before the convention through the death of its president, E. M. Blake of Charles R. McCormick & Company, San Francisco, Cal. Mr. Blake had fathered the project to hold the convention in San Francisco and had been the prime mover in most of the activities of the association during the past year. Through his efforts the association obtained an appreciable increase in membership and now enrolls 61 individuals and firms, producing approximately 50,000,000 ties annually. The sessions of the convention were presided over by John H. Johnson (B. Johnson & Sons, Richmond, Ind.), who was the treasurer of the association.

The Tie Specifications

The specifications as adopted by the association were presented by W. Nixon (Western Tie & Timber Company, St. Louis), chairman of the committee on this subject. They are as follows:

MATERIAL

Kinds of wood: Before manufacturing ties, producers shall ascertain which of the following kinds of wood suitable for cross ties will be accepted: Ash, beech, birch, catalpa, cedar, cherry, chestnut, cypress, elm, fir, gum, hackberry, hickory, larch, locust, maple, mulberry, oak, pine, poplar, redwood, sassafras, spruce, sycamore and walnut. Others will not be accepted unless specially ordered.

PHYSICAL REQUIREMENTS

General quality: All ties shall be free from any defects that may impair their strength or durability as cross ties, such as decay, large splits, large shakes, large or numerous holes or knots, or grain with slant greater than one in fifteen.

Resistance to wear: Ties from needle-leaved woods shall be of compact wood throughout the top fourth of the tie, where any inch of radius from the pith shall have not less than one-third summerwood in six or more rings of annual growth, or not less than one-half summerwood in fewer rings. Ties of coarse wood having fewer rings or less summerwood will be accepted if specially ordered.

Resistance to decay: Ties for use without preservative treatment shall not have sapwood wider than one-fourth the width of the top of the tie between 20 in. and 40 in. from the middle, and will be designated as "heart" ties. Those with more sapwood will be resigned as "sap" ties.

DESIGN

Dimensions: Before manufacturing ties, producers shall ascertain which of the following lengths, shapes or sizes will be accepted, and whether ties are to be hewed or sawed and in either case whether on the sides as well as on the top and the bottom.

All ties shall be 8 ft., 8 ft. 6 in., or 9 ft. long.

All ties shall measure as follows throughout both sections between 20 in. and 40 in. from the middle of the tie:

Grade	Sawed or hewed top, bottom and sides	Sawed or hewed top and bottom
	1	None accepted	6 in. thick by 6 in. wide*
2	6 in. thick by 7 in. wide*	6 in. thick by 7 in. wide
3	6 in. thick by 8 in. wide	6 in. thick by 8 in. wide
4	7 in. thick by 7 in. wide	7 in. thick by 7 in. wide
5	7 in. thick by 8 in. wide	7 in. thick by 8 in. wide
6	7 in. thick by 9 in. wide	7 in. thick by 9 in. wide
7	7 in. thick by 10 in. wide	7 in. thick by 10 in. wide

*Width of tie in all cases refers to the top width.

Northern white cedar or tamarack (larch) pole ties manufactured from timber, measuring 8 in. in diameter under the bark at the small end, shall be classed as grade No. 1. All other usable ties shall be classed as grade 0 ties.

MANUFACTURE

All ties shall be straight, well hewed or sawed, cut square at the ends, have bottom and top parallel, and have bark entirely removed.

INSPECTION

Ties will be inspected after delivery at suitable and convenient places satisfactory to the railroad, which reserves the right to inspect ties at points of shipment or at destination. Ties will be inspected at points other than the railroad's property whenever in the judgment of the railroad there is sufficient number to warrant it; but the shipper shall provide accommodations for the inspector while away from rail or steamer lines and transport him from or to a railroad station or steamer landing.

Inspectors will make a reasonably close examination of the top, bottom, sides and ends of each tie. Each tie will be graded independently without regard for the grading of others in the same lot. Rafted or boomed ties too muddled for ready examination will be rejected. Ties handled over hoists will be turned over as inspected.

Ties will be rejected when decayed in a degree sufficient to materially impair the strength or serviceability, except that the following will be allowed: in cedar, "pipe or stump rot" up to 1½ in. in diameter and 15 in. deep; in cypress, "peck" up to the limitations as to holes; and, in pine, "blue sap stain."

A large hole in woods other than cedar is one more than ½ in. in diameter and 3 in. deep within, or more than 1 in. in diameter and 3 in. deep outside the sections of the tie between 20 in. and 40 in. from its middle. Numerous holes are any number equaling a large hole in damaging effect. Such holes may be caused in manufacture or otherwise.

A large knot is one exceeding in width more than ¼ of the width of the surface on which it appears; but such a knot may be allowed if it occurs outside the sections of the tie between 20 in. and 40 in. from its middle. Numerous knots are any number equaling a large knot in damaging effect.

A shake is a separation of one ring of annual growth from another. One which is not over 4 in. long or ¼ in. wide will be allowed.

A split is a break across annual rings. One which is not over 10 in. long will be allowed provided a satisfactory anti-splitting device has been properly applied.

A tie will be considered straight: (1) When a straight line along the top from the middle of one end to the middle of the other end is entirely within the tie; (2) when a straight line along a side from the middle of one end to the middle of the other is everywhere more than 2 in. from the top and the bottom of the tie.

A tie is not well hewed or sawed when its surfaces are cut into with score-marks more than ½ in. deep or when its surfaces are not even.

The lengths, thicknesses and widths specified are minimum dimensions. Ties over 1 in. more in thickness, over 3 in. more in width, or over 2 in. more in length, will be degraded or rejected.

The top and bottom of a tie will be considered parallel if the difference in the thicknesses at the two sides or ends does not exceed ½ in.; that is, one side may be 7¼ in. while the other is 6¾ in. wide; or one end may be 6¾ in. while the other is 7¼ in. thick.

All thicknesses and widths apply to the sections of the tie between 20 in. and 40 in. from the middle of the tie. All determinations of widths will be made on top of the tie, which is the narrower of the horizontal surfaces.

Ties which are oversize will be accepted as follows: 8 in. to 9 in. by 9 in. to 12 in. as Grade 4; 9 in. to 10 in. by 9 in. to 12 in. as Grade 3. Ties over 10 in. thick or over 12 in. wide on top will be rejected. Ties will be graded up by their smaller ends and graded down by their larger ends. The dimensions of the tie will not be averaged.

Split redwood ties are permitted a slight variation in size but

such variation must not be more than 1/2 in. one way or 3/4 in. two ways.

DELIVERY

Ties delivered on the premises of the railroad for inspection shall be stacked not less than 10 ft. from the nearest rail of any track at suitable and convenient places; but not at public crossings, nor where they will interfere with the view of trainmen or of people approaching the railroad. Ties shall be stacked in alternate layers of 2 and 7, the bottom layer to consist of 2 ties kept at least 6 in. above the ground. The second layer shall consist of 7 ties laid crosswise of the first layer. When the ties are rectangular, the two outside ties of the layers of 7 and the layers of 2 shall be laid on their sides. The ties in layers of two shall be laid at the extreme ends of the ties in the layers of 7. No stack may be more than 12 layers high, and there shall be 5 ft. between stacks to facilitate inspection. Ties which have stood on their ends on the ground will be rejected.

Each stack shall have fastened to it a tag on which is written the owner's name and address, the date when stacked, and the number of ties of each kind of wood in the stack.

All ties are at the owner's risk until accepted. All rejected ties shall be removed within one month after inspection.

Ties shall be stacked as grouped below. Only the kinds of wood named in a group may be stacked together.

CLASS U—TIES WHICH MAY BE USED UNTREATED

Group Ua Black Locust White Oak Black Walnut	Group Ub "Heart" Doug- las Fir "Heart" Pines	Group Uc "Heart" Cedars "Heart" Cypress "Heart" Red- wood	Group Ud "Heart" Catalpa "Heart" Chestnut "Heart" Red Mulberry "Heart" Sassa- fras
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CLASS T—TIES WHICH SHOULD BE TREATED

Group Ta Ashes Hickories "Sap" Black Locust Red Oaks "Sap" Black Walnut Honey Locust	Group Tb "Sap", Cedars "Sap", Cypress "Sap", Douglas Fir Hemlocks Larches "Sap", Pines "Sap" Redwood	Group Tc Beech Birches Cherries Gums Hard Maples	Group Td "Sap", Catalpa "Sap", Chestnut Elms Hackberry Soft Maples "Sap" Mulberries Poplars "Sap" Sassafras Spruces Sycamore White Walnut
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SHIPMENT

Ties forwarded in cars or vessels shall be separated therein according to the above groups, and also according to the above sizes if inspected before loading.

DISCUSSION

The attitude of the convention was generally favorable to the specifications as many advantages of the promulgation of a general specification were pointed out. Attention was called to the fact that the standard specifications of the United States Railroad Administration enabled the western mills to take the business of the eastern roads safely, whereas in the absence of such a specification, a lack of knowledge concerning eastern trade practice would have made this considerably more difficult.

Statistical Data

One important feature of the convention was the presentation of statistical data on the production of ties throughout the United States. The production of ties in the south and southwest was low at the beginning of the year, increased appreciably during the summer months, and declined again in the fall. In the central western states the production of ties has increased greatly, 2,500,000 ties being cut in Illinois in 1920 as compared with 1,000,000 in the preceding year. In the far west, the 1920 production was about normal, aggregating between 14,000,000 and 15,000,000 ties. The outlook for a large production in this area is less favorable, for the logging for the season is done before March 1 and the present depression in the lumber industry is causing a curtailment of logging operations.

A paper by A. A. Baxter, general manager of the Douglas Fir Exploitation and Export Company, contained some interesting facts on the export of ties from the west coast during 1920 and are summarized as follows:

UNTREATED

United Kingdom	103,100,000 ft. b. m.
China (sold and shipped in 1920)	1,100,000 ft. b. m.
China (sold in 1920, to be shipped during the first half of 1921)	7,200,000 ft. b. m.
West Coast of South America	990,000 ft. b. m.

TREATED

China—Taku Bar	415,000 ft. b. m.
India	7,411,000 ft. b. m.
San Domingo	1,473,000 ft. b. m.
Total untreated	112,390,000 ft. b. m.
Total treated	9,299,000 ft. b. m.
Grand total	121,689,000 ft. b. m.

Other Business

Other papers covered the various trade and technical problems of the tie producers and included a paper by C. L. Hill, Forest Products, United States Forest Service, on the Timber Resources of the United States, with special reference to the Pacific coast, and one by John Foley on The Tie Supply of the Future.

At the concluding session of the convention on Friday afternoon the following officers were elected:

President, Charles R. McCormick, Charles R. McCormick & Co., San Francisco, Cal.; first vice-president, J. H. Johnson, B. Johnson & Son, Richmond, Ind.; second vice-president, R. J. Witherell, L. D. Leach & Co., Chicago; secretary, Warren Nixon, Western Tie and Timber Company, St. Louis, Mo.; treasurer, J. J. Schlaflay, the Potosi Tie and Lumber Company, St. Louis, Mo.

Chicago was selected as the place of next meeting.

"The Gospel of Appreciation"

On the Santa Fe

J. R. HITCHCOCK, assistant general manager of the Atchison, Topeka & Santa Fe Coast Lines, is the author of a series of interesting educational pamphlets now being issued to employees on the coast lines. The latest circular, entitled "The Gospel of Appreciation," is designed to encourage efficiency and courtesy and to make public numerous examples of exceptionally good work by individual employees.

The circular takes up illustrations and testimonials sent in by patrons of the company, both shippers and passengers, who have been pleased with the service rendered by employees with whom they have come in contact. It then sets forth a number of instances of meritorious services which have come directly to the attention of the officers. The list covers all phases of railroad work. One trainman has discovered a defective brakebeam and by prompt action has prevented a serious accident; others have given assistance in similarly difficult situations, perhaps not in the line of duty. Still other employees have done conspicuously good work in cases of derailment. The pamphlet praises station employees, foremen and clerks who have displayed intelligence and honesty in preventing pilferage or in apprehending thieves. It tells of trainmen who have gone out of their way to move their trains on time, of agents whose warehouses are especially clean and well-kept, and who all will be rewarded for their energy and diligence.

The idea of these various illustrations is to impress the employees with the fact that good work will be recognized, no matter where, or under what circumstances, it may be accomplished. To quote Mr. Hitchcock: "It is appreciated that many trying circumstances must be encountered in the transportation game. They must be dealt with patiently, courteously and efficiently, in order to accomplish the best results. . . ."

Winslow Partial Payment Bill Passed by Senate

Will Authorize Immediate Disbursement of Large Sums Due the Railroads Held Up on a Technicality

WASHINGTON, D. C.

THE WINSLOW BILL, authorizing and directing the Secretary of the Treasury to honor certificates of the Interstate Commerce Commission for instalment payments to the railroads on account of their guaranty for the six months following the termination of federal control, was passed by the Senate on February 22 without a record vote, in the form in which it was passed by the House on February 8, and sent to the President. The provisions of the bill will make possible prompt payments of a large part of the sums still due the railroads, estimated at about \$370,000,000 for the six months' period, on certificates of the Interstate Commerce Commission for amounts certainly due pending a final adjustment of the balance. The commission was prepared to issue such certificates after September 1 and did issue some but they were not honored because of a ruling by the Comptroller of the Treasury.

There has been no indication of the attitude of the President toward the bill, although the Treasury Department has been hostile to it, but it would seem that there are enough votes for the bill in both the Senate and the House to pass it over a veto, if necessary, if it can be done within the short time allowed. The President has referred the bill to the Secretary of the Treasury and to the Interstate Commerce Commission for an opinion. The Senate had deliberately taken up the bill, amid the congestion which usually prevails toward the close of a session, with the purpose of having another day available, in case the President should disapprove the bill and keep it for 10 days, in which to pass it over the veto by a two-thirds vote. A fight against the bill was made by Senator La Follette of Wisconsin but merely served to consume time and furnish ammunition for the publicity forces of the labor organizations. The Senate voted 36 to 35 on February 21 to take up the bill in place of the agricultural appropriation bill and an agreement was reached to conclude the debate at 5:00 p. m. on the following day. The bill was passed about 3:00 p. m. after very little debate.

Senator La Follette used six hours with one of his characteristic speeches, which again demonstrated the manifold possibilities which lie in the use of statistics, presenting an amendment that no money shall be paid to the roads until after an investigation by the Interstate Commerce Commission of the expenditures of the railroads during the guaranty period, in spite of the fact that the Transportation Act authorizes the commission in ascertaining the amount of the guaranty, to make readjustments for abnormal or improper charges to operating expenses and to determine the amount to be charged for maintenance. The proposed amendment was rejected 47 to 19. An amendment proposed by Senator Kirby to eliminate the provision in the law for a 5½ or 6 per cent return on the aggregate value by repealing Section 15-a was defeated by a vote of 59 to 14 and one proposed by Senator Trammell of Florida to reduce the "fair return" to 3 per cent was defeated 61 to 7. Senator Trammell recently introduced an amendment to provide for 4 per cent as a fair return, with the idea that it would reduce freight rates sufficiently to induce the consumers to buy more Florida fruits and vegetables, but after he found that the railroads have been making less than 4 per cent on the present rates he reduced the percentage. The two amendments aroused a lively discussion of the freight rate question, Senators Kirby and Trammell insisting that the "guaranty" of 6 per cent to the railroads had put rates so high that the producers of agricultural products cannot market their products. Sena-

tor Kellogg pointed out that under the new rates the railroads have earned at the rate of only 3.3 per cent since September 1. After the 3 per cent amendment had been defeated Senator Trammell offered a 4 per cent amendment which was rejected.

Extracts from Senator La Follette's speech were sent to the press by the publicity man who has recently been handling the numerous statements to the press issued by W. Jett Lauck and the labor unions affiliated with the American Federation of Labor in their mudslinging campaign against the railroads which has been used as a smoke screen for the national agreements. He denounced the bill as providing for the presentation to the railroads of "a gift from the public treasury before the gift promised is due," and asked why the railroads instead are not required to pay back to the government the "enormous debts" which they owe on account of permanent improvements and equipment provided during the period of federal control, which the Transportation Act permits to be funded for 10 years, and for money borrowed from the revolving fund, which under the law is to be paid back in 15 years.

He said the railroads owe the government \$750,000,000 for betterments and \$350,000,000 for equipment provided during federal control, which he attempted to give the impression the railroads are trying to sneak off with, and \$192,000,000 borrowed from the revolving fund, a total of \$1,292,000,000. He took the position that the railroads themselves have delayed the payment of their guaranty by failing to present final "claims" for the amounts due, preferring to leave the accounts open—"leave the door of the treasury ajar so that they may come back year after year, pyramiding new claims upon the old and gradually swelling the total." He said that while it was intended that the guaranty would enable the railroads to give improved service, in practice it has proved an "invitation to fraud and extravagance" and in this connection he rang the changes upon the charges made by the shop craft unions regarding the car and locomotive repair work sent to contract shops. "The courageous policy," he said, "would be to repeal the law by which this gift was made. The government owes the railroads no debt. The railroads are indebted to the government in so many millions of dollars that it is doubtful if they can ever discharge the debt."

Senator Townsend of Michigan, who was in charge of the bill for the committee on interstate commerce, discussed it in part as follows:

There is about \$350,000,000 due now; \$250,000,000 has been paid. This amount is due under contract with the government, under acknowledged liability by the government and the amount has been appropriated by Congress.

The committee on interstate commerce have had long hearings on this subject, and we have determined upon an amendment to the Transportation Act of 1920 which is advocated by the Interstate Commerce Commission and approved by the railroads, and, as I understand, meets with no informed opposition. Under that act we had supposed, at least, that Congress had provided for the payments of the sums due in installments. When it was determined that a certain amount was actually due to the railroads, it was supposed that the Interstate Commerce Commission could make a certificate to that effect and it would be paid by the Secretary of the Treasury. It turned out, however, that the Secretary of the Treasury submitted this question to the Comptroller of the Treasury, and he advised that no payments could be made to the railroads of any amount, except in final settlement. That is the ruling today; and many of these settlements, from the very nature of things, can not be completed entirely for possibly several years.

Now, not only are the railroads embarrassed—indeed, that is

hardly the greatest thing that is to be considered here—but the concerns with which the railroads have been doing business can not carry their accounts any longer. Some of them are behind in payments more than five months, and some of these concerns themselves are threatened with bankruptcy. There is certainly but one alternative for them to take, and that is to cease supplying the railroads with coal and other material. That will still more embarrass the railroads. I say to you, Mr. President, in all candor, I believe that many of these railroads, especially the weaker lines, are threatened with bankruptcy unless they can obtain the money due them from the United States and needed for their operation. Their credit has already been extended to the limit.

Your committee believes that there is no question about the obligation of the United States; but we provide that the amounts must be determined as certainly due, and the Interstate Commerce Commission is seeing to it that the full payment is not made to the railroads, but that a certain amount is reserved to meet, under all circumstances, any possible contingencies as to balances in the future.

Senator Pomerene of Ohio put in the record the following memorandum from the Bureau of Statistics of the Interstate Commerce Commission:

Revenues and Expenses Since 1917

The revenues and expenses as shown by the monthly reports of Class I roads, 1917 to 1920, are as follows:

Calendar Year	Operating revenues	Operating expenses	Net operating income	Operating ratio
1917.....	\$4,050,463,579	\$2,858,212,210	\$974,778,937	70.57
1918.....	4,926,593,957	4,017,209,501	693,111,170	81.54
1919.....	5,184,230,244	4,419,988,750	515,793,287	85.26
1920.....	6,213,489,049	5,810,970,021	67,823,711	93.53

It will be seen that in spite of an increase of over \$2,000,000,000 in operating revenues, the net return has been nearly eliminated because of an increase of about \$3,000,000,000 in operating expenses. This is reflected by the increase in the operating ratio.

The volume of traffic in 1917 was slightly below that of 1918 and 1920, but somewhat greater than that of 1919. The principal source of the increased revenues is from the increase in rates. Certain increases granted by the commission in 1917 became operative for the full year 1918, but the general increase effective in June, 1918, of 25 per cent in freight rates, was reflected in the revenues of that year for only the last half of the year. In 1919 no general increases were made. In the calendar year 1917 Class I roads received an average revenue per ton mile of 7.15 mills, while in 1919 the corresponding figure was 9.73 mills, an increase of 2.58 mills per ton mile. Applied to the total freight traffic of 1917, namely, 394,465,400,493 ton miles, the increased freight charges per annum over the basis existing in 1917 amounted to approximately \$1,017,720,000. In 1920 the increase in freight rates was made applicable late in August. While this increase has been estimated at 33 1/4 per cent, the statistics do not indicate that the increase realized has been as great as that. Taking an increase over 1919 of 30 per cent for illustration, the increase would be 2.919 mills per ton mile, which when applied to the traffic of 1917 would produce approximately \$1,151,440,000.

Passenger fares were also increased in June, 1918, and again in August, 1920. In 1917 the average revenue was 2.090 cents per passenger mile, as against 2.541 cents in 1919, an increase of 4.51 mills. Applied to the traffic of 1917, or 39,476,858,549 passenger miles, this amounts to approximately \$178,000,000 annually. The increase allowed in 1920 was 20 per cent. Reports available at this time indicate that an average increase of 4.6 mills per passenger mile was realized. Applied to the 1917 traffic as above, the increased annual revenue amounts to \$181,589,000. There has also been added a surcharge on Pullman travelers for the benefit of the railroads, amounting to perhaps \$25,000,000 annually, and an increase in compensation for carrying the mail yielding about \$45,000,000 annually.

The increases above mentioned total nearly \$2,600,000,000 annually on the basis of the traffic of 1917.

On the side of expenses, wages are the principal source of increase. Increases were granted in 1918 and made retroactive to January 1 of that year. Further increases were granted from time to time by the Director General of Railroads, and there was an increase of about 22 per cent in July, 1920, granted by the United States Railroad Labor Board, the increase being made retroactive to May 1, 1920. According to statistics published by the Interstate Commerce Commission for the first six months of 1920, the pay roll of Class I roads, without any of the increase granted by the Labor Board was \$1,596,680,268, which, for 12 months would have been \$3,193,360,536. The actual pay roll in 1917 was \$1,739,482,142, an increase of \$1,453,878,394. Twenty-two per cent of the \$3,193,360,536, is \$702,539,200. This added to the \$1,453,878,394 gives a total increase in wages over the 1917 basis of \$2,156,417,594.

It may further be assumed that the fuel consumed in 1917 would, at the prices paid by railroads in 1920, have cost \$200,000,000 additional annually. Increased taxes account for about another \$60,000,000. In addition there were increases on materials, the amount of which can not be given at this writing.

It should be said that all of the figures showing the results of increases in rates and costs are subject to revision, and are given at this time merely to illustrate roughly where the increased revenue came from and where it went. No statement can be made at this time as to the extent to which the roads were under- or over-maintained during 1920.

If the rates granted in August had been in effect during the whole year 1920, the roads would have made a better showing. What showing will be made in 1921 depends so much on the extent to which traffic revives and to what extent economies in expenditure can be effected that it is quite impossible to make a prediction. It may be noted, however, that in October, 1920, the best month under the new rates and fares and under the new wage schedules, the net railway operating revenue was \$86,455,487.

A New and Novel Crossing Sign

THE NOVEL WARNING SIGN shown in the accompanying illustration has been erected by the San Antonio & Aransas Pass at the intersection of its line with Roosevelt avenue, in San Antonio, Texas. Surmounting a sign which bears the words, "Did the Driver of This, Stop, Look, Listen?" is a platform about eight feet above the ground, upon which is placed a wrecked automobile which figured in a fatal accident at a country road crossing on the Waco district of that road some time ago and which re-



The New Crossing Sign Used by the San Antonio & Aransas Pass to Reduce Grade Crossing Accidents

sulted in the death of two occupants of the car and serious injury to a third.

A series of similar accidents at different points on the line suggested to J. H. Newberry, claim adjuster of the San Antonio & Aransas Pass, the necessity for devising some sort of a warning different from anything theretofore used, and of such a nature as would attract the attention of motorists and cause them to "stop, look and listen" before crossing railroad tracks. The new warning sign, devised as a result, seems to be serving the purpose for which intended, for it is causing much comment and the idea is being taken up by safety men of other roads.

THE HUDSON'S BAY COMPANY, which has been reported as intending to build a light railway across the 24-mile portage between Fort Fitzgerald and Fort Smith which would connect the Peace river and the Mackenzie river, has abandoned its plan for this project. It was found upon investigation that there is not a sufficient prospect of freight to justify the construction of a line.

General News Department

Fire early on the morning of February 16, destroyed a two-story shop building of the Missouri Pacific at St. Louis, Mo.; estimated loss, \$100,000.

The House Committee on interstate and foreign commerce on February 19 reported favorably a bill to provide a substitute for Section 10 of the Clayton anti-trust law in the same form in which the bill has been reported to the Senate by the Senate Committee on interstate commerce.

Seven passengers and a motorman were killed and 20 passengers injured in a butting collision of electric cars between Bridgeport, Conn., and Shelton on February 22. Several persons were burned to death, the wreck having quickly taken fire from a can of gasoline (belonging to a passenger) which was in the vestibule of one of the cars and was ruptured in the collision.

Eight thousand is the number of members of the National Safety Council who own or operate shops or other industrial plants; and the officers of the Council propose to proprietors to conduct intensive campaigns, for some particular feature of safety, in all of these plants during one month throughout the year; a month to each feature. January was devoted to special efforts to prevent ladder accidents and February to infections arising from minor injuries. For March, the program is unsafe clothing; for April, horse play.

The Interstate Commerce Commission and the American Railway Association Committee on Automatic Train Control have decided to place inspectors on the Chicago & Eastern Illinois, Chesapeake & Ohio and Chicago, Rock Island & Pacific to check up and report on the operation of the automatic train control devices in service on those roads with a view to furnishing up to date information as to what, if any, changes would be necessary if it should be decided to order an extension of the present installations or an installation on another road.

The governors of 35 states have expressed favorable opinions on the operation of public service commissions in their states; this, according to the New York Times, being the result of a questionnaire which was sent out by Governor Charles H. Brough, of Arkansas. Governor Campbell, of Arizona, the 36th governor who responded to the questionnaire, said that he could not commend the work of the commission in his state; this, however, not because of any fault in the principle of commission laws, but to the personnel of that particular commission. Twelve states seem to have furnished no replies.

Personal appearance is one of the principal things by which one is judged. It is easy to present a good appearance. It is not upon the clothes that a person wears nor upon their quality, but upon their condition, that a good appearance depends. A man may wear the best clothes, but if he is untidy, he will give a bad impression. On the other hand, old clothes, pressed and clean, will give a good appearance. It is the same with a railroad. If things are left in a slipshod condition, material scattered along the tracks, equipment neglected, station grounds and platforms untidy, employees unbrushed, unshaved and unshowered, the public gets the impression that the railroad is run down and badly managed. If employees form the habit of thinking that "anything will do," the railroad gets the same thinking from the public.—*E. E. Nash, General Manager, Minneapolis & St. Louis.*

Full Crew Law Costs Indiana Roads \$1,000,000 Yearly

The full-crew law of Indiana costs the railroads of that state a million dollars a year; and Frank E. Lewis, general superintendent of the Chicago, Indianapolis & Louisville, at a meeting of merchants and manufacturers in Lafayette on February 15 urged them to co-operate with the railroads in seeking the repeal of

the law. He said that the law was costing \$1,000,000 a year without contributing anything to the safety of train operation. The third man is only in the way. He told the shippers that inasmuch as they were paying the bill they should lend a hand to the movement for the repeal of the law. Fifty shippers present agreed to communicate with representatives in the legislature, urging them to vote for the repeal.

Loyalty Means Obedience and Justice

E. E. Nash, general manager of the Minneapolis & St. Louis, in a circular to his subordinates, says:

"In the operation of a railroad nothing is more essential than obedience. The first requirement of a good officer is obedience. He has no right to expect a subordinate to do anything which he is not willing to do himself. An officer is obedient when he is just to his subordinates and loyal to his superiors. He will command obedience when he frames his orders carefully and so issues them that his subordinates can obey them. It is demoralizing to issue a mass of instructions when it is known that some of them cannot be carried out. This makes an executing officer or employee careless; and soon he begins to use his own judgment as to which orders he will obey. This looseness soon permeates an entire organization."

The Snell Forestry Bill

The National Forestry Program Committee, with headquarters at New York, is calling the attention of all users of forest products to the Snell Forestry Bill, now pending in Congress, which provides for a comprehensive national forestry program in order to establish a continuous supply of timber for the people of the United States. The bill is sponsored by the Forest Service and is supported by the National Forestry Program Committee which has been formed by manufacturers, consumers and converters of forest products to work for a policy which will mean an adequate and continuous supply of raw material. The Committee has secured agreement among the industries using the products of forests upon the measures proposed, as being fair to all concerned. Hearings will be arranged at which any points of issue will be clarified and Congress shown how vitally necessary a comprehensive forestry policy is to the industrial and public welfare of the nation.

Senator LaFollette Wants Information

Senator LaFollette on February 18 submitted to Congress two resolutions calling for a large amount of information from the Railroad Administration and the Interstate Commerce Commission on the subject of railroad expenses during the guaranty period and the efficiency and economy of railroad operation during the period of federal control, for which he asked immediate consideration. The resolutions were placed on the table because of an objection by Senator Townsend, who asked for opportunity to look them over.

The first resolution called for information concerning the charges that railroad companies have paid excessive prices for car and locomotive repair work in outside shops. The second resolution called upon the director general of railroads for information relative to improper conditions in shops, engine houses and repair yards, comparative efficiency of shop and engine house operation, all studies of maintenance of equipment made on the basis of the check of locomotive shop output and round house and shop costs, all information prepared and submitted to federal managers regarding maintenance of equipment during the test period; also during the seven years prior to the test period and during the year 1918, and, in general, all information gathered and tabulated by the administration relative to maintenance of equipment, as well as the equation factors for increased costs of

labor and material, to enable comparisons to be made as between the test period and the period of federal control.

Deficiency Appropriation for Valuation Work

Congress acted with unusual expedition on February 15 to pass a deficiency appropriation bill for \$1,000,000 to carry on the railroad valuation work by the Interstate Commerce Commission during the balance of the fiscal year ending June 30, 1921, after it had been informed by Chairman Clark of the commission, the day before, that within 48 hours all of the funds available for the purpose would be exhausted and that if the appropriation were not put through at once it would be necessary to call in the men from the field. The commission had asked for the deficiency appropriation some time ago and it was provided for in the general deficiency bill, which has recently been passed by the House. The bill, however, required further consideration in the Senate and after it had been explained that the commission needed the money to meet its payroll on February 15 a special joint resolution for the \$1,000,000 appropriation was introduced in the House and promptly passed, and shortly thereafter it was also passed in the Senate. The appropriation for \$1,000,000 in the deficiency bill will be taken out of that bill in conference.

A. R. E. A. Program

The program for the twenty-second annual convention of the American Railway Engineering Association, which will be held in the Congress Hotel, Chicago, on March 15-17, is as follows:

TUESDAY, MARCH 15

President's address.
Reports of secretary and treasurer.
Reports of committees on:
Signals and Interlocking.
Ballast.
Stresses in Railroad Track.
Electricity.
Track.
Rail.
Standardization.
Uniform General Contract Forms.

WEDNESDAY, MARCH 16

Signs, Feuces and Crossings.
Ties.
Iron and Steel Structures.
Water Service.
Economics of Railway Labor.
Economics of Railway Operation.
Economics of Railway Location.
Shops and Locomotive Terminals.
Buildings.
Annual dinner at 6:30 p. m.

THURSDAY, MARCH 17

Masonry.
Roadway.
Wood Preservation.
Wooden Bridges and Trestles.
Yards and Terminals.
Rules and Organization.
Records and Accounts.
Conservation of Natural Resources.
New Business.
Election and installation of officers.
Adjournment.

Speakers at the annual dinner at the Congress Hotel will include John F. Wallace, consulting engineer, New York, and David Kinley, president, University of Illinois, Urbana.

Boost!

If you were working in a grocery store, wouldn't you make it a daily habit to let some person know what a good store you were working for? What good groceries were on sale there? What reasonable prices were asked? And generally how well customers were treated?

You can be just as enthusiastic about boosting for "M. & St. L." as you could for the best store. We have a first class railroad, but it can be made a much better road if each employee will do more to make it so. You can boost hard for it and you will be telling the truth when you do so. If you live at a competitive point, ask your merchants on what road they ship their goods or travel, and urge them to use "M. & St. L." Such a question and request, put when you are spending money, is bound to do great good and you will be sowing seed that is sure to bring forth a good harvest. You may be living at a non-competitive point; but "Talking M. & St. L." all the time, day in, day out, by employees.

will do much to boost our gross receipts from which we all get our bread and butter, whether it be from non-competitive points or from competitive points. In reality, there is no such thing as a non-competitive point. Furthermore, the merchants you talk to in this way will have an added respect for "M. & St. L." and also more respect for you, as an employee who likes his job and his employer.—E. E. Nash, general manager, Minneapolis & St. Louis.

Mail Across Continent in 33 Hours

Postoffice department airplanes carried 300 lb. of mail from San Francisco to New York, about 2,700 miles, on February 22 and 23, in 33 hours 20 minutes, less than half the best time previously made, this being accomplished by keeping up the flying all night. The time actually on the wing was 25 hours 53 minutes. The record as given in press despatches is as follows:

SPECIAL AIRPLANE MAIL TRIP, FEBRUARY 22 AND 23

	Pac. time	E. time	Pilot
San Francisco, left Tuesday.....	4:30 a.m.	7:30 a.m.	.....
Reno .....	.....	.....	.....
Salt Lake .....	.....	.....	.....
Cheyenne	5:10 a.m.	8:10 p.m.	Knight.
North Platte .....	.....	.....	.....
Omaha .....	.....	.....	.....
Iowa City .....	.....	.....	.....
Chicago, arrived Wednesday.....	6:40 a.m.	9:40 a.m.	Webster.
Chicago, left	7:00 a.m.	10:00 a.m.	.....
Cleveland, arrived	10:52 a.m.	1:52 p.m.	.....
Cleveland, left	11:03 a.m.	2:03 p.m.	Allison.
Bellefonte .....	.....	.....	.....
New York	1:50 p.m.	4:50 p.m.	.....

The landings for fuel and refreshment at North Platte, Omaha and Iowa City, were made by the aid of flares marking the boundaries of the landing fields. Knight, the night flyer, steered his course of about 1,000 miles by compass. With the route from Omaha to Chicago, about 500 miles, he was wholly unacquainted.

These successful flyers were not the only ones who made the experiment on that day; westbound as well as eastbound trials were made; and one of the eastbound flyers, Capt. W. E. Lewis, was killed at Elko, Nevada.

National Railway Appliances Association

Assigns Additional Exhibit Space

C. W. Kelley, secretary of the National Railway Appliances Association, has sent out the following list of exhibitors supplementing that published in the *Railway Age* of November 19 (page 897), and bringing the list of exhibitors up to date. There are now but four unassigned spaces and it is expected that these will be taken during the present week. The supplementary list is as follows:

American Radiator Company, Chicago.
American Malleable Castings Ass'n, Cleveland, Ohio.
Brown Hoisting Machinery Company, Chicago.
L. S. Brach Mfg. Company, Newark, N. J.
The Basic Mfg. Company, Chicago.
Barrett-Gravens Company, Chicago.
Challenge Company, Batavia, Ill.
Detroit Steel Products Company, Detroit, Mich.
Duke Nut Lock Company, Chicago.
Elwell Parker Electric Company, Chicago.
Federal Electric Company, Chicago.
The Goss Company, Chicago.
Howlett Construction Company, Moline, Ill.
Headley Good Roads Company, Philadelphia, Pa.
Leich Electric Company, Genoa, Ill.
Lakeswood Engineering Company, Cleveland, Ohio.
McGraw-Hill Publishing Company, New York.
National Surface Guard Company, Chicago.
Oiley Paint Mfg. Company, Chicago.
Page Steel & Wire Company, Menomson, Pa.
Reading Specialties Company, Reading, Pa.
Geo. J. Roberts Company, Dayton, Ohio.
Stuebing Truck Company, Chicago.
Standard Asphalt & Refining Company, Chicago.
Train Control Appliance Company, El Paso, Texas.
Turner Day & Woolworth Handle Company, Louisville, Ky.

Medical and Surgical Section—A. R. A.

J. E. Fairbanks, general secretary of the American Railway Association, announces the establishment of a medical and surgical section in the Operating Division; and railroads, members of the association, are requested to send him the names of their chief surgeons or other officers who may properly become members. It is proposed to have in the section the surgeon-general of the United States Public Health Service, and also a representa-

tive of the State and Territorial Health Officers' Association. The temporary officers of the section are Dr. D. Z. Dnott, chief surgeon, Western Maryland, chairman; Dr. G. G. Dowdall, chief surgeon, Illinois Central, first vice-chairman, and Dr. Duncan Eve, chief surgeon, N. C. & St. L., second vice-chairman. These and the following twelve surgeons constitute the temporary committee of direction:

William B. Coley (N. Y. C.); Robert J. Graves (B. & M.); C. W. Hopkins (C. & N. W.); J. A. Hutchison (G. T. R.); A. W. Ide (N. P.); A. F. Jonas (U. P.); R. W. Knox (S. P.); J. P. Kaster (A. T. & S. F.); Southgate Leigh (Virginian); S. C. Plummer (C. R. I. & P.); J. B. Walker (Pennsylvania); H. S. Cumming, surgeon general, Bureau of the Public Health Service, Washington, D. C.

The temporary committee of direction has appointed three standing committees. On sanitary codes, Dr. R. W. Knox (S. P.), chairman; on physical standards, Dr. C. W. Hopkins (C. & N. W.), chairman; and on hospital standards, Dr. A. F. Jonas (U. P.), chairman.

Scale Men to Meet in Chicago

One added feature of engineering week in Chicago this year is the sixth annual meeting of the National Scale Men's Association which will be held at the Auditorium Hotel, Chicago, on March 15-17, inclusive. The program for this meeting, which is given below, consists largely of papers prepared by railway scale men. The annual dinner will be held Wednesday noon and all of Wednesday afternoon will be devoted to a visit to the National Railway Appliances exhibit.

TUESDAY, MARCH 15

10:00 a. m.

Address of welcome by Joseph P. Griffin, president, Board of Trade of Chicago.

President's address by B. B. Gordon, general scale inspector, Pennsylvania System.

1:30 p. m.

Motor Truck Scales, by Charles B. Barackman, scale inspector, C. R. I. & P.

Address by William F. Cluett, chief deputy inspector, Department of Weights and Measures, City of Chicago.

Standards, by Dr. S. W. Stratton, director, United States Bureau of Standards.

Automatic Indicating Scales, by E. D. Gordon, sales engineer, General Automatic Scale Company.

Repairing Counter and Portable Scales, by A. R. McFarlane, scale inspector, C. B. & Q.

The Testing and Inspection of Industry-Owned Scales, by C. H. Mann, superintendent of scales, Southern Railway.

WEDNESDAY, MARCH 16

9:30 a. m.

The Scale Inspector's Relation to Scale Sales, by L. R. Boyer, sales engineer, Fairbanks, Morse & Co.

Official Supervision of Grain Weighing at Terminal Markets, by James T. Bradshaw, grain warehouse commissioner of Missouri.

Scales and Weighing from the Viewpoint of a Railroad Engineer, by R. Hayes, structural engineer, Southern Ky.

Weights and Weighing from a Freight Agent's Standpoint, by H. C. Howe, freight claim agent, C. & N. W.

Weights on Grain Shipments from the Standpoint of the Country Shipper, by George A. Wells, secretary, Western Grain Dealers' Association.

Scale Specifications and Requirements of Interstate Commerce Commission Docket 9009, by Henry L. Goemann, president, Goemann Grain Company.

Address by H. A. Foss, weighmaster, Chicago Board of Trade.

THURSDAY, MARCH 17

9:30 a. m.

Linear Measurements; the Basis of all Metrological Standards, by Charles C. Neale, the Measuregraph Company.

Address by A. B. Jacobs, president, Strait Scale Company.

The Present Status of the Grain Scale Situation, by C. A. Briggs, United States Bureau of Standards.

The Proper Use of Cement and Concrete, by Professor Duff A. Abrams, Structural Materials Research Laboratory.

Method of Computing Fibre Stresses, by H. O. Hem, consulting engineer, Toledo Scale Company.

Design of Weigh Bridges, by James L. Miller, engineer of bridges, N. Y. C.

Testing Mine Scales, by L. A. Fischer, United States Bureau of Standards.

1:30 p. m.

Testing Hopper Scales Under Normal Working Conditions as Compared with Results of Shut-Down Tests, by G. O. Awe, chief scale inspector, Missouri State Weighing Department.

Waterproof Decks for Railroad Truck Scales, by John E. Armstrong, assistant engineer, Canadian Pacific.

Shop Treatment of Steel for Scale Pivots, by A. Malmstrom, chief scale inspector, A. T. & S. F.

Errors in Scale Weighing Beams, by W. E. Thompson, supervisor of scales, Minnesota Truck and Hopper Scale Department.

Protecting Structural Steel Against Corrosion, by C. Pettis, general scale inspector, N. Y. C.

Waterproof Fits and Scale Drainage, by T. O. Dean, superintendent of scales, T. & G.

Address by R. C. Welsh, scale inspector, Pennsylvania System.

Traffic News

The St. Louis Southwestern will use the freight terminal facilities of the Illinois Central at Memphis, Tenn., effective February 28.

F. M. Elkinton was elected president of the Milwaukee Traffic Club at the annual meeting on February 4. J. G. Love was elected first vice-president; W. Bowersock, second vice-president; L. R. Conger, third vice-president; and R. S. Dahl, secretary and treasurer.

The eighteenth annual dinner of the Transportation Club of Detroit was held at the Hotel Statler, in that city, on February 24. The speakers included Charles F. Moore, of New York, who spoke on "Dollars and Sense," and George A. Matthews, whose subject was "The Invisible Line."

The Erie Railroad has inaugurated a foreign trade service for the benefit of shippers and will publish regularly foreign trade bulletins dealing with the foreign ports and their facilities. The second number, just published, contains a very complete and detailed account of the port of Cardiff, Wales.

Senator Fletcher of Florida has introduced in the Senate a resolution requesting the Interstate Commerce Commission to furnish to the Senate full information regarding all traffic agreements, arrangements or understandings between the eastern trunk line railroads and the foreign flag steamship lines.

The State of New York, which entered suit in the Federal Court to enjoin the increases in intrastate fares and freight rates recently ordered by the Interstate Commerce Commission, was defeated, the decision, handed down at Utica on February 22, by Judges Manton, Ray and Hazel, being in favor of the federal authorities on all points. The attorney general of the state proposes to appeal without delay to the Supreme Court of the United States.

Senator Kenyon of Iowa has introduced in the Senate a bill to amend the Transportation Act so as to provide that the rate-making provisions in section 15-a authorizing the Interstate Commerce Commission to fix rates calculated to afford a return of 5½ or 6 per cent shall not apply to intrastate traffic. The bill says that "the commission shall have no power to fix or adjust rates, passenger or freight, which are within a state, and such power to fix or regulate intrastate rates is hereby conferred entirely upon the respective states."

A Shippers' Service Association has been organized at St. Louis, Mo., with offices in the Victoria building, by I. L. Burlingame, for many years general manager of the Terminal Railroad Association of St. Louis, as president, and W. E. McGarry, who was associated with Mr. Burlingame, and later connected with the American Railroad Association, Car Service Division, as chairman of the St. Louis district. Mr. McGarry will act as vice-president and general manager of the association, which has been organized to furnish service in traffic and transportation problems.

The Traffic Club of Denver

A new organization, the Traffic Club of Denver (Colorado), was put in operation at a meeting at the Metropole Hotel in that city on February 16. It is composed of prominent railroad and commercial traffic men and meets a general need which has been felt for some time. The following officers and directors were elected: President, J. F. Vallery (C. B. & Q.); first vice-president, F. B. Choate (U. P.); second vice-president, Harry Dickinson (Civic Association); secretary, C. B. Rader (Denver Grain Exchange). Directors: Fred Wild (D. & R. G.); L. P. Banks (S. P.); Geo. W. Martin (C. R. Q. & P.); F. W. Myers (A. T. & S. F.); M. H. McEwen (C. M. & St. P.); Ashley Faynor (I. & G. N.); T. J. Toner (D. & S. L.); Mr. Flickinger (Morey Merc. Co.); H. G. Naylor (Midwest Oil Co.); F. M. Andrews (Denver Dry Goods Co.); G. W. Work (Colo. M. & E. Co.); and the officers above named.

Commission and Court News

Interstate Commerce Commission

The commission has rendered its decision in the North Carolina intrastate rate case ordering increases by percentages corresponding to those authorized for interstate traffic in Ex Parte 74.

The commission is to investigate the action of the Alabama Public Service Commission in denying the carriers' request for permission to establish a surcharge of 50 per cent on intrastate passengers in Alabama.

The commission has suspended until June 20 the operation of certain schedules appearing in a Hocking Valley tariff which propose reductions in the amount of switching charges that will be assumed by the railway company at Toledo, Ohio.

The commission has suspended until June 23 the operation of certain schedules shown in Agent E. B. Boyd's tariff, which propose increased rates on pig iron from points in Alabama, Georgia, Kentucky, Louisiana, Tennessee and Virginia to Ogden and Salt Lake City, Utah, and points taking same rates.

The Interstate Commerce Commission has issued its decision in the Utah intrastate rate case ordering an increase in the intrastate passenger fares by the amount of the increases applied to interstate traffic to correct discrimination against interstate commerce. The present intrastate rates on coal and on ore were not found unreasonable, preferential, prejudicial or discriminatory.

The Interstate Commerce Commission has suspended from February 15 until June 15, 1921, the operation of certain schedules which propose to increase the rates on various commodities from points in the Mountain-Pacific territory in Colorado, New Mexico and Wyoming to El Paso, Texas, and related points located in the Western group from 25 and 33½ per cent to 35 per cent over rates in effect August 25, 1920.

The Interstate Commerce Commission has prescribed the following instructions as the second paragraph of section 2, of the general instructions on page 9 of the Classification of Investment in Road and Equipment of Steam Roads, Issue of 1914: "If the total cost of additions and betterments to any class of equipment, or any class of fixed improvements (except additional, or extension of, tracks), under a general plan, considered as a whole, is less than \$100, the amount expended shall be charged to the appropriate account in operating expenses. This rule is not to be construed as authorizing the parceling of expenditures in order to bring them within this limit.

The Interstate Commerce Commission has issued a notice to shippers calling attention to the fact that Section 206-c of the transportation act provides that complaints praying for reparation on account of damage claimed to have been caused by reason of the collection or enforcement during the period of federal control of unreasonable rates or rates otherwise in violation of the interstate commerce act may be filed with the commission within one year after the termination of federal control. The commission says it is not vested with jurisdiction to consider claims for reparation filed after the expiration of that time and that notification to the commission that a complaint may or will be filed later for the recovery of damages is not a filing of complaint within the meaning of the statute.

State Commissions

The State Senate of Colorado has passed a bill repealing the law which created the State Railroad Commission and the measure has been sent to the House.

The Public Service Commission of the State of Kansas has continued all railroad rate cases for a period of six months from March 1. This means that there will be no change in existing intrastate rates prior to next September.

Foreign Railway News

Electrification in South Africa

The South African Railways are advertising in the United States for bids for materials to be used in the electrification of their lines between Capetown and Simonstown and between Durban and Pietermaritzburg. The following materials will be needed for the Capetown project: Motor coaches and underframes, motor bogies, electrical equipment for coaches, substation equipment and power station transformers, boilers and boiler house equipment, turbo-alternators and condensing plant. For the work at Durban the following materials are desired: Electric passenger and freight locomotives, electric switching locomotives, substation equipment, boilers and boiler house equipment, turbo-alternators, condensing plant and transformers for substations and power stations. It is understood that the Capetown project is a multiple unit proposition and the one at Durban primarily to secure cheaper operation on heavy grades.

Specifications can be obtained from the High Commissioner for the Union of South Africa, 32 Victoria street, S. W. 1, London, England. The charge for these is £5 5s, for the first copy and £2 2s, for additional copies. Sums expended for these specifications up to three will be refunded upon receipt of bona-fide bids. Bids will be received by the High Commissioner at London up to May 3. It is understood that the total cost of the work will exceed \$20,000,000.

Plans for Spanish Cars Received

Specifications for freight and passenger cars, of which the Spanish government intends to order a large number, have been received by the Bureau of Foreign and Domestic Commerce and are on file at the Custom House, New York. Bids for this equipment opened in Madrid beginning February 14, 1921.

Car Exports in December

Passenger cars exported in December totaled 32, valued at \$258,451—the highest figure for any month of the year. Freight car exports were 1,611, valued at \$2,267,660, showing a considerable improvement over the figures for each of the two preceding months. Cuba was the destination of 865 of these cars, while 300 were sent to the Philippine Islands. The detailed figures by countries as compiled by the Bureau of Foreign and Domestic Commerce follow:

Countries	Passenger		Freight and other		Parts of cars, Dollars
	No.	Dollars	No.	Dollars	
France .....	..	..	..	..	425,607
Italy .....	..	..	..	..	7,416
Poland and Danzig .....	..	..	100	400,000	..
Spain .....	..	..	..	..	5,525
England .....	..	..	..	..	9,309
Scotland .....	..	..	..	..	4,575
Canada	1	2,391	12	4,200	125,365
Costa Rica .....	..	..	..	..	532
Guatemala .....	..	..	..	..	638
Honduras .....	..	..	..	..	340
Nicaragua .....	..	..	..	..	454
Panama .....	..	..	..	..	309
Salvador .....	..	..	..	..	1,101
Mexico	10	20,000	109	135,993	26,143
Jamaica .....	..	..	..	..	749
Trinidad and Tobago .....	..	..	..	..	..
Cuba	14	155,871	865	1,295,707	238,237
Dominican Republic .....	..	..	94	189,926	1,166
Argentina .....	..	..	..	..	268
Bolivia .....	..	..	..	..	309
Brazil	28	..	29,070	..	10,977
Chile .....	..	..	..	..	..
Colombia	6	68,919	1	8,865	19,273
Peru .....	..	..	25	2,818	11,251
Uruguay .....	..	..	..	..	1,883
Venezuela	1	11,250	..	..	..
China .....	..	..	3	12,450	18,884
Kwantung, leased territory .....	..	..	..	..	7,537
British India .....	..	..	..	..	4,232
Other British East Indies .....	..	..	..	..	..
Dutch East Indies .....	..	..	..	..	11,565
Hongkong .....	..	..	..	..	50
Japan .....	..	..	..	..	53,054
Australia .....	..	..	..	..	712
New Zealand .....	..	..	..	..	2,688
Philippine Islands	300	92,325	..	..	27,734
British South Africa .....	..	..	73	94,711	5,375
Total	32	258,451	1,611	2,267,660	1,021,397

December Exports of Car Wheels and Axles

Exports of car wheels and axles in December totaled \$631,999 in value. The largest shipments during the month were to Spain. These exports were valued at \$201,546. The figures, by countries, as compiled by the Bureau of Foreign and Domestic Commerce, follow:

Countries	Dollars
Belgium	3,203
Spain	201,546
England	2,595
Canada	93,671
Costa Rica	1,026
Guatemala	2,737
Honduras	1,330
Fanama	200
Mexico	76,086
Jamaica	2,278
Trinidad and Tobago	108
Other British West Indies	400
Cuba	83,837
Perch West Indies	14
Dominican Republic	886
Argentina	4,941
Bolivia	460
Brazil	3,296
Chile	48,787
Colombia	3,567
Ecuador	512
Peru	9,767
China	11,318
Kwantung	8,207
British India	7,541
Japan	50,904
New Zealand	537
Other British Oceania	28
Philippines	12,121
British South Africa	96
Total	631,999

December Exports of Track Material

Spikes weighing 3,158,612 lb. and valued at \$143,177 were exported during December. Cuba was the destination of by far the largest shipments of this material. Rails valued at \$3,324,802 and weighing 52,986 tons were the month's totals. The exports of switches, frogs, splice bars, etc., were valued at \$784,108. The detailed figures, by countries, as compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce, follow:

Countries	Spikes		Steel rails	Switches, frogs, splice bars, etc.	
	Pounds	Dollars		Tons	Dollars
Denmark			119	7,497	959
Finland			197	13,748	
France			72	4,896	3,174
Netherlands			48	2,618	920
Norway			330	23,086	857
Portugal			270	17,509	578
Spain			872	53,423	6,469
England			3,909	274,570	7,098
Scotland			265	14,180	14,854
British Honduras					40
Canada	65,560	3,683	719	31,309	43,744
Costa Rica	2,000	193			2,406
Guatemala	40,000	2,280			8,967
Honduras	110,700	5,120	1,172	75,689	42,278
Panama	755	36	152	9,291	3,300
Salvador	83,260	2,173	1,116	68,548	4,454
Greenland				1,305	28,710
Mexico	206,364	11,631	1,305	87,393	
Newfoundland and Labrador	10,000	600			
Jamaica					7,098
Trinidad and Tobago				11	976
Cuba	1,238,980	42,520	5,884	345,835	192,473
French West Indies			26	1,851	
Haiti					2,160
Dominican Republic	21,200	1,161	350	22,881	20,472
Argentina					80
Brazil	362,472	17,062	2,211	149,358	91,821
Chile	26,650	1,351	2,534	178,475	80,770
Colombia	6,000	396	2,001	112,926	15,665
Ecuador	1,800	132		37,038	784
British Guiana	32,000	2,070	101	6,251	1,615
Dutch Guiana			150	9,328	355
Peru	123,772	8,183	1,973	125,491	25,481
Venezuela					3,695
China	118,221	5,222	3,565	229,046	13,369
Kwantung			4,712	234,602	
British India			330	19,412	4,426
Ceylon					10,468
Straits Settlements	500	51	31	1,320	219
Dutch East Indies	270,546	17,084	6,738	451,754	38,145
Japan	249,862	11,704	3,466	201,537	30,502
Australia					3,695
Other British Oceania					2,812
Philippine Islands	187,970	10,525	1,481	106,741	62,265
British South Africa			4,167	273,061	6,228
British East Africa			175	13,384	350
French Africa			1,669	90,126	
Portuguese Africa			362	27,452	2,086
Total	3,158,612	143,177	52,986	3,324,802	784,108

Equipment and Supplies

Locomotives

THE NEW JERSEY, INDIANA & ILLINOIS is inquiring for some Mogul type locomotives.

THE OLIVER IRON MINING COMPANY, Duluth, Minn., is asking for prices on 12 locomotives.

THE MEXICO & NORTH WESTERN is inquiring for some 2-6-6-2 type and some 2-8-0 type locomotives.

CERRO DE PASCO RAILWAY (Peru) is inquiring through the locomotive builders for one Mikado type locomotive.

THE UNITED FRUIT COMPANY, New York, has ordered 2 Forney type locomotives from the Porter Locomotive Works. The locomotives will have a total weight of about 12 tons and will be used on the Truxillo Railroad, Honduras.

Freight Cars

THE ATCHISON, TOPEKA & SANTA FE is inquiring for 1,000 50-ton gondola cars.

THE BANGOR & AROOSTOOK has ordered 30 ballast cars from the Rodger Ballast Car Company.

THE LOUISIANA & ARKANSAS has ordered 25 Hart convertible dump cars from the American Car & Foundry Company.

THE ERIE is having general repairs made to 300 50-ton all-steel gondola cars, at the shops of the Greenville Steel Car Company, Greenville, Pa.

Passenger Cars

THE ANN ARBOR has revived its inquiry for 2 combination smoking and mail cars and 4 passenger coaches.

THE NORTHERN PACIFIC is inquiring for 22 coaches, 12 dining cars, 12 70-ft. baggage cars, 5 combination mail and express cars and 11 combination baggage and express cars.

Iron and Steel

THE ATLANTIC COAST LINE is inquiring for 3,000 tons of rails.

THE MISSOURI PACIFIC has ordered 150 tons of plate girder spans from the American Bridge Company.

Miscellaneous

THE ATCHISON, TOPEKA & SANTA FE is inquiring for 1,000 rolled steel car wheels, 36 in. in diameter.

Trade Publications

MACHINE TOOLS.—George Swift & Sons, Halifax, England, have issued a general catalogue of machine tools, illustrating and describing the line of radial drills, lathes, slotters, shapers and planers which are included in the regular line manufactured by this company.

LOCOMOTIVE CRANES.—A catalogue of detailed parts of Brown-hoist locomotive cranes has recently been issued by the Brown Hoisting Machinery Company, Cleveland, Ohio. All the parts are shown in photographs in which each detail is clearly numbered to facilitate identification for ordering. The book also contains illustrated directions for erecting and operating these locomotive cranes.

Supply Trade News

The general offices of **The Watson Engineering Company** have been changed from 1101 Hippodrome building, to 4614 Prospect avenue, Cleveland, Ohio.

S. D. Inman, who has been associated with the Conveyors Corporation of America, Chicago, has been placed in charge of the engineering and design of its American trolley carrier monorail conveying equipment.

Frank P. McCaughey, a member of the firm of **McCaughey Brothers**, railroad contractors, died suddenly at his home in Chicago on February 4. Mr. McCaughey entered the railroad contracting field with his two brothers John J. and Patrick E., in 1882.

Max Grant, whose appointment as manager of technical railway sales of the **Glidden Company**, Cleveland, Ohio, was announced in the *Railway Age* of February 18, was born in Berlin, Germany, in 1876. After serving for three years in the paint business in Germany he came to America in 1896, and went to the Devoe-Raynolds Company, serving first at Chicago and then at New York. About five years later he was appointed superintendent and later became manager of the Canton Paint & Varnish Company, Canton, Ohio. In 1910, he was appointed manager of the railroad paint department of the Wrinkle Paint Manufacturing Company, Columbus, Ohio, and since 1915, was manager of the railway paint department of the Tropical Paint & Oil Company, Cleveland, until his recent appointment as manager of technical railway sales of the Glidden Company with headquarters at Cleveland.



M. Grant

Robert P. Sanborn has been appointed manager of the traction department of the **Edison Storage Battery Company**, Orange, N. J. He previously served for several years in the power and mining department of the General Electrical Company, Erie works, Erie, Pa.

The **Federal Engineering Company** has just been organized to specialize in railway plumbing, heating and power plant work. The headquarters of the new firm are at 3240 S. Michigan Boulevard, Chicago, and the company will maintain a branch office at Kansas City, Mo.

The **Commonwealth Steel Company**, St. Louis, Mo., has recently established an employee's benefit association, which provides insurance against sickness, accident or death for the employees. The company has offered to each member of its force a life insurance policy, varying in amounts from \$500 to \$2,000, depending on the length of service.

Harry A. Pastre of the **Elliott Company**, Jeannette, Pa., has been appointed manager of a special railroad department. Mr. Pastre for some time has had charge of the company's relations with the railroads and the development of products specially designed for railroad work. The Elliott Company controls the Lagonda Manufacturing Company of Springfield, Ohio, and the Liberty Manufacturing Company of Pittsburgh, both makers of arch tube cleaners.

The **Hazard Manufacturing Company**, Wilkes-Barre, Pa., manufacturers of wire rope and electrical wires and cables, on February 1 opened a new sales office and warehouse at 1701-1703 First avenue, Birmingham, Ala., in charge of **R. J. Bravand**, district manager. Mr. Bravand has been with the Hazard Manufacturing Company for 22 years.

N. C. Hoyles, C. E., has been appointed manager of the Cincinnati, Ohio, branch of the **Pittsburgh Testing Laboratory**, Pittsburgh, Pa. From 1909 to 1914, Mr. Hoyles was manager of the Birmingham, Ala., branch of this company. In 1914, he joined the Canadian military forces, went overseas with the Canadian engineers, and at the close of the war was mustered out with the rank of Lieutenant-Colonel. For the past year, he has been assistant manager of the Pittsburgh Testing Laboratory's New York office.

A bulletin issued by the **Bureau of Labor Statistics** of the United States Department of Labor on employment in selected industries in January, 1921, summarizes reports from 46 car building and repairing establishments which in January, 1921, had on their payrolls 44,613 employees, or 5½ per cent less than for January, 1920. The amount of the payroll in January, 1921, however, was \$3,125,082, or 9.6 per cent greater than that for January, 1920. A similar comparison for January, 1921, and December, 1920, is given for 45 establishments, which shows a decrease of 12.4 per cent in the number of employees on the payroll and a decrease of 20.2 per cent in the amount of the payroll. The bulletin states that the industry reports that in order to reduce expenses and on account of the general business conditions the number of employees was reduced. The per capita earnings for the period in January were 8.9 per cent lower than for the December payroll period.

Obituary

Charles B. Schoenmehl

Charles B. Schoenmehl, president and treasurer of the **Waterbury Battery Company**, Waterbury, Conn., who died on February 14, at his home in Waterbury, as was noted in the *Railway Age* of February 18, was born in New York City in November, 1858. At the age of 15 he entered the employ of the **Benedict & Burnham Company** and afterward went to the **Waterbury Brass Company** in the tube rolling department. During his employment with the latter company he first took up the study of electro-chemistry.

He commenced experimenting with electric batteries in the early eighties; his first attempt to market a battery was about 1884, while in the employ of the **Waterbury Brass Company**, when he made and sold to physicians in and about Waterbury batteries for use with medical coils. These batteries were made by him at night after his day's work in the brass company. In 1886, he developed a new type of open circuit cells, and about this time he began taking out patents covering batteries in general. The first type of battery marketed under a trade name was **Victor cell**.

In 1896, the **Excelsior cell** was placed on the market, this was of the cylindrical type and was based upon patents which were kept more or less active by additional combination and improvement patents. Up to 1896, he did all the work of manufacturing and selling his battery product himself, still producing at night such batteries as were sold, and



C. B. Schoenmehl

retaining his employment in the Waterbury Brass Company.

The Waterbury Battery Company was organized in 1898 with a few hundred dollars Mr. Schoenmehl had borrowed to start operations. Subsequently he secured additional finances from a friend but this was all repaid later from the profits of the company's business. The company started operation with one employee, and its manufacturing plant consisted of a small building 20 ft. by 30 ft.

The first product of the company was the Excelsior battery. In 1904, a new compressed cylinder type of copper oxide cell was presented to the trade under the trade name of Schoenmehl's primary battery. This type, in modified form, is still being sold in large quantities, and the present Unit cylinder type of cell now being featured by the company is the further development of this original cylinder type. In 1906, the company placed upon the market a plate type of battery. This type, with certain modifications, also a high internal resistance or track circuit type of primary battery produced in 1912, are still being made in large quantities.

During 1912, Mr. Schoenmehl put out his multiple plate type element and the same year he acquired the business and plant of the Gordon Primary Battery Company. In the acquisition of this business, he obtained all the patents covering the Gordon battery to which he subsequently added combination and improvement patents.

Mr. Schoenmehl was a prolific inventor. Since the organization of The Waterbury Battery Company he has invented and patented in the United States and Canada a great many improvements in primary batteries as well as other devices including patents covering the electro-deposition of metals, and he originated and devised the method of electro-deposition of copper now in use in some of the great mining centers of the West. Altogether Mr. Schoenmehl has taken out upward of 60 patents in the United States.

Arthur H. Johnson

Arthur H. Johnson, for many years signal and telegraph superintendent of the London & South Western, and formerly well known in America, died in England on January 23. He had retired from active service in 1918 because of failing health. He was the eldest son of Henry Johnson, also prominent in former years in the signaling field in this country, and brother of Sidney G. Johnson. His first railroad service was on the Lancashire & Yorkshire. He lived in this country about twelve years and was connected with the Union Switch & Signal Company, the Johnson Railroad Signal Company and later with the Standard Signal Company; and he designed the Johnson interlocking machine. For about two years he was signal engineer of the Erie Railroad.

When he returned to England some 23 years ago he joined W. R. Sykes, the inventor of controlled manual signaling apparatus. He married at that time Mr. Sykes' daughter. A couple of years later he went to New Zealand, for the government railroads, as signal and telegraph superintendent, spending several years there, establishing for the New Zealand Railways a signal and telegraph department. All this was before he entered the service of the London & South Western, which was about 1903.

He was the author of a valuable sketch of the history of railroad signaling which was published in the *Railroad Gazette* in August, September and October, 1894.

Mr. Johnson is survived by his wife, two sons and two daughters. His eldest son, Clive, now 21 years old, served with the army in France, during the latter part of the war, as lieutenant in the British Regulars.

RAILROAD OFFICERS should be thoughtful of everyone, think of others' requirements and consider what other people will think of them. They should give their subordinates as much consideration as they expect their subordinates to give them. No one can afford to talk or write in a domineering or angry way. During the past few years there has been a noticeable lack of thoughtfulness, not only for the railroad, but also for the public. Conditions have been so free and easy that about all any railroad man thought about was how much wages he could get.—E. E. Nash.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company contemplates the construction of a bridge across the Iowa river about 20 miles west of Fort Madison, Ia., to cost approximately \$250,000.

ESQUIMALT & NANAIMO.—This company has awarded a contract to the Foundation Company of British Columbia for the construction of a line from Port Alberni, B. C., to Great Central Lake, a distance of 10½ miles. The work will include the erection of one steel lattice girder span with a 150 ft. deck on concrete piers and four frame trestles and will cost approximately \$480,000.

ILLINOIS CENTRAL.—This company contemplates extensions to its roundhouses at Dubuque, Ia., Waterloo, Ia., and Freeport, Ill., to handle new and heavier equipment which is now being delivered.

ILLINOIS CENTRAL.—This company contemplates the construction of a viaduct 700 ft. long and 36 ft. high, carrying McLemore avenue over South Yards, Memphis, Tenn.

LIVE OAK, PERRY & GULF.—This company has begun the reconstruction of its blacksmith and car shops at Live Oak, Fla. The buildings will be of frame construction, 50 ft. by 60 ft. and 60 ft. by 150 ft., respectively. The following new machinery will be purchased: a plane, a shaper, a drill press and a wheel press.

LOUISVILLE & NASHVILLE.—This company has awarded a contract to H. W. Hancock, Louisville, Ky., for the construction of a roundhouse and shops at Loyall, Ky., at an approximate cost of \$150,000.

MISSOURI, KANSAS & TEXAS.—This company has awarded a contract to T. H. Johnson, Sedalia, Mo., for the construction of a one-story brick passenger station at North Jefferson, Mo. This building will replace a frame structure destroyed by fire and will be 21 ft. by 60 ft. and will cost approximately \$13,000.

MT. STRETER.—This company has awarded a contract to the James V. Stryker Construction Company, Denver, Col., for the construction of a line from Meeker, Col., through Mt. Streter and Craig to Wamsutter, Wyo., a distance of 150 miles. The project will cost approximately \$10,000,000 and will require three years for completion.

SOUTHERN PACIFIC.—This company which was noted in the *Railway Age* of February 11 (page 391) as having been ordered by the California Railroad Commission to build a new station at Oakland, Cal., is asking a rehearing of the case, stating that an Oakland syndicate will build a six-story office building including station facilities on the station site under a 50-year lease.

WESTERN PACIFIC.—On the application of this company for a certificate of public convenience and necessity authorizing the construction of a branch line 175 miles in length in Butte County, Cal., the Interstate Commerce Commission holds that the line in question, which is to be built for the sole purpose of serving a tract of timber, will be a spur track within the meaning of paragraph 22, section 1, of the interstate commerce act and a certificate is not required.

THE GOVERNMENT owes the railroads \$350,000,000, but won't pay. Yet some people like the government's business methods so much that they would have the government own and operate the railroads and almost everything else.—*Forbes Magazine*.

MAKING FRIENDS.—We want to make our relations to the public uniformly courteous and efficient. Doubtless there are times when it would be easier to be curt than courteous. But the easier course is by no means always the better. Difficulties merely make a given task more worthy of accomplishment. Good service depends not only on what you do, but upon the way you do it. That is true of all work. Whatever satisfies or pleases a patron is good service. Whatever dissatisfies or displeases a patron is, in most cases, bad service. Has the thing been done right? This is always the final test.—E. E. Nash, general manager, Minneapolis & St. Louis.

Railway Financial News

ANN ARBOR.—*Asks Authority to Repledge Bonds.*—This company has applied to the Interstate Commerce Commission for authority to repledge from time to time \$700,000 of its improvement and extension mortgage bonds.

BALTIMORE & OHIO.—*Asks Authority for Bond Issue.*—This company has applied to the Interstate Commerce Commission for authority to nominally issue \$2,782,000 of its refunding and general mortgage bonds and to issue bonds of certain subsidiaries to be pledged as further security under the refunding and general mortgage and to use the bonds as collateral security.

CANADIAN PACIFIC.—*Leases Railway.*—Application will be made to the Board of Railway Commissioners for Canada, on March 8, for the approval of a 99-year lease from July 1, 1920, of the Nakusp & Slocan Railway.

CHICAGO, MILWAUKEE & ST. PAUL.—*New Director.*—Burton Hanson has been elected a director.

CHICAGO & NORTH WESTERN.—*Asks Authority to Issue Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue and pledge \$15,000,000 of general mortgage 5 per cent gold bonds under its mortgage of 1987 for the purpose of exchanging, retiring, refunding or paying certain existing bonds reserved for in the mortgage of 1987, maturing April 1 and May 1, 1921. The company also asks authority to execute a trust indenture and to pledge thereunder the \$15,000,000 and also \$3,000,000 of general mortgage gold bonds now in its treasury and for authority to issue and sell \$15,000,000 of 6½ per cent secured gold bonds dated March 1, 1921, and maturing March 1, 1936, for the purpose of facilitating the retirement and refunding of the existing bonds. The latter bonds have been sold to Kuhn, Loeb & Company, subject to the approval of the commission, on a basis of 95.40.

CHICAGO & WESTERN INDIANA.—*Asks Authority to Issue Bonds.*—Application has been made to the Interstate Commerce Commission for authority to issue \$130,000 of its consolidated mortgage 4 per cent bonds, dated September 1, 1920, to retire and refund a like amount of general mortgage 6 per cent bonds.

CLEVELAND UNION TERMINALS COMPANY.—*New York Central Asks Authority to Purchase Stock.*—The New York Central, the Cleveland, Cincinnati, Chicago & St. Louis, and the New York, Chicago & St. Louis have applied to the Interstate Commerce Commission for authority to purchase the stock of this company for \$10,000 and an order approving the grant by it to the New York Central and other companies of the right to use for 999 years the passenger station and approaches proposed to be constructed by the company in Cleveland, on the southwest corner of the Public Square, in accordance with a city ordinance. It is stated that the company has prepared plans for the station which, with land, approaches, etc., is estimated to cost about \$60,000,000. The railroads propose to enter into an agreement with the terminals company providing for the acquisition of the necessary lands and for the construction of the terminal by the sale of first mortgage gold bonds of the terminals company to be issued in series, each series maturing in 50 years and to be guaranteed by the separate railroads. The bonds are to be convertible into cumulative, preferred stock and the first series proposed is for \$6,000,000 but authority for the bond issue has not yet been requested.

COLLINS & LUDOWICI.—*Sale.*—The sale of this road, about 46 miles in length (formerly part of the Georgia Coast & Piedmont, abandoned in 1919), at public auction at Reidsville, Ga., on February 1, for \$70,000, has been confirmed by Judge Shepherd of the Superior Court of Tattall County, Georgia. Half of the road was bought by L. Metzger & Co., of Mobile, Ala., and half by W. A. Dubberty and John D. Bradley, of Glenville, Ga. Efforts, it is said, are being made to save the road from being junked.

DAYTON, TOLEDO & CHICAGO.—*Sale.*—This road has been sold by John Ringling to W. H. Ogborn, of Chicago, and a group of

associates. Mr. Ogborn will become president of the road, which runs from Dayton, Ohio, to Delphos, 95 miles.

DELAWARE, LACKAWANNA & WESTERN.—*Net Operating Income Declines.*—The statement of the 1920 operations submitted to the stockholders at their annual meeting on February 23 showed a net operating income of \$6,104,886, a decrease of \$5,842,478 from the preceding year's net. The chief items in the company's financial report are given in the following table:

	1920	1919
Revenues:		
Transportation of coal.....	\$20,228,484	\$19,055,523
Transportation of merchandise.....	40,132,599	32,839,878
Transportation of passengers.....	13,868,517	12,380,787
Total revenues.....	83,340,062	71,824,047
Expenses:		
Maintenance of way and structures.....	10,178,887	7,682,365
Maintenance of equipment.....	19,508,625	15,132,815
Transportation expenses.....	40,165,381	30,661,441
Net railway operating income.....	6,104,886	11,947,364

GULF, TEXAS & WESTERN.—*Receivership.*—It is reported that W. F. Knox, secretary and treasurer, has been appointed receiver. The road operates between Jacksboro, Tex., and Salesville, 130 miles.

INDIANA HARBOR BELT.—*Authorized to Issue Note.*—The Interstate Commerce Commission has authorized this company to issue a promissory note for \$23,020 at 6 per cent in renewal of a note for the payment of land at Hammond, Ind.

INTERNATIONAL & GREAT NORTHERN.—*Loan Approved.*—The Interstate Commerce Commission has approved a loan of \$260,750 to aid this company in providing itself with new equipment and additions and betterments to way and structures at a total estimated cost of \$521,500. The company itself is required to finance an equal amount to meet the loan of the government.

KNOXVILLE, SEVIERVILLE & EASTERN.—*Receivership.*—Col. S. E. Cleage has been appointed receiver on the petition of the Mechanics Bank & Trust Company, as trustees of the bondholders.

LOUISVILLE & NASHVILLE.—*Asks Authority to Pledge Stock and Bonds.*—This company has applied to the Interstate Commerce Commission for authority to pledge from time to time \$22,164,000 of bonds and \$4,126,025 of stock in its treasury as collateral for proposed loans on short term notes, including a proposed loan of \$4,500,000 from J. P. Morgan & Co. evidenced by short term notes.

MINNEAPOLIS & ST. LOUIS.—*Asks Authority to Issue Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue \$2,096,000 of its refunding and extension mortgage 5 per cent bonds, of which \$1,382,000 is to pay at maturity an equal amount of first mortgage 6 per cent bonds maturing April 1 and the balance is to be issued against installment payments on various equipment obligations.

MISSOURI-ILLINOIS RAILWAY.—*Illinois Southern taken over.*—This road has been organized under the laws of Missouri to take over and operate the property formerly owned by the Illinois Southern Railway, has secured a franchise to do business in Illinois, and has consummated the purchase of the Illinois Southern property. The Missouri-Illinois, which is now in possession of the property, plans to resume operation of the road at the earliest possible time. The company has established its general offices at Bonne Terre, Mo.

MISSOURI PACIFIC.—*Authorized to Issue Equipment Trusts.*—This company has been given authority by the Interstate Commerce Commission for the issuance of \$1,836,000 of equipment trust certificates at 6½ per cent for the acquisition of 25 Mikado locomotives, 15 switching locomotives and 10 passenger locomotives at a total estimated cost of \$3,076,000.

NEW YORK CENTRAL.—*Asks Authority to Purchase Stock.*—See Cleveland Union Terminals Company.

NORTHERN PACIFIC.—*New Director.*—Stephen Birch has been elected a director.

NORFOLK SOUTHERN.—*Final Payment of Guaranty.*—The Treasury Department announces that it has paid to this company \$1,311,700.63 on a certificate of the Interstate Commerce Commission for final payment of the guaranty under section 209 of the transportation act, for the six months' period following the termination of federal control.

READING.—Preferred Protective Committee Approves Plan.—The committee for the protection of the holders of first and second preferred stock, through its chairman, Adrian Iselin, has issued a notice to stockholders saying the dissolution plan filed with the court meets its approval.

"It provides," says the notice, "for equitable and just treatment of the preferred stockholders, as it deals with the preferred stock on the same basis as the common issue. Nevertheless, it has been considered desirable that the committee should be at the hearing in support of the plan before the court, in order to be prepared to oppose any modifications that may be adverse to the interests of the preferred stockholders."

The hearing on it is set for March 1.

The Reading dissolution plan was abstracted in last week's issue of the *Railway Age*, page 425.

SOUTHEASTERN EXPRESS COMPANY.—Capital Stock Oversubscribed.—The capital stock of this company, consisting of 10,000 shares each of \$100 par value, was offered to the public on February 17, and was oversubscribed. The Southeastern Express Company was incorporated in Alabama on October 6, 1920. Fairfax Harrison, president of the Southern Railway, in an announcement dated February 18, said:

"The books for subscription to the million dollars of capital stock offered to the people of the South by the Southeastern Express Company were opened yesterday morning and were closed at night. The stock was allotted proportionately to all the 14 states served by the lines of Southern Railway System and the Mobile & Ohio Railroad. The reports received this morning show over-subscription in every state.

"The stock list will be made up of the names of at least 2,500 widely distributed Southern business men holding on the average about four shares apiece. No single subscription in excess of 100 shares was received and no officer or employee of the railroad was permitted to participate, although many of them, especially the employees, offered to subscribe.

"This result of the test of practical business democracy and individualism in the South at a time of business depression is of course gratifying to us, but has perhaps a larger significance. Certainly it fully justifies our confidence that the people of the South desire competition in express service and are willing to back their desire with their money and their support in other respects.

"The Southeastern Express Company will now proceed under the able management of its president, John B. Hockaday, to purchase its necessary equipment and will begin service at the earliest practicable moment, of which announcement will be made."

WESTERN MARYLAND.—Equipment Notes Offered.—The National City Company is offering \$1,500,000 7 per cent equipment gold notes, preferred series. The prices yield from 6.75 per cent to 7 per cent, according to maturity. The certificates are dated March 1, 1921. There is due \$100,000 annually each March 1, 1922 to 1936, inclusive.

Dividends Declared

Cincinnati, New Orleans & Texas Pacific—Preferred, 1½ per cent, quarterly, payable March 1 to holders of record February 19.

Erie & Pittsburgh.—\$.87½, quarterly, payable March 10 to holders of record February 28.

North Pennsylvania.—\$1.00, quarterly, payable February 25 to holders of record February 10-February 20.

GEORGE A. GILLINGHAM, a ticket seller in the Pennsylvania station, New York City, has received a prize of \$50 as the most courteous ticket seller in the city, this sum being given by the *Daily News*, a reporter of which paper has been going about the city to try his skill in exhausting the patience of ticket sellers, conductors, clerks in stores and other persons. Recently he gave the prize—one of which was awarded every day for a considerable time—to a conductor of the Hudson & Manhattan. Mr. Gillingham, whose portrait is printed in a circular issued by the railroad company, appears to have been prepared for all contingencies. The circular says:

The reporter posed as an uninformed and somewhat exacting, but not overly quick-witted traveler, and made a number of minute inquiries regarding rates and time-tables between New York and Kansas City. He also inquired innocently why lower berths cost more than upper ones. This information having been furnished, with the greatest cheerfulness, he requested the ticket seller to put it down in writing, which required some trouble and considerable time. Departing with the memorandum he returned, about an hour later, and shortly explained he had lost it and asked to have the same information again furnished in full and once more in writing. Mr. Gillingham, although busy, made no objection and furnished another written memorandum. The reporter then put Mr. Gillingham's patience to a further test by engaging him in a discussion over the question of accepting a check in payment for transportation from New York to Kansas City. Gillingham, when informed that he was the winner in the competition, made no comment, except to say—"By being polite I can serve twice as many passengers."

Railway Officers

Executive

W. H. Ogborn, whose election as president and general manager of the Dayton, Toledo & Chicago, with headquarters at Dayton, Ohio, was announced in the *Railway Age* of February 18 (page 440), was born at Lafayette, Ind., on September 27, 1873. He entered railway service in March, 1887, with the Lake Erie & Western, as a messenger boy in the offices of the general superintendent at Lafayette. During the next four years he served successively as messenger, yard clerk, operator and agent. In 1891, he was employed by the Wabash, on which road he served as a clerk, agent and yardmaster at various points in Indiana until 1893, when he entered the service of the Atchison, Topeka & Santa Fe in the freight department at Chicago. A year later he was employed by the Chicago, Rock Island & Pacific in the accounting department at Chicago. In 1898, he returned to the Wabash as a contracting agent with headquarters at Chicago. In 1900, Mr. Ogborn was appointed traffic manager of the Barry Steamship Company, a position which he held until 1903, when he returned to railroad service, as chief clerk and accountant to the manager of the Lehigh & Wabash Dispatch Fast Freight Line, Chicago. From 1905 to 1915, he served as general freight and passenger agent of the Illinois Southern, with headquarters first at Chicago and later at St. Louis, Mo. In the latter year he was made general manager of the St. Joseph Valley Railway, with headquarters at Elkhart, Ind. Mr. Ogborn was appointed general manager of the Dayton, Toledo & Chicago on December 15, 1920, and was serving in this position on February 7, 1921, when, with his associates, he negotiated the purchase of the railroad from the Ringling interests.

A. B. Calder, assistant general passenger agent of the Canadian Pacific with headquarters at Montreal, has been promoted to the executive staff of the company. Mr. Calder was born at London, Ontario, in 1868 and was educated at Manitoba College. He started his railway career in construction work but shortly thereafter, in 1887, entered the service of the passenger traffic department of the Canadian Pacific. For a year he was city ticket agent at Winnipeg, Man., after which he served the company at Tacoma, Wash., San Francisco, Calif., Seattle, Wash., and Chicago. At the two latter cities he was general agent. At the outbreak of the war Mr. Calder was assigned by the company to work with the British and Canadian Recruiting Mission. He returned to the company at the close of the war as assistant general passenger agent and in that capacity in 1919 conducted the tour through Canada of the Prince of Wales and his party.



A. B. Calder

Financial, Legal and Accounting

Herbert N. Paist, whose election as treasurer of the Minneapolis, St. Paul & Sault Ste. Marie, with headquarters at Minneapolis, Minn., was announced in the *Railway Age* of January 21 (page 263), was born on October 15, 1859, at St. Paul, Minn., and entered railway service in May, 1882, as a night operator

on the Chicago, St. Paul, Minneapolis & Omaha, at Brewster, Minn. During the succeeding year, Mr. Paist served as day operator and agent at Brewster and on May 1, 1883, he was transferred to Heron Lake, Minn., where he was employed until 1885. In that year he was transferred to Lake Crystal, Minn., and 6 years later was appointed cashier, with headquarters at Sioux City, Ia., a position which he held until 1894. On the latter date he entered the service of the Minneapolis, St. Paul & Sault Ste. Marie, serving as an agent at various points until October, 1896. At this time he was transferred to the office of the auditor, and after two years' service there, he was promoted to traveling auditor. At the time of his election as treasurer, Mr. Paist was serving as paymaster, and assistant treasurer, positions which he had held continuously since 1900.

Traffic

H. C. Montgomery has been appointed general agent on the Chicago, Indianapolis & Louisville, with headquarters at Birmingham, Ala., effective February 20, succeeding Henry Hiden, deceased.

F. E. Lewis, whose appointment as assistant general freight agent on the New York Central, with headquarters at Detroit, Mich., was announced in the *Railway Age* of January 21 (page 263), was born on March 5, 1884, at Fayette, Ohio. He entered railway service in June, 1899, as a student and extra station man on the Lake Shore & Michigan Southern at Deerfield, Mich. A year later he was transferred to Morenci, Mich., as station man and extra agent. In May, 1902, he was made agent and operator and served in this capacity at various points until 1910, when he was made soliciting freight agent and traveling freight agent, with headquarters at Toledo, Ohio. In 1911, he was appointed commercial agent with headquarters at Detroit, Mich., and after 6 years' service in this position, he was promoted to division freight agent. At the time of his recent appointment, Mr. Lewis was serving as division freight agent, with headquarters at Hillsdale, Mich., where he had been transferred in 1918.



F. E. Lewis

L. D. Gruber, traveling freight and passenger agent on the Denver & Rio Grande, has been promoted to general agent with headquarters at St. Louis, Mo., succeeding **J. L. Hohl**, who has been transferred to Chicago. Mr. Hohl succeeds **J. E. Courtney**, who has been transferred to New York, succeeding **W. C. Connor**, who has resigned. These promotions and changes were effective February 15.

Operating

J. B. Hersh, general yardmaster on the Baltimore & Ohio, with headquarters at Garrett, Ind., has been promoted to trainmaster, with headquarters at Willard, Ohio, and jurisdiction over the Willard terminal.

J. F. Coleman, trainmaster on the Northern Pacific, with headquarters at Tacoma, Washington, has been appointed chief dispatcher, with the same headquarters, effective February 15, succeeding **J. F. Thomas**, who has been transferred.

J. B. MacGregor, supervisor of telegraph on the Grand Trunk, Western Lines, with headquarters at Battle Creek,

Mich., has been promoted to assistant superintendent of telegraph, with the same headquarters, effective February 15.

A. O. Veitch, whose promotion to superintendent of the Olympic division of the Chicago, Milwaukee & St. Paul, with headquarters at Port Angeles, Wash., was announced in the *Railway Age* of January 7 (page 173), was born at Cambridge, Ohio, and spent the early years of his railway service with the Baltimore & Ohio. After serving successively with this road as operator, dispatcher, chief dispatcher and assistant trainmaster, Mr. Veitch entered the service of the Chicago, Milwaukee & St. Paul on March 1, 1912, as a train dispatcher at Miles City, Mont. He was shortly promoted to chief inspector and has served in that capacity at various points on the line. At the time of his recent promotion, Mr. Veitch was serving as trainmaster on the Idaho division, with headquarters at Spokane, Wash.

Mechanical

D. G. McCormick has been appointed mechanical engineer of the Mobile & Ohio with headquarters at St. Louis, Mo.

Obituary

M. H. Smith, president of the Louisville & Nashville, died at his home in Louisville, Ky., on February 22 at the age of 85. Mr. Smith had been ill for several months.

Francis C. Donald, formerly commissioner of the Central Passenger Association, with headquarters at Chicago, whose death on February 14, at his home in Hubbard Woods, Ill., was announced in the *Railway Age* of February 18 (page 440), was born at Canfield, Ohio, and entered railway service in March, 1883, as northwestern passenger and freight agent on the Chicago & Atlantic (now a part of the Erie), with headquarters at St. Paul, Minn. In March, 1886, he was transferred to Chicago as city passenger and ticket agent and a year later was promoted to general passenger and ticket agent. When the Chicago & Atlantic was taken over by the Erie, Mr. Donald was appointed general passenger agent of the Chicago & Erie.



F. C. Donald

In October, 1890, he left railroad service to become vice-chairman of the Central Traffic Association, with jurisdiction over the passenger business of the organization. He was made commissioner of the passenger department of the Association in December, 1892, and served in this position until February, 1896, when he was appointed commissioner of the Central Passenger Committee. Mr. Donald had served as commissioner of the Central Passenger Association for over 23 years, having been appointed to the position in February, 1897. In addition to his other duties he had been chairman of the Chicago Eastbound Passenger Committee since October, 1890; Commissioner of the Mileage Exchange Order Bureau of the Central Passenger Association since September, 1897; and chairman-treasurer of the Railway Ticket Protective Bureau since February 1, 1903. During the period of federal control the work of the Central Passenger Association was taken over by the Central District Passenger Committee and Mr. Donald was made secretary of this organization. When the roads were returned to private management, he returned to the reorganized Central Passenger Association and was serving in an advisory capacity at the time of his death.

EDITORIAL

Railway Age

EDITORIAL

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The number of tank car shipments of sulphuric acid of varying degrees of concentration has increased greatly in the last few years. This is a commodity of

A Hazardous Commodity

a dangerous character and accidents which would be negligible under ordinary conditions may be serious if acid is involved. The majority of railroad

employees probably do not realize this; in fact serious injuries have resulted from men stepping into acid that has leaked from tank cars. All who have jurisdiction over, or are engaged in the movement of cars containing this product, should at all times exercise particular care and use all possible precautions to protect both the car and the lading. Switching crews are vitally interested in proper handling as a measure of self-protection. Yardmasters and others, having control of hump yards, should appreciate the necessity of strict adherence to the rule requiring car droppers to ride the cars to a standstill. Each car of acid carries the Bureau of Explosives' danger signal in the form of the regulation white label on both sides and ends of the tank, but familiarity breeds contempt for potential hazards and the warning is not infrequently disregarded. The significance of the placard should be recognized by all concerned in the interest of the operating road, as well as the tank car owner.

Progress in engineering design is always most rapid during periods of intensive construction. Conversely, the least

Little Progress in Concrete Design

development occurs during periods of retrenchment. The truth of this principle with regard to the design of concrete structures during the last

six years is exemplified most eloquently in a bulletin of the International Railway Congress on the subject of concrete work, which was written in 1914 by the late C. H. Carlidge, but not published until December, 1920. The dearth of progress since this paper was written is an effective measure of the marked cessation of railway expansion. Railway concrete structures, barring the typical reinforced concrete, multiple-store building, are in a class by themselves. Even highway bridges, which are now being built in great numbers with the impetus to road construction, have little in common with railway structures. Consequently the progress in concrete work as regards design in lines outside the railroads has had little influence on railway practice. It is for this reason that there have been few recent developments to compare with those that took place during the period which saw the completion of the Tunkhannock viaduct, the building of the high abutments for the St. Paul trestles in the Bitter Roots, the inception of the reinforced concrete trestle design on the Burlington, the later years of track elevation at Chicago, and similar work on the Kansas City Terminal, unit construction roundhouses on the Santa Fe and butterfly train sheds at Denver and elsewhere. Of course, it is not presumed that all progress has ceased, but such developments as the concrete snow sheds of the Union Pacific and the use of flat slabs for grade separation work on the Lackawanna stand out as exceptions that prove the rule. Construction practice embracing such matters as proportioning, mixing, concreting in cold weather and surface

finishes are common to all classes of structures whether built by railroads, highway authorities or private individuals. Consequently, the railroads have shared in the progress along such lines even though the amount of work done by the railroads themselves has been very meagre. As regards design, on the other hand, further progress awaits the restoration of railway development on a scale commensurate with the needs of the country.

Figures, especially when expressed in millions, have little meaning unless they can be visualized by comparison. To

Who Is Stopping This Leak?

state that loss and damage on American railroads for the year 1920 amounted to \$280,000,000 may sound impressive. However, a better idea of the magnitude of this waste can be gained from the fact that last year it cost the railroads nearly as much as did taxes and almost half as much as locomotive fuel. The waste of fuel has been recognized for years as a serious cause of loss and the mechanical associations have given attention to reducing it to a minimum. Loss and damage has reached its present proportion only since the war. Some roads have effective organizations for dealing with it, but the majority of roads not only are not organized to combat the waste, but from all indications hardly realize that the problem exists. Yet the field for saving in this direction is probably as great as the possible saving in fuel. If fuel consumption were brought down to the irreducible minimum, probably not more than 25 per cent could be saved, in the present state of engineering development. On the other hand, probably 50 per cent of loss and damage is preventable, which would make the possible saving by correct practice approximately the same. At any rate, loss and damage represents one of the big leaks that the railroads should constantly be alert to stop.

A clam shell which is being propelled along a railroad track through the instrumentality of its own spontaneous

Regulation of Clam Shell Transportation

internally-developed kinetic energy ought to be treated the same as a common gravel train; or, at least, that is the opinion of a grievance committee which recently appealed to the Railroad Labor Board at Chicago to adopt that ruling, as noticed in the *Railway Age* of February 18, page 413. To the weary newspaper reader who is hoping to see some rift in the clouds which now envelop the general railroad situation, the referring of such a petty detail to a company of men burdened with grave matters of nation-wide interest must seem absurd to the point of disgust. One of the characteristics, however, of these modern days of collective bargaining is the multitude of smallest details which the central powers—both of capital and of labor—are called upon to deal with and the incident of the clam shell may perhaps serve a useful purpose in showing us which way we are drifting. How long before our administrative and regulating machinery will come to a dead stop wholly because of internal friction?

The Interstate Commerce Commission—which costs us a thousand dollars a day—has to give the same sober attention to an overcharge on a carload of scrap iron from Texarkana to Poplar Bluff as to a general rate problem affecting the current freight earnings of 100,000 miles of railroad. The New York Public Service Commission has just issued and circulated a formal report rebuking a railroad company for being stingy with coal in a small country waiting room. In Canada, the railway commission recently formulated and published a ten-page report to please a grievance committee which, being short of grist for its mill, had complained about the irregular application of Rule 93 of the Standard Code. The commissioners evidently gave up the attempt to comprehend the merits of this much-discussed rule and decided the case along the line of least resistance—an expenditure of several hundred dollars with no discernible benefit to the public.

As the time approaches when the railways of Great Britain are to be returned to their owners it becomes increasingly

Difficulties of the British Railways

apparent that the politicians are not disposed to provide the legislation needed to insure either an adequate return on the invested capital or to free the carriers from increased costs and vexatious restrictions which have arisen under government control. Most of the freight traffic of the British railways is hauled a relatively short distance. Competition by motor trucks is, consequently, an ever-present danger which makes rate increases beyond a certain point highly inadvisable. The adoption of the eight-hour day, the granting of greatly increased wage rates and the high prices which must be paid for supplies are a heritage from government control which the railways must accept. The chairman of the board of directors of one of the companies proposes that the government return the properties without restricting decreases in wages and without assuming control over rates. In this manner, he says, the companies can arrange to charge the rates which will bring the greatest returns and each road will be allowed to negotiate with its own employees to arrive at a wage scale which the company can afford to pay. Others propose, as the only means by which adequate returns on the invested capital can be assured and, consequently, the quality of service maintained, that the government continue paying the present guaranteed return until such time as the costs which have increased some 300 per cent under government control can be decreased sufficiently to allow the railways to pay adequate returns to investors out of regular earnings. It is to be hoped that the British government will soon realize the importance of securing for the railways the financial position which they must have if they are to keep pace with the growing needs of the country.

The exports of locomotives and passenger cars in 1920 were greater than those of any previous year. The figures compiled by the Bureau of Foreign and

Railway Supply Exports in 1920

Domestic Commerce, shown in detail elsewhere in this issue, give 1,711 locomotives and 123 passenger cars as the totals for the year. The same totals in 1919 were 959 and 104, respectively, and the total value of locomotives exported during that year was considerably less than the \$53,629,847 total for 1920, but the value of passenger car exports in 1919 exceeded the 1920 total. The export totals of other railway materials during the past year, however, afford less encouragement to those who desire to see American railway supplies maintain their position in the world's markets. Only 21,676 freight cars, valued at \$37,-

192,502, were exported in 1920, as against 27,317, valued at \$57,473,824, in 1919. In addition, the exports of car wheels and axles show a decrease of more than 20 per cent from the 1919 totals, track spikes more than 30 per cent, steel rails almost 10 per cent and miscellaneous track material almost 20 per cent. This decrease can be traced in most cases to a decline in buying power in our markets abroad and to renewed foreign competition. The situation is not, it would appear, altogether hopeless. If some arrangement can be made to extend long term credits to purchasers abroad the danger of competition on the part of foreign concerns, due now largely to exchange rates which are unfavorable to this country, will be materially lessened and the buying power of the foreign markets will be to some extent restored. The extension of such long term credits is the purpose of the Foreign Trade Financing Corporation which is now being organized under the Edge law. It is to be hoped that its plans for meeting the serious problems which now confront our export trade may secure from the American people the hearty support which is necessary if they are to succeed.

A close study of car conditions will disclose a large number of difficulties in the way of effecting a permanent improvement, and it is not possible to cover

A Demoralizing Influence

them all in a brief classification. It is probable, however, that the three most pronounced difficulties are a lack of adequate facilities, considering the railroads of the United States as a whole, the continued perpetuation of weak equipment and a lack of uniformity in the distribution of the burden of car repairs. These conditions are not new, but with the growth of traffic and the increasing severity of operating conditions they have gradually become more aggravated in spite of all efforts to bring about permanent improvements. The continuance of these conditions suggests that there is something fundamentally wrong in the methods of dealing with them. One such fundamental weakness is the policy of fixing prices for labor and material for foreign car repairs only high enough to cover the actual cost plus overhead for the average railroad. Of course, an attempt to attribute all of the evils in the car situation to this policy would be futile, but it is equally futile to attempt to prove that this policy does not exert a strong influence toward their continuance. Prices set to cover the bare cost plus overhead for average conditions, necessarily do not cover these items for roads whose costs are higher than the average. These roads, therefore, have little incentive to provide facilities to take care of their full share of the burden of car maintenance, as their immediate interests may often seem to be best served by continuing to do only what is necessary to keep cars moving on their own lines. The result is that the roads with comparatively low costs or with operating conditions which demand a high standard of car maintenance for safety, are burdened with an abnormally large share of the maintenance. Such roads must often do extensive work on weak equipment at prices considerably lower than the actual cost of the same work if performed by the owning road. It seems evident that such prices exert a demoralizing influence, not only tending to perpetuate, but actually to aggravate, the evils of the car situation. Would not a scale of prices definitely established to include a profit of 10 or 15 per cent under average conditions exert a powerful influence toward the equalization of the burden of freight car maintenance? It is true that the profit of those roads whose costs are low would be considerably higher than the 10 or 15 per cent; but on the other hand, those roads whose costs are high would not be compelled to take a loss should they attempt to do their full share of the work.

Enactment of the Winslow Bill

PROBABLY IN THE FUTURE we shall look back to the signing of the Winslow Bill by President Wilson as marking the beginning of a substantial and important improvement of conditions in the railroad and railway supply industries. It will be some time before large amounts of the money authorized to be paid to the railways in installments will be received by them. The passage of the bill makes certain, however, that as soon as the Treasury Department can raise sufficient funds the railways will begin to receive part of their money. The new national administration which takes control today will naturally want to promote a revival of business as rapidly as practicable, and there is no way immediately available by which it can do this better than by speeding up payments to the railroads. Because the government owes hundreds of millions of dollars to the railroads, they owe proportionately large amounts to companies from which they have bought materials and supplies. These concerns in turn have borrowed heavily at the banks. This condition has reduced railroad purchases, seriously hampered and almost bankrupted many railway supply companies, and impaired the ability of the banks to furnish credit to concerns desiring to enlarge their operations. There can be no doubt that as the railways are enabled to pay their present current indebtedness they will begin to buy materials in larger amounts. This in turn will help the railway equipment and supply business, and whatever causes activity in any particular line of business is bound to help the general business situation.

The passage of the Winslow Bill through Congress by large majorities, and its prompt signing by President Wilson, were a strong indication not only of the public sentiment which demands fair play for the railroads, but also of the loss of influence of certain labor organizations. The leaders of these labor organizations sought to prevent passage of the bill, and they appealed to the President not to sign it. It has not been many years since the government at Washington heeded pleas from them which were hardly more unreasonable. Their activities in connection with the Winslow Bill had apparently no influence at all. The enactment of this legislation was important in itself, and even more important as an indication of public sentiment.

Farmers and the Railroad Situation

ONE OF THE MOST fundamental troubles with the business situation in the United States today is that the purchasing power of the farmers, who are the largest class of its people, has been largely destroyed. The purchasing power of the farmers has been largely destroyed by heavy reductions in the prices of practically all the things they have to sell, which have not been offset by corresponding reductions in the prices of most of the things that they buy.

The farmers produced more grain in 1920 than ever before. But their power of buying is determined by the total amount for which they can sell their products.

The aggregate value of their products measured in the prices of farm machinery, automobiles, coal, railroad transportation, building materials, is less than it has been in years. Until their purchasing power is restored they will and must buy much less of almost everything than they have bought heretofore.

With them buying so much less there is an inevitable reduction in the amount of commodities of all kinds that the merchants can sell, that the manufacturers and the mines can produce, that the railways can get to transport. This reduction in mercantile, manufacturing, mining and transportation activity inevitably results in all these industries laying off many thousands of men. The consequence is the wide-

spread unemployment that now prevails, which in itself reduces the demand for farm products and the prices of them.

There is but one remedy for this condition. This is to restore the purchasing power of the farmers. Theoretically this might be done either by increasing the prices of the things they sell or reducing the prices of the things they buy. As a practical matter it cannot be done in the former way. The decline in the prices of farm products is due to world-wide conditions, and there is no prospect of conditions so changing as to cause a substantial increase in these prices.

The purchasing power of the farmer must be restored by reductions in the prices of the things he buys. The main reason why reductions cannot be made in the prices of many of these things is the present high cost of producing them. This high cost, in turn, is mainly due to the reduced productivity and high wages of labor in many industries.

The wages of coal miners are higher than ever before. This keeps up the price of coal. Coal enters largely into the cost of manufacturing and of conducting transportation. Therefore its high cost tends to keep up the cost of manufacturing and of operating railroads. The railways, owing to artificial, rigid and iniquitous rules and working conditions, are being forced to employ an excessive number of men, and, in addition, are paying the highest wages ever known. The high price of fuel, and especially the present rules and working conditions and wages, are making the cost of railroad operation excessive. This, in turn, renders it impracticable to reduce the freight rates the farmers or any other class pay. On the present rates the railways are earning an utterly inadequate return. On a six per cent annual basis they should have earned \$408,000,000 net operating income in the last four months of 1920. They actually earned \$233,146,000. They should have earned \$87,000,000 in December; they earned only \$17,000,000.

The costs of producing the things the farmers buy should be reduced in order that the prices that the farmers must pay for them can be reduced. The cost of railroad operation especially ought to be reduced so that the freight and passenger rates the farmer must pay can be reduced.

While, however, the farmers have suffered heavy losses by reductions in their prices, and owing to these reductions in their prices they have had their purchasing power largely destroyed, organized labor throughout the country, and especially on the railroads, is opposing every effort to reduce the labor costs of the things that the farmer must buy.

The railway companies are seeking the abolition of the wasteful rules and working conditions adopted under government control. They are seeking reductions of the wages of unskilled labor, for which they compete with the farmers in every community in the country. The railroad payroll now constitutes at least 65 per cent of total railroad operating expenses. It must be reduced if there are ever to be any reductions of rates.

Organized labor meets this situation by carrying on Plumb plan propaganda among the farmers and by opposing every effort made by the railways to get changes in working conditions and wages which will enable them to operate more efficiently and economically, and thereby make possible reductions in freight and passenger rates.

There are many farmers who apparently think that the present high rates of the railways are maintained to enable them to earn fancy profits. In the month of December, 1920, the total wages paid to railway employees amounted to about \$300,000,000, while the total net operating income received by the companies was about \$17,000,000. The farmers are being injured by having to pay railway rates that are too high in proportion to the prices of the farmers' products, and the railways are being ruined because with present rates, present traffic and present operating costs they cannot earn anything approaching a reasonable return.

The purchasing power of the farmers must be restored. Not only their welfare, but that of the entire country demands it. Normal general business and normal general prosperity cannot return until the purchasing power of the farmers has been largely restored. Since it can be restored only by reducing the costs of production in other industries, and the cost of transportation, it is high time that the farmers should begin directly to interest themselves in the efforts being made by business men and railroad managers to reduce production and transportation costs.

Since labor costs are now about 65 per cent of the total operating expenses of the railways, the Railroad Labor Board, with its control of rules, working conditions and wages, virtually has control of 65 per cent of the operating expenses of the railways. The railways are before the Board trying to get action which will enable them to reduce these labor costs. Since not only the present extremely small net earnings of the railways, but also the present high freight and passenger rates, are mainly due to these high labor costs, the farmers and others who pay railway rates should recognize the fact that the railway managers, in trying to reduce labor costs, are working in the interest of those who pay the rates.

Railroad Returns for 1920

TAXES PAID by the railroads in 1920—or those for which they became liable, because some of the roads are behind in their tax bills as well as other bills—amounted to 4½ times as much as the net operating income which the roads earned for their owners. Total operating revenues for the year, according to the Interstate Commerce Commission statistics made public this week, were \$6,225,402,762, the largest in the history of the railroads and \$1,041,000,000 greater than for 1919. Operating expenses, however, consumed \$5,826,197,474 of this, or \$1,406,000,000 more than in 1919, and taxes, \$281,380,620, or \$83,000,000 more than in 1919. Taxes include \$33,349,938 of war taxes for the period from March to December after the roads were returned by the government. After deducting for uncollectible revenues and equipment and joint facility rents this leaves a net operating income, or profit from railway operations, of only \$62,264,421.

This compares with an average of over \$900,000,000 for the three years preceding the war. It represents a return of about one-third of one per cent on the valuation of \$18,900,000,000, which the Interstate Commerce Commission used for the purposes of the rate case. It is less than the roads should earn in one month to receive the 6 per cent which the Transportation Act prescribes as the measure of a fair return on the investment. It is less than one-fourth of the taxes charged by local state and federal governments for the privilege of owning property and doing business and the protection of the laws, and it represents a profit of almost exactly 1 per cent on the gross business done during the year when the railroads handled more freight and passengers than ever before in their history.

These figures strikingly illustrate the importance to the railroads of the relief to be afforded by the Winslow bill, which authorizes partial payments, pending final settlement, of the guaranty provided for by the Transportation Act for the six months following the termination of federal control, which has just been signed by the President. Without the guaranty most of the railroads would have been bankrupt several months ago, particularly as the entire net operating income of \$62,000,000 was earned by only about half of the Class I railroads, the other half having deficits for the year. With the promise of the guaranty and with the assistance of about \$262,000,000 actually advanced on applications filed

prior to September 1, the roads have struggled along for a year but it took a new law, passed a year after the passage of the Transportation Act, to make any of the balance available and the relief could not have been delayed much longer without disastrous results.

The total guaranty for the six-months period is estimated at about \$600,000,000, of which about \$200,000,000 has already been paid out for back wages under the Railroad Labor Board award of July 20. In addition the railroads received about \$150,000,000 for their guaranty for January and February, 1920, when they were still under federal control. While the tax-payers are grumbling about paying the guaranty, they might pause to remember that the railroads themselves have to pay nearly half of it for their taxes.

New Books

The Maintenance of Way Cyclopeda, edited by E. T. Howson and E. R. Lewis. 860 pages, 2,500 illustrations. 11½ in. by 8½ in. Bound in cloth and leather. Published by the Simmons-Boardman Publishing Company, Woolworth building, New York City. Price, cloth \$10, leather \$15.

This is the latest of the series of cyclopedias and dictionaries to be published by the Simmons-Boardman Publishing Company. It also represents another step in the plans of this company of some 10 years' standing for the fuller treatment of maintenance of way subjects, which was started in the publication of the *Maintenance of Way Section of the Railway Age* and which later developed into an independent form in the *Railway Maintenance Engineer*. The cyclopeda is a companion book to the *Car Builders' Dictionary* and the *Locomotive Dictionary* which have been issued by the same publisher at intervals for upwards of 30 years. It has been edited in co-operation with the American Railway Engineering Association, with the assistance of a committee of this association appointed for that purpose. It represents an endeavor to place in permanent form between the covers of one volume, the vast fund of information contained in a variety of texts, association proceedings, personal papers, etc. But the work goes much further than this in that a large amount of material is presented which has received little or no treatment heretofore.

Consistent with the adoption of the term "cyclopeda" the authors have endeavored to make the contents of interest and value alike to the railway employee engaged directly in some particular branch of maintenance of way as well as to the general or operating officer who finds it necessary to enlarge his knowledge of maintenance of way matters because of his general responsibility over the work of that department. The needs of the purchasing and stores officers, who are required to deal with maintenance of way materials, have also been kept in mind. As stated in the preface: "The thought has been to select that which is representative of the best in the maintenance of way field, to incorporate the most modern methods, to include those standards bearing the approval of the prominent technical societies and to show those devices which have been proved to be of undoubted value."

A particular effort has been made to include a large amount of maintenance of way information not previously presented in a permanent form and to clear up confusion of terminology as far as possible in this volume, the editors having co-operated with the American Railway Engineering Association and allied technical associations in the adoption and use of preferred terms. In general the nomenclature of the *Manual of the American Railway Engineering Association* has been accepted. The work of this association

was also drawn on in no small measure by incorporating the latest specifications approved by that organization as well as standard plans, etc. In order to make the book most readily usable it has been arranged in two separate departments, editorial and catalog, while the editorial portion has been further subdivided into sections, each relating to some particular branch of maintenance of way and each with its own alphabetical arrangement. Thus, there are separate sections for track, bridges, buildings, water service, signals, and wood preservation, as well as a general section to cover miscellaneous unclassified subjects.

The catalog section of 218 pages is designed to supplement the general information in the text section with itemized descriptions and illustrations of specific devices referred to more generally in the text section. Here the reader can supplement the general facts gained from the text pages with specific information concerning the particular line of products he desires to investigate. To insure that the reader will find all matter relating to any subject, a general subject index is given in the front of the volume, give page references to all sections of the book where the subject is treated in any way. In addition the catalog section is fully indexed by a directory of products, an alphabetical index of manufacturers and a trade-name index.

Straight Business in South America. By James H. Collins. 285 pages, 5 in. by 8 in. Bound in cloth. Published by D. Appleton & Co., 35 West 32nd street, New York City.

An unbiased American, with his eyes and ears wide open solely for information on Latin America for his countrymen, has returned after eight months of intimate contact with the South Americans, and his book, a result of that expedition, apparently omits nothing of value for those who know little of the respective countries on that continent and are interested in trading or building in Latin America. To them, a careful reading of this book, as well as the preparation therefor of a permanent space on the book shelf for reference, is advisable. Its index will be found useful in its references to paragraphs on "American Backwardness in South America," "Misrepresentative Americans," "The Argentine as a Spender," "Picking Up the Spanish Language," "Thrift" "Time" and "Tassajo," as well as hundreds of other intimate items which convey the writer's familiarity with the countries visited, their inhabitants and their views on the methods of the Yankee, as well as their opinions on his competitor, the European. Chapter XI, "Why South America Needs Continental Methods," conveys a bird's-eye view of what South America's railway systems are—and are not. It points out the opportunity for reward to the railway builder, and the South American's attitude on the investments of the foreigner.

AT THE PRESENT TIME there is much talk of the narrow viewpoint of laboring men due to specialization in industry. It is undoubtedly true that the majority of workers have very limited knowledge of the products that they help to produce with the exception of that part on which they are directly employed. Modern workmen are not unresponsive when efforts are made to give them a broader knowledge of their work, however, as is well illustrated by the experience of the Industrial Works, Bay City, Mich. This company has been conducting a "Crane College" for shop and office employees to teach them more of the results of their daily work. The course consists of eighteen lectures, one each week, by various department heads best fitted to handle their subjects. So great was the interest developed in the portion of the course dealing with air brakes that, as an offshoot of the "Crane College" proper, an intensive series of lectures on the Westinghouse air brake was given, in which 69 students were enrolled.

Letters to the Editor

Do the Work at the Initial Terminal

ST. PAUL.

To the Editor:

I am a firm advocate of classification at the initial terminal so that trains will leave in station order. Many roads in the west use this system, while others use the zone system. However, some roads, notably the larger and more prominent lines, throw their trains together indiscriminately at the initial point with the idea that the required classification will be obtained in the course of rehandling at the intermediate yards. A number of roads practice this and go farther by wiring the next terminal information concerning the exact position of all cars in a train and their destination. This helps the intermediate yardmaster considerably in preparing for the fray, but in case of reduction on lower commodities and an application of more important freight, the only thing left for him to do is to re-switch the train, with the result that approximately two hours is lost. When this is repeated at, say, every freight terminal between the Mississippi river and the Pacific coast, it is not surprising that a lot of time has been lost. If the train were properly classified at the initial terminal and each subsequent terminal it is advised concerning the consist of the train, the "add" can properly be aligned to cut in and the "cut out" can be quickly handled, one hour will be the maximum time required.

I have noticed that refrigerator cars are often in several different positions in a train, whereas they could easily be assembled and a minimum time used for the service. It is absurd to suppose that a train of high class freight thrown together haphazardly at its initial terminal will right itself by the time the final destination is reached. Has consideration been given to the amount of switching required at the intermediate yards? The relative importance of high class freight traffic on any railroad is the same to the freight traffic manager as the high class passenger traffic is to the passenger traffic manager. It is hardly probable that the large roads out of Chicago and St. Louis would place in the middle of the train a Pullman that was to be cut out at the first junction point. Then why not give the same observance to the freight traffic?

EMMETT H. BURCH.

Don't Neglect Refrigerator Cars

CHICAGO.

TO THE EDITOR:

The average person has only a slight conception of either the service performed by the refrigerator car, or of the necessity for it under our present mode of living. The time is long past when such delicacies as grapefruit, oranges and sea foods are considered luxuries, to be enjoyed only by the wealthy, for within the last 20 years the refrigerator car has placed these and similar commodities within reach of all.

To illustrate the extent to which this refrigerator car service is now used, we find that during the year 1917 the Class I roads transported approximately 30,000,000 tons of perishable freight, requiring the movement of 2,300,000,000 refrigerator car miles. But while railroad men may justly regard this work of distributing perishable commodities throughout the length and breadth of the land with pride, the service is still far from perfect. In fact these imperfections, represented by claims paid out for loss and damage to perishable freight during 1919 approached \$13,000,000, and this

sum, based on the invoice value of the goods in carload lots, does not begin to represent the economic loss to the country as a whole.

In my opinion this tremendous waste can be overcome in some measure by closer co-operation between shippers and carriers, and by co-ordination of effort between the carriers themselves. The shipper, for example, should see that the cars intended for perishable freight are in condition to give adequate service, and are properly cooled or heated according to the season and the commodity to be transported. He should not fail to instruct the carrier as to the attention which his shipment will require en route, whether it be icing, ventilating or protection against cold. The carriers, on the other hand, are especially interested in the condition of their cars, in maintaining schedule time, and in carrying out the instructions of their shippers to the letter.

It is significant that the roads best equipped to handle the refrigerator car business, are the ones to secure this business to handle. In many instances they have created perishable freight departments manned by specialists who devote their entire time to the work. The officers of these roads find that their expenditures in this direction are repaid many times by their savings in claim payments and by the continued good will of their patrons. During the past few years, however, the maintenance and development of refrigerator equipment in general has not kept pace with the increasing demand for, and production of perishable products. War-time conditions, too, interfering with the construction of new cars, and the adequate repairing of existing equipment, have resulted in a condition so serious that measures must be taken quickly to enable the carriers to handle the increasing volume of perishable freight without a still more enormous bill for loss and damage than they now have.

I hope that our executive officers, in allotting their funds for 1921, will realize the seriousness of this situation, and will look with consideration upon two items—repairs to refrigerator cars, and new refrigerator equipment. With the application of these remedies it does not seem too much to expect that we can reduce the \$13,000,000 paid out in loss and damage claims on perishable freight in 1919, at least to the pre-war figures of \$2,750,000. And surely this would seem worth the effort.

J. D. SHIELDS,

Freight Claim Agent, Chicago, Burlington & Quincy.

Two Opposing Views on Maximum Car Loading

NEW BRITAIN, Conn.

To the Editor:

In 1919, during the life of the Railroad Administration, the question of maximum car loading now being discussed in your columns was before the shippers of the country and was given every consideration, and the shippers co-operated (at some cost to themselves) so as to get the full benefit of all available equipment. There is a limit to this loading of equipment, based upon commercial usage, classification, and tariff minimums. Shippers, at much inconvenience and financial loss, and receivers, at a much greater outlay financially, handle, and have been handling, larger quantities of merchandise than they would under ordinary commercial conditions. The return of the carriers to corporate control and operation was a relief to the commercial interests of the country, in that it again opened up competition among carriers and the fight for conservation of equipment was not as strenuous as it was under federal control.

The loading of cars to full visible or carrying capacity, of less than carload shipments for various points, does not bring satisfactory results; nor is it conservation of equipment. It ties up more cars at transfer points, for the reason that a check clerk and trucking crew can handle four cars

reasonably loaded where they are handling one loaded to the roof. Further, the amount of damage in cars so loaded offsets any other advantage which might be named.

We are being requested by the carriers to load, as far as possible, all shipments of 10,000 lb. direct to final destination, to save extra labor and handling at transfer points. This we have always done. I am very sure that the shippers will do everything they possibly can to conserve equipment, but the carriers should not overlook the commercial customs and necessities, and the fact that it is the continual movement of water over the dam that operates the mill, rather than a large volume today and nothing tomorrow. It is the same way with business. There must be a continual movement of raw material in to the factory, and finished product out. The receiver or jobber must count upon the source of supply and his ability to spread his capital out and turn it over a number of times, rather than invest in large quantities of some article or commodity which is liable to be left on his hands for a long period.

R. W. POTEET,
Manager, The Stanley Works.

MANSFIELD, Ohio.

To the Editor:

The grain trade has for several years been compelled, with minor exceptions, to give maximum loading in that the tariffs of the carriers call for loading cars to full capacity. This trade, more than any other interest, has given capacity loading and at a sacrifice to itself. In a great many cases by loading so heavily it has not been possible to obtain proper inspection upon the inbound road and the shipper has had to accept deterioration in grade, due to the condition of the grain and delay in switching at terminals. In a great many cases at the small country points where the shipper has only a minimum quantity of grain to load, he needs a 60,000-lb. or 80,000-lb. capacity car, but was furnished a 100,000-lb. capacity car. In consequence the shipper was compelled to pay for dead space due to the rule of having to load to the capacity of the car.

Under these circumstances I could not advocate, for the grain trade, any more intensive loading than that in effect. On the contrary, as a matter of common justice to the grain trade, the rules in effect should be modified to a more equitable basis. The grain shipper will always load the cars to capacity when cars are scarce and the condition of the grain will warrant such loading, because he is anxious to secure elevator space and take advantage of market values. Therefore the rule which is in effect with the carriers does not increase the loading but creates a hardship at times.

H. L. GOEMANN,
Chairman Transportation Committee,
Grain Dealers' National Association.



Photo by Gilliams Service

A New Switching Locomotive Recently Completed in Germany



Position of New York Central Engine After the Accident. Photo by International

Passenger Trains in Disastrous Collision

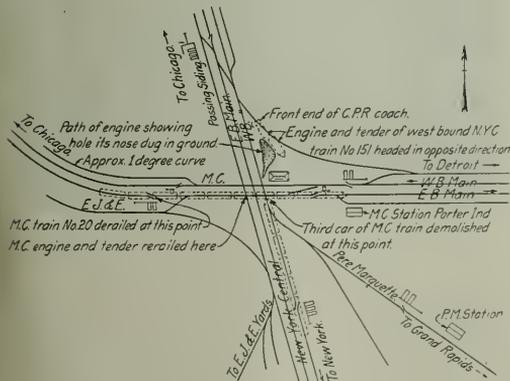
Michigan Central Train Runs Over Derail Onto Crossing and
New York Central Train Crashes Into It

ON SUNDAY EVENING, February 27, westbound New York Central passenger train No. 151 plowed through the third coach of eastbound Michigan Central train No. 20, at an interlocked crossing of these lines at Porter, Ind. Thirty-seven persons were killed and 4 seriously injured. Preliminary investigation indicates that the

The trains involved in the collision were New York Central westbound passenger train No. 151, known as the "Interstate Express," and Michigan Central eastbound passenger train No. 20, known as the "Canadian." The accident happened on the crossing of the interlocking plant at Porter, Ind., 40 miles southeast of Chicago on the New York Central and 44 miles southeast of Chicago on the Michigan Central. Both trains were approaching the crossing at a high rate of speed. Investigation after the accident disclosed that the levers in the interlocking machine were in the proper position to permit of a westbound movement on the New York Central and that the routes on the Michigan Central were set against the passage of trains. The New York Central train No. 151 leaves Buffalo daily at 8:30 a. m. and is due to arrive in Chicago at 7:30 p. m. This train is scheduled to arrive at Porter, Ind. (Norwood), at 6:21 p. m.

Michigan Central train No. 20 leaves Chicago at 5:05 p. m., arriving at Windsor, Canada, at 1:45 a. m., where it is turned over to the Canadian Pacific for movement to Toronto, Montreal and points east. The train was made up largely of Canadian Pacific cars, the baggage car, smoker, day coach and three sleepers being Canadian Pacific equipment, while the diner and two sleepers were Michigan Central and Pullman equipment, respectively. This train was due to arrive at Porter at 6:16 p. m. and was running a few minutes late at the time of the accident. The schedule time of this train is 50 miles an hour between Hammond, Ind., and Michigan City. The schedule running time of the New York Central train between La Porte, Ind., and Englewood (Chicago), Ill., is 41 miles an hour.

At the point of the accident the Michigan Central tracks run almost due east and west. About 1,000 ft. west of the crossing there is a curve to the north of about 1 degree, after which the track is again tangent, while east of the crossing the track is tangent for some distance. The New York Central tracks at this point are tangent. The interlocking at this place is a mechanical plant equipped with electric route locking and approach indicators on both railroads and is



Sketch Showing Track Layout and Position of Trains at Time of Accident

engineman on the Michigan Central train had run past a home interlocked signal in the stop position at a high rate of speed, his train being derailed on the split point derail which was open. After running on the ties for a distance of approximately 800 ft., the third coach of the train remained upright and standing directly on the crossing of the New York Central. The New York Central train, traveling at high speed, struck this coach, reducing it to a mass of kindling wood.

maintained by the New York Central. After the accident the levers in the machine were found in the proper position to give the New York Central train the route over the plant.

The preliminary investigation indicated that the engineman of the Michigan Central train ran past the eastbound home signal in the stop position and through the open derail. The train then ran on the ties for a distance of 300 ft., when the engine was rerailed on the crossing diamond, continuing across the crossing to a point where the day coach, Canadian Pacific 1560, the third in the train, was on the crossing of the westbound New York Central main when the New York Central train crashed into it. It was in this coach, which was of wooden construction, that the heaviest loss of life occurred. The impact of the New York Central engine was so great that the day coach was reduced to a mass of splinters, part of the wreckage breaking out the windows on the

and did not slow down when we were certain the signal was right. Proof that we were not to blame for the wreck is seen from the fact that the engine and one coach passed the derail. I will not state what I believe caused the wreck. The derail was locked and I could not be to blame."

Joseph Cook, the leverman on duty at the interlocking plant at the time of the accident, declared after the accident that Engineman Long ran by the home signal. The New Central train had been given the route, as its approach was announced first by the indicator in the tower. In his statement he said, "Under normal conditions the block is set against all trains. The train hitting the buzzer first is then given the right of way. * * *

"That is exactly what happened when the buzzer sounded yesterday. It showed that the New York Central train was the first to hit the buzzer by almost a full minute ahead of the Michigan Central flyer.

"I released the block which permitted the New York Central train to go through. Just as the train hit the crossing I saw the Michigan Central train coming around the curve at 60 miles an hour. I saw right away what was going to happen and thought the tower would be demolished. I called to Charlie Whitehead, the telegraph operator in the tower with me, and made for the steps which lead to the ground. The Michigan Central train by this time had hit the derail, which clearly showed that the block had been set against it and plowed over the ties and track, tearing them up as it went across the New York Central track. When the third coach of the Michigan Central train passed over



Photo by International

The New York Central Locomotive and Splinters of Demolished Cars

south side of the interlocking tower as well as the siding in some places. One peculiarity of the accident was that those killed were mostly decapitated, and a number were mutilated so badly that identification was difficult. After the New York Central engine plowed through the day coach it left the track near the northwest corner of the tower and plowed into the ground, which was level at this point, digging a hole about 10 ft. deep. The momentum was so great that the engine and tender were turned completely around and over on their sides upon the wye connection between the New York Central and Michigan Central tracks, breaking and twisting the rails. The engineman and fireman of the New York Central train were killed and many of the passengers in the Michigan Central day coach were buried under the engine and tender. In this coach were between 60 and 80 passengers, many of whom were railroad employees returning to Michigan City, Ind., and Niles, Mich., after spending Sunday in Chicago.

An examination of the stock rail at the eastbound derail on the Michigan Central indicated that the top had rolled slightly and at the point where the wheels dropped to the ties the lower corner of the head was sheared. From this point for a distance of about 800 ft. the ties in this track were reduced to pulp. The crossing frogs were skewed, the lugs on several being broken and it was necessary to replace four of them.

After the accident Engineman Long of the wrecked Michigan Central train was reported as saying: "My fireman, Block, first sighted the signal that meant a clear track and called my attention to it. We were running at full speed



Photo by International

The Scene of the Collision at Porter, Ind., Showing the New York Central Locomotive

the New York Central right of way the New York Central train cut through it. As the locomotive of the New York Central train passed over the track it toppled over and the coaches of both trains were scattered in all directions.

"I cannot understand how the engineman of the Michigan Central train could have proceeded against the two blocks which were set against him. I can't help but feel that the engineman must have been asleep, for there are two blocks which are visible for almost a mile and half before he reached the crossing. I heard later that his fireman had admitted that the engineman disregarded the block. Investigation of the scene of the accident will show that the Michigan Central train hit the derail and the plowing up of the ties is conclusive proof that the blocks were correctly set."

In a statement issued by General Manager Henry Shearer of the New York Central at Chicago, it was said that "at

6:23 p. m., February 27, Michigan Central passenger train No. 20, engine No. 8306, ran past the eastbound home signal at Porter (Norwood), Ind., interlocking plant 40 miles east of Chicago, striking the open derail, derailing its engine and entire train. The train kept on going on the ties and the engine jumped back on the track at the crossing. The engine, baggage car and smoker of the Michigan Central train had gotten over the crossing and as the day coach, Canadian Pacific No. 1560, the third car, was on the crossing, New York Central train No. 151 struck the Canadian Pacific coach, demolishing it, derailing and turning over the New York Central engine and derailing four cars behind the New York Central engine."

On Monday morning, February 28, a preliminary investigation of the accident was held at Michigan City, Ind., by officers of the Michigan Central and the New York Central. Representatives of the Indiana State Railway Commission have also started an investigation, as have representatives of the Interstate Commerce Commission.

Henry Shearer, general manager of the Michigan Central, on Tuesday issued the following statement:

"In the matter of the unfortunate collision at the crossing of the New York Central and Michigan Central at Porter, Ind., on February 27, after careful investigation of the facts with all interested employees and conference with officials just completed, it has been determined that engineer W. S. Long and fireman George F. Block, on engine No. 8306, train No. 20, violated rules and regulations in failing to observe and properly obey signal indications, and will be forthwith dismissed from the service."

Automatic Train Stop Committee

THE BUREAU OF SAFETY of the Interstate Commerce Commission, and the special committee of the American Railway Association, which meet in joint session every month to discuss automatic train stops, have decided that the definitions of the functions of and requisites for installation of automatic train control systems need not be perfected to the last degree before some actual forward step may be taken. At a meeting on February 15 they embodied in a progress report the following paragraph:

"The functions to be accomplished and the specifications and requirements to which a device to be installed in any designated location must conform will of necessity be determined by traffic, operating and other local conditions and can be prescribed in detail only when the specific location for an installation has been designated. In connection with the test installations now in contemplation, it may be necessary to establish specifications and requirements merely tentative at the outset and subject to modification and development as the work progresses. Such specifications and requirements for several test installations, together with records of alterations in the installations which may become necessary in the course of the tests, should furnish data from which the commission may ultimately prepare specifications and requirements to be prescribed in accordance with the terms of the law."

Preliminary to this, the committees, quoting the definition of automatic train control (paragraph 1) adopted the clauses below (paragraphs 2 and 3).

1. *Definition* (Adopted by A. R. A., May, 1914).

An installation so arranged that its operation will automatically result in either one or the other or both of the following conditions:

First—The application of the brakes until the train has been brought to a stop.

Second—The application of the brakes when the speed of the train exceeds a prescribed rate and continued until the speed has been reduced to a predetermined rate.

2. *Functions.*

The primary function of an automatic train control system is to enforce obedience to the indications of fixed signals. The following features may be included, separately or in combination, in automatic train control systems:

1. *Automatic stop.*

(a) Without manual control by engineer; requiring train to be stopped, after which apparatus may be restored to normal condition manually and train permitted to proceed.

(b) Under control of engineer, who may, if alert, forestall automatic brake application and proceed.

2. *Automatic speed control.*

(a) Automatic stop, after which train may proceed under low-speed restriction until the system is automatically restored to normal or clear condition by reason of the removal of the condition which caused the stop operation.

(b) Low-speed restriction, automatic brake application being under control of engineer who may, if alert, forestall application at a stop indication point or when entering a danger zone and proceed under the prescribed speed limit, until the system is automatically restored to normal or clear condition by reason of the removal of the condition which caused the low-speed restriction.

(c) Medium-speed restriction, requiring the speed of a train to be below a prescribed rate when passing a caution signal or when approaching a stop signal or a danger zone in order to forestall an automatic brake application.

(d) Maximum-speed restriction, providing for an automatic brake application if the prescribed maximum speed limit is exceeded at any point.

3. The following general requirements applicable to automatic train control devices may be stated:

1. An automatic stop device shall be effective when the signal controlling it indicates stop, and so far as possible when that signal fails to indicate existing danger conditions.

2. An automatic speed control device shall be effective when the train is not being properly controlled by the engineer.

3. An automatic train control device shall be operative braking distance from the signal location if signals are not overlapped, or at the signal location if an adequate overlap is provided.

New York Commission on

Automatic Train Control

THE JOINT COMMITTEE appointed last August, pursuant to a request of the New York Central Railroad Company, following a recommendation by the Public Service Commission, Second District, that the company consider the installation of an automatic train control device, on March 1 submitted its report. The committee consisted of Public Service Commissioner George R. Van Namee, chairman; C. R. Vanneeman, chief of the Division of Railroads, and James J. Gill, inspector of equipment, for the commission; and W. H. Elliott, signal engineer; H. S. Balliet, assistant terminal manager, and T. L. Burton, air brake engineer, for the railroad com-

pany. Numerous plans and devices have been examined and the committee reports to the commission as its conclusions:

1. That only devices employing the induction means of actuating the locomotive apparatus should be installed.
2. That no device now available has been developed to a point warranting installation without a preliminary test on a short section with one locomotive equipped.
3. That of the devices examined, those of the following proprietors may be tried in active service with the minimum of preliminary test; George P. Finnigan, the General Signal Company and the Sprague Safety Control & Signal Corporation provided that a modification of the present practice of snow flanging is made.
4. That a two-block or three-block section of track 4 immediately west of Signal Station 9, between Schenectady and Hoffmans, on the Mohawk division is a desirable place in which to make a test of a train control device.

This report is signed by the members appointed by the Public Service Commission, the members appointed by the railroad having withheld their signatures on account of a request having been received by the railroad company, from the joint committee of the American Railway Association, that the Sprague device be tested on its railroad; and, further, because these members felt that there should be co-operation between the Public Service Commission committee and that of the American Railway Association before a report is rendered. The members appointed by the commission, however, are of the opinion that the committee has completed the work for which it was appointed and that therefore the report should be submitted to the commission.

The commission at once considered the report in executive session and issued an order to the New York Central to show cause on Thursday, March 10, why it should not immediately install one of the devices suggested in the report, and conduct investigations of its feasibility under actual operating conditions.

New Passenger Terminal for Cleveland Planned

THE NEW YORK CENTRAL has filed with the Interstate Commerce Commission an application for authority and for a certificate of public convenience evidencing the Commission's approval for the construction of a union passenger station in Cleveland, Ohio, for the use of the New York Central, the Cleveland, Cincinnati, Chicago & St. Louis and the New York, Chicago & St. Louis.

Plans have been under consideration for several years, for the construction of a passenger terminal on the lakefront, to accommodate the New York Central, the Big Four and the Pennsylvania which use the present union station at Cleveland. It has become apparent, however, that the future growth of Cleveland industrially, as well as in population, may be better provided for with a passenger terminal of sufficient size to accommodate all of the railroads, located so as to be free from interference by operations connected with necessary service to industrial plants.

On January 6, 1919, the city of Cleveland passed an ordinance containing provisions for the location of a passenger station on the Public Square and for necessary changes in streets for the station and approach tracks. The New York Central, the Big Four and the Nickel Plate have now filed applications with the Interstate Commerce Commission asking for permission to enter into a contract with the Cleveland Union Terminals Company for the construction and operation of such a passenger terminal, in order that there may be ample time for complying with all of the legal provisions necessary for the financing, which should be undertaken as soon as the time is opportune.

A substantial portion of the passenger terminal will be devoted to the operation of suburban and interurban railroads, which will add distinctly to the terminal's usefulness and convenience to the public.

The plan proposes the purchase by the railroads of the entire capital stock of the Cleveland Union Terminals Company, in proportion of 64 per cent by the New York Central, 28 per cent by the Big Four and 8 per cent by the Nickel Plate, this being the relative proportion of passenger business handled by the respective railroads in Cleveland. The Cleveland Union Terminal Company is organized under the Union Depot Act of Ohio and is to construct the station pursuant to the provisions of the ordinance of the city of Cleveland, adopted to permit the project, which ordinance provided that it should become a contract upon its acceptance by the Terminal Company.

While the present plans contemplate the use of the new terminal by the New York Central, the Big Four and the Nickel Plate, the station is so located as to be readily accessible for all the other steam railroads entering Cleveland and the contracts provide that any or all the other roads may enter the station in the future if they desire, upon terms to be agreed upon. Electrification is provided for between the passenger station and the points for changing power exterior to the terminal limits.

The present passenger station on the lakefront was constructed fifty-five years ago and its location below the general level of the city, hemmed in by bluffs and other obstacles, has prevented adequate improvement as well as restricted its accessibility to the public. In 1918 President A. H. Smith of the New York Central, in his capacity as then Eastern Regional Director of the Railroad Administration, appointed a joint committee representing all seven railroads entering Cleveland to consider the union station problem. This committee reported and the city of Cleveland enacted an ordinance to permit the construction with the proviso that its terms should be accepted within a given period, but due to the non-acceptance by certain of the roads, the ordinance was subsequently amended to provide that the project might be accepted by at least two of the three railroads on the lakefront, and this resulted in the present agreement and application for permission to proceed.

The length of the passenger terminal, which includes the passenger station and its approaches, is to be about three and a half miles. The general plans, as filed with the Interstate Commerce Commission with contracts and agreements, provide that the station initially shall cover approximately twenty acres, with property available to add an additional ten acres in the final improvement. Initially, there will be fourteen miles of trackage, with provision for the addition of ten miles more for use of the steam railroads. For use of the suburban and interurban lines, there are to be nine and a half miles initially and space for eight and a half additional miles.

The Union Terminal track and platform layout will be 30 feet below the level of the Public Square, with a service floor for waiting rooms, ticket offices, etc., ten feet below level of the street and connected therewith by ramps. The railroad terminal facilities will be surmounted by an office building twelve stories in height and a tower extending upward twenty stories. In order to distribute pedestrian traffic, the terminal plans provide for entrance and exits to streets on four sides, the main access opening directly upon the Public Square.

A BILL increasing the personnel of the Wisconsin Railroad Commission from three to five, and providing that at least one of the commissioners be a woman, was introduced in the Legislature on February 16.

Proposed Hill Line Financing Plan Disapproved

Interstate Commerce Commission Authorizes Capitalization of Surplus by Stock Issue But Objects to Use of Bonds

WASHINGTON, D. C.

THE PLAN of financing proposed by the Chicago, Burlington & Quincy for the purpose of assisting the Great Northern and Northern Pacific to meet the maturity on July 1 of the \$215,000,000 of joint 4 per cent bonds issued against their Burlington stock by capitalizing part of its surplus, was disapproved by a majority of the Interstate Commerce Commission on February 28. The commission granted authority to the Burlington to issue \$60,000,000 of additional capital stock as a stock dividend and made no objection to the capitalization of surplus as such, but it denied authority to issue \$109,000,000 of first and refunding mortgage 6 per cent bonds, of which \$80,000,000, or the proceeds, were to be used as a dividend to enable the two northern companies to reduce their joint bond issue by the amount of their share of the dividend in order that the balance of about \$140,000,000 might be refunded at a lower rate of interest than could be obtained for an issue of the full amount.

Eight of the nine members of the commission offered no objection to the idea of capitalizing extensions and improvements paid for out of surplus earnings, but a majority of five objected to the idea of issuing interest-bearing securities for that purpose.

The commission answered the principal objection advanced against the plan by saying that there is no proof that the Burlington surplus income is the result of excessive rates, and it said that "no one questions the right of owners to compensation for sacrifices made in foregoing dividends," but the denial was extended to the proposed bond issue, which the report refers to as a "bond dividend," which would materially increase the company's fixed charges for 50 years by a railroad which itself "has no need for the bonds and which can advantageously issue all the stock reasonably required for its needs." "Division of that part of the surplus not needed for ordinary surplus purposes by means of stock appears more in accord with applicant's and the public's welfare," the commission said.

According to the statements made by the representatives of the Hill lines at the hearings, the proposed stock issue was intended primarily to afford a broader base for bond issues and would be practically valueless to the stockholders because it was proposed to reduce the dividend rate from 8 per cent to probably 6 per cent. It was stated that the bond

issue was proposed instead of a stock issue as a less expensive means of financing, because the stock could not be sold at par. The commission's report suggests that the refunding of the joint bonds could be accomplished at a reasonable rate by the issuance of bonds of the Great Northern and Northern Pacific secured by mortgage and the pledge of Burlington stock.

The commission was very much divided in opinion on the questions raised by the Burlington application. Concurring opinions were written by Chairman Clark and Commissioner Potter and dissenting opinions by Commissioners Daniels and Ford, protesting against the refusal to authorize the proposed bond issue, while Commissioner Eastman in a dissenting opinion objected because the stock dividend had not also been denied. Commissioner McChord also wrote a separate concurring opinion agreeing fully with the majority report. The majority opinion, therefore, apparently represents the views of Commissioners Meyer, Aitchison, Hall and McChord, with the partial concurrence of Commissioners Clark and Potter, the vote of whom was necessary in order to get a majority vote for even the stock issue. Eight members of the commission, or all except Mr. Eastman, therefore, approved the stock issue but only four approved both the bond and stock issues. Commissioner Daniels describes the permission which is granted as "largely ineffectual" and the denial as "essentially technical or formal."

The hearing on the Burlington's application was held before the director of the commission's Bureau of Finance in December and the early part of January and the case was referred to Division 4, consisting of Commissioners Meyer, Potter, Daniels and Eastman. Commissioner Eastman's dissent put the case before the full commission and an oral argument on the Burlington application and that of the Delaware, Lackawanna & Western to issue a stock dividend covering its surplus was held before the full commission on February 14 and 15. It was announced at the office of the secretary of the commission on Saturday afternoon that the commissioners were in conference and that the decision would be given out about 5 o'clock, but at 5:30 it was stated that the decision would be postponed and another conference was held on Monday.

An abstract of the majority and of the separate concurring and dissenting opinions follows:

Report of the Commission

The Chicago, Burlington & Quincy Railroad Company seeks approval under section 20a of the interstate commerce act of its first and refunding mortgage and authority to issue \$60,000,000 par amount of capital stock and \$109,000,000 principal amount of first and refunding mortgage bonds. No objection to the granting of the application was made directly by any state authority other than the Nebraska State Railway Commission. The Northern Pacific Railway and Great Northern Railway appeared in support of the application.

Applicant is an Illinois corporation and the railroads incorporated in other states which it now operates have been conveyed to it in fee simple. In 1901 the Great Northern Railway and the Northern Pacific Railway jointly acquired control of applicant's system by the purchase of \$108,000,000 or 96.79 per cent of its capital stock, giving in payment therefor their joint 4 per cent bonds maturing in 1921 and pledging the stock acquired as collateral security.

Applicant has outstanding \$110,839,100 par amount of capital stock and \$174,040,800 prin-

cipal amount of bonds, of which \$168,050,000 is in the hands of the public. The greater part of its funded debt is issued under three mortgages.

Its Nebraska extension mortgage is a lien upon 269 miles of road, and is secured by deposit of \$23,494,000 of first mortgage bonds on 1,202 additional miles of subsidiary companies which have conveyed their roads to applicant. There have been issued thereunder to reimburse the treasury for expenditures for extensions of lines \$29,441,000 of 4 per cent bonds maturing in 1927, sold at prices ranging from 84.5 to 95.12, netting applicant \$26,843,383. Discounts thereon of \$2,597,617 were charged to construction. Of these bonds \$20,024,000 are outstanding, \$18,294,000 in the hands of the public and \$1,730,000 in applicant's treasury.

Applicant's Illinois division mortgage covers 1,646 miles of road. There have been issued thereunder \$85,000,000 in bonds maturing in 1949, \$56,000,000 to be used to retire prior bond issues, the remainder to reimburse the treasury, \$15,000,000 being for expenditures for construction and acquisition of roads before July

1, 1899, and \$14,000,000 being for additions and betterments subsequent to that date. Some \$50,835,000 of these bonds bearing interest at 3.5 per cent were sold at prices ranging from 75 to 103.5, netting applicant \$45,992,235. Discounts thereon of \$1,088,975 were charged to construction and of \$3,753,790 to profit and loss. Some \$34,165,000 of 4 per cent bonds were sold at from 98.5 to 104.5, netting \$35,228,505. Discounts thereon of \$9,880 were charged to construction and \$1,073,385 of premiums were credited to profit and loss. Of the 3.5 per cent bonds \$384,000 and of the 4 per cent \$189,000 are in applicant's treasury. The balance of both issues are in the hands of the public.

A general mortgage maturing in 1958 covers substantially all of applicant's railway property existing in 1908, being a first lien on more than 5,000 miles of road. It is so limited that not over \$300,000,000 can be outstanding thereunder at any one time, and that bonds cannot bear over 5 per cent interest. There have been issued thereunder and are outstanding \$65,247,000 of 4 per cent bonds which were sold at

from 91.5 to 100, netting applicant \$62,444,450. Discounts thereon of \$2,602,550 are being amortized from income during the life of the bonds. Before the passage of the transportation act, 1920, the Public Utilities Commission of Illinois authorized the issuance of \$121,378,000 of general mortgage 4 per cent bonds; of this amount \$2,252,000 have been issued, leaving \$119,126,000, of which \$9,873,000 were in applicant's treasury and \$109,253,000 remain unexecuted.

The investment in road and equipment, as shown in applicant's accounts is \$503,745,838. Its outstanding securities amount to \$284,879,900, leaving a book surplus of \$218,865,937. Applicant contends that it has an actual surplus materially in excess of that figure which does not take into account investments in property other than road and equipment, and does not include any sum in consideration of its guaranty under section 209 of the transportation act, 1920. It asserts that the value of its physical property upon the basis provided in section 19a of the interstate commerce act amounts to \$572,800,000, or about \$70,000,000 more than the total shown as investment in road and equipment. Depreciation of its equipment has been charged to the amount of \$48,514,240. Applicant states that since July 1, 1901, it has invested out of earnings \$189,070,776 in additions and betterments to its property, only a small portion of which was expended for non-revenue producing assets; that it has in addition used earnings to retire bonds, expending a total of \$91,348,478, properly chargeable to capital account, no part of which has been capitalized. During that time applicant has increased its mileage from 7,600 to 8,900 miles. The total mileage owned and operated has increased from 7,700 to 9,300 miles. Second track has been increased from 425 to 1,700 miles and yard track and sidings from 1,000 to 3,200 miles. The tons of traffic handled have increased from 17,000,000 to 49,000,000; the ton miles from 3,800,000,000 to 14,000,000,000; the density ton miles per mile of line from 582,000 to 1,483,000; the trainload from 200.43 to 722.19 tons; the carload from 12.5 to 26.5 tons. Applicant has during this time reduced its funded debt and now has securities in the hands of the public totaling \$31,164 per mile of road.

Objectors do not deny the existence of property value used and useful in rendering the public service materially in excess of applicant's present capitalization, and do not question the nature of the expenditures involved. They question the right of a public service corporation to declare dividends from invested surplus acquired from earnings during a period when the stockholders were receiving regularly a fair dividend upon the outstanding capital.

Applicant's net income applicable to dividends for the past 10.5 years has been as follows:

1910	\$13,308,746
1911	16,843,763
1912	14,106,754
1913	19,430,746
1914	17,114,007
1915	17,288,913
1916*	43,878,845
1917	28,009,002
1918	15,947,881
1919	16,561,229

Total 10.5 years.....\$202,490,286

Average per year.....\$19,284,789

*18 months' period due to change in report year.

Notwithstanding this large net income available for distribution among the stockholders the average of all dividends paid from 1901 to 1920 was 8.51 per cent upon the abnormally low capitalization and 3.916 per cent upon the average property investment in excess of all outstanding bonds.

Income Not the Result of Excessive Rates

There is no proof that this income is the result of excessive rates. Traffic has been carried by applicant at rates controlled by state or interstate regulatory bodies, substantially the same as those applicable over competing lines. Nor is there any proof that the total return upon the fair value of applicant's property has been excessive. Applicant's rate of capitalization \$19,000,000 of net surplus has in fact been recognized by the public utilities commission of Illinois, the state of its incorporation, under express statutory provision. A five-year statutory limitation prevented that body from considering surplus accumulated during an earlier period.

Applicant points out that its present financial structure is inadequate for present and future

needs. Its Nebraska extension and Illinois division mortgages are closed, and its general mortgage so limited that its use is impractical under present conditions. The execution of a new mortgage subject to these existing liens would be futile. Applicant now proposes to close the general mortgage without issuing further bonds under it, and to execute a 50-year refunding mortgage to secure coupon bonds to be issued in series at interest rates, and redeemable at times, and on terms, to be determined by the directors at the date of issuance, subject to our approval.

Applicant points out that bonds under its general mortgage could not bear more than 5 per cent interest and if they could be marketed at all would have to be sold at heavy discount, and that they would not be redeemable before 1958. It is shown that the amount of bonds issuable under that mortgage would not meet applicant's needs for additions and betterments at the current rate beyond 1933, and if the proposed dividend were paid would not meet requirements beyond 1929. It is contended that the proposed financial program would better applicant's credit and strengthen its position.

Authority is sought to issue \$109,000,000 of first and refunding mortgage bonds at 6 per cent, \$29,000,000 thereof to be used for future additions and betterments subject to our approval, \$80,000,000 thereof to be held free in applicant's treasury for any lawful use including the proposed additions as dividends. It appears that they would be used solely for dividend purposes and if authorized would be distributed among the stockholders.

Applicant calls attention to the necessity of refunding on July 1, 1921, \$215,227,000 of its controlling road's joint 4 per cent bonds given in payment for its stock, and points out that practically all of its material dividend issue, if authorized, would be available to those roads for use in meeting that obligation, thus materially reducing their fixed charges. It points out that as the controlling roads are its principal stockholders it is their foregoing of dividends which has produced its invested surplus. It contends that its own increase in fixed charges would be offset by the material advantage resulting to its established connections. It shows that the proposed financing would slightly reduce its ratio of bonds to stock, placing it substantially upon the basis of 1.5 to 1, and would not so increase fixed charges as to impair applicant's ability to serve the public.

Objectors contend that applicant should not be permitted to increase its fixed charges without a showing of resulting benefit to applicant. The issuance of the proposed bonds at this time would materially increase applicant's interest burden without apparent necessity. The interest rate at the time of the above-mentioned expenditures from surplus was not in excess of 4 per cent. Authorization of bonds at that rate at the present time would seem inexpedient. Division of that part of the surplus not needed for ordinary surplus purposes by means of stock appears more in accord with applicant's and the public's welfare.

Both the wisdom and legality of the joint acquisition and ownership of the Burlington by the Great Northern and the Northern Pacific are questions foreign to this proceeding and therefore require no consideration on this occasion.

While we do not minimize the advantages derived by applicant from its connections with the northern lines we are not convinced that the continuance of these connections is dependent upon the continuance of the proposed bond dividend. The general advantages of minimizing fixed charges in refunding the joint fours are apparent, but we cannot share applicant's apprehensions relative thereto. The northern lines enjoy a position relatively favorable to financing such a refunding. The value base of applicant's stock and its desirable collateral security. No evidence has been introduced which convinces us that the refunding could not be accomplished at a reasonable rate by the issuance of bonds of the Great Northern and Northern Pacific secured by mortgage and the pledge of applicant's stock.

Confusion has been injected into this case by the failure to distinguish between the issuance of bonds to reimburse the treasury from the proceeds thereof for expenditures for additions and betterments, and the issuance of bonds from invested surplus for dividend purposes. We cannot accept applicant's argument which finds in the Illinois commission's approval of the issuance of 4 per cent or 5 per cent bonds to

reimburse applicant's treasury for expenditures for additions and betterments, a sanction of a dividend of 6 per cent bonds. It is true that both the authorizations contained no express prohibitions against such a dividend, but each of its orders provided that the bonds should be sold and a majority of the orders specified sale for cash; all required that the proceeds be applied to specified purposes. One order made optional the pledge of the bonds. The Illinois statute enumerated the purposes for which a public service company might issue securities without including the issuance of dividends, and expressly stated that securities might be issued for no other purposes. Nor is it certain that the question before the Illinois commission was wholly analogous to that here presented, the approval of a bond issue during a normal period differs materially from approval of an issue at an abnormal rate at an abnormal time when the only material advantage anticipated inures to parties other than the applicant.

Applicant's authority to issue \$60,000,000 additional capital stock is not in excess for the proposed mortgage, under which the aggregate amount of such bonds cannot exceed three times the outstanding capital stock. It is proposed to issue such stock as a dividend.

If applicant's petition is granted in full it is urged that there will remain a corporate surplus of \$101,781,197; that this amount would be adequate to meet applicant's emergency needs, support its borrowing power, afford insurance against obsolescence, minimize short term financing, and serve as a general financial balance wheel. Allowance should be made, however, pending the valuation of applicant's system, for shrinkage of book values, so that the adjusted capitalization will not leave applicant with an inadequate actual surplus.

Present Capitalization Below Actual Investment

The evidence establishes (1) that the Chicago, Burlington & Quincy Railroad has a great uncapitalized surplus; (2) that the present capitalization is far below the actual investment or any fair value for rate-making purposes which we may subsequently fix under the Valuation Act, section 19a of the Interstate Commerce Act; (3) that the increase in capitalization which would follow the grant of this authority would still leave the total capitalization of the Burlington below the actual investment and the probable fair value of the property devoted to the public service; (4) that the remaining uncapitalized surplus would be sufficient to serve the purposes for which a surplus should be accumulated; and (5) that the present financial structure of the Burlington is obsolete and inadequate and that a new form of mortgage and a larger stock base to meet the requirements of statutes governing investments by savings institutions in various states are necessary.

We find that the proposed issue of \$60,000,000 capital stock by the Chicago, Burlington & Quincy Railroad Company as a dividend (a) is for a lawful object within its corporate purpose, and compatible with the public interest, which is necessary, appropriate for, and consistent with the proper performance by it of service to the public as a common carrier, and which will not impair its ability to perform that service, and (b) is not necessary, appropriate or appropriate for such purpose; but that applicant has not justified an authorization of the issuance as dividends of mortgage bonds against its surplus and that authority therefor should be denied. If applicant desires, we shall give consideration on the present record to an application to issue bonds for appropriate purposes other than dividends.

The question of a proper return on the fair value of property devoted to the public use is not pertinent. It is not before us. No one questions the right of owners to compensation for sacrifices made in foregoing dividends. The denial in this case extends only to the issuance of a bond dividend by a railroad which has no need for the bonds, and which can advantageously issue all the stock reasonably required for its needs. The more adaptable form of mortgage which the applicant desires can be provided without the issuance of a bond dividend. An appropriate order will be entered.

Chairman Clark Would

Approve Bond Issue Also

CLARK, Chairman, concurring:

I concur fully in the approval of the issuance of \$60,000,000 of stock to be distributed to myself in accord with the refusal to authorize \$80,000,000 of bonds. I regard the case as

unique, and, therefore, as one that should not be decided upon the idea that it establishes a general precedent or a general policy. The Burlington has an abnormally low capitalization and an abnormal surplus from income that has been spent upon the property. That surplus has been accumulated at under rates fixed by state and federal regulatory bodies. Competing carriers, under the same rates, have not accumulated similar surpluses. The Northern Pacific and the Great Northern own 97 per cent of the stock of the Burlington, and have so owned it for some 20 years. They must refund their obligations, assumed in acquiring that stock.

Looking at the situation in its general aspects, and from the standpoint fixed in the present law of considering and dealing with the railroads in a national sense or in large groups, it would seem that the main question is what will be the effect upon the public interest. The northern lines must pay these joint collateral bonds or make good any deficit from surrender of the collateral. It is not clear that that would, as it seems to me, cause the placing upon these lines an additional burden as a net loss, to be borne by the public. Obviously these owning lines will not choose that course. The debt, which I regard as well secured, must be met. Is it more to the public interest that it shall be done by retaining this \$80,000,000 of Burlington's surplus, which admittedly will be large enough for all reasonable purposes if the \$80,000,000 is disbursed, and adding a like sum to the capitalization of the owning lines, with substantially larger fixed charges, than to consider the three systems as a family and permit the owning lines to have the benefit of that much of the surplus of the Burlington which is not needed by it? The answer, in my opinion, in any of the three systems would not be substantially different in either event. It seems certain that under any plan that is left open for refunding this debt the fixed charges will be much greater for a long term of years than they would be if the \$80,000,000 of bonds were made available for the sole purpose of reducing the principal amount of the debt about to become due.

McChord Agrees With Majority Report

McCHORD, Commissioner, concurring:

Agreeing fully with the majority report, I wish to state briefly certain other considerations which lend support to my concurrence in the conclusions reached. When all is said and done, the submitted justification for the course proposed is that, as against an available interest rate of 6 per cent for Burlington bonds, funds obtained by the Great Northern and Northern Pacific upon their own securities probably would cost them 8 per cent. This purely speculative apprehension does not justify itself to my mind. The now outstanding bonds of those lines are in a large measure collaterally secured by capital stock of the Burlington, and the credit of that company would equally well be available on an issue of its own bonds or of refunding issues of the Great Northern and Northern Pacific collaterally secured by an equivalent dividend issue of Burlington capital stock. Indeed, the total pledged security would be ample, in the ratio of the accumulated surplus, than that by which the now maturing bonds were originally supported.

It does not appear that the two lines most concerned, as they might and should have done, have laid before the interests from whom the requisite financial assistance is to be obtained the merits of refunding issues of bonds of those lines and the enhanced value of the securities they would have to offer. If when this were done, the financial interests were nevertheless to take advantage of the necessities of those carriers and demand a prohibitive rate of interest, which is hard to believe, these interests must bear their share of the responsibility for the impairment of the carrier's transportation functions. The present transportation and industrial situation calls for moderation and forbearance, and there can be no condoning an abuse of opportunity which can only tend to block a downward trend of prices so essential to the mutual welfare of carriers and shippers.

The assertion that if this application is denied the outstanding 4 per cent bonds cannot be refunded at less than 8 per cent, is startling. If the financial institutions of the country have determined to increase the interest rate on such bonds 100 per cent, and it is accomplished, our railroads cannot weather the storm. Good business judgment on the part of the Great Northern and Northern Pacific would dictate the sub-

mission to the present bondholders of an offer of 6 per cent refunding bonds, representing an increase of 50 per cent in earning power and resting upon a materially enlarged basis of security.

An approval of the proposed application and the devotion of approximately 98 per cent of the proposed refunding bonds to the retirement of the maturing Great Northern and Northern Pacific bonds would virtually weld into one inseparable system, for the life of the bonds, the three trunk lines, although it is by no means certain at this time that such a merger would suit the purposes of amended section 5 of the act. For other reasons, we should proceed with particular care in the financial matters, especially in these critical times and until the trend of events is definitely determined.

Potter Finds Bond Issue in Public Interest

POTTER, Commissioner, concurring:

I concur in that part of the majority report which authorizes the issuance of \$60,000,000 of stock, but do not concur in the view that permission to issue \$80,000,000 of bonds should be denied. The withholding of permission to issue the bonds under the circumstances as they are presented, is, to my mind, hostile to the public interest.

The issuance of bonds to reimburse the treasury of a carrier and replace income used for additions and betterments not only is lawful, but has the sanction of established practice and general public and official approval. When carriers have in their income account surplus funds not needed, they have the right to distribute that surplus among their stockholders, and the control of such distribution is not within our jurisdiction. The question presented by the situation before us is whether the issuance of bonds to reimburse the treasury is proper, coupled as it is with the proposed distribution among the shareholders of the restored income. The importance which existing conditions attach to this question is obvious. It is not a good time to issue securities carrying the present high interest rates. If, however, securities must be issued, they should be issued so as to take advantage of the lowest available rate. A basis that is high is preferable to another basis that is still higher. The real question which is involved in the existing situation is whether permission to put out securities on one basis should be denied when because of that denial we will have to authorize the issue of securities on another and higher interest basis.

The investing public holds the bonds of the Northern companies maturing July 1, 1921, in the aggregate amount of \$215,000,000. The record made upon the public hearing before us when all interests were represented supports the conclusion that the plan proposed will accomplish a reduction of the interest burden upon the three properties considered together, substantially as low as has been available under any other plan. The Northern companies as Burlington stockholders naturally consent to the proposed bond issue and distribution. It does not appear that the minority of Burlington stockholders in any way will be injured thereby. We are to consider the question of public interest. Courts applying the law will attend to any question as to relative rights of shareholder. The comparatively favorable interest basis which the proposed plan affords serves the public interest in an important way. By reducing the aggregate interest burden of the three companies, their net income will be increased, the drains upon their earnings will be reduced, their aggregate strength and credit will be improved, and they will be enabled better to serve the public. A plan which facilitates the lowering of the basis upon which a large financial undertaking is handled should naturally have a tendency to improve the general credit situation in which carriers and shippers have a vital interest. This consideration will apply particularly to the carriers in the Northwest group.

We should deal with the substance of things. The ownership of approximately 97 per cent of the Burlington stock by the Northern companies justifies treating the Burlington company as an instrumentality through which its properties are owned by the Northern companies—if this may be done in justice to the minority of Burlington stockholders, and if that for the purpose of this application be so treated in justice to them. The stockholders of the Northern companies are the persons vitally interested in the situation before us. They own practically all of the assets of the Burlington company in the same way

they own the assets of the Northern companies. They must finance \$215,000,000 on July 1. It is natural and right for them to feel that if they can make a saving by using their Burlington security in part instead of relying entirely upon the property of their Northern companies, they should be permitted to do so, when to do so is, as in this case, consistent with the public interest and in the interest of the Burlington minority shareholders.

Daniels Says Permission

Granted Is Largely Ineffectual

DANIELS, Commissioner, dissenting:

The chief objection to the majority report goes not to what the report grants, but to the far more vital permission which it withholds. It concedes the propriety of capitalizing surplus to the amount of \$60,000,000 in stock, the effect of which is remote, while it denies the propriety of capitalizing surplus to the amount of \$80,000,000 in bonds, the beneficial effect of which would be immediate. It allows a stock dividend which will be available as a stock base for bond issues in the future, and denies a bond issue which will effect substantial economies in refunding at present. It provides for the future financing of the Burlington, while it disallows the means proposed for financing the current and pressing exigencies of the Burlington's proprietors. The permission granted therefore seems to me to be largely ineffectual.

The majority report evidently attaches no conclusive weight to the objection most seriously urged before us against the proposed capitalization of the Burlington's surplus—that a public service corporation has no right to declare dividends from invested surplus acquired from earnings during a period when the stockholders were receiving regularly a fair dividend upon the outstanding capital stock. It properly points out that the average rate of dividend paid from 1901 to 1920, was 8.5 per cent upon the abnormally low capitalization, and 3.916 per cent upon the average property investment in excess of bonds." It declares correctly that "there is no proof that this income is the result of excessive rates." It calls attention to the fact that "applicant's right to capitalize \$129,000,000 of the surplus has in fact been recognized by the public utilities commission of Illinois, the state of its incorporation"—all of which, it may be added, was in the form of bonds, not stock.

The majority report therefore affirms the lawfulness of this stock dividend as against uncapitalized surplus derived from earnings under reasonable rates and reinvested in property permanently devoted to the service of the public. The proposed dividend against the surplus, if the dividend took the form of bonds, is not denied by the majority report on the ground that such a dividend would not be for some lawful object within the applicant's corporate purposes, or otherwise in conformity to the requirements of the act of the legislature of 20a of the interstate commerce act. The denial is mainly based on the finding that "the applicant should not be permitted to increase its fixed charges without a showing of resulting benefit to applicant."

Why should applicant be permitted to increase the stock base on which additional dividends are anticipated, without a showing of resulting benefit to applicant? And why should the denial not extend to the issuance of a stock dividend to a railroad which has no need for more stock?

The answer suggested by the majority report is that the applicant has a need for more stock in order that it may have a larger stock base and in order that it may execute a new mortgage under which the permissible bond issues may be greater than those expedient under its present general mortgage. That this is technically true may be at once conceded. But the differentiation made between the additional stock which it may have and the stock needed for the additional bonds for which the railroad is found to have no need, rests on the rather tenuous ground that future financing will be promoted by an increase in stock. The total stock as increased, it may be observed, will carry no greater equity than the existing stock, and will be worth financially less than the mortgage needed. This distinction is only a valid distinction between the two parts of the application, what justification can be found for a proposal to capitalize surplus derived from earnings and invested in the property when there is no intention of executing a new mortgage requiring an enlarged stock base, if by executing any more

gage at all? No one may question the right of owners to compensation for sacrifices made in foregoing dividends, as the majority report affirms, but it would appear that the finding of the need of the railroad for more stock which will cast an increased dividend charge on the carrier and the simultaneous finding of no need for more bonds carrying additional fixed charges is rested on an essentially technical or formal basis.

The essential error, as it appears to me, in the reasoning of the majority report is centered in its too exclusive consideration of the Burlington as a separate and distinct legal entity, and in a disregard of the essential factors in the case. Railroad corporations, after all, are legal entities created by which individuals effect their ends. To disregard the individual shippers served and the individual investors involved, to say nothing of the general status of railroad credit, by confining attention to the legal entity known as the Burlington, is to miss the significance of the whole situation. The two northern carriers, the Northern Pacific and the Great Northern, own substantially 98 per cent of the stock of the Burlington. "Both the wisdom and legality of the joint acquisition . . . are questions foreign to this proceeding." Since they acquired their ownership they have permitted a large part of the Burlington's earnings to be reinvested in extensions, additions, and betterments. In consideration thereof they are to obtain a stock dividend of approximately \$60,000,000. But these northern carriers in their acquisition of the Burlington stock executed joint obligations of approximately \$215,000,000 which fall due on July 1, 1921. The refinancing of an amount as great as this is unparalleled in the history of railroads, and is being undertaken at a time when the ordinary run of investments is carrying unusually high rates of interest. The plan which these northern companies propose is to discharge a part of this huge obligation by obtaining \$80,000,000 in bonds of the Burlington, of which they are the proprietors, and by applying the proceeds thereof to that end. The residue of the indebtedness they propose to finance jointly or severally by the issuance of their own obligations. In essence, their plan, matured after months of study, is to redistribute the \$215,000,000 of indebtedness, so that a part thereof will be secured by the bonds of the strongest member of the trio. If the proposition were to saddle a part of the indebtedness on a carrier only distantly related to the two northern companies, and in which they had not for 20 years past reinvested the greater part of its earnings to which they were currently en-

titled in dividends, the plan would merit instant disapproval. But in thus proposing to mortgage the Burlington, they are mortgaging property built up out of earnings to which as proprietors they might during the past 20 years have asserted and enforced their claim. In reality, therefore, the proposal is akin to one which proposes in discharge of indebtedness, to pledge as part security that which, by reason of their equity therein, is their most available asset. It is testified that this plan of refunding will save annually in fixed charges an amount computed to be not less than \$688,000, and which may be as great as \$3,529,000. The exact annual saving depends on the interest rate necessary if the two northern carriers allow issue bonds for refunding. This annual saving in fixed charges is the essence of the matter. In the aggregate, the saving spread over the life of the bonds proposed to be issued, will be of the greatest magnitude.

To deny the proposed issue of Burlington bonds to the effect that the refunding can be accomplished at an undefined but reasonable rate of interest by the issuance of mortgage bonds by the two northern companies alone, secured by the pledge of the Burlington's stock, appears to me to be a radically unwise step. When the transportation act, 1920, prescribed a return to carriers uniform for all rate groups, and expressly stated that the efficient and economical "management" the rejection of a project which would permit savings in fixed charges running into the millions, is directly at variance with the expressed object of the statute.

It is, of course, conceded that the application to capitalize surplus for a bond dividend ought not to be granted, unless it clearly appears that such a dividend, which might properly be restricted to the \$80,000,000 requested for refunding purposes, would leave a substantial surplus uncapitalized, and would involve no reasonable doubt of the Burlington's ability to meet the additional fixed charges. These matters are not discussed in detail in the majority report, and are therefore analyzed in the margin.* The separate question of the specific benefit to the Burlington of its co-operative operation with the two northern lines is recited in the dissenting memorandum of Commissioner Ford.

There are two further observations which seem pertinent. The first is that the approval sought of the pending application is based on the situation disclosed in this particular case, and would affect not at all the indefinite continuance of the joint ownership of the Burlington by the two northern lines, or the question of future consolidations that may arise under section 5 of the interstate commerce act.

The second relates to the responsibility of certain financial interests and institutions for the rate of interest on whatever securities may issue to effect the refunding of the Burlington Joint 4's. The rates of interest currently prevalent, are fundamentally traceable to world-wide causes which can be affected only in a minor and largely inappreciable degree by the instrumentalities through which securities are currently marketed. Just as the rise in war prices was a universal outcome of the relative scarcity of commodities, so the prevalent high rates of interest are a result of the universal dearth of capital seeking investment as compared with the current demand therefor. The high interest rates, as has so often been said, are rather the symptoms of the evil the industrial world confronts in the relative dearth of capital, rather than the essential evil itself. Holders of maturing obligations are offered a wide range of choice in investments carrying attractive rates of return. The instrumentalities which effect the marketing of securities have therefore to reckon with a situation not of their creation and which they can not materially affect.

Eastman Objects to Capitalization of Surplus

EASTMAN, Commissioner, dissenting in part: I concur in the remainder of the majority, except that I believe the stock dividend should also be denied.

The chief purpose of the stock and bond dividends sought is to meet the needs, not of applicant, but of its stockholders, the Northern Pacific and the Great Northern. The most persuasive argument in favor is the saving in interest charges which might result. The total amount now total about \$215,000,000 fall due on July 1, 1921. It is testified that if the attempt is made to refund them by the issue of bonds of the same kind, it may not be possible to do so on better than an 8 per cent basis. On the other hand, applicant can issue \$80,000,000 of bonds on a 6 per cent basis, and if it is permitted to do this, and to turn over the proceeds, or the bonds themselves, as dividends to the Northern Pacific and Great Northern, the amount so realized can be used to retire some of the maturing bonds and the remainder can be refunded by the issue of mortgage bonds of the northern lines, with the net result that something like \$3,500,000 in interest charges may be saved. This saving is apparently figured by comparison with the issue at 8 per cent of collateral trust bonds like those maturing and not by comparison with the issue of mortgage bonds of the northern lines for the total amount.

But is the reasoning sound? In 1901 the

*Making reasonable allowance by way of offset against the applicant's asserted investment out of earnings since June 30, 1901, and down to August 31, 1920, it may be reasonably assumed that a surplus in excess of \$140,000,000 has since that period been accumulated by the applicant out of earnings invested in and now existing in railway property permanently and necessarily devoted to serving the interests of the public and no part of which is now represented by issued capital obligations outstanding. It may be added that if applicant's contention is substantiated with reference to amounts legally due by reason of the guaranty for the six months following federal control and for compensation during federal control, the corporate surplus which it now claims will be materially augmented. On August 31, 1920, the applicant's comptroller estimated as due under the guaranty alone \$21,668,851.15.

It is generally conceded that where a carrier has accumulated a surplus a certain part thereof should remain uncapitalized. This part should cover non-revenue earning property, and also serve as a certification of credit. If such a minimum surplus remains uncapitalized, but is invested in revenue-earning property, there is an assurance that even in times when the ordinary level of returns is somewhat depressed, the carrier's earnings from a property base in excess of surplus capital will afford the opportunity to pay returns upon the capital outstanding. It is therefore proper to inquire what residual surplus would remain uncapitalized should a total issue of \$60,000,000 in stock and \$80,000,000 in bonds be approved in this case. Applicant's balance sheet for August 31, 1920, shows as before indicated, and exclusive of \$21,668,851.15 estimated to be due under the guaranty, a surplus of \$233,239,309.28. If the corporate surplus last indicated be reduced by \$10,767,815.75 for estimated additional depreciation in equipment not yet carried in the carrier's accounts, said corporate surplus would be reduced by the issuance of \$27,435,614.93 in total securities to \$22,471,493.53. This, however, represents the total corporate surplus as against which there stand assets of the applicant in equipment not yet carried in road and equipment. However, the remaining uncapitalized surplus may be raised from an estimated \$27,435,614.93 balance sheet aforesaid gives as investment in road and equipment \$503,745,837.57. If we deduct therefrom not only the accrued depreciation on equipment of \$30,647,507.63 now carried among the corporate liabilities, but also the additional estimated depreciation of \$1,785,000.00 on the investment in road and equipment would be reduced to \$452,330,514.19. This last named amount would exceed by \$27,450,614.19 the total outstanding securities in which they would exist. The additional \$140,000,000 in securities to be now authorized. When in addition to this \$27,450,614.19 the allowance is made for the estimated amount of \$21,668,851.15 due under the guaranty, there would be in excess of the outstanding capitalization over \$49,000,000, to which, if we were to estimate the total corporate

surplus, a large and substantial addition would have to be made for cash on hand amounting, as of August 31, 1920, to over \$17,500,000 for investments in affiliated properties, especially the Colorado & Southern, all of which, even when allowance is made for offsetting items would indicate a residual uncapitalized surplus of such substantial magnitude that it is clear that the issuance of \$140,000,000 additional securities would not fail to leave an ample margin of uncapitalized surplus.

The net income and income applicable to dividends since July 1, 1901, stated in tabular form, are as follows:

Term	Net income	Income applicable to dividends
Since July 1, 1901	Total	\$351,818,777
	Annual average	18,355,759
Since July 1, 1909	Total	245,198,601
	Annual average	21,958,077
Since July 1, 1914	Total	161,091,710
	Annual average	26,122,966
		24,917,621

If we assume that future income would approximately equal that since July 1, 1914, it is apparent that, after making the requisite deductions therefrom, including the additional interest charges, there would remain an average annual net income of \$21,322,966 and an annual income applicable to dividends of \$20,117,621. This latter amount would suffice to pay a dividend of 6 per cent on \$370,839,100. In excess of \$17,500,000 for investments in capital stock would have been increased to pay a dividend of 6 per cent thereon, leaving annually \$9,867,275 available for extensions, additions and betterments. It should be stated that in the figures just cited the amounts for 1918 and 1919 based on applicant's just compensation under federal control and the amount for the months ended August 31, 1920, on the guaranty under section 209 of the transportation act, 1920. For the 12 months of 1920 the railway operating income of the applicant, deducting for equipment rents and joint facility rents, appears to be only \$8,012,045.93. These figures, however, covered applicant's operating income and do not include any part of the estimated amount of \$21,668,851.15 due under the guaranty. Applicant's lessened earnings in 1920 appear to be attributable to causes which have affected all carriers. Assuming, as we may, that these causes are but temporary and have been in a measure counteracted by increased rates accorded, it can not be said that the public interest is adversely affected by the proposed security issues impairing the substantial soundness of applicant's financial structure.

holders of Burlington stock sold it at the exorbitant price of \$200 per share, and 4 per cent interest has since been paid upon that amount, equivalent to \$8 per share on the stock. If, upon maturity, they should be offered, in place of the collateral trust bonds, an equal amount of 6 per cent mortgage bonds (or bonds secured in part by the stock and in part by the mortgages on the Northern Pacific and the Great Northern), this would be equivalent to \$12 per share on the stock originally sold, or a return 50 per cent greater than has been paid for the past 20 years, combined with greater security. Would they reject such an offer and insist upon 8 per cent bonds, doubling the return, as the wisdom of the railroad carriers struggling desperately against a temporary tide of depression?

I have enough confidence in the investors of the country so that I do not believe that they would, if the situation were frankly explained and its bearing upon the general welfare of the country made clear. I realize the difficulty in attempting to control the rate of interest, but the rates of interest. But this is a unique situation, and I am confident that investors will readily appreciate that under its special circumstances, and looking beyond the immediate present, they have more to gain than to lose from forbearance and moderation.

There is, moreover, a further alternative. Under the plan during the first 4½ years, the holders of three-fourths in interest may agree upon default, to accept applicant's stock in full satisfaction of their claims, and by such agreement they may bind the remaining one-fourth in interest. If this method of meeting the situation could be adopted, it would, it seems to me, be to the advantage of all concerned. For 20 years the northern lines have held control of the Burlington system and the benefits have been admittedly large. But the advantages of such control are no longer so important as they once were, in view of the wide powers over divisions, the routing of freight, and the use of terminal facilities conferred upon us by the transportation act, 1920. The return of applicant's stock to the holders of the joint 4½ would place them in immediate possession of these very valuable shares; the chief argument for imposing upon applicant a new load of fixed charges would be gone; the credit of both the Northern Pacific and the Great Northern would be improved; by the reduction in their own fixed charges, the way would be left open for the consideration, without embarrassment, of the possible future union of the Burlington system with other railroad properties.

But the question before us is larger than one of mere interest rate. Applicant asks authority to issue \$80,000,000 of mortgage bonds and \$60,000,000 of stock, both issues to be used for dividend purposes. The bond dividend will be 6 per cent, and the stock one of 54 per cent. The total would fall short but \$35,000,000, in par value, of the aggregate paid in dividends since 1901. The dividends prior to that year are not stated of record, but no claim is made that the return was inadequate. Since 1901 the dividend rate has averaged 8.5 per cent. The \$140,000,000 of bonds and stock now sought for dividend purposes represent additional earnings which were turned back into the property. In other words, it is proposed to capitalize \$140,000,000 of invested surplus. If all the excess earnings had been paid out in dividends from year to year, however, the aggregate of such dividends would not have equaled the present surplus, for it has grown in part from its own earnings.

Authority to issue these securities can not be claimed as of right. It is subject to our determination, and we may grant authority only if we are able to make the statutory finding that the issue is "compatible with the public interest" and for an object "which is necessary or appropriate for or consistent with the proper performance by the carrier of its public service as a common carrier, and which will not impair its ability to perform that service."

Nor is it possible by denying the application to deprive applicant of any right. On this point there has been much confusion of thought. If the Burlington is lawfully entitled to 6 per cent for the return upon the fair value of all its property, including invested surplus, nothing that we can do can take away this right; and such return, if earned, can be paid regardless of the volume of securities outstanding. The real question, therefore, is whether it is "compatible with the public interest" to translate the invested surplus into shares of

stock and mortgage bonds. I operate it is not, both because such translation may operate to enlarge the rights of applicant as against the public and prejudice the consideration of a question which has an importance spreading far beyond the limits of this case, and because it will weaken applicant's splendid financial strength.

The carriers have again and again told us that sound public policy demands that rates be high enough to permit not only the payment of reasonable dividends, but the accumulation of large surplus reserves. Some have reduced this to the rule that for every dollar paid in dividends, a dollar from earnings should be invested in the property. Financiers have been equally emphatic in favoring such a policy. Summarizing the arguments, we hold that the public and stockholders are interested quite as much in regularity and dependability of dividends as in their amount; that surplus reserves are necessary to maintain such regularity, and to protect against inevitable and wide fluctuations of earnings and financial disturbances; that they are needed for improvements which will not immediately yield revenues to which we will never do so, but are required to enable a company to keep abreast of the times and furnish the best of service; and that they are equally necessary to enhance credit and enable financing upon favorable terms without disproportionate increases in funded debt.

With the representations of the carriers in favor of surplus earnings, have gone equally emphatic representations by shippers. They claim that when such earnings over and above reasonable dividends, are invested in carrier property, the public, having provided the funds, has an interest in that property and can not fairly be asked to pay the same return upon it as upon property representing actual sacrifice by investment. They will never do so, but are required to provide both capital and return. While such a surplus may be the property of the carrier, the claim is that the circumstances attending its accumulation impose a duty upon the carrier at least to share its advantages with the public, and that this duty may be considered in valuation for rate making purposes.

It is not a sufficient answer to this doctrine to say that the property acquired from surplus earnings is owned by the carrier, for the rights of ownership are not absolute, but limited by the dedication of the property to the public use and the circumstances of such dedication. Nor is it enough to say that the surplus might have been distributed to the stockholders at the time it was earned, for the property might well have yielded an acquiescence in rates producing excess income if that income had not been used for the improvement of the property. The question has many aspects. It would be a curious anomaly to accept the theory that rates should be high enough to permit the investment of income in non-revenue-producing improvements, and then hold that a company may exact a rate upon such property. It would be just as anomalous to approve the building up of sinking funds for the retirement of debt, and then permit the exaction of a return upon the property for which the debt so retired was incurred, or permit its recapitalization. Over \$31,000,000 of applicant's surplus was derived from the retirement of debt in this manner, and more than \$10,000,000 is represented by sinking funds in process of accumulation.

The courts have said that a carrier is entitled to a reasonable return upon the fair value of its property, but the full meaning of the words "fair value" still remains to be determined. Without undertaking to argue the point now, I think it clear that the word "value," as it has thus been used by the courts, has a meaning quite different from that which it carries in ordinary usage. It has been said that the determination of such value is "the determination of what, under all the facts and circumstances of the case, is the just and equitable amount upon which the return allowed to the corporation should be computed."

I make no claim that the Supreme Court of the United States has yet conclusively determined that property acquired from excess earnings is to be treated differently from other property in valuation for rate-making purposes. I do believe that this is still an open question.

The carriers are inclined to ridicule the suggestion that the surplus accumulations are held in any way as a trust fund in behalf of the public. From one standpoint this ridicule may be justified; but nevertheless there is, I believe, a trust in connection with these accumulations. The trust is upon us. Whatever may be our views as to the merits, we ought to take no

action which will foreclose or impair the opportunity to bring this issue fairly before the Supreme Court. To permit the capitalization of surplus will, I fear, do this very thing.

The danger involved is the more important because the question at issue is closely allied to the question involved in the recapture of excess earnings under section 15a of the interstate commerce act. Indeed, the argument before us upon the application of the Declaratory Act, and the fact that the carriers have sought to have the Interstate Commerce Commission and the Federal Reserve Board and Western for authority to capitalize surplus, counsel for the Association of Railway Executives urged the right of stockholders to all the earnings of the property in substantially the same terms that have been employed in questioning the validity of the recapture provisions of the present act.

Summing up this phase of the matter, applicant may have a right to a return upon its surplus, but whether or not the surplus shall be translated into stocks and bonds is subject to our determination under the law, and whatever right to a return it has, can not be lost by the denial of the application. On the other hand to grant the desired authority may prejudice and embarrass the decision of a question which has far-reaching importance.

But there is a further ground for denial, entirely separate and distinct. Assume all the carriers claim with respect to the first fund, that they should have the stock and the dividends proposed are "compatible with the public interest?"

At this point we hark back to the reasons for surplus accumulations which have been urged upon us over and over again. No better proof that such accumulations do improve credit could be offered than the testimony that applicant is unable to obtain \$100,000,000 of stock on a 6 per cent basis. How many carriers can do this under present conditions? If its credit has thus been enhanced, will it not be impaired by the addition of \$4,800,000 per year to its fixed charges and by the capitalization of all but a comparatively small portion of its surplus? And has the public no interest in such impairment?

Consider the matter from another angle. Our attention has repeatedly been called to the danger of a disproportionate increase in funded debt and we have been told that it is vital that the carriers should be able to finance their needs in part by the issue of stock. With its present capitalization of applicant, one of the very few railroads in the country which could probably make stock—if not common, at least preferred—even under present conditions. Will not the distribution of \$60,000,000 of stock gratify applicant's ability to some extent at least?

And if stock dividends are not open to question, what should be the rate of interest? After its stockholders have foregone extra dividends for years and approved the use of surplus earnings for improvements in times when money could have been borrowed at 4 per cent or better, can it be argued that it is sound financial policy to permit applicant to reverse this procedure and borrow money on the worst market in its history for the purpose of reimbursing stockholders for their previous moderation? To ask this question is to answer it. The surplus has been invested in property. Even if the stockholders have a right to demand a return upon that property, they are certainly not to be denied the right to apply for new issue mortgage bonds for the sake of applying in the treasury, for distribution in dividends, the cash which was so invested.

The truth is that applicant, as it is now capitalized, is one of the fortunate carriers of the country. If all other carriers had been financed with equal conservatism and sound financial judgment, our financial problem would be far less serious. Its credit is unsurpassed, its stockholders seem assured of regular and dependable returns, for 20 years they have had dividends averaging more than 8 per cent, and if they should now wish to reap the reward of good management by increasing the regular dividend rate, they could do so by occasional extra dividends, there are few who would question the appropriateness of such action. Applicant ought not, I think, in the public interest or in its own interest, to be permitted to abandon this position of vantage in the absence of compelling need by greatly increasing the volume of its outstanding securities and the measure of its fixed charges. Rates would ought to avoid unnecessary increase in capitalization and finance its own actual needs by the issue of stock, or by this is for the time being impracticable, or the issue of bonds and stock in equal proportions.

The kernel of the application is the request for authority to issue \$80,000,000 of bonds. The \$60,000,000 stock dividend which the majority have approved is a far less important part of the plan and, without the bonds, will be of relatively little consequence to applicant or its stockholders. From the public standpoint the objections differ only in degree. The application should, I feel, be rejected in its entirety.

Foab, Commissioner, dissenting:

Although I concur in so much of the majority report as authorizes the issue of capital stock, I dissent from the finding that applicant has not justified the issuance of bonds against its surplus. I allow that the formal terms in which the application was made did not warrant our approval of the bond issue as proposed. I allow that on the face of it any proposal to issue bonds as a dividend to stockholders is not only vicious in character, but is also reminiscent of practices that have in the past brought shame and disgrace upon American railroad manage-

ment which it was planning to obtain by extension of its lines, and when the Northern Pacific and the Great Northern were in need of terminal facilities at Chicago and other western cities which they were planning to obtain, it was decided that combination of interests would supply them more economically and efficiently than would be possible by independent action, each carrier for itself. After efforts made in various directions, the northern carriers in 1901 obtained control of the Burlington. Since then the mileage owned and operated by the Burlington has been increased over 1,334 miles and the freight tons handled have increased from about seventeen millions in 1901 to over forty-nine millions in 1919. The financial results of this increase are set forth in the following table, in which the Burlington is contrasted with systems of similar character, one of which, the Chicago & Northwestern, had been sought in the way of similar alliance before the northern carriers turned to the Burlington:

ity to serve the public would be at all impaired.

The immediate need for a bond issue is to provide for the maturing obligations of the northern carriers, contracted in acquiring their holdings of Burlington stock. If they can get the use of \$80,000,000 of Burlington bonds they say they can by that much reduce the amount of their maturities and can then refund the remainder at about 6 per cent. If denied that resource, they say they will not be able to effect refunding for less than about 8 per cent. The majority report does not share applicant's apprehensions relative to the difficulties of refunding operations at a reasonable rate of interest without this Burlington bond issue, but it will scarcely be disputed that it will cost more without that issue than with the use of it by the controlling roads.

The evidence presented to us has been such as to convince me that the practical results of the relationships between the Northern Pacific, the Great Northern and the Burlington have

Net income				Net income			
	Chicago & Northwestern Ry. Co.	Chicago, Milwaukee & St. Paul Ry. Co.	Chicago, Burlington & Quincy Ry. Co.		Chicago & Northwestern Ry. Co.	Chicago, Milwaukee & St. Paul Ry. Co.	Chicago, Burlington & Quincy Ry. Co.
Year ended June 30, 1901.	\$10,146,563	\$8,183,157	\$8,159,520	Year ended June 30, 1911.	12,828,100	16,358,314	17,506,073
Year ended June 30, 1902.	10,810,328	9,640,458	10,060,064	Year ended June 30, 1912.	11,505,313	9,913,838	14,764,732
Year ended June 30, 1903.	10,751,849	10,473,259	13,395,047	Year ended June 30, 1913.	14,875,013	16,643,038	20,086,196
Year ended June 30, 1904.	9,625,241	10,718,401	12,943,111	Year ended June 30, 1914.	15,506,142	15,457,268	17,774,268
Year ended June 30, 1905.	10,642,822	11,839,259	13,829,905	Year ended June 30, 1915.	19,914,049	12,108,175	19,041,919
Year ended June 30, 1906.	15,026,053	10,782,764	12,852,199	Year ended June 30, 1916.	17,282,510	16,860,684	29,846,270
Year ended June 30, 1907.	15,965,566	13,489,813	13,141,931	Year ended Dec. 31, 1916.	20,368,924	16,209,842	32,994,726
Year ended June 30, 1908.	13,864,191	12,555,450	12,684,089	Year ended Dec. 31, 1917.	17,125,031	4,661,595	26,032,632
Year ended June 30, 1909.	14,159,794	13,112,200	13,046,909	Year ended Dec. 31, 1918.	9,810,822	6,457,361	22,792,500
Year ended June 30, 1910.	12,523,997	17,315,815	13,975,621	Year ended Dec. 31, 1919.	13,453,186	7,785,453	23,542,471

ment. But the application was accompanied by explanations of purpose, which purpose we had power to secure by appropriate stipulations, that seemed to me to entitle it to our favorable consideration to the extent of granting authority to issue \$80,000,000 in 6 per cent bonds as well as \$60,000,000 in stocks. It seemed to me that when the circumstances of the case were duly considered, the essence of the proposition before us was whether we should facilitate arrangements tending to conserve the present relations between this applicant and the controlling roads and to obtain for them needed financial accommodations on favorable terms.

The record shows that nearly 98 per cent of the capital stock of the Burlington road is held in joint ownership by the Northern Pacific and the Great Northern. At a time when the Burlington was in need of Pacific Coast termini

it is admitted that although the fixed charges of the Burlington would be augmented by this bond issue, its capitalization per mile would still be low as compared with that of other large systems in the same general territory. Per mile of road owned it amounts for the applicant, to \$31,836.45, as against \$46,232 for the Chicago, Rock Island & Pacific; \$47,919 for the Chicago & Northwestern; \$52,641 for the Great Northern; \$55,875 for the Atchison, Topeka & Santa Fe; \$56,046 for the Missouri Pacific; \$60,165 for the Chicago, Milwaukee & St. Paul; \$65,483 for the Northern Pacific; and \$87,196 for the Union Pacific. In case there were authorized \$60,000,000 additional stock and \$80,000,000 additional bonds, or a total of \$140,000,000, the applicant's capitalization per mile would amount to \$47,478. I see no grounds whatever for thinking that the applicant's abil-

ity to serve the public would be at all impaired. The immediate need for a bond issue is to provide for the maturing obligations of the northern carriers, contracted in acquiring their holdings of Burlington stock. If they can get the use of \$80,000,000 of Burlington bonds they say they can by that much reduce the amount of their maturities and can then refund the remainder at about 6 per cent. If denied that resource, they say they will not be able to effect refunding for less than about 8 per cent. The majority report does not share applicant's apprehensions relative to the difficulties of refunding operations at a reasonable rate of interest without this Burlington bond issue, but it will scarcely be disputed that it will cost more without that issue than with the use of it by the controlling roads.

The evidence presented to us has been such as to convince me that the practical results of the relationships between the Northern Pacific, the Great Northern and the Burlington have

Interstate Commerce Commission Orders Increase in Texas Rates

WASHINGTON, D. C.

THE INTERSTATE COMMERCE COMMISSION has rendered its decision in the Texas intrastate rate case in which, following similar decisions in other states, it orders an increase in the intrastate rates and fares corresponding to the increases allowed on interstate traffic in its decision in Ex Parte 74. The Texas commission had limited the increases in intrastate rates and charges for freight service to 33½ per cent in place of the 35 per cent which was allowed for interstate traffic in that territory, and it denied any advance in passenger fares on the ground that it was without jurisdiction to authorize increases above the rates fixed by the state statute, which provided for a fare of 3 cents per mile.

The commission in its decision refers to its previous decisions and orders in various cases affecting Texas rates, particularly the Shreveport case, in which maximum class rates and many commodity rates were prescribed and says that under the requirements of the Shreveport case and other cases in which the Shreveport scale has been prescribed the rates on interstate commerce to and from Texas and the great majority of rates on intrastate traffic in Texas have been placed upon a fixed and non-prejudiced relationship which was not destroyed by the decision in Ex Parte 74.

It is estimated that less than 30 per cent of the traffic moving intrastate over the 26 principal carriers in Texas was affected by the order of the Texas commission. The rates on

over 70 per cent were increased 35 per cent to accord with the increases in interstate rates. The commission in its decision says in part:

Based on the intrastate revenue of the principal Texas lines during the year 1919, derived from freight traffic not subject to the orders in the *Shreveport Cases*, and assuming that the same volume of traffic will continue in the future, the carriers estimate that their annual loss in revenue, due to the restrictions placed upon them by the Texas commission, will approximate \$265,000. The anticipated loss in passenger revenue is much greater. During 1919 the Texas lines earned from their intrastate passenger traffic slightly less than \$35,000,000. With the same volume of traffic the fares approved by us and made effective on interstate travel would yield an annual return greater by \$7,000,000. It is estimated that an additional loss of over \$1,500,000 will result from their failure to receive the surcharge upon passengers occupying space in sleeping and parlor cars. The record shows that for the seven months ended July 31, 1920, the operations of the Texas lines, including both state and interstate traffic, were conducted at a loss of more than \$10,000,000.

For many years the passenger fares in Texas were the same per mile as those assessed for the interstate carriage of passengers. Since August 26, 1920, the intrastate passenger has been accorded a material advantage, although he may travel in the same train and even in the same seat with an interstate passenger who pays a higher fare. A passenger from Shreveport destined to Houston, for example, will pay a fare of \$8.38, exclusive of war tax, for the distance of 233 miles, while an intrastate passenger from Longview, going to the same point, will be required to pay but \$6.98 for the same distance, a difference in favor of the latter of \$1.40. For most of the distance they may travel on the same train. A passenger traveling from Kansas City to Houston occupying a lower berth will be charged a total fare of \$38.82, including war tax, while an intrastate passenger traveling from

Sierra Blanco to Houston, substantially the same distance, will be charged \$29.87, or \$8.95 less.

Business houses located in Shreveport, Kansas City, and cities in other states compete with local Texas concerns in the development of trade and commerce in Texas. One of the items of expense common to both is the railroad fare of salesmen. The higher basis of fares required is a burden on them.

The lower fares in Texas tend to convert interstate revenue into intrastate revenue. This results from the common practice of rebuying tickets at border points, paying the intrastate fare in Texas and the interstate fare beyond the border. The record indicates that at three such points on the Texas & Pacific Railroad, 120 passengers, on an average, are daily rebuying tickets to defeat the interstate fares. The Missouri, Kansas & Texas Railroad enters the state of Texas near Denison, and the number of passengers rebuying tickets at that point renders it necessary at times to hold the trains for their accommodation. Because of the large territory covered by the state of Texas the practice of rebuying tickets causes a substantial loss to the carriers. The distance from the eastern border of the state to the western border is over 900 miles and the earnings on interstate travel may be adversely affected to the extent of \$5 per ticket on travel across the state, and, with Pullman surcharge added, over \$8.

The carriers introduced voluminous exhibits in which they have undertaken to apportion their revenues and expenses between state and interstate freight traffic and thus determine the rates of return on the values of their properties within the state devoted to the public use. The information was developed by the application of what is known as the Oklahoma formula—a formula devised to provide a means for segregating revenues and expenses as between freight and passenger traffic, line and terminal, and state and interstate. The general purport of these exhibits is to show that the carriers, as a rule, have received during recent years a lesser rate of return from their intrastate than from their interstate operations.

Evidence relating to the earnings of the carriers on state traffic was received over objection of counsel for the state commission, and in order to afford that commission an opportunity to submit similar data in its possession, upon which it had predicated its findings, a further hearing was ordered. The record as supplemented, contains the calculations relied on by the Texas commission as establishing the fact that an increase of 33½ per cent in intrastate freight rates, added to the amount derived from the increased interstate rates and fares, would yield the carriers fully 6 per cent net return on the property investment.

We deem it unnecessary for the purposes of this report to enter upon a discussion of the testimony and exhibits dealing with the valuations of railroad properties in Texas and the earnings of the carriers on state traffic. In a proceeding similar to this, *Increased Rates within Illinois*, 59 I. C. C., 350, it was urged that in prescribing the measure of the increases to be applied to the rates and charges of the carriers throughout the country necessary to yield the return fixed by Congress for the two years beginning March 1, 1920, we had failed to determine the values of the railroad property separately in that and other states. We pointed out therein that Congress had laid upon us the duty of prescribing rates so that in the aggregate they would yield a certain return, as nearly as may be, "upon the aggregate value of the railroad property of such carriers held for and used in the service of transportation," and expressed the view that the interstate commerce act required us to determine upon a valuation for the total property of the carriers and not for the property that might be assigned to interstate traffic. We adhere to that view and repeat that, in our opinion, the manifest intent of Congress was to repose in us full and final authority to provide the revenues found necessary to yield the specified return by considering the entire structure of rates, both state and interstate, and the aggregate value of the railroad property held for and used in the service of transportation without regard to state lines, and to protect interstate commerce against any rate, fare, charge, classification, regulation, or practice that causes discrimination.

Accident Reports, Third Quarter, 1920

THE INTERSTATE COMMERCE COMMISSION, Bureau of Safety, has issued its "Summary of Accident Investigation Reports No. 5," which is for the quarter ending with September, 1920. The pamphlet fills 56 pages and the index shows 25 accidents, as follows (the first two occurred in 1919, all of the others in 1920):

ACCIDENT INVESTIGATION WITH REFERENCE NUMBERS
650. Baltimore & Ohio, Glenwood, W. Va., December 11.
653. St. Louis-San Francisco, Knobview, Mo., December 21.

- 703. Minneapolis & St. Louis, Livermore, Iowa, July 3.
- 704. Peoria & Pekin Union, Acme, Ill., July 3.
- 705. Lackawanna & Wyoming Valley, South Pittston, Pa., July 3, 1920.
- 706. Missouri, Kansas & Texas, Atoka, July 4.
- 707. Southern, Piedmont, Ga., July 8.
- 708. Atchison, Topeka & Santa Fe, Kirklind, Ariz., July 9.
- 709. Western Maryland, Conboy, Pa., July 23.
- 710. Texas & Pacific, Orphans Home, Texas, July 23.
- 711. Oregon Short Line, Zenda, Idaho, July 31.
- 712. Gulf, Colorado & Santa Fe, Nicholls, Texas, August 10.
- 713. St. P., M. & O., Hespera, Iowa, August 10.
- 714. Union Pacific, Corlett Junction, Wyo., August 19.
- 715. New York, N. H. & H., Yalesville, Conn., August 21.
- 716. Kansas City, Mex. & O., Paret, Texas, August 24.
- 717. Pennsylvania, Alliance, Ohio, August 26.
- 718. Louisville & Nashville, Mullins, Ky., August 27.
- 719. Pere Marquette, New Boston, Mich., September 1.
- 720. Denver & Interurban, Globeville, Colo., September 6.
- 721. Washington & Old Dominion, Clark, Va., September 11.
- 722. New York Central, Canastota, N. Y., September 18.
- 723. Texas & Pacific, High, Texas, September 20.
- 724. Detroit United, Ortonville, Mich., September 24.
- 725. Chicago, M. & St. P., Piedmont, Mont., September 30.

Of the collisions here described, eight, not including those on interurban lines, occurred on lines which are reported as having no block system in force. These eight are the Atchison, Topeka & Santa Fe; the Gulf, Colorado & Santa Fe; the Kansas City, Mexico & Orient; the Minneapolis & St. Louis; the Peoria & Pekin Union; the Southern; the Texas & Pacific, and the Western Maryland.

Trainmasters, dispatchers and others will find many interesting facts in this pamphlet, none the less interesting because several months old. Beginning on page 41 there is an instructive chapter on how not to manage things when running passenger trains on a double-track line against the current of traffic. The dispatcher and the superintendent come in for censure as well as men of lower degree.

The time-honored custom of running circus trains with cars in poor condition and without suitable brakes appears not yet to have been abandoned, as will be seen readily from the report of a collision at High, Texas, on September 20, 1920.

One report which the busy reader may perhaps think himself too busy to read is that of a rear collision at Canastota, N. Y., on September 18, in which two employees were killed and which report, after giving interesting details for more than a page, gives the true explanation in a single line, at the end; it appears that the engineer was at the time sound asleep.

For a case in which the conditions were 100 per cent bad the reader will perhaps turn to the report of a butting collision, page 20, near Piedmont, Ga., on July 8, resulting in the deaths of three employees, where the engineer overlooked an opposing train, and where the conductor and all the rest of the crew were unfamiliar with the road. And the engineer had only recently been promoted from fireman.

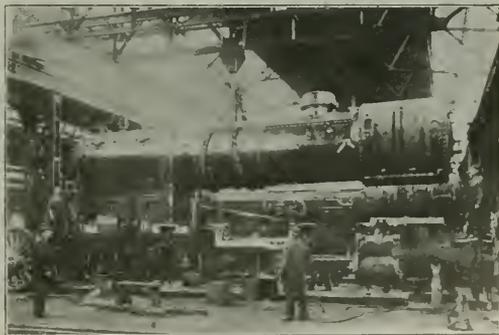


Photo by Keystone View Co.

A German Locomotive Plant Where Engines Are Being Built to Deliver to France Under Terms of the Treaty



THE CENTRAL ARGENTINE'S GORTON WORKS, PEREZ, ROSARIO

- 1.—Erecting Shop; 2.—A Corner in a Store Room; 3.—An Exterior View of the Locomotive Shops; 4.—Wheel Department; 5.—Blacksmith Shop; 6.—An Exterior View of the Power House; 7.—Inside the Power House



Multiple Unit Equipment on the Central Argentine's Suburban Line at Buenos Ayres

British Railways Predominate in Argentina

The Central Argentine's Modern Equipment and Efficient Methods
Exemplify the Country's Progress

By John P. Risque
Part III

BECAUSE OF THE OBVIOUS impossibility of describing in any detail the equipment and operations of all the railways of Argentina, it was decided to select one of the roads which because of its modern equipment and efficient operation could be said to exemplify the extent of railway progress in the country. The Central Argentine, as was

chain couplers, and the newer cars have vacuum brakes. The popular car roof is of corrugated iron, arched as are the roofs of the passenger cars. The grain cars are provided with manholes in the roofs to facilitate quick loading at the elevators. A considerable amount of freight is hauled in open-top cars covered with tarpaulins. Because of this fact "loading gages" are a feature of most of the freight yards. These gages are suspended loosely from a cross-arm attached to an upright mast. They indicate the limit in the height of the load. An offset is provided in the center to allow for the passage of the locomotive "chimneys."

Quick loading and unloading of cattle is facilitated by end doors placed in the cattle cars. A string of empties ready for loading is set on the patron's siding with the first car opposite the cattle runway from the corral and all of the end doors but the last one, at the end of the string of cars, are left open. The cattle are driven in through the first cars, and arranged in order in the last one, after which the door is closed and the loading goes on as before until the job is finished, the doors of each car being closed as the car fills. Compared to the laborious methods of loading cattle cars in this country—one car at a time loaded through a side door, the door closed and the next car pried into place with many pinch bars, and more or less profanity, or—what is more expensive still—a locomotive coupled to the string to move it when necessary—the efficiency of the Central Argentine's method furnishes further food for reflection for those who doubt the ability of foreigners to teach us anything about railroading. The plans showing the designs of those cars are available to us; further information concerning this superior method would probably be gladly furnished by its users. At water stations along the route the stranger's eye will probably not fail to notice the riveted leather waterspouts which hang from the standpipes, in place of the all-metal ball-jointed pipes in use in his own country. The British railroader could learn some things in America as well as teach us.



A Carload of Quebracho the Principal Fuel of Argentina

noted in a previous installment of this article, was chosen as meeting these requirements.

In the matter of freight equipment this road is comparatively well advanced. The greater part of its rolling stock in freight service consists of large box, flat and grain cars with four-wheel trucks. Many of these cars are of pressed steel. The old six-wheel "goods wagons" of small capacity are rapidly disappearing. Platforms have been added to a number of these old cars, insulation installed and lattice applied, and they are now giving good service as refrigerator cars. All of the rolling stock is equipped with buffers and hook and

In September, 1915, the first trains were run on the electrified suburban division of the Central Argentine at Buenos Ayres. This third rail double track system is now in operation between Buenos Ayres (Retiro station) and Tigre, a point on the river of that name about 18 miles distant. Multiple unit power is used, the current being generated at 20,000 volts at a special power house built for the purpose at San Fernando. This current is delivered to four substations along the line by underground cables and is transmitted to the third rails at 800 volts, d.c. The patronage of the line is exceedingly heavy and the service is fast and frequent. Steel underframe cars of unusual length, with doors in the center in addition to those at the ends, are run on this division.

Practically all of the road's cars are built at the Rosario shops, while extensive locomotive shops are operated 10 miles further out of the same city at a point called Perez. This plant bears the name of the "Gorton workshops" and was completed in June, 1912. The boundary fences of the layout include some 70 acres. At the main entrance to the yard is located the administration building for the mechanical department. This building is so well planned and maintained that it seems to the American railroader more like the headquarters of an industrial concern than the headquarters of a railway shop, so little used is he to convenience or comfort in the mechanical department plants in this country. Close inspection of this building, which contains the principal offices, the timekeepers' office, the drafting room, the medical consulting rooms and the mess room, will provide other little lessons here and there for the railroad man who is anxious to make his visit profitable.

The administration building itself would seem to teach that such elaborate preparations for the care of the occupants pay after all, in that the work done by employees so well taken care of can rightly be expected to excel that done by those who are provided only with the dingy and poorly equipped shop buildings used for such purposes elsewhere. Other observations confirm this generalization. For instance the mess room is equipped with convertible benches, the backs of the seats of which are secured by a conventional cast or malleable iron frame at each end and are hinged in such a manner that by pulling them forward a table is formed which has the added advantage that the part of the board upon which the workman leans before the change is the

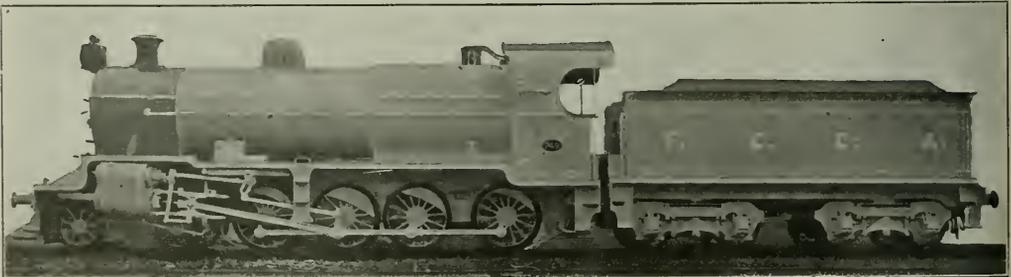
it a width of 125 feet and a floor area of nearly 39,000 sq. ft. The pattern storehouse is protected with automatic sprinklers. The blacksmith shop is 80 ft. by 340 ft. and equipped with 19 double and 14 single forges, 8 steam hammers and a battery of electrically driven power hammers, 6 oil furnaces and a section fitted with complete spring making and repairing machinery. The latter department, due to the scarcity of steel for the leaves of springs, has had a rather hard time of it during and since the war, the engineering



A Grain Elevator on the Parana River at Rosario, Argentina

department having had to resort to all kinds of methods to "get by," even to changing styles and sizes in order to utilize what small stocks of spring steel they could get.

The machine shop, including erecting and tender shops and a section for coppersmiths, is 413 ft. by 1000 ft.—the installation covers more than 9 acres. The two locomotive erecting bays are served by two 50-ton cranes, and the rest of the shop is equipped with a number of traveling cranes of less capacity. The boiler shop is 165 ft. by 415 ft. and is equipped with three 25-ton traveling cranes. The paint shop for locomotives is 66 ft. by 348 ft. and has an underground storage system for the care of all paints and varnishes. The main stores building has a floor area of 32,243 sq. ft. and is equipped with a great quantity of labor saving



A Central Argentine Freight Locomotive Equipped with a Superheater

bottom side of the table upon which he eats his lunch. A stop, arranged at the hinge, limits the travel of the frames to the desired point.

Lying close to the administration building are the electrical transformer substation, the pump houses and the elevated tanks for the shops' water supply. There are four main buildings in the shop system, viz., the pattern shop, the pattern storehouse, the machine shop and foundry. The foundry is 315 feet long and contains three bays which give

machinery. The whole plant shows in its design a due regard to providing for future expansion, based upon the Central Argentine's previous record for continuous growth. Electric power for the entire works is supplied by the company's power house in Rosario and is carried to Perez by $3\frac{1}{2}$ miles of underground and $6\frac{1}{2}$ miles of overhead cables at 20,000 volts. At Perez its three phase alternating current is reduced to 500 and 220 volts for power and lighting purposes respectively. The arrangements and equipment throughout

are of the best procurable. No expense seems to have been spared to make the plant complete and it stands forth as a monument to some individual's thorough understanding of the needs of the mechanical department of the road, which needs have for a decade been met in some supposedly more progressive countries by the crumbs which have fallen from the budget table.

In the completeness of the organization of this South American railway, the personnel department has not been overlooked. The company circulates its own "house organ" in Spanish and English every month. The publication is called the Central Argentine Railway Magazine. It is edited by the road's publicity department and contains in



A Modern Pressed Steel Gondola on the Central Argentine

some 50 pages all the latest news relating to additions, betterments and plans of the company, well illustrated with many photographs. There is also a "personal" department which covers the activities of the members of the staff of thousands of employees. The publicity department is responsible also for the time tables which are unique and—if the reader will pardon another admonition—teach another lesson to the American railroad man. These "horarios," as they are called in the language of the country, not only provide time tables, but contain many illustrations and descriptions of places along the lines with a comprehensive and easily read map of the entire system. Interspersed with this material are advertisements by concerns along the railway, which advertisements are not only unobjectionable, but, on the contrary, are highly instructive and serve to help the company pay for the printing cost.

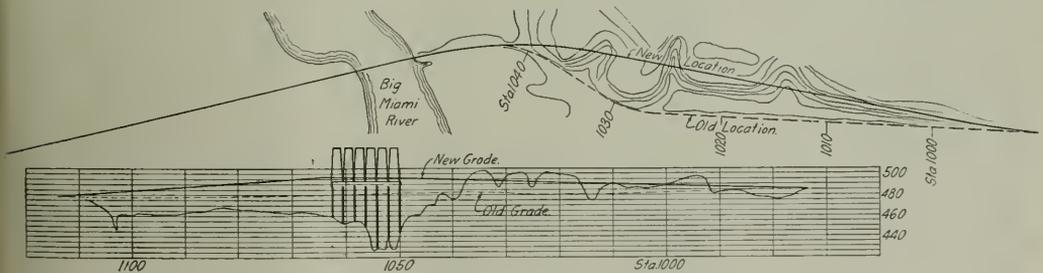
Baltimore & Ohio to Build Large Bridge

ONE OF THE MOST IMPORTANT railway bridge projects recently undertaken is that being carried out by the Baltimore & Ohio at Lawrenceburg, Ind., on the main line between Cincinnati and St. Louis. It consists in the renewal of the existing bridge over the Big Miami river with six spans of double-track, through riveted Warren trusses, each 206 ft. 2 in. center to center of end piers. In addition there will be two 45 ft. double-track deck plate-girder approach spans at each end. The total estimated weight of the steel work is 8,000,000 lb. One feature of the superstructure is the large operating clearance provided. The trusses of the through spans are spaced 30 ft. in the clear, thus providing for tracks at 14 ft. center to center with side clearances of 8 ft. The vertical clearance is 25 ft. above base of rail.

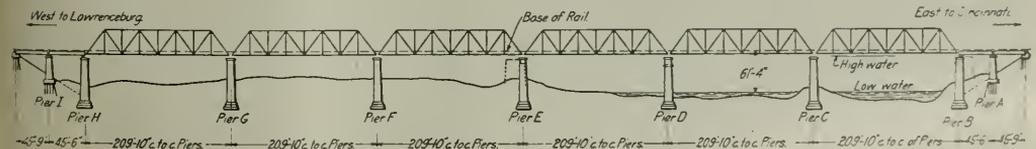
The project entails a raise of grade of about 10 ft. above the old rail level, and this change necessitates a relocation of the east approach so as to afford support for the new grade against the hillside. This is indicated on the map.

The substructure forms the most formidable part of the project and will be entirely new except for the use of one old pier (Pier D) which will be extended for second track and raised to the new grade. All of the piers supporting the truss spans will be carried to natural foundations by the means of the pneumatic process. The two abutments and the piers A and I under the girder spans will be carried on concrete piles. The caissons for all of the piers except the one embracing the old pier will be constructed of reinforced concrete.

The contract for the fabrication and erection of the superstructure has been awarded to the American Bridge Company. The masonry and grading contracts have been placed with the Vang Construction Company, Cumberland, Md. The entire project is under the general charge of H. A. Lane, chief engineer of the Baltimore & Ohio, Baltimore, Md.; the fabrication and erection of the superstructure is being performed under the immediate supervision of P. G. Lang, Jr., assistant engineer of bridges, while the steel work is in the hands of A. H. Griffith, district engineer, Cincinnati, Ohio.



Location Map and Profile, New Baltimore & Ohio Bridge



General Elevation of the New Baltimore & Ohio Bridge

Operating Statistics for December and 1920

The Interstate Commerce Commission has issued a summary of operating statistics for the month of December, 1920,

of roads having annual operating revenues in excess of \$25,000,000.

Some of the principal items shown in the statement are as follows (including mixed and special train service):

Region and name of road	Net ton-miles (millions)		Net ton-miles per loaded freight car-mile		Car-miles per car-day		Net ton-miles per car-day	
	1920	1919	1920	1919	1920	1919	1920	1919
New England Region:								
Boston & Albany.....	December 116	114	25.5	20.5	32.2	27.7	504	414
	12 months 1,592	1,421	24.9	22.0	27.9	31.4	478	490
Boston & Maine.....	December 287	304	26.2	22.9	16.3	16.0	288	276
	12 months 3,920	3,465	24.8	23.2	16.6	17.5	294	297
New York, New Haven & Hartford.....	December 250	263	25.2	21.0	12.8	20.9	208	208
	12 months 3,078	3,320	23.9	23.0	10.6	14.0	185	244
Great Lakes Region:								
Delaware & Hudson.....	December 357	328	36.3	35.3	28.6	27.2	663	652
	12 months 4,468	3,714	35.5	35.5	27.9	26.7	626	648
Delaware, Lackawanna & Western.....	December 453	416	29.0	27.0	33.4	30.0	621	516
	12 months 5,355	5,030	28.8	29.1	29.5	28.1	592	577
Erie (Including Chicago & Erie).....	December 1,011	973	32.1	29.7	30.4	30.1	636	606
	12 months 11,936	10,723	29.5	28.6	26.3	27.4	536	566
Lehigh Valley.....	December 484	486	13.9	29.2	25.9	21.7	527	437
	12 months 6,484	5,925	31.8	30.4	21.9	22.9	480	487
Michigan Central.....	December 339	455	25.6	23.9	25.7	19.3	400	351
	12 months 4,881	4,679	24.5	21.2	20.7	24.4	370	378
New York Central.....	December 2,631	1,905	30.8	25.7	25.3	21.0	456	480
	12 months 24,610	21,664	28.5	26.0	23.0	24.1	432	425
Pere Marquette.....	December 194	200	27.7	24.2	18.8	14.5	351	261
	12 months 2,677	2,555	26.5	24.3	16.2	17.6	365	319
Pittsburgh & Lake Erie.....	December 223	222	41.5	41.8	32.8	32.8	485	507
	12 months 2,414	2,244	42.3	41.2	8.8	9.4	253	255
Wabash.....	December 404	416	26.8	24.4	27.6	22.8	504	466
	12 months 4,927	4,206	25.3	23.6	27.0	26.2	526	469
Ohio-Indiana-Allegheny Region:								
Baltimore & Ohio.....	December 1,689	1,596	36.2	32.8	24.0	23.0	497	524
	12 months 21,667	17,994	34.9	33.0	24.5	23.0	566	502
Central of New Jersey.....	December 233	201	36.0	32.5	13.9	13.1	299	269
	12 months 2,672	2,448	34.2	33.0	13.9	13.5	299	277
Cleveland, Cincinnati, Chicago & St. Louis.....	December 562	522	31.1	26.3	32.3	30.2	479	566
	12 months 6,929	6,502	29.0	27.7	28.3	27.8	540	530
Pennsylvania System.....	December 4,358	3,755	37.4	31.3	23.8	18.1	518	393
	12 months 51,971	49,009	34.9	35.3	20.2	19.5	466	449
Philadelphia & Reading.....	December 657	496	35.5	22.6	17.6	17.6	540	348
	12 months 7,299	6,466	38.3	37.4	20.0	18.9	510	471
Pocahontas Region:								
Chesapeake & Ohio.....	December 995	813	43.8	38.7	29.5	27.1	718	638
	12 months 12,456	10,264	41.5	40.1	35.0	26.1	878	625
Norfolk & Western.....	December 906	875	44.5	40.9	30.8	27.7	754	712
	12 months 11,676	10,631	42.1	39.7	34.3	28.9	909	715
Southern Region:								
Atlantic Coast Line.....	December 314	347	22.2	20.8	23.5	24.5	309	334
	12 months 3,844	3,674	21.6	21.3	23.1	21.2	338	310
Illinois Central.....	December 1,441	1,198	32.8	27.5	37.7	32.4	713	640
(Incl. Yazoo & Mississippi Valley.)	December 17,489	13,353	40.9	36.8	32.8	30.8	805	677
Louisville & Nashville.....	December 836	731	32.9	29.3	27.3	26.4	532	512
	12 months 10,027	9,061	30.5	29.0	30.6	25.6	613	508
Seaboard Air Line.....	December 211	237	23.7	23.1	24.0	20.5	360	345
	12 months 2,839	2,394	23.2	22.1	23.4	20.6	370	324
Southern Railway.....	December 685	795	26.6	23.6	26.2	21.1	382	355
	12 months 9,362	7,465	23.9	22.2	23.7	20.8	406	345
Northwestern Region:								
Chicago & North Western.....	December 917	795	30.8	23.9	22.6	18.6	406	308
	12 months 11,651	9,931	26.3	24.0	21.5	20.1	377	326
Chicago, Milwaukee & St. Paul.....	December 776	1,054	24.6	24.6	24.2	22.2	394	411
	12 months 12,963	12,862	25.5	24.6	26.3	26.4	461	457
Chicago, St. Paul, Minneapolis & Omaha.....	December 125	187	25.0	25.9	19.1	19.7	317	373
	12 months 1,858	1,807	23.9	23.9	22.2	20.9	393	348
Great Northern.....	December 577	693	29.5	27.1	16.5	20.5	315	424
	12 months 9,565	9,071	28.9	28.5	25.7	23.2	525	456
Minneapolis, St. Paul & Sault Ste. Marie.....	December 233	293	24.9	21.5	18.6	26.2	286	404
	12 months 3,677	3,409	23.7	26.3	26.5	24.9	485	408
Northern Pacific.....	December 564	630	28.3	26.5	22.7	25.3	392	417
	12 months 8,860	8,430	27.3	26.7	32.8	27.4	634	522
Oregon-Washington R. R. & Navigation Co.....	December 130	109	29.2	25.5	21.8	20.1	479	393
	12 months 2,052	1,724	28.4	26.2	29.3	26.4	636	523
Central Western Region:								
Atchison, Topeka & Santa Fe.....	December 924	1,113	24.4	23.3	31.8	29.1	442	481
	12 months 12,782	11,997	22.8	22.1	33.5	29.2	514	451
Chicago & Alton.....	December 183	175	28.2	25.5	23.7	22.6	379	396
	12 months 2,358	2,112	27.2	25.9	23.4	22.6	418	378
Chicago, Rock Island & Pacific.....	December 753	757	23.5	23.5	25.9	20.8	424	412
	12 months 8,776	7,871	24.5	23.7	26.7	23.9	468	411
Chicago, Burlington & Quincy.....	December 1,232	1,169	11.5	27.6	30.9	24.4	554	484
	12 months 16,380	14,179	28.8	26.8	31.8	27.1	611	497
Denver & Rio Grande.....	December 184	219	31.1	28.5	17.6	19.0	371	390
	12 months 2,226	1,992	29.4	28.5	20.0	15.8	402	305
Oregon Short Line.....	December 226	221	31.5	27.8	25.8	34.2	526	674
	12 months 3,471	2,921	29.6	27.1	43.5	35.0	888	664
Scouthern Pacific.....	December 702	792	26.2	26.1	37.0	33.2	552	609
	12 months 10,201	9,546	25.3	25.6	35.5	33.5	629	595
Union Pacific.....	December 710	751	27.6	26.4	50.3	52.2	893	968
	12 months 9,940	9,028	24.7	23.7	69.8	58.4	1,229	978
Southwestern Region:								
Missouri, Kansas & Texas.....	December 163	220	26.5	27.2	25.9	28.2	350	488
	12 months 2,246	2,090	24.1	23.7	28.2	25.1	411	370
Missouri, Kansas & Texas of Texas.....	December 129	90	26.1	23.3	21.4	12.2	314	194
	12 months 1,441	1,223	24.8	23.5	18.1	18.1	289	198
Missouri Pacific.....	December 701	700	24.1	22.1	22.6	20.0	444	441
	12 months 9,030	7,606	27.1	25.3	22.8	22.0	453	406
St. Louis-San Francisco.....	December 373	394	27.1	26.5	21.0	19.2	552	343
	12 months 4,936	4,508	26.0	25.1	19.1	17.1	329	329
Texas & Pacific.....	December 148	148	23.4	23.4	15.9	39.0	262	390
	12 months 1,988	1,813	23.5	22.9	22.2	18.7	360	300

State Rate Question Argued in Supreme Court

Forty-Two State Commissions Protest Against Centralization and Attack Transportation Act as Unconstitutional

WASHINGTON, D. C.

THE POWER of the Interstate Commerce Commission to prescribe statewide schedules of rates for intrastate traffic for the purpose of removing discrimination against interstate commerce, was contested and defended in briefs filed in the Supreme Court of the United States on February 28 by representatives of 42 state railroad commissions and of the railroads. The test case is an appeal by the railroad commission and state authorities of Wisconsin from a decision of the federal district court for the eastern district of Wisconsin enjoining the state officials from interfering with the establishment by the railroads of the increased passenger fares ordered by the Interstate Commerce Commission. Oral arguments in the case will be heard by the court later in the week or the early part of the coming week. Briefs on behalf of the railroads were filed by Alfred P. Thom, general counsel for the Association of Railway Executives, and by Bruce Scott, general solicitor, and Kenneth F. Burgess, general attorney, of the Chicago, Burlington & Quincy. A brief on behalf of the 42 states as amici curiae was filed by John E. Benton, general solicitor of the National Association of Railway and Utilities Commissioners, and A. E. Helm, commerce counsel of the Kansas Court of Industrial Relations, in addition to that of the Wisconsin commission.

The Broad National Purpose of Congress

"In this case," said Mr. Thom in his brief, "there is brought to the bar of this court the broad and reasonable policy adopted by Congress to deal with the entire subject of transportation from a national standpoint and to provide for its adequacy and competency, in the interest of all the people, by a system which will foster and preserve its instrumentalities in full vigor and will create equality of commercial opportunity and privilege as between all its users, irrespective of their location and irrespective of the markets which they seek to reach."

Mr. Thom argued that either the commerce power, the war power or the power to establish postoffices and postroads, standing alone "is adequate to sustain the validity of the power exercised by Congress with reference to the state rates of carriers engaged in interstate commerce."

In respect to the war power, he said in part:

"This court has held, in the case of Northern Pacific Railway Company vs. North Dakota, that the war power of Congress extends to the regulation of intrastate rates. The power in the case just referred to was exercised during a state of actual hostilities. But the war power does not exist only during the war. It likewise, in order to be adequate, must extend to all reasonable measures of preparation. Thus there can be no doubt that the war power includes the power of reasonable preparation and organization for the purposes of national defense. We accordingly submit that the following proposition cannot be successfully questioned:

"That the war power of Congress under the Constitution is not confined, in its exercise, to an actual state of war or to dealing with the consequences of actual war, but also includes all measures of proper, reasonable and adequate preparation for war.

"That the existence of an adequate and competent system of transportation, both rail and water, reaching and making available the national resources for supplying and provisioning armies and navies and transporting troops and munitions

of war is essential to the effective and successful exercise of the war power and the performance of the war duty, and is so closely and directly related to the power itself as to become an integral part of it.

"That coming under the due and reasonable exercise of the war power, Congress may in its discretion, as a means of fostering and promoting in full vigor these essential agencies, control and regulate, within constitutional limitations, their rates and charges, both state and interstate—otherwise it would be in the power of the states to obstruct and defeat the war power which the states themselves conferred upon Congress and the exercise of which, for the protection of themselves and their people, they have the right to exact from Congress."

Mr. Thom said that the rights of the states are of two kinds: the rights they reserved when they entered the union and the rights they acquired by the compact of the Constitution when they entered the union. Among the latter was the right to have the federal government regulate the commerce in which all are interested.

"The commission is given the power, and it is made its duty, to protect the body of interstate and foreign commerce against undue or unreasonable preferences, prejudices and discriminations created by the act of a state or under its authority. It takes no argument to show, if the revenues permitted by a state from state traffic do not bear a proper relationship to the revenues which Congress in this act has required the commission to provide from interstate commerce, that there is an unjust and hurtful discrimination against interstate commerce."

Messrs. Scott and Burgess in a joint brief contended that in enacting the Transportation Act, Congress provided a comprehensive plan of railroad regulation in the national interest to avert a crisis threatening the transportation of the country upon termination of federal control. They also contended that Congress can control both intrastate and interstate rates when they are so intermingled that adequate regulation of the latter necessitates regulation of both.

Some extracts from this argument are as follows:

Correction of Discrimination a Necessary

Part of Interstate Regulation

"The power of the Interstate Commerce Commission to require the removal of unjust discrimination and undue preference caused by intrastate rates lower than reasonable maximum interstate rates, has been upheld by this court in decisions dealing with both the constitutionality of the congressional action and the interpretation of the statute.

"Subsequent to the decisions Congress enlarged the power of the Interstate Commerce Commission in respect to intrastate rates by adding paragraphs 3 and 4 to Section 13, Interstate Commerce Act, as contained in Section 416, Transportation Act, 1920, approved February 28, 1920.

"Counsel for appellant contends that this section grants no new authority to the Interstate Commerce Commission with respect to unjust discrimination and undue preference, and the same argument was presented to the Interstate Commerce Commission.

"In the new section Congress both sets a statutory standard for intrastate rates, and authorizes the commission, on finding the facts of departure from that standard, to prescribe the intrastate rates 'hereafter to be observed.' Yet appellant contends that the section adds nothing.

"Congress enacted the Transportation Act, during the period of federal control of railroads. The act had the declared purpose of providing for the relinquishment and the return to private operation under such public regulation and protection as would insure adequate transportation service to the whole country.

"As to the regulation of rates, the final rule enacted by Congress was that initial jurisdiction over regulation of intrastate rates should be returned to the states and should continue there unless and until the Interstate Commerce Commission in the exercise of newly granted administrative powers, should on appropriate complaint and hearing find any unjust discrimination against interstate commerce or undue prejudice against persons and localities to exist, in which event the Interstate Commerce Commission should prescribe the intrastate rates necessary to remove such discrimination or prejudice, which should thereafter be observed, 'the law of any state or the decision or order of any state authority to the contrary notwithstanding.'

"In order to accomplish the result desired, Congress hit upon the plan of dividing the railroads of the country into convenient groups for rate-making purposes, and providing for a basis of rates in each group which would yield a fair return upon the value of the property of the carriers devoted to transportation purposes, the rates so made to be reasonable from the viewpoint of both the users and proprietors of the railroad plants.

"It was conceived that the success of the plan made it essential that some regulating body should initiate and establish rates within the rate group, which would be just and reasonable to the public, and, at the same time, would yield the revenue necessary to avert a breakdown of transportation throughout the country. It was manifest that these important functions must have final lodgment in a single regulating body, since unity of action and harmony of purpose were essential to success. It was known to the Congress that the great preponderance of the business of the country was interstate commerce, and that there could be no doubt as to the power of Congress under the Constitution, to intrust these important matters to a federal body. It was obvious, therefore, that the Interstate Commerce Commission, which had been long functioning to the satisfaction of the country, which was informed by experience and enlightened by a great body of expert knowledge, which was administering the Valuation Act, and familiar with the rate structure of the country, should be selected as a governmental agency intrusted with the duty of dividing the country into rate groups, of ascertaining the value of property within such groups, and fixing the rate of return. No single state commission could have been selected. Nor could these matters have been intrusted to all the state commissions acting separately, since to do so would have been to create 48 rate groups with 48 different bases of rates, and the possibility of 48 different standards of measuring the value of the property, and the necessary rate of return. The problem was manifestly a national one. In the light of the formation of rate groups state lines could not be considered.

"In the actual limitation of rates within the groups and on the basis so prescribed, Congress for the first time placed the Interstate Commerce Commission under the mandate of prescribing in the first instance the rates applicable to that portion of the commerce which was interstate. As to the rates on intrastate commerce, Congress yielded to the urgent solicitation of some of the states by returning to the states a portion of the duty and responsibility which they had had in respect thereto prior to federal control. This it did by omitting from the new legislation a direct mandate upon the Interstate Commerce Commission to prescribe intrastate rates in the first instance. But in so doing, Congress was careful to prescribe a standard to which the states must adhere—that the rates maintained or initiated by them should not result in disadvantage or prejudice against persons or localities in interstate commerce or in 'any unjust discrimination against interstate commerce' itself.

"Having in mind the distinction of the Minnesota Rate Cases, Congress did not authorize the court to determine when such variance from the standard might exist, but intrusted its determination as a question of fact to the Interstate Commerce Commission—not as a question of law to the judiciary.

"It is impossible to read Section 15a (Sec. 422, Transportation Act) and Section 13 (Sec. 416, Transportation Act) of the Interstate Commerce Act as they stand today, each in the light of the other, and both in the light of the underlying purpose of Congress, and arrive at any other conclusion than that Congress had determined the time had arrived when the interstate and intrastate transactions of interstate carriers had become so intermingled as to require ultimate responsibility for both to be within the realm of national supervision.

"Thus, a failure on the part of the states to follow or decline to follow the lead of the Interstate Commerce Commission might or might not result in preferences and discrimination, dependent upon the particular facts in particular cases, and the justification which might exist therefor."

After an exhaustive discussion of the commission's order itself, the brief says no one has ever demonstrated why the intrastate rates should be lower than interstate rates, when, transportation conditions being similar. If such demonstra-

tion were made in any particular case doubtless the commission would give recognition by appropriate differences in the rates prescribed. No one has ever suggested any proportion why the intrastate rates should fail to produce their proportionate share of such increased revenue as Congress might determine was necessary to keep open and in successful operation the railroads engaged in interstate commerce.

Nine States Reduced Revenues by \$41,000,000

The brief says that the reports of the commission show that the annual direct loss in revenue of which the carriers in nine states have been deprived by the failure to allow the full amount of increase amounted to \$41,680,256, which would be greatly increased if the intrastate rates were reduced to the maximum of 2 cents a mile prescribed by the unprepared state statutes in some of the states, and the indirect losses resulting from the use of lower intrastate rates to portions of interstate transportation, the commission found could not be measured in terms of dollars.

Brief of State Commissions

In explaining the interest of state regulatory commissions in this case, the brief filed on behalf of the 42 states says:

"The state regulatory commissions joining in this brief seek to preserve power to serve the people of their respective states in the manner prescribed by their laws. The Transportation Act of 1920, as construed by the Interstate Commerce Commission, destroys the power of such commissions, and of the legislatures of their sales as well, to regulate intrastate commerce.

"Already the commission has made state-wide orders dispossessing the states of New York, North Carolina, South Carolina, Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Nebraska, Arkansas, Montana and Utah of power over substantially all passenger fares. Like orders have been made covering freight rates in the states of Indiana, Illinois and Nebraska. The commission has also instituted proceedings looking towards like orders with respect to freight rates or passenger rates, or both, in the states of Georgia, Alabama, Florida, Missouri, Kansas, Louisiana, North Dakota, Texas, Nevada and Arizona. The orders made by the commission, by the provisions of the act, and by the express terms of such orders, are 'to remain in force until the further order of the commission.' Such orders, therefore, in their operation, are not confined to the removal of discriminations existing at the time of the making of the orders, leaving in existence state power thereafter to regulate rates upon the traffic affected, but result in the permanent destruction of all state power over such rates.

"While these orders of the commission thus far made under the Transportation Act relate to passenger fares and freight rates only, it may be said that all power of regulation is involved. Section 13 (4) of the Interstate Commerce Act, as amended by the Transportation Act, under which the orders of the commission have been made, authorizes action with respect to any 'rate, fare, charge, classification, regulation or practice' which causes 'undue, unreasonable or unjust discrimination against interstate commerce.' If it shall be held in this case that the commission can find a rate prescribed by state law discriminatory, and make an order setting the same aside, because in the opinion of the commission it is too low, and so burdensome to interstate commerce, it will be claimed that the commission may make a like finding and order as to any regulation requiring the provision of terminal or station facilities, or the furnishing of equipment or the making of improvements to safeguard life, or the doing of anything that requires the expenditure of money; and thus, if that claim shall be sustained, the power to regulate carriers in any respect, as to their intrastate operations, will be found to have been transferred from the states to the federal government.

"The state regulatory authorities jointly in this brief, therefore, believe it to be their duty to press upon the attention of the court the revolutionary character of the power which the commission has attempted to exercise in this case, and to urge that no such construction as the commission has placed upon the Transportation Act can have been within the intent of Congress, and, further, that if such construction can be held in accord with such intent, then the act is unconstitutional, as an invasion of the reserved power of the states under the federal compact."

A large part of the brief attacks the general rate-making rule of the act providing for a net return of 5½ or 6 per cent on aggregate value. After quoting the direction to the commission to exercise its power to prescribe just and reason-

able rates so that carriers shall earn a return "as nearly as may be" to the fixed percentage it is contended that Congress by this intended only to command the commission in adjusting rates to do what it could to enable carriers to earn the income prescribed by the exercise of its power to regulate interstate rates. If the rates prescribed by state authority should chance to be too low, and because of that fact the net railway operating income should fall short of producing a fair return on the aggregate value of all carrier property, it is contended that this would still be "as nearly as may be" to that return by reason of anything that the commission may do.

The rule of Section 15-a is declared to be arbitrary in its operation as to traffic on roads which through lack of traffic are unable to earn a fair return at reasonable rates.

The brief says in addition:

"The commission is commanded, under the rule as construed, to establish rates which shall yield a fixed percentage return. The level of rates that will produce this return is thus by legislative mandate declared reasonable, without respect to the worth of the transportation service rendered, or to the effect of the rate on traffic. Under this rule, in times of business depression, when prices fall and the volume of transportation decreases, rates must be advanced without regard to the worth of the service rendered.

"Paragraph 5 recites in substance that the plan will enable 'some of such carriers to receive a net railway operating income substantially and unreasonably in excess of a fair return upon a value of their railway property held for and used in the service of transportation.' Later paragraphs of the section provide that the excess above a fair return so collected by a road shall be divided equally between the road and the government.

"This rule operates to impose upon the internal traffic of a state, moving upon the lines of such carriers as earn excessive returns, the payment of charges which, as to such traffic, is unreasonably in excess of fair payment for the transportation service rendered.

"If it be admitted, for the purpose of this argument on this particular point, that non-compensatory rates upon intrastate traffic may weaken interstate carriers, and so retard or otherwise injure interstate commerce that the federal government may require the same to be increased, this does not reach the situation under discussion. Power to raise rates that are non-compensatory in a very different thing from power to raise rates that already yield a fair return on the value of the property used, to a point where they will yield 'substantially and unreasonably in excess of a fair return on such value.'

"The federal power with respect to intrastate rates is dominant only to the extent that its exercise is necessary to protect interstate commerce from injury. When the returns yielded by rates in effect are adequate there can be no weakening of carriers, nor injury to interstate commerce from failure to increase them, and hence the federal power never becomes dominant as to such rates.

"Laying aside for the moment the question of constitutionality of Section 15-a, it may be pointed out that the construction which the commission has placed upon it goes far beyond the design of Congress. Congress was not seeking to establish uniform rates upon all traffic. It was, so far as interstate rates were concerned, seeking to establish as the basis for determining the sufficiency of such rates, group values instead of values of particular properties.

"Paragraph 5 does not contemplate 'uniform rates' upon all traffic, but 'uniform rates upon competitive traffic.' There may be ground for argument that it is good policy for the federal government upon competitive traffic to allow some roads to earn more than a fair return, so that weak competing roads may be sustained. But the competitive traffic is ordinarily through traffic, which passes state lines, and is so subject to federal regulation. Intrastate traffic, on the other hand, in very large part, is not competitive, being often confined to a single route.

"We maintain, however, firmly that the public policy which shall control in the regulation of carriers, so far as such carriers are engaged in the transportation of intrastate commerce, must be determined by the state and not by the federal government. If it be granted, for the sake of argument at this point, that a failure to permit reasonable returns upon the intrastate business of an interstate carrier may be found to constitute unjust discrimination, such discrimination can be found only when the return upon the value of the property devoted to such transportation is in fact unreasonable.

"If it is claimed to be good policy to go beyond what is reasonable in some cases, it is the constitutional right of a state to determine that question for itself. Its determination may be unwise, but it alone has the right to make it.

"The commission's misconstruction of the true purpose of

section 15-a as to uniformity of rates produced the order complained of in this case. We have before called attention to the entire failure of the commission to make delimit the persons and localities, if any, injured by the intrastate rates sought to be displaced by its order. If the commission found all intrastate passenger fares in Wisconsin in fact discriminatory it would undoubtedly, in view of the decision of this court in *Illinois Central Railroad v. Public Utilities Commission*, 245 U. S., 493, have clearly stated that finding, as it might easily have done. Instead, however, it has expressly left open the question of what rates are discriminatory and what rates are not discriminatory. Doubtless for the purpose of most expeditiously exercising the new power which the commission believes has been committed to it, it has applied Mr. Ford's methods, and has standardized its reports. Having stated its conception of the law, and its methods of procedure, in the New York and Illinois reports, which are part of the record here, it has since contented itself by reference to those reports, making its findings as to discriminations found in all the cases relating to the same class of traffic in the same form, and leaving the earlier reports to be examined for statements of reasons and of procedure."

It is asserted that the railroads desire to centralize regulation as much as possible because, being human, they resent interference and "a bureau in Washington hundreds or thousands of miles away from people who want to complain, and buried in thousands of complaints that would suffice to keep 48 commissions busy, comes as near to ideal regulation from the railroad point of view as can be imagined."

It is also asserted that the commission failed to comply with the law in not making a separation of the aggregate value of the railroads in the Western territory when it divided it into the Western and Mountain-Pacific districts for the purpose of the rate case, and also in failing to hold conferences and joint hearings with the Wisconsin Railroad Commission before ordering an advance in the Wisconsin rates.

Railroads to Receive Partial Guaranty Payments

WASHINGTON, D. C.

PRESIDENT WILSON on February 26 signed the Winslow bill, providing for partial payments to the railroads on account of their guaranty for the six months following the termination of federal control, on certificates to the Treasury Department by the Interstate Commerce Commission. The President announced his approval of the bill after having received opinions on it from both the commission and the Treasury Department. It is understood the commission fully approved it, as it had recommended such a bill in its annual report, and that the Treasury Department interposed no objection, now that the problem of raising the funds to meet the payments to the railroads is about to be transferred to a new administration.

The way is thus prepared for early payments to the railroads for a large part of the approximately \$350,000,000 still due on their guaranty, and the railroads owe so many bills both to other railroads and to companies that have accounts against them for materials, supplies and equipment that it is expected that the relief afforded by the law will be widely distributed.

How much money will be made available and how soon depends on the Interstate Commerce Commission, which it is understood proposes to issue certificates as rapidly as possible for such amounts as it feels perfectly safe in certifying as certainly due the carriers pending final adjustments. The commission had prepared some certificates for partial payments which were withdrawn when it was advised that the comptroller of the Treasury had ruled that payments could not be made and officers of a large number of roads have been conferring with the Bureau of Finance since the passage of the new law in the effort to arrange for additional certifications to meet pressing needs as soon as possible.

President Wilson was urged to veto the Winslow bill as

"an unjust and unjustifiable concession to the railroad owners, who have shown a wanton disregard for law and lawful processes," in resolutions adopted by the executives of the national and international trade unions affiliated with the American Federation of Labor, at a conference in Washington on February 23. The resolutions also urged the legislative representatives of all organizations affiliated with the federation, in the event the President should veto the bill, to use every effort and all legitimate means to prevent the passage of the bill by the Congress over the Presidential veto. The resolution states that the railroads are seeking through this bill additional financial benefits from the Treasury to an amount and in a manner not contemplated by the original transportation act. The reason for this opposition to the bill is indicated in a preamble to the resolution saying that "the railroads, closely organized through the Association of Railway Executives, so that they stand as a unit in all matters pertaining to the relations between the carriers and the workers, have declined to meet in general conference the corresponding national organization of the workers," and that this is evidence of a purpose to destroy trade unionism that is identical with the so-called open shop movement in the steel industry and in violation of the Transportation Act.

When Congress adjourned on March 4 no action had been taken on the bills which had been favorably reported by the Senate and House committees as a substitute for Section 10 of the Clayton law, which became effective on January 1. The original bills introduced at the request of the railway executives' association have been largely rewritten in accordance with suggestions made by the Commission.

Another bill which was not acted upon was that proposed by the state commissioners' association and approved by the Interstate Commerce Commission to amend the railroad valuation act by eliminating the provisions requiring the Interstate Commerce Commission to ascertain and report the cost of acquisition of railroad land. A hearing on the bill had been held by the House committee on interstate and foreign commerce but no report has been made.

Freight Car Loading

WASHINGTON, D. C.

THE NUMBER OF CARS loaded with revenue freight during the week ended February 19 shows a slight increase over that for the previous week, for the first time since January 15. The total was 695,506 as compared with 681,-

627 during the week ended February 12 and as compared with 772,102 and 700,913 during the corresponding weeks of 1920 and 1919, respectively. The summary as compiled by the Car Service Division of the American Railway Association is shown in the table at the bottom of the page.

Reports received by the Car Service Division show that on February 15, 64.1 per cent of the freight cars were on home roads, as compared with 58.9 per cent on February 1 and 21.9 per cent on March 1, 1920, when the railroads were returned. In a summary of general car conditions for the last half of February, the Car Service Division says that it is generally felt that the peak of the open top car surplus has now been reached and that after the first of March the demand for this class of equipment will progressively increase, not only for the transportation of coal and for manufacturing necessities but also with the renewal of building and road construction activities made possible by improved weather conditions. "Due to the lack of demand for open top cars and the observance of the car service rules," the circular says, "very satisfactory progress is being made in relocating such equipment to the home roads. These cars upon arrival home are being overhauled and repaired as fast as possible in anticipation of heavy transportation demand in the near future when business has resumed its normal proportions." There has, however, been a steady increase during the winter in the percentage of bad order cars reported. On February 1 the percentage was 9.4 per cent as compared with 8.5 per cent on January 1, 7.4 per cent on October 1 and 6.7 per cent on March 1, 1920.

The freight car surplus is steadily increasing and during the week ending February 23 it reached a point never before attained except during the period of depression following the armistice. The number of cars on the railroads of the United States for that week was 423,193 and for the railroads of the United States and Canada the number was 450,250. There were 172,713 idle coal cars and 203,817 idle box cars. During the spring of 1919 the car surplus at one time reached nearly 500,000 cars.

OFFICERS OF THE CANADIAN NATIONAL say that labor conditions, so far as railways are concerned, are improving. They anticipate that by the end of February a large number of men will be shipped out along the line for the commencement of spring work. Owing to the return of a large number of railway workers to Europe during the past few months, a shortage of such labor is looked for.—*Commerce Reports.*

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

Summary—All Districts, Comparison of Totals This Year, Last Year, Two Years Ago, for Week Ended Saturday, February 19, 1921

Districts:	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Merchandise L. C. L.	Miscellaneous	Total revenue freight loaded			Received from connections		
										This year	Corresponding year 1920	Corresponding year 1919	This year 1921	Corresponding year 1920	Corresponding year 1919
Eastern	1921	5,333	2,908	41,710	976	8,633	645	47,892	56,118	164,215	164,215	173,904	187,854	180,750	
	1920	4,567	2,919	44,935	3,739	4,546	1,661	27,521	74,317	164,405	155,766	144,087	121,467	124,804	
	1919	2,230	2,936	45,259	5,341	3,501	3,376	24,829	50,637	161,446	144,087	121,467	121,467	124,804	
Allegheny	1921	2,061	2,936	45,259	5,341	3,501	3,376	24,829	50,637	161,446	144,087	121,467	121,467	124,804	
	1920	2,230	2,936	45,259	5,341	3,501	3,376	24,829	50,637	161,446	144,087	121,467	121,467	124,804	
	1919	155	77	13,119	72	1,470	35	2,478	51,174	22,549	12,506	12,506	18,465	17,241	
Pochohantas	1921	133	87	17,936	766	1,835	279	1,148	9,379	30,763	43,676	43,676	43,676	43,676	
	1920	133	87	17,936	766	1,835	279	1,148	9,379	30,763	43,676	43,676	43,676	43,676	
	1919	3,757	2,293	22,079	207	15,356	2,384	19,927	55,859	121,862	108,660	77,308	63,978	63,978	
Southern	1921	3,763	2,185	20,396	565	13,762	933	36,876	32,437	110,917	110,917	110,917	110,917	110,917	
	1920	3,757	2,293	22,079	207	15,356	2,384	19,927	55,859	121,862	108,660	77,308	63,978	63,978	
	1919	8,879	7,840	5,914	1,381	17,633	1,176	24,615	26,337	93,775	93,775	93,775	93,775	93,775	
Northwestern	1921	10,096	7,730	12,236	1,057	20,385	1,562	20,444	39,074	112,644	122,316	122,316	122,316	122,316	
	1920	10,096	7,730	12,236	1,057	20,385	1,562	20,444	39,074	112,644	122,316	122,316	122,316	122,316	
	1919	11,013	10,137	16,234	232	2,959	5,067	24,237	29,437	99,356	99,356	99,356	99,356	99,356	
Central Western	1921	10,565	10,883	22,147	402	5,612	6,486	18,880	45,473	119,917	95,414	66,190	55,247	55,247	
	1920	10,565	10,883	22,147	402	5,612	6,486	18,880	45,473	119,917	95,414	66,190	55,247	55,247	
	1919	4,855	1,789	3,806	148	6,459	470	16,137	23,090	56,754	41,364	41,364	41,364	41,364	
Southwestern	1921	3,639	2,389	15,840	767	6,490	683	15,623	24,579	61,065	43,694	31,926	40,875	40,875	
	1920	3,639	2,389	15,840	767	6,490	683	15,623	24,579	61,065	43,694	31,926	40,875	40,875	
	1919	36,659	27,892	146,438	8,735	54,417	11,702	187,064	233,199	695,506	695,506	695,506	695,506	695,506	
Total all roads	1921	36,714	29,168	171,408	9,818	57,931	15,278	137,210	314,575	772,102	772,102	772,102	772,102	772,102	
	1920	36,714	29,168	171,408	9,818	57,931	15,278	137,210	314,575	772,102	772,102	772,102	772,102	772,102	
	1919	32,387	38,250	141,273	6,004	21,074	2,074	49,854	80,755	700,913	700,913	700,913	700,913	700,913	
Increase compared	1920	0	0	0	0	0	0	0	0	0	0	0	0	0	
Decrease compared	1920	0	0	0	0	0	0	0	0	0	0	0	0	0	
Increase compared	1919	3,672	0	5,165	8,735	0	0	187,064	0	72,189	107,575	107,575	107,575	107,575	
Decrease compared	1919	0	10,358	0	0	5,687	9,372	0	184,636	5,407	68,246	68,246	68,246	68,246	

L. C. L. merchandise loading figures for 1921 and 1920 are not comparable as some roads are not able to separate their L. C. L. freight and miscellaneous of 1919. Ad merchandise and miscellaneous columns to get a fair comparison.

February 12	32,879	27,456	151,786	9,026	53,882	8,094	134,892	213,612	681,627	786,633	687,128	488,983	610,331	537,109
February 5	36,875	31,277	153,917	10,381	54,066	8,501	183,221	217,759	696,997	762,690	692,614	495,860	599,454	551,312
January 29	39,830	32,368	162,652	9,749	53,627	7,993	179,123	214,844	699,936	803,332	718,297	491,184	589,838	577,709
January 22	46,695	35,255	168,453	11,747	49,159	7,991	176,581	207,804	703,115	804,866	734,293	491,640	589,000	608,775

Milton H. Smith

MILTON H. SMITH, president of the Louisville & Nashville Railroad, who died at Louisville, Ky., on February 22, was almost the last of the generation of railway executives to which he belonged. Perhaps the only exception which can be made to this statement is that of Marvin Hughitt, chairman of the Chicago & North Western, who became president of the North Western in 1887. The beginning of Mr. Smith's career as a railroad president antedated that of Mr. Hughitt's, Mr. Smith having become president of the Louisville & Nashville on June 11, 1884. He had, furthermore, been vice-president of the railroad since 1882, and in this position had been the chief executive officer of the property. Therefore, it can be correctly stated that he was the real head of the Louisville & Nashville for more than thirty-eight years.

Most of the development of the Louisville & Nashville into a great railway system occurred under his management. When he became vice-president in 1882 it had 3,233 miles of line, 364 locomotives and 10,762 freight cars. When he died it had 5,041 miles of line, 1,209 locomotives and 53,100 freight cars. Even these figures give a very inadequate idea of the development of the property under his management. It was, when he became the head of it, a small, poorly developed, inadequately equipped property. He left it one of the leading railways of the country in point of physical condition, strategic location, traffic handled and earning capacity. He deserves, therefore, to be ranked among the greatest railroad builders, developers and managers of his time.

Probably the country never produced a greater railroad administrator than E. P. Ripley, for many years president of the Santa Fe. The regard in which Mr. Smith was held by Mr. Ripley was strikingly shown by the following telegram which Mr. Ripley sent to Mr. Smith on September 12, 1916:

"Congratulations on long, useful and well spent life.

This will be one of many, but there will be few from people who have known you so long as I have. We are both nearing the foot of the hill, but if I leave behind me as good a reputation as you will, it will be the best legacy I can leave to my children."

Mr. Smith was 84 years old at the time of his death. The great success of his career was largely due to the length of his active life, and the length of his active life and the enormous amount of work he did were largely due to the fact that nature endowed him with an unusually powerful natural constitution. He worked during most of his life without taking any form of recreation, and it has been said of him that he never learned until he was past 75 years old that the Louisville & Nashville trains would continue to run if he occasionally took an afternoon off to play golf. In the last years of his life he played golf and took more or less rest, but he continued to work hard right down to the last.

Like most of the successful railroad men of his generation,

Mr. Smith was eminently a fighter. He fought everybody who opposed him and he usually won, but he fought fairly. He was distinctly "a diamond in the rough." He was rough in his external appearance and manner, but those who came intimately in contact with him all found that, like most men of his general type, he was really very kind-hearted and considerate.

Like many railway men of his generation, Mr. Smith was extremely averse to newspaper publicity and boasted that he was never interviewed. He had a keen sense of humor and a happy gift of sarcasm which were displayed in a letter which he wrote to one newspaper man who had published a story about him. He began by denying a statement that the newspaper man had made to the effect that he was 79 years old. Having challenged the correctness of almost everything else in the story, he concluded by saying: "You got one thing right, my name is Milton Hannibal Smith."

Mr. Smith was an intense lover of accuracy, and before his death dictated a memorandum giving in detail the correct chronology of his life. He was born on September 12,

1836, in Windham Township, Greene County, New York. He moved with his parents to Cook County, Illinois, in October, 1850. In 1858 he went south and lived in Tennessee and Mississippi until January 1, 1860, when he entered the employ of the Southwestern Telegraph Company as a telegraph operator at Oxford, Miss.

In October, 1860, he went to Jackson, Tenn., as assistant agent of the Mississippi Central Railroad and operator for the Southwestern Telegraph Company. In June, 1861, he was transferred to the superintendent's office of the Mississippi Central at Holly Springs, Miss., as telegraph operator and chief clerk.

He entered the employ of the United States Military Railroads in September, 1863, in charge of transportation at Stevenson, Ala. He performed the same duties at Chattanooga, Tennessee, during the Atlanta campaign of the Union Army, and afterwards also at Huntsville, Alabama, Knoxville, Ten-

nessee, and Atlanta, Georgia.

In September, 1865, he went to Louisville and entered the employ of the Adams Express Company. In June, 1866, he went to Alabama as division superintendent of the Alabama & Tennessee River Railroad, returning to Louisville in August of the same year as local agent of the Louisville and Nashville Railroad. He was made general freight agent of that road in June, 1869.

In October, 1878, he went with the Baltimore & Ohio to Baltimore, and was subsequently made general freight agent, holding that position until October 1, 1881. He then became general agent of the Pennsylvania Railroad in New York, which position he resigned on January 1, 1882, to become third vice-president and traffic manager of the Louisville & Nashville. He was made chief executive officer of the road with the title of vice-president on July 6, 1882. He was elected president on June 11, 1884, and again served with the title of vice-president from October 6, 1886, to March 9, 1891. There was, however, no change in his duties



M. H. Smith

during this period. It was decided that the railroad needed stronger financial representation in New York and the title of president was given to one of its officers in New York. Subsequently this officer was given the title of chairman of the board, and Mr. Smith again took the title of president on March 9, 1891.

One of the principal officers of the Louisville & Nashville wrote to the *Railway Age*: "The biographical sketch heretofore furnished you was prepared by Mr. Smith himself, his idea being that if the newspaper men were absolutely accu-

rate as to the essentials they might say anything else about him that their fancy might dictate." The same officer wrote: "He was such a wonderful man that it is hardly possible to say that he possessed any one outstanding quality or characteristic. His versatility knew no bounds. His genius sprang from an incomparable combination of rugged integrity, love of truth and extraordinary breadth of vision. I valued and admired him so greatly, and his life was such an inspiration to those who came in contact with him, that I am sure you cannot exaggerate his virtues and achievements."

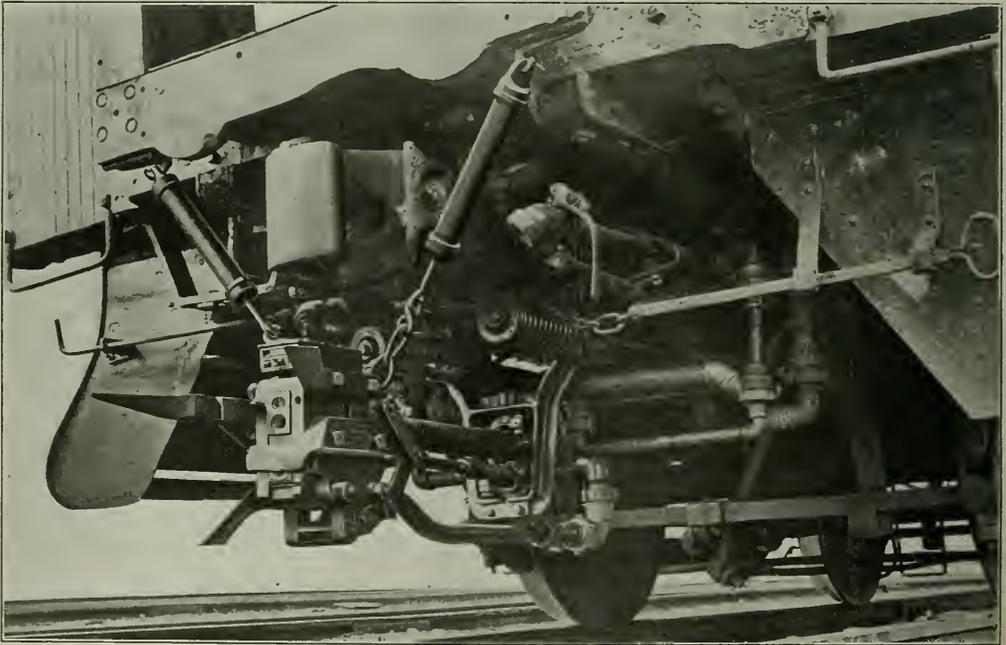
The Futrell Automatic Train Line Connector

New Type Suspension, Positive Lock for Connector Heads and Removable Gasket Plate Are Features

DURING THE PAST 18 MONTHS the Baltimore & Ohio has had in service on a local passenger train a new design of automatic connector. This device, which is the invention of Thomas J. Futrell, is made by the Futrell Coupler Company, Streator, Ill. While the construction follows the general principles of some of the existing types, there are several unique features, the most notable being the arrange-

stem which extends from the rear of the coupler head. Two springs attached to the bracket force the yoke forward and another spring is applied to the stem of the coupler head. These parts are adjusted so that the connector when not coupled extends 53/4 in. ahead of the pulling face of the coupler knuckle.

Beneath the main stem of the connector is an auxiliary



The Futrell Connector, Showing Suspension, Piping and Electric Contacts

ments for locking the heads and taking care of movement between coupled cars.

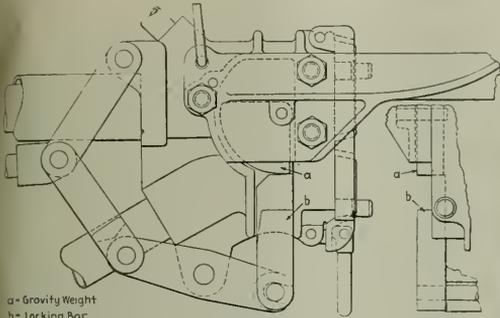
The coupler, as shown in the illustration, is of the butt-face, wing type. The head casting is suspended beneath the coupler by diagonal wire cables which are supported by an enclosed spring mechanism from the car body. A bracket is attached to the center sill behind the coupler carrier iron and a yoke shaped lever, pivoted to the bracket, supports a

stem with a spring adjustment. This stem operates a lock through a toggle arrangement and after the connector faces are in contact the lock is caused to engage a slot in one of the wings as it mates with the coupler head. The details of operation of the locking arrangement are clearly shown by the drawing of side and front views of the head. In a recess in the head beneath the left side wing is a segment, *a*, pivoted near the upper edge. The portion of this segment lying

within the head serves as a stop for the locking bar, *b*. The lower outer edge of the segment extends into the guide in which the wing of the opposing connector engages the head. Thus as the wing moves in it will force the segment upward and release the locking bar, which is then free to enter the

relative movement between the ends of adjacent cars. The yoke shaped lever, being pivoted at the upper end, is free to move forward or backward to take up motion resulting from the compression of the drawbar springs and a trunnion casting between this lever and the stem of the coupler head provides for lateral and vertical movement.

The wing type gathering mechanism has a vertical range of 7 in. and a horizontal range of 7 in. On the earlier designs, four wings were used but the latest type has but two. An additional means of insuring perfect alinement in the head is provided by two pins in the face which register with recesses in the opposing connector head. As is the usual



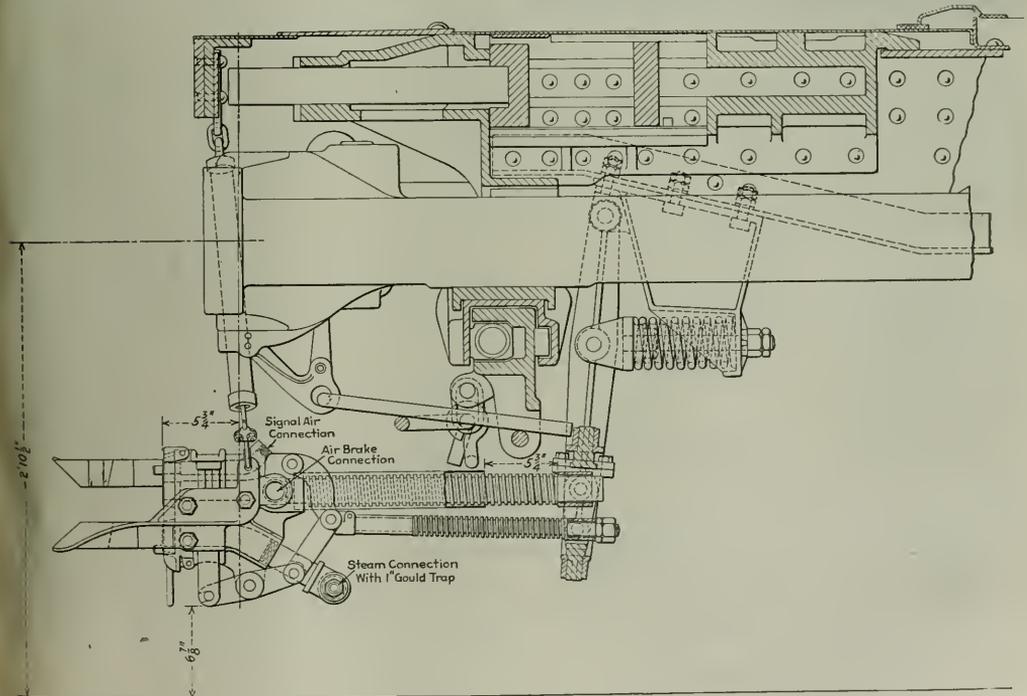
Side View of Head Showing Locking Mechanism



End View of a Car Equipped with the Connector

slot in the wing. When the connectors are separated the locking bar is returned to the lower position and the segment, being released as soon as the wing is removed, returns to its original position by gravity.

practice in this type, the ports are located on the vertical center line, the air signal connection being at the top; the



Side Elevation of the Connector Head and Suspension

The heads, when locked, form practically one solid part and since the connectors are supported from the car body, it is necessary to provide sufficient freedom of movement to insure that no additional stresses are placed on the heads by

air brake in the center and the steam heat at the bottom. The sizes of the openings are as follows: air signal $\frac{7}{8}$ in.; air brake $1\frac{3}{8}$ in.; steam heat $1\frac{1}{2}$ in.

The gaskets are held in place by a detachable gasket plate

fastened to the front of the head. The plate is hinged at the top and is locked at the lower end by a cam which forms part of the gasket plate keeper. In order to remove the gasket plate, the handle must be raised to the position shown by the dotted lines. When the two connectors are coupled, the handle is held in the vertical position and there is no possibility of the plate becoming unfastened. It will be noted from the illustration that the gaskets are tapered to fit

where they can be reached from the side without going between the cars. The piping and cocks to which the rubber hose are connected are not disturbed in the installation of the coupler and for that reason no other provision is made for interchanging with equipment fitted with the standard connections.

Advantages and Cost of Railroad Electrification

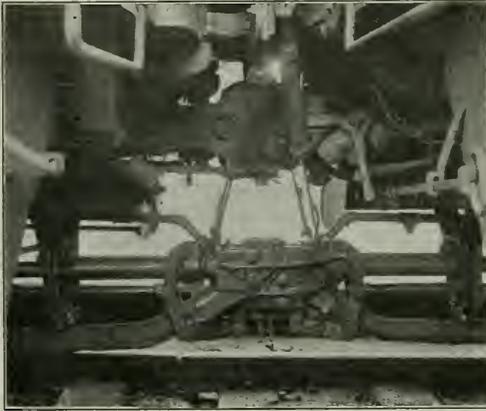
A MEETING of the Electrical Section of the Franklin Institute was held in Philadelphia, Pa., on February 24, which was addressed by A. H. Armstrong, of the General Electric Company. Mr. Armstrong called electrification an economic necessity and spoke of the need for developing railroad facilities. He said that it is a matter of grave national concern properly to diagnose the true character of the ailment affecting our transportation system, and to prescribe the treatment of greatest promise for its future recovery. He enlarged on the subject of how electric operation could best be used to meet future railroad requirements and told of what had already been accomplished.

In summing up his paper, Mr. Armstrong said that electrified terminals in large cities would revolutionize present steam locomotive practice and not only effect economies in operation, but greatly stimulate traffic by introducing radical improvements and facilities. With no immediate prospect in sight for any material reduction in the price of labor, its output must be increased, and electric operation has demonstrated its effectiveness in this direction. In addition, locomotive division points may be indefinitely extended. All of these improvements in the electrified property will cost large sums of money, although in some items of operating expense, such as fuel, crews and maintenance, direct savings are effected of such magnitude as to show a reasonable return upon new capital charges incurred. The argument for electrification, however, is built upon a broader foundation than a direct return upon the investment. It has to do with the vital question of the future growth of our transportation system and its effect upon our national prosperity.

In answer to several questions put to Mr. Armstrong relating to electrification costs and mileages, he said that the original 440-mile electrification on the Chicago, Milwaukee & St. Paul cost about \$13,000,000. This included 42 freight and passenger and two switching locomotives. This, he said, figures out at about \$28,000 per route-mile or \$18,000 to \$19,000 per single-track mile. The freight and passenger locomotive cost about \$130,000 each, and they replaced 112 steam locomotives, worth about the same in total as the electrics; hence the items of locomotive costs about offset each other. The last 220-mile electrification on this road cost more, having been carried out in war time, the increase being, roughly, about 50 per cent.

BOLIVIA, Colombia, Honduras, Nicaragua and Peru are now included in the list of countries to which letters may be mailed at the domestic rate, two cents an ounce. Domestic rates apply also on second class matter. The weight limit on newspapers and other printed matter is 8 lb., 12 oz.; maximum weight for single volumes, 11 lb.; maximum dimensions of rolled papers, 40 in. in length by 6 in. in diameter.

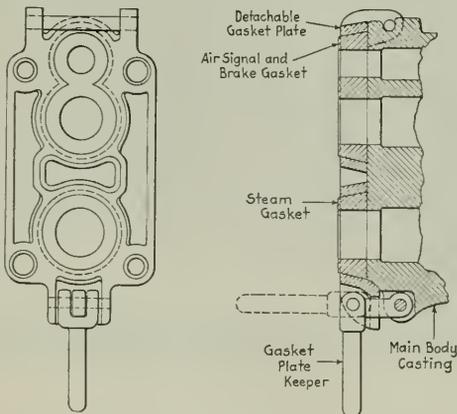
THE CHICAGO, BURLINGTON & QUINCY has appointed a loss and damage committee to take charge of a campaign for reducing freight claims to a minimum. The company has prepared bulletins describing the work of the committee and calling for the co-operation of officers and employees in keeping down the number of claims, which, the bulletin states, represent "additional expenditure that buys criticism, complaints and extra work."



A Side View of the Connectors in the Coupled Position

the plate and the air brake and signal ports have a single gasket in common. With slight changes in the gasket holder, A.R.A. standard air hose gaskets could probably be used. In the design of the head, provision has been made for the attachment of electrical connections at the top of the head casting.

All connections between the connector head and the train line are made by pipe and flexible joints, both the Barco and



Details of Removable Gasket Plate

McLaughlin type being used. In order to make the connections to the head, tees are inserted in the train lines behind the angle cocks. Ordinary air cocks are used in the air connections and a quick opening throttle valve in the steam passage. The levers for the operation of these cocks are placed toward the center of the car just behind the steps

Labor Board Resumes Hearings on Working Rules

National Agreement with Clerks Is Defended—Other Proceedings Before Wage Tribunal

HEARINGS in the controversy between the carriers and various classes of their employees over the latter's demand for the perpetuation of the National Agreements formed during the period of federal control were resumed before the Railroad Labor Board at Chicago on March 1, when representatives of the Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station Employees, appeared before the Board to justify the agreement made with the clerks and present their rebuttal statements.

The Board had previously announced that representatives of the maintenance of way workers would be heard on that date, but at the opening of the session Chairman R. M. Barton of the Board stated that the program had been rearranged and the clerks would be heard first.

The session was opened by E. H. Fitzgerald, grand president of the Brotherhood, who, after describing the history of National Agreements, spoke briefly of the necessity, from the employees' standpoint, of the Board's recognizing the principle of collective bargaining as defined by B. M. Jewell in the previous hearings. Mr. Fitzgerald contended that such action would end the present controversy and that it would be settled amicably.

The remainder of the testimony presented on behalf of the clerks dealt wholly with rebuttal statements to various parts of the presentation made by E. T. Whiter on behalf of the carriers. During the morning and afternoon sessions on March 1, R. P. Dee, vice-grand president, W. E. Gollings and J. F. Murray, general chairmen of the clerks' organization, testified in reply to certain groups of the objections to this National Agreement put forward by Mr. Whiter.

The character of the testimony offered at these sessions indicates the manner in which the labor executives propose to reply to the carriers' objections to National Agreements. If similar testimony is presented by each of the organizations involved, it will doubtless take some time to complete the case. Such development would be in line with the attitude which has been taken by the labor executives since the beginning of the case.

Clerks Complete Presentation

The presentation in support of the clerks' demand for continuation of their national agreement was completed on March 2, Mr. Fitzgerald testifying in part as follows:

Our testimony, though voluminous, is but a brief history of the struggle through which the employees have gone in their efforts to emancipate themselves from industrial servitude. The deplorable conditions that existed prior to the time they organized, to which frequent reference has been made during the progress of this hearing, were not confined to any particular railroad but were general throughout the country. Our testimony has given you some idea of the conditions our people worked under. It has shown you that under the old regime they were denied living wages, as statistics will prove; that they were subjected to most unfair and unjust working conditions; that they worked long hours without extra compensation; that they had absolutely no protection against dismissal without cause; that they had no assurance that their skill and industry would be rewarded; that they were utterly at the mercy of their employers. And to add insult to injury, every attempt they made to collectively improve those conditions was ruthlessly thwarted by summarily dismissing from the service every known leader; by the denial of their constitutional rights of free speech and free assembly; by spying upon and discharging employees found entering a union meeting.

It is amazing that these employers should have thought that this sort of treatment was profitable. It is more amazing that they should come before this board and declare, in the face of

facts that are incontrovertible, that our national agreement is detrimental to the service and makes the economic operation of the railroads impossible. I repeat the assertion that I made earlier in my testimony, that the employees whom I represent are giving better service today than before they had a national agreement. I deny absolutely that the conditions under which these employees formerly worked are conducive to good service. Those conditions are conducive of nothing but poor workmanship and bad citizenship. Those conditions are inimical, not only to the interests of the worker, but to the public.

The management denies that their request for the setting aside of the national agreement is an attempt to restore the old order of things. They declare that they simply want system agreements substituted for national agreements. But these men who are asking for this are the same men who have positively refused to deal collectively with their employees; they are the men who were responsible for the conditions we have been talking about. Have they suddenly had a change of heart? Judging from our past experiences we believe not—we have been beguiled too many times by promises from these men.

We are not living in the same world we lived in five years ago. Old industrial methods will not meet the requirements of new industrial needs. The railroad workers, having finally loosened the bonds of industrial autocracy and having lifted themselves to a position bordering upon, but still far from just, are not going to peaceably surrender the things they have struggled for years to gain.

This is a momentous problem confronting your board. You hold, as it were, in the palm of your hand the welfare of two million men. The industrial peace and tranquillity of the nation may depend upon the decision you render. Labor is looking for no special privileges. It wants only what it is justly entitled to; namely, a fair and square deal, and it is determined to have that. The Congress of the United States passed the Transportation Act declaring that it was necessary to properly safeguard our great public highways. We have heard a great deal about the protection the Transportation Act affords the employees. What protection does it afford if it fails even to guarantee them just and equitable wages and working conditions? No protection whatever will be left them if the national agreements are set aside except their economic strength, which they will surely use to prevent a return to the former intolerable conditions.

It is interesting to note that during the past few weeks, all of the labor organizations' spokesmen have talked of "the request of the managements for the setting aside of the national agreements." It will be recalled that this controversy was brought before the Board by the employees who demanded the perpetuation of their national agreements. The vigor with which the carriers have opposed this demand has evidently caused the representatives of the employees to forsake the aggressive and adopt a defensive policy.

Walsh Asks for Decision on Labor's Request

The railroad labor organizations, through their general counsel, Frank P. Walsh, on February 24, petitioned the Board for an immediate decision on labor's previous request for the calling of a joint conference between railway executives and labor leaders to settle the controversy over national agreements. A decision without delay was desirable, Mr. Walsh said, "since it may be necessary for us to seek a judicial determination as to certain features of the Transportation Act and as to certain interpretations of the Act by the carriers, by ourselves, and by your honorable body."

The petition said in part:

"On February 17, 1921, a formal request was submitted for a recommendation by the Board that all grievances and complaints of the railway executives as to rules and national agreements be remanded to a general conference between the national organization of the carriers and the national representatives of the railway employees.

"We now ask that the Board at the earliest possible moment hand down its ruling or decision on that request. It is essential that we know at as early a moment as possible the decision of the Board in this important matter, as it necessarily will determine largely the scope and character of our preparation in the case which the Board has set for hearing March 10, 1921.

"It may be necessary for us to seek a judicial determination as to certain features of the Transportation Act and as to interpretations of the Act by the carriers, by ourselves and by your honorable body, and for this additional reason we urge respectfully that the Board hand down its decision as soon as possible."

No action has so far been taken on this petition.

Frank P. Walsh, general counsel for the railroad labor organizations affiliated with the American Federation of Labor, later addressed a petition to the Railroad Labor Board at Chicago, asking that the Board hand down, at the earliest possible moment, its ruling or decision on the request for a recommendation by the Board that all grievances and complaints of the railway executives as to rules and national agreements be remanded to a general conference between the national organization of the carriers and the national representatives of the railway employees.

"It is essential," the petition said, "that we know, at as early a moment as possible, the decision of the Board in this important matter, as it necessarily will determine largely the scope and character of our preparation in the case which the Board has set for hearing March 10. It may be necessary for us to seek a judicial determination as to certain features of the Transportation Act and as to interpretations of the Act by the carriers, by ourselves and by your honorable body, and for this additional reason, we urge respectfully that the Board hand down its decision as soon as possible."

Erie Hearings Closed

Hearings in the controversy between the Erie and its train dispatchers and track laborers, the opening phases of which were described in the *Railway Age* of February 18 (page 412), were held on February 23. The Erie, on February 14, issued an order reducing the wages of track laborers where the "going" rate was lower than the rates fixed in the Board's award of last spring, re-establishing the seven-day week for train dispatchers and deducting the January 31 earnings of telegraphers. Representatives of the employees concerned protested to the Board, which as a result issued an order directing the Erie to rescind its order until hearings could be held before the Board. The Board, at the same time, ordered an investigation to determine whether the Erie had violated Decision No. 2 in ordering these wage reductions.

When the case came before the Board on February 23, F. W. McLaughlin and J. G. Luhrsen, representing, respectively, the organizations of the maintenance of way workers and the train dispatchers, contended in their testimony that the question of whether or not the Erie had violated the Board's Decision No. 2 was the only question which was properly before that body, and asked for a ruling first on that phase of the controversy. The question of the justifiableness of the wage cut was not properly before the Board. Mr. McLaughlin contended, because conferences on this dispute had not been held between the carrier and representatives of the men.

Mr. Luhrsen contended, in addition, that the train dispatchers are not required, by the terms of the Transportation Act, to confer with the management until the order making effective the abolition of the weekly rest day and the deduction from the pay of the telegraphers is rescinded.

Samuel Adams, representing the Erie, pointed out that the employees had objected to changes made in their working conditions. This dispute, he contended, could not properly be before the Board, inasmuch as rules and working conditions are now under consideration by the Board. In

reply to questioning, Mr. Adams stated that the Erie had not complied with the Board's order to rescind its wage cut ruling and held that the Board has no jurisdiction to make "stay" orders without hearings and proper representation by all the parties interested.

R. S. Parsons, general manager, presented the carriers' reasons for ordering a wage reduction, stating that in December, 1920, \$1.01 was paid out for materials and wages, exclusive of the expenditures for taxes, which run about \$300,000, for every \$1.00 of income. In January, he testified, because of the continued slump in business, \$1.07 was paid out for every dollar of income. These facts led to the ordering of a reduction in the wages being paid unskilled labor only after every other form of economy had been employed, he added.

"It has been represented here," Mr. Parsons said, "that we are paying track men 30 cents per hour. That is only partially true. The order was to pay the men the 'going rate.' Through the Youngstown (Ohio) district, we are not paying 30 cents, but 38 cents, and it is only in the isolated districts where labor is plentiful that we are paying 30 cents per hour. We are now paying anywhere from 30 to 48 cents per hour."

W. S. Bratton, in closing the case for the employees, said: "I think the Erie has violated Decision No. 2, and if they refuse to put into effect the orders of this Board and pay the wages, it is up to us, and we will endeavor to find a way to collect the money from the Erie Railroad Company."

The case was closed on February 23.

Missouri & North Arkansas Employees Walk Out

Four days after the Board had remanded the dispute between the Missouri & North Arkansas and its employees to conferences between the management and representatives of the men, the officers of that road were notified that unless the wage reduction order was rescinded the men would walk out. The management replied that under the ruling of the Board, reported in part in the *Railway Age* of February 25 (page 454), it could not comply with the request. The threat materialized on February 27, when the enginemen, trainmen, telegraphers and station agents left their work.

The strike was ordered after the railroad company, in compliance with authorization from the federal board, had called upon the employees to appoint representatives to confer with the railroad management on the question of reducing wages. Brotherhood officers have let it be known that the strike has the backing of the national organizations, and that strike benefits will be paid the striking employees for the period of the tieup.

The Board has not decided what action it will or can take in this matter. C. W. W. Hanger, a member of the Board, said in regard to these developments:

"The Board has received a telegram from the general manager of the Missouri & North Arkansas stating that the employees had gone on strike. We have not officially considered the action and the telegram was in the nature of advice rather than complaint."

A. B. & A. Enters Receivership

As a sequel to the Atlanta, Birmingham & Atlantic case, the progress of which was described in the *Railway Age* of February 4 (page 319), of February 11 (page 367), of February 18 (page 412), and of February 25 (page 454), B. L. Bugg, president of the road, was named receiver by Judge S. H. Sibley in the United States District Court at Atlanta, Ga., on February 25. During the progress of the hearings before the Labor Board, it was asserted by the representatives of the road that the wage reduction placed in effect on February 1, would enable the line to keep out of the hands of the receiver. The dispute was remanded

by the Board to conference between the carrier and its employees. Counsel for the company, in answering the petition for the receivership, stated that with the state and federal railroad commissions fixing rates and the Labor Board fixing wages, it was unable to meet expenses, and in the interests of all parties concerned, a receivership was desirable.

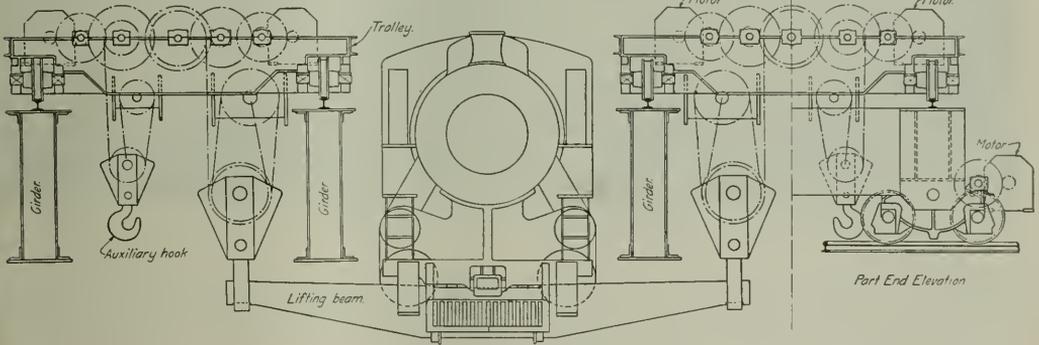
Later Judge Sibley signed an order putting into effect the schedule of reductions which Mr. Bugg, as president of the road, had urged before the Labor Board. These reductions amount to approximately 50 per cent of all increases granted since the government assumed control of the property in 1917. At the same time Judge Sibley indicated his willingness to grant a hearing should the men desire to make a showing in court as to wage scales.

A New Type of Erecting Aisle Saves Shop Headroom

ONE OF THE MOST formidable problems imposed in the design of modern locomotive repair shops is to provide a traveling crane capable of lifting a complete locomotive high enough so that it may be carried over the tops of

quired. Thus, with adequate allowance made for clearance, the height of a locomotive on the floor, plus that of another one being passed over the top of it, plus the depth of the traveling crane and its trolley, gives a total height of 54 to 56 ft. or more from the floor to the underside of the roof trusses. This height is obviously a source of great expense in construction and is also a disadvantage in the operation of the shop because of the waste of heat, inefficient illumination and disadvantageous height to which the crane operator is removed from the floor.

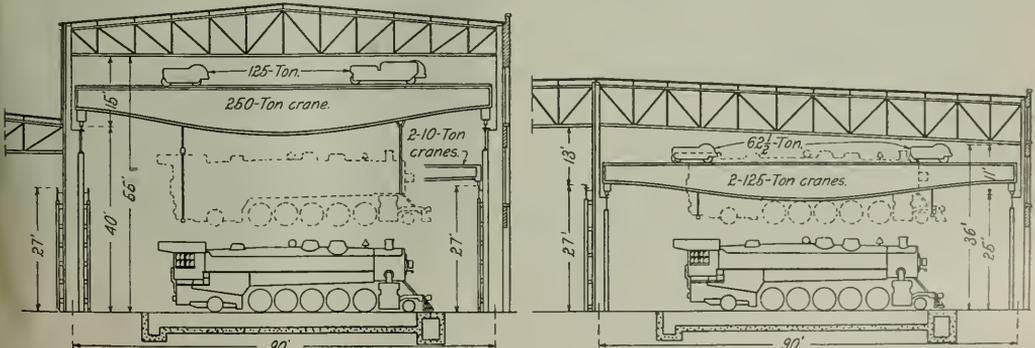
An appreciation of these shortcomings of the prevailing arrangement of shop structures has led to the development of the "gap crane" erecting shop by which from 15 to 18 ft. of the vertical height of the shop building may be saved. This is the invention of Harvey Shoemaker, formerly motive power superintendent of the Bangor & Aroostook. The idea is simple. The girders of the crane are spread apart a sufficient distance to permit the locomotive to be lifted up between them. As a consequence the crane may occupy the same vertical position as the locomotive, consequently the vertical height between the floor and the underside of the roof trusses consists of the height of the locomotive on the floor, plus the height of the locomotive in the air, plus the necessary clearance. The idea will be understood more clearly after an examination of the illustrations.



Cross Sectional Elevation of a Gap Crane

other engines in the shop to be set down at some other point. With the rapid increase in the length and weight of locomotives, so that 90-ft. cranes are now common, this utility has added greatly to the cost of erecting shops. One feature that has been especially troublesome is the great headroom re-

The gap crane is made up of four girders arranged in pairs with the two pairs separated a sufficient distance to allow the entire locomotive to be lifted up between them. Four trolleys of 62½ tons capacity each are used in pairs with the hooks or lifting devices at the ends of the fall lines



How a Gap Crane Reduces the Required Headroom in an Erecting Shop

attached to lifting beams which engage the front and rear ends of the locomotive. The lifting beam at the front end may be placed either under the extended sills or side frames which support the pilot truck or may be provided with adjustable saddle blocks and placed under the front end of the boiler, thus giving the same advantages as the sling rig but with greater resistance against overturning.

The gap crane may be constructed as a single unit or the two pairs of girders may be arranged to serve as independent "twin" cranes with provision for multiple unit control when they are used together for lifting a locomotive. Another feature of this development is the facility it offers for adapta-

tion to a large carrier, supported at its outer end by rods attached to a boom. This carrier contains the main conveyor by means of which the freight is transferred to and from the barge, the carrier being raised or lowered by means of blocks and tackle and a hoist as shown in the illustration to provide for the changing water level. The main conveyor is supplemented by a second conveyor extending the length of the main frame (on the wheels) and, when necessary to deliver the load at some distance behind the machine, by a third conveyor projecting to the rear. These auxiliary conveyors may be raised or lowered as found desirable for delivering packages to the floor of the dock, to freight cars or to motor trucks. The fact



Raising and Lowering of the Boom Compensates for Variation in the Distance from the Water to the Dock Level

tion to old shops equipped with a crane of limited capacity. Thus, if a shop is equipped with a traveling crane of 120 or 125 tons capacity, a second crane of the same capacity may be provided and the two arranged to serve as twin cranes.

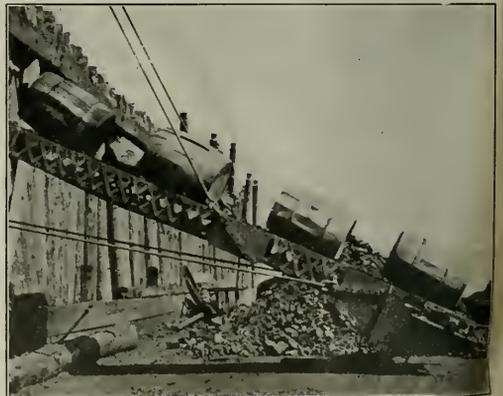
One point not to be overlooked in considering this development is the need in any modern shop of auxiliary or messenger cranes of 10 to 20 tons capacity. In the modern shop where high headroom has had to be provided for the lift-over operations, the auxiliary cranes have been usually operated on a separate runway about 27 ft. above the floor and therefore from 12 to 16 ft. below the runway upon which the large capacity crane is supported and thus the small cranes are enabled to operate without any appreciable interference with the large cranes. With the use of the gap crane in shops of 10 to 12 pits in erecting aisles, it is believed that the use of a single crane runway for both the heavy and light capacity cranes will work out very satisfactorily.

that the entire frame rests on wheels lends considerable flexibility to the equipment in reaching the points of receipt and delivery to the greatest advantage. They will handle package freight up to an individual package weight of 400 lb.

Mechanical Equipment for a Railway Water Terminal

A NEW TYPE of material handling equipment has been developed for use at rail-water terminals where large variations in the stage of water occur. Thus, the illustrations show the use of this conveying system by the Illinois Terminal Railroad at Alton, Ill., for the transfer of freight to and from barges on the Mississippi river.

The equipment consists of a frame, mounted on wheels, that runs on a track laid on the dock perpendicular to the water front. Extending from the "water" end of this frame



The Lower End of the Main Conveyor Hoisting Package Freight from the Deck of a Barge

This form of conveyor, some types of which will handle packages weighing up to 800 lb., is handled by the Brown Portable Conveying Machinery Company, Chicago.

General News Department

The American Railway Tool Foremen's Association will hold its eleventh annual convention at the Hotel Sherman, Chicago, on August 9, 10 and 11.

The legislature of Indiana has before it a bill to repeal the full train crew law of that state and also one to repeal the full switching law; and the bill has actually been passed by the lower House by considerable majorities.

Senator Cummins, chairman of the Senate committee on interstate commerce, announces that he proposes to introduce at the beginning of the next session of Congress a bill providing for the compulsory consolidation of the railroads into 14 to 18 systems.

Proposals to reduce the pay of unskilled workmen on April 1, noticed in another paragraph, referring to the New York Central, are also being issued by the Central of New Jersey, the Lehigh Valley and other roads; and similar notices will probably be issued within a few days by all of the prominent Eastern roads.

Senator Calder's bill for the regulation of the coal industry was reported to the Senate on February 24 by the committee on manufactures. The committee has been holding hearings on the bill, and has eliminated the provisions for price-fixing and government control and operation during emergencies. The bill provides for greater publicity regarding mine operation and costs of production.

The American Society for Steel Treating will hold its 1921 convention and exhibition at Indianapolis, Ind., on September 19 to 24 inclusive. The exhibition will be in the Manufacturers' Building at the State Fair Grounds which will provide a floor space of 76,800 sq. ft., and the meetings will be held at the Women's Building, which is located a short distance from the exhibition hall, where three or four large rooms will make it possible to hold sectional meetings simultaneously.

The Chicago Safety Council, through its Steam Transportation Committee, has requested all of the railroads to furnish information with respect to accidents to school children while trespassing on railroad premises. It is intended that this information shall be compiled periodically and forwarded to the superintendent of schools who in turn will place the data before all the scholars in bulletin form. In line with its work the committee is urging that school instruction be made a part of the school curriculum.

William G. McAdoo, formerly director general of railroads, declaring the transportation act a failure both in theory and effect, told newspaper men at Washington the other day that the railroads were drifting toward government ownership, which, he added, seemed to be the only apparent solution. The increasing of rates has not solved the railroad problem, Mr. McAdoo said, and the railroads have not been put into the condition desired, "despite the payment of millions of dollars of taxpayers' money to them under the terms of the transportation act." He did not discuss the question of how many of the millions had been paid.

The New York Central has notified its "unskilled" workmen—freightmen, platform, storehouse men, freight handlers, trackmen, track walkers, car laborers, asphaltmen, etc., to send representatives to a conference with officers of the company to be held in New York City on March 8, when revisions of wages will be proposed, to go into effect on April 1. It is understood that about 30,000 employees of the New York Central are affected by this notice. Many of them have no organization, and, apparently, committees will have to be chosen this week. Any properly accredited representative of 100 or more men of any craft, whether connected or not connected with a brotherhood, will have a standing in the

conference. The other roads in the New York Central system have as yet taken no action in this direction. The large majority of unskilled laborers are now receiving about 48.5 cents an hour, which is higher than the prevailing rate in most cities on the lines of the New York Central.

Persons killed in automobile accidents in the United States in 1919, according to statistics gathered by the Census Bureau, numbered about 8,000, and an officer of the Southern Railway calculates that the actual total is considerably larger than the total number of persons killed on the railroads of the country. He says:

"Automobile accidents in the United States claimed 1,474 more victims in 1919 than were killed in accidents on American railways. Deaths from automobile accidents showed a total of 7,969 for the Census Bureau's registration area, comprising about 80 per cent of the country's total population. In 66 of the large cities there were 3,808. In railway accidents the Interstate Commerce Commission reports 6,495 killed (less than for any previous year since 1898). This included 2,553 trespassers and 1,882 other persons, not either passengers or employees, of whom a large percentage were the victims of collisions between automobiles and railway trains." [Adding non-train accidents on railroads the total is 6,978.]

New Rules for Reporting Operating Statistics

The Interstate Commerce Commission has prescribed revised rules relative to operating statistics intended to continue, with some modifications, the compilation and report by Class 1 carriers, except switching and terminal companies, of the basal operating statistics reportable to the commission in special monthly and annual forms pertaining to the year 1920. The principal changes are, briefly: (1) The requirement of gross ton-miles of locomotives and tenders in connection with certain items; (2) the addition of a statement of the average number of serviceable and of unserviceable locomotives by classes of service; (3) the omission of rating ton-miles and of locomotive-hours; (4) the requirement of direction of movement for freight-train car-miles only; (5) the requirement of monthly and cumulative figures for like items in the same forms without a separate statement of annual figures other than those appearing in the regular annual reports of the carriers.

Precepts for Minneapolis & St. Louis

Employees—And the Rest of Us

[From an Official Circular]

Courtesy, consideration and common sense, practiced continuously, will create a "real" personality on "M. & St. L."

Never overlook any opportunity to boost "M. & St. L."

No matter what may be your position on "M. & St. L.," remember this one thing: The patron comes first.

Surround your job; bound it on all sides with Perseverance, Conscientiousness, Faithfulness and Efficiency.

If you feel the job on "M. & St. L." is not big enough for you, make it bigger.

Don't be afraid to ask intelligent questions.

Be willing to assist your fellow-workers.

Whenever a question is asked, take pains to answer it accurately, fully, briefly, promptly and with a pleasant smile.

Do not get angry under any circumstances.

If you are in the wrong, you can't afford to get angry.

If you are in the right, you don't need to get angry.

Servants of the Public Must Be Respectful

Respect in the railroad business is closely connected with obedience, for disobedience to a superior is disrespect. In the operation of a railroad, there are necessarily officers of various

ranks. Fitness for a position is the first consideration in choosing an officer. When an employee is chosen for an official position he is entitled to the respect that the position demands. When respect is wanting, little, if any, attention is paid to instructions issued. In order to command the respect of subordinates it is essential that officers be competent to fill the positions they occupy. It is not possible for an officer to secure from his employees the respect to which he is entitled, unless he is willing to respect his superior.

Officers are entitled to respect. It is just as easy to say "Yes, sir," as it is to say "Yah." Certainly it is much more respectful. To respect a person or a position, one must have confidence in the person or position. It behoves every officer to conduct himself so that he will command, and be in a position to demand, the respect of his subordinates.—*E. E. Nash, general manager, Minneapolis & St. Louis.*

On-Time Record of the Illinois Central

The Illinois Central has just issued the seventh article in its series of public statements, featuring the road's record for passenger train punctuality together with additional information on its service and equipment. The circular presents the percentage of trains arriving on time for four months ending with November, 1919, as compared with the percentage figures compiled by the United States Railroad Administration as follows:

All Railways.	Illinois Central System.
August, 1919.....	83 per cent
September, 1919.....	84 per cent
October, 1919.....	84 per cent
November, 1919.....	82 per cent
	95.4 per cent
	96.2 per cent
	95.4 per cent
	96.2 per cent

Reviewing the conditions for 1920 the article says that for the entire system 79,022 passenger trains were operated during that year on its 6,000 miles of line. The low level of on-time arrivals in 1920 was in January and April, when a figure of 93.4 per cent was reached whereas the high level came in October when a percentage of 97.3 per cent was made. The percentage average for all months of 1920 was 95.55.

Store Door Delivery

Pursuant to a vote of the Federal Highway Council, the desirability of establishing store door delivery of freight in large cities is to be presented to the principal railroads by a committee, of which J. C. Lincoln, traffic manager of the Merchants' Association, New York City, and formerly chief freight traffic officer of the Wabash Railroad, is a member. It is proposed to recommend that the railroads themselves provide the necessary plants and conduct store door delivery and collection, including in the operations all merchandise to or from freight houses, even carload freight; but not including freight loaded or unloaded at team tracks. In New York City large quantities of freight shipped in carloads is handled over the platforms. The committee will recommend that a reasonable charge be made for the service, separate from the regular freight charge, and that rates be published in separate tariffs. Other members of the committee are A. E. Beck, Baltimore Md.; W. J. Pitt, Philadelphia, Pa.; T. T. Harkrader, New York; W. J. L. Banham, New York, and Dr. R. S. MacElwee, director, Bureau of Foreign and Domestic Commerce, Washington, D. C.

Retrenchment

Further extensive reductions of forces by the Pennsylvania Railroad were reported on February 26, at Altoona, Pittsburgh and other points. The operation of the Pittsburgh Terminal as a separate division is to be discontinued and the old division boundaries will, in general, be restored.

The Delaware, Lackawanna & Western has ordered further reductions in forces at the Scranton shops. The Union Pacific on February 26 ordered further extensive reductions in its shops. On the New York Central, large numbers of men returned to work in the shops at Collinwood, Ohio; Elkhart, Ind., and other points, after forced vacations of one or more weeks.

The Canadian National, following the severe falling off in business throughout large sections of Canada, has taken off some passenger trains in New Brunswick, including trains

No. 31 and No. 32 between Moncton and Levis. In the western part of Ontario considerable numbers of men have been dismissed and two divisions have been consolidated into one.

Two hundred men in the shops of the New York, Ontario & Western at Middletown, N. Y., resumed work on March 1 after a layoff of a month.

Economy; Trust Men to Practice It

If we are fair with ourselves, we shall admit that we have never done as much as we could do to economize. We have been living in the thought of "getting by." Waste starts in with the little things and gradually grows and grows until it reaches the larger ones. How many officers when sending a telegram, censor it, to be sure that the fewest possible words have been used? It is not uncommon for employees to receive an order to have a certain thing done and then in the same order, instructions how it should be done. Surely, that is not economy. Every man must be credited with possessing the ability to think and use ordinary judgment, and he should not be deprived of his right to exercise it. If the employee is not permitted to think for himself, to think out his problems, to think how the thing should be done most economically, how can we expect him to be broad and independent? A subordinate official should grow and expand so that when his turn comes he may be ready for promotion. Economy means the wise spending of money or time, good stewardship, careful administration. We are just as large as we will permit ourselves to be. Economy comes by using what we have to the best possible advantage. An inventory of "M. & St. L." will show that we have practically as many resources on this railroad as other railroads have. In many instances we have much better.—*E. E. Nash, general manager, Minneapolis & St. Louis.*

Revenues and Expenses for 1920

The net operating income of the railroads of the United States for the calendar year 1920 was only \$62,264,421, or about one-third of 1 per cent on the valuation used by the Interstate Commerce Commission last summer for the purpose of the rate case, according to the final summary of revenues and expenses for December, and the year 1920, issued by the commission. Total operating revenues for the year were \$6,225,402,762, or \$1,041,000,000 greater than for the year 1919 when the roads earned a net of \$516,290,090. Operating expenses, \$5,826,197,474, were \$1,406,000,000 greater than in 1919 and taxes, which amounted to \$281,380,620, were \$83,000,000 greater. The Eastern roads had a deficit for the year of \$99,384,902, while the other districts showed decreases as compared with 1919. For the month of December the net operating income (for the whole country) was only \$10,225,583, although the total operating revenues were \$97,000,000 greater than for December, 1919. The summary, which covers 188 Class I roads and 15 switching and terminal companies, is given in the table.

RAILWAY RECEIPTS AND EXPENSES, DECEMBER AND TWELVE MONTHS ENDING WITH DECEMBER

Item	Calendar Year		December	
	1920	1919	1920	1919
27. Average number of miles operated....	235,580.01	234,428.79	235,881.09	234,571.20
REVENUES:	Dollars	Dollars	Dollars	Dollars
28. Freight	4,325,078,866	3,556,918,712	386,057,436	303,704,454
29. Passenger	1,288,808,159	1,180,010,766	115,060,511	100,080,515
30. Mail	150,404,467	57,456,159	8,876,400	9,716,268
31. Express	143,501,613	127,708,607	9,664,053	10,048,057
32. All other transportation	163,494,648	126,333,455	18,680,428	11,070,184
33. Incidental	148,731,748	130,500,436	11,850,844	11,928,652
34. Joint facility—Cr.....	7,790,789	7,301,480	696,183	1,035,200
35. Joint facility—Dr.....	2,407,528	2,164,894	303,474	196,334
36. Railway operating revenues	6,225,402,762	5,184,064,221	550,582,381	453,386,816
EXPENSES:				
37. Maintenance of way and structures.....	1,033,548,881	778,340,219	71,735,168	63,995,994
38. Maintenance of equipment	1,584,405,718	1,232,960,112	138,741,728	117,131,940
39. Traffic	73,659,951	47,534,691	7,527,801	4,633,116
40. Transportation	2,907,187,529	2,192,770,837	264,578,001	213,762,268
41. Miscellaneous operations	61,523,891	48,442,246	5,036,498	4,414,510
42. General	170,892,533	125,422,140	15,969,552	11,180,192
43. Transportation for investment—Cr.....	5,021,029	6,028,296	381,919	603,991
44. Railway operating expenses	5,826,197,474	4,419,441,949	503,206,889	414,514,029

45. Net revenue from railway operations.....	399,205,288	764,622,272	47,375,492	38,872,787
46. Railway tax accruals	281,380,620	198,806,615	30,295,417	21,259,370
47. Uncollectible railway revenues.....	1,226,574	917,221	300,675	107,357
48. Railway operating income.....	116,598,094	564,898,436	16,779,400	17,505,860
49. Equipment rents (Dr. bal.).....	34,712,122	32,717,162	4,182,784	1,930,256
50. Joint facility rent (Dr. bal.).....	19,621,551	15,891,184	2,371,033	1,870,627
51. Net of items 48, 49 and 50.....	62,264,421	516,290,090	10,255,583	13,704,977
52. Per cent of expenses	93.59	85.25	91.40	91.43

Note: (a) Federal lap-over items settled during the month are included in the above compilations for those periods that have indicated that estimates were not included for substantially all unaudited corporate items. (b) The amount of war taxes included in December, 1920, is \$5,395,794, and for period, March to December, 1920, \$33,349,938.

(c) Credit item.

(d) Debit item.

Meetings and Conventions

The following list gives names of secretaries, dates of next or regular meetings and places of meetings:

AIR BRAKE ASSOCIATION.—F. M. Nellis, Room 3014, 163 Broadway, New York City. Next convention, May 3-6, 1921, Hotel Sherman, Chicago. Exhibit by Air Brake Appliance Association.

AIR BRAKE APPLIANCE ASSOCIATION.—Fred W. Venton, 836 So. Michigan Ave., Chicago. Meeting with Air Brake Association.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—F. A. Pontius, Supervisor of Demurrage and Storage, C. & N. W. Ry., Chicago.

AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—S. W. Derr, Philadelphia & Reading, Philadelphia, Pa.

AMERICAN ASSOCIATION OF ENGINEERS.—C. E. Draver, 29 S. La Salle St., E. I. R. R., 322 South Michigan Ave., Chicago. Next meeting, June, 1921, Quebec, Can.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—J. Rohschild, Room 400, Union Station, St. Louis, Mo. Next convention, August 24-26, 1921, Kansas City.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Bhrift, 8 W. 40th St., New York.

AMERICAN RAILROAD MASTER TINNERS', COPPERSMITHS' AND PIPE FITTERS' ASSOCIATION.—C. Borcherdt, 202 North Hamilton Ave., Chicago, Ill. Next convention September 12-14, Hotel Sherman, Chicago.

AMERICAN RAILWAY ASSOCIATION.—J. E. Fairbanks, General Secretary, 75 Church St., New York, N. Y. Next regular meeting, November 16, 1921.

Division I.—Operating, W. J. Frupp (Chairman), General Manager, New York Central Railroad, Eastern Lines, New York, N. Y.; R. E. McGarty (Vice-Chairman), General Manager, Central Region, Pennsylvania System, Pittsburgh, Pa.

Freight Station Section (including former activities of American Association of Freight Agents), C. E. Fish (Chairman), Freight Agent, Baltimore & Ohio Railroad, Chicago, Ill.; J. G. Gilmore (First Vice-Chairman), Agent, Pennsylvania System, Eastern Region, Philadelphia, Pa.; C. M. Teschemacher (Second Vice-Chairman), General Agent, Chicago & Alton Railroad, Chicago, Ill.; R. O. Wells (Secretary), Freight Agent, Illinois Central Railroad, Chicago, Ill.

Medical and Surgical Section, D. Z. Duncit (Chairman), Chief Surgeon, Western Maryland Railway, Baltimore, Md.; G. G. Dowdall (First Vice-Chairman), Chief Surgeon, Illinois Central Railroad, Chicago, Ill.; Duncan Eve (Second Vice-Chairman), Chief Surgeon, Nashville, Chattanooga & St. Louis Railway, Nashville, Tenn.

Protective Section (including former activities of the American Railway Chief Special Agents and Chiefs of Police Association), R. S. Mitchell (Chairman), Chief Special Agent, Missouri Pacific Railroad, St. Louis, Mo.; H. D. Bennett (First Vice-Chairman), General Superintendent of Police, Baltimore & Ohio Railroad, Baltimore, Md.; Emmett Gregg (Second Vice-Chairman), Superintendent Special Service, Atchison, Topeka & Santa Fe Railway, Topeka, Kan.; J. C. Morrison (Secretary), 5 Church St., New York, N. Y.

Telegraph and Telephone Section (including former activities of the Association of Railway Telegraph Superintendents), H. Hulatt (Chairman), Manager of Telegraphs, Grand Trunk Railway, Montreal, Ont.; W. H. Hall (First Vice-Chairman), General Superintendent of Telegraph, Missouri, Kansas & Texas Lines, Denison, Texas; R. F. Finley (Second Vice-Chairman), Superintendent Telegraph, New York Central Lines, West of Buffalo, Cleveland, Ohio; W. A. Fairbanks (Secretary), 75 Church St., New York, N. Y.

Division II.—Transportation (including former activities of the Association of Transportation and Car Accounting Officers), E. J. Pearson (Chairman), President, New York, New Haven & Hartford Railroad, New Haven, Conn.; J. J. Bennett (Vice-Chairman), President, New York, New Haven & St. Louis Railroad, Cleveland, Ohio; C. W. Crawford (Chairman, General Committee), 431 South Dearborn St., Chicago, Ill.; G. W. Covert (Secretary), 431 South Dearborn St., Chicago, Ill.

Division III.—Traffic, G. H. Inghalls (Chairman), Vice-President, New York Central Lines, New York, N. Y.; J. Gottschalk (Secretary), 143 Liberty St., New York, N. Y.

Division IV.—Engineering, H. R. Safford (Chairman), Assistant to the President, Chicago & Burlington & Quincy Railroad, Chicago, Ill.; C. J. Kelloway (Vice-Chairman), Superintendent of Signals, Atlantic Coast Line Railroad, Wilmington, N. C.; E. H. Fritch (Secretary), 431 South Dearborn St., Chicago, Ill. Next annual meeting, March 15-17, 1921, Chicago, Ill.

Construction and Maintenance Section, H. R. Safford (Chairman), Assistant to the President, Chicago, Burlington & Quincy Railroad, Chicago, Ill.; E. H. Fritch (Secretary), 431 South Dearborn St., Chicago, Ill.

Electrical Section, George Gibbs (Chairman), Chief Engineer of Electric Traction, Lone Island Railroad, New York, N. Y.; E. B. Katte (Vice-Chairman), Chief Engineer, Electric Traction, New York Central Railroad, New York, N. Y.; E. H. Fritch (Secretary), 431 South Dearborn St., Chicago, Ill.

Signal Section (including former activities of the Railway Signal Association), F. W. Pfleger (Chairman), Signal Engineer, Union Pacific Railroad, Omaha, Neb.; F. B. Wizeand (First Vice-Chairman), Signal Engineer, New York Central Railroad, Western Lines, Cleveland, Ohio; J. A. Christoffersen (Second Vice-Chairman), Signal Engineer, Northern Pacific Railway, St. Paul, Minn.; H. S. Balliet (Secretary), 75 Church St., New York, N. Y.

Division V.—Mechanical (including former activities of the Master Car Builders' Association and the American Railway Master Mechanics' Association), W. T. Tolbert (Chairman), General Mechanical Superintendent, Chicago, Rock Island & Pacific Railway, Chicago, Ill.; J. Coleman (Vice-Chairman), Assistant to General Superintendent, Motive Power and Car Departments, Grand Trunk Railway, Montreal, Que.; V. R. Hawthorne (Secretary), 431 South Dearborn St., Chicago, Ill. Next convention, June 15-18, 1921, Atlantic City, N. J. Exhibit by Railway Supply Manufacturers' Association.

Equipment Painting Section (including former activities of the Master Car and Locomotive Painters' Association), E. L. Younger (Chairman), Foreman Painter, Missouri Pacific Railroad, Little Rock, Ark.; J. G. Keil (First Vice-Chairman), Foreman Painter, New York Central Railroad, Western Lines, Elkhart, Ind.; J. R. Ayers (Second Vice-Chairman), General Manager, Canadian Pacific Railway, Montreal, Que.; V. R. Hawthorne (Secretary), Foreman Painter, Boston & Maine Railroad, Reading, Mass.

Division VI.—Purchase and Stores (including former activities of the Railway Storekeepers' Association), H. C. Pearce (Chairman), General Purchasing Agent, Seaboard Air Line Railway, Norfolk, Va.; H. E. Ray (Vice-Chairman), General Storekeeper, Atchison, Topeka & Santa Fe Railway, Topeka, Kans.; I. P. Murphy (Secretary), General Storekeeper, New York Central Railroad, Western Lines, Collinwood, Ohio; W. J. Farrell (Assistant Secretary), 75 Church St., New York, N. Y. Second annual meeting June 20-22, 1921, Atlantic City.

Division VII.—Freight Claims (including former activities of the Freight Claim Association), H. C. Pribble (Chairman), General Claim Agent, Atchison, Topeka & Santa Fe Railway System, Topeka, Kans.; H. C. Howe (First Vice-Chairman), Freight Claim Agent, Chicago & North Western Railway, Chicago, Ill.; D. C. MacDonald (Second Vice-Chairman), Assistant General Claim Agent, Canadian Pacific Railway, Winnipeg, Man.; Lewis Pilcher (Secretary), 431 South Dearborn St., Chicago, Ill. Next meeting Coronado Beach, San Diego, Calif., May 17, 1921.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W. Ry., 319 N. Waller Ave., Austin Station, Chicago. Next convention, October 18-20, 1921, New York City. Exhibit by Bridge and Building Supply Men's Association.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—(Works in co-operation with the American Railway Association, Division IV.) E. H. Fritch, 431 South Dearborn St., Chicago. Next annual meeting, March 15-17, 1921, Congress Hotel, Chicago. Exhibit by National Railway Appliances Association.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—(See American Railway Association, Division 5.)

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—R. D. Fletcher, 1145 East Marquette Road, Chicago. Exhibit by Supply Association of the American Railway Tool Foremen's Association.

AMERICAN SHORT LINE RAILROAD ASSOCIATION.—T. F. Whittelsey, Union Trust Bldg., Washington, D. C.

AMERICAN SOCIETY FOR TESTING MATERIALS.—C. L. Warwick, University of Pennsylvania, Philadelphia, Pa.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Col. H. S. Crocker (acting secretary), Engineers' Conventions Building, 33 W. 39th St., New York City. Next convention, April 27, 1921, Houston, Texas. Regular meetings 1st and 3rd Wednesday in month, except July and August, 33 W. 39th St., New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York. Next meeting, May 23-26, Congress Hotel, Chicago.

AMERICAN STEEL TREATERS' SOCIETY.—W. H. Eiseman, 154 East Erie St., Chicago.

AMERICAN TRAIN DISPATCHERS' ASSOCIATION.—C. L. Darling, Northern Pacific Ry., Spokane, Wash. Next convention, June 20, 1921, Kansas City, Mo.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—George M. Hunt, Chemist, Forest Products Laboratory, Madison, Wis.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—Willis H. Palling, C. R. R. of N. J., Jersey City, N. J. Next meeting, June 15-17, 1921, St. Louis, Mo.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreuccetti, C. & N. W. Ry., Room 411, C. & N. W. Sta., Chicago. Exhibit by Railway & Electrical Supply Manufacturers' Association.

ASSOCIATION OF RAILWAY EXECUTIVES.—Thomas De Witt Cuyler (chairman), 61 Broadway, New York, N. Y.

ASSOCIATION OF RAILWAY SUPPLY MEN.—C. L. Mellor, 212 W. Illinois St., Chicago. Meeting with International Railway General Foremen's Association.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—(See American Railway Association, Division 1.)

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—(See American Railway Association, Division 2.)

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—A. J. Filkins, Paul Dickinson Company, Chicago. Meeting with convention of American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—W. A. Booth, 131 Charron St., Montreal, Que. Next meeting, December 14.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 626 North Pine Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, New Morrison Hotel, Chicago.

CAR FOREMEN'S ASSOCIATION OF ST. LOUIS, MO.—Thomas B. Koeneke, Federal Reserve Building, St. Louis, Mo. Meetings, first Tuesday in month at the American Hotel Annex, St. Louis.

CENTRAL RAILWAY CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 2d Thursday in November and 2d Friday in January, March, May and September, Hotel Statler, Buffalo, N. Y.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S ASSOCIATION.—W. P. Elliott, Terminal Railroad Association of St. Louis, East St. Louis, Ill. Next meeting March 3-4, 1921, Hotel Sherman, Chicago.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S SUPPLY MEN'S ASSOCIATION.—D. B. Wright, 34th St. and Artesian Ave., Chicago, Ill. Meeting with Chief Interchange Car Inspectors' and Car Foremen's Association.

CINCINNATI RAILWAY CLUB.—H. Boutet, 101 Carew Bldg., Cincinnati, Ohio.

EASTERN RAILROAD ASSOCIATION.—E. N. Bessling, 614 F St., N. W., Washington, D. C.

FREIGHT CLAIM ASSOCIATION.—(See American Railway Association, Division 7.)

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 321 Grand Central Sta., Chicago. Regular meetings, Wednesday preceding 3d Friday in month, Room 856, Insurance Exchange Bldg., Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—W. J. Mayer, Michigan Central R. R., Detroit, Mich. Next convention, August 16-18, 1921, Hotel Sherman, Chicago.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—J. G. Crawford, 702 E. 51st St., Chicago. Next annual meeting, May 24-26, 1921, Hotel Sherman, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 1061 W. Wabasha St., St. Paul, Minn. Next convention, September 12-15, Hotel Sherman, Chicago. Exhibit by Association of Railway Supply Men.

MAINTENANCE OF WAY MASTER PAINTERS' ASSOCIATION.—E. E. Martin, Union Pacific R. R., Room No. 19, Union Pacific Bldg., Kansas City, Mo. Next convention, October 4-6, 1921, Buffalo, N. Y.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York. Next convention, May 23-26, 1921, Planters' Hotel, St. Louis, Mo.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—(See American Railway Association, Division 5, Equipment Painting Section.)

MASTER CAR BUILDERS' ASSOCIATION.—(See American Railway Association, Division 5.)

NATIONAL ASSOCIATION OF RAILROAD TIE PRODUCERS.—E. E. Pershall, T. J. Moss Tie Company, 720 Security Bldg., St. Louis, Mo.

NATIONAL ASSOCIATION OF RAILWAY AND UTILITIES COMMISSIONERS.—James B. Walker, 49 Lafayette St., New York.

NATIONAL FOREIGN TRADE COUNCIL.—O. K. Davis, 1 Harbor Square, New York.

NATIONAL RAILWAY APPLIANCE ASSOCIATION.—C. W. Kelly, Kelly-Derby Co., Peoples Gas Bldg., Chicago. Meeting with American Railway Engineering Association.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, excepting months of June, July, August and September.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in month, except June, July and August, 29 W. 39th St., New York.

PACIFIC RAILWAY CLUB.—W. S. Wollner, 64 Pine St., San Francisco, Cal. Regular meeting, 2d Thursday in month, alternately in San Francisco and Oakland.

RAILWAY ACCOUNTING OFFICERS' ASSOCIATION.—E. R. Woodson, 1116 Woodward Building, Washington, D. C. Next annual meeting, June 8, 1921, Hotel Traymore, Atlantic City, N. J.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Naxon, 600 Liberty Bldg., Broad and Chestnut Sts., Philadelphia, Pa.

RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, 515 Grandview Ave., Pittsburgh, Pa. Regular meetings, 4th Thursday in month, except June, July and August, American Club House, Pittsburgh, Pa.

RAILWAY DEVELOPMENT ASSOCIATION.—D. C. Welty, Missouri Pacific R. R., Little Rock, Ark.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, General Electric Co., Chicago. Annual meeting with Association of Railway Electrical Engineers.

RAILWAY EQUIPMENT MANUFACTURERS' ASSOCIATION.—D. L. Eubank, Galena Signal Oil Company, Richmond, Va. Meeting with Traveling Engineers' Association.

RAILWAY FIRE PROTECTION ASSOCIATION.—R. R. Hackett, Baltimore & Ohio R. R., Baltimore, Md.

RAILWAY REAL ESTATE ASSOCIATION.—R. H. Morrison, C. & O. Ry., Richmond, Va.

RAILWAY SIGNAL ASSOCIATION.—(See American Railway Association, Division 4, Signal Section.)

RAILWAY STOREKEEPERS' ASSOCIATION.—(See American Railway Association, Division 6.)

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 1841 Oliver Bldg., Pittsburgh, Pa. Meeting with American Railway Association, Division 5.

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, Waterbury Battery Co., 30 Church St., New York.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—P. J. McAndrews, C. & N. Y. R., Burlington, Ill. Next annual convention, September 20-22, 1921, Chicago. Exhibit by Track Supply Association.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, Schroeder Headlight & Gearing Co., New York City. Meeting with American Railway Association, Signal Section.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—L. W. Cox, 1217 Commercial Trust Bldg., Philadelphia, Pa.

SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, P. O. Box 1205, Atlanta, Ga. Regular meetings, 3d Thursday in January, March, May, July, September and November, Piedmont Hotel, Atlanta.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, Western Ry. of Ala., Atlanta, Ga.

SUPPLY ASSOCIATION OF AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—C. N. Thulin, Duff Manufacturing Company, 935 Peoples Gas Bldg., Chicago.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Meets with Roadmasters' and Maintenance of Way Association.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. R. R., Buffalo, N. Y. Exhibit by Railway Equipment Manufacturers' As-

Traffic News

At Vera Cruz, Mexico, the amount of freight lying on the docks awaiting transportation inland is said to amount to 40,000 tons. Locomotives, as well as cars, are lacking.

The Railway Commissioners of Canada have authorized a general increase in the freight rates on liquor, from first-class to double first-class; in carloads it is to be advanced to third-class.

The Indiana Coal Traffic Bureau, the Knox County Coal Operators' Association and the Southern Indiana Coal Bureau, said to represent 85 per cent of the coal tonnage mined in Indiana, have asked the Interstate Commerce Commission to withdraw its service order No. 18 regulating the assignment of cars for railroad fuel loading.

The house committee on interstate commerce has favorably reported a bill introduced by Representative Coady of Maryland, to extend the guaranty provisions of Section 209 of the transportation act for the six months following the period of federal control of the railroads to the Merchants' & Miners' Transportation Company. A similar bill has been introduced in the Senate by Senator Smith.

At Bridgeburg, Ont., which is just across the river from Buffalo, N. Y., the receipts at one ticket office recently increased rapidly from about \$2,500 a month to \$10,000 a month, this in consequence of large numbers of purchases by persons coming to Bridgeburg from Buffalo to begin their trip to some point in the United States, advantage being taken of the difference in the value of Canadian and American money. A rule has now been adopted under which these passengers, as soon as they come into the United States, are called upon by the conductor of the train for a payment sufficient to cover the difference in exchange and the full United States war tax.

Coal Production

A sharp decline again marked the production of soft coal during the week ended February 19 and for the first time since the market broke last December the output fell below even the level of 1919, according to the weekly bulletin of the Geological Survey. The total production is estimated from reports of railroad shipments at 7,472,000 net tons, or 5 per cent less than that for the preceding week. In the corresponding week of 1919 the output was 7,722,000 tons. The present rate of production is below the lowest point reached in 1920 during the railway switchmen's strike. With car and labor supply at present ample, the bulletin says, the factor limiting production is absence of demand.

New England Roads Ask Higher Mail Rates

The New England railroads have petitioned the Interstate Commerce Commission for a further increase in the rates for the transportation of the mails, on the ground that the rates prescribed by the Interstate Commerce Commission in its decision of December, 1919, are inadequate. During the original hearings before the commission on the subject of railway mail pay, the New England roads asked for rates 33 1/3 per cent higher than those accorded to the railroads generally, on the ground of their higher operating expenses and the character of their service. The petition states that the rates of pay now in effect are not in conformity with the provisions of the law of July 28, 1916, under which the commission fixed the rates, in that they do not yield and since September 1, 1920, have not yielded them fair, reasonable or adequate compensation for the service performed. The commission is asked to re-examine the facts and circumstances surrounding the transportation of mail on the New England lines and the service performed by them, with special reference to the period since September 1, 1920.

Stock of Southeastern Express Company

Taken by Business Men

Fairfax Harrison, president of the Southern Railway, announced on February 18 that the books for subscription to the million dollars of capital stock offered to the people of the south by the Southeastern Express Company were opened the previous morning and were closed at night. The stock was allotted proportionately to all the 14 states and the District of Columbia served by the lines of the Southern and the Mobile & Ohio. The reports received show oversubscription in every state, at least 2,500 widely distributed southern business men having taken shares. No single subscription in excess of 100 shares was received and no officer or employee of the railroads was permitted to participate.

"This result," said Mr. Harrison, "fully justifies our confidence that the people of the south desire competition in express service."

Transcontinental Freight by Water

Freight between places south of the Atlantic Coast and ports on the Pacific is now moving by way of the Panama Canal in an estimated volume of 250,000 tons a month. Rates by water are, on many commodities, about 25 per cent lower than by the transcontinental railroads. Since last August, when the Interstate Commerce Commission authorized a horizontal advance in the freight rates, the rail movement, especially of export freight, has been at a standstill. The coastwise steamship companies have increased the number of sailings until there is a departure of a freighter in the coastwise trade every day both eastbound and westbound. Eleven lines are operating from the Atlantic to the Pacific. With the marked depression in ocean freight rates, American ship-owners, unable to make profits on the transoceanic voyages, have placed their steamers in the coastwise trade. The Luckenbach Steamship Lines have made the voyage from the Atlantic to the Pacific in eighteen days, while the slower ships, owned by the Shipping Board and by some of the other companies, average from 24 to 26 days. Merchants say that the steamship companies have taken away from the railroads the east-bound movement of lumber from the Pacific Coast. In order to meet this competition the rail lines have announced reductions of seven cents per hundred pounds.

New England Roads Appeal to Governors

The presidents of the Boston & Maine, the New York, New Haven & Hartford, the Maine Central and the Bangor & Aroostook have asked the Governors of the six New England States to use their influence to aid the railroads in securing without delay authority to make a general advance of ten per cent in rates, both freight and passenger. At a conference in Boston on February 27, at which all of the Governors were present, the railroad representatives declared that the increase was made necessary because the roads were operating under a deficit of more than \$27,000,000 a year and were failing by about \$50,000,000 to earn 6 per cent annually on the conservative estimate of their values.

"In order that adequate and satisfactory transportation service may be assured to New England," a memorandum presented to the Governors said, "it is essential not only that the immediate solvency of these roads should be assured but also that their credit should be re-established * * *"

The Governors decided to appoint citizens' committees of five in each State to examine into the condition of the roads. Governor Cox, of Massachusetts, announced that the committees which would be named without delay, would convene in Boston probably "within the next ten days."

The railroads proposed to make the increase effective until February 28, 1922. It would not apply to coal and coke, switching charges, or export and import traffic in cases where the latter meets competition from other ports.

The executives told the Governors that although the proposed increases had been figured to provide \$23,000,000 additional revenue this year, a decrease in the volume of traffic would cut that figure to about \$18,000,000. Trunk lines might be generally relied upon to come to the aid of New England roads with payments aggregating \$15,000,000 a year, subject to the approval of the Interstate Commerce Commission.

Commission and Court News

Interstate Commerce Commission

The Commission has suspended until June 29 the operation of proposed changes in rates on rough and sawed stone from Bedford and certain other Indiana points to Dexter and Poplar Bluff, Mo.

The Interstate Commerce Commission has suspended from March 3 until July 1 the operation of a uniform increase of 20 cents per net ton in the rates on coal, carloads, from points on the Cumberland Railroad to points in Florida.

The Commission has suspended until June 25 the operation of schedules which provide increased commodity rates on iron or steel bolts, in less than carload quantities, from Kansas City, Mo., to Galveston and Beaumont, Tex., and points taking same rates.

The Commission has suspended until June 28 certain tariffs providing rates to, from and between points south of the Ohio river, including Mississippi Valley, purported to be established in conformity with orders of the commission in the Memphis Southwestern Case.

The Commission has suspended until June 29 the operation of items in W. J. Kelly's tariff which provide increased carload rates on green salted hides from Chicago, Milwaukee and certain other western points to Old Fort and Morgantown, N. C. Johnson City, Tenn., and other points.

The Commission has suspended, until June 25, the operation of proposed increased rates on petroleum and its products from points in Arkansas and Louisiana to Memphis, Tenn., purported to be established in conformity with order of the Commission in the Natchez Case, Docket 8845, 58 I. C. 610.

The Commission has suspended until June 29 proposed increases in the charges (50 and 75 cents a car) for loading and unloading live stock at the stock yards, in Sioux City, Iowa, Omaha, East St. Louis, and at other points, to \$1 and a proposed provision for the absorption of these increased charges by the carriers.

The Commission has suspended until June 29 the operation of certain schedules providing rates to, from and between points south of the Ohio river, including Mississippi Valley, purported to be established in conformity with orders of the Commission in the Memphis Southwestern case and the Murfreesboro case.

The Commission has suspended until June 29 the operation of items in a Kansas City Southern tariff which propose the cancellation by the Texarkana & Ft. Smith of the rule providing for the switching of carload shipments of lumber and timber to and from the tracks of the Texas & New Orleans, at Port Arthur, Tex.

The Commission has suspended until June 29, schedules published in a Union Stock Yard & Transit Company of Chicago tariff which propose to increase the existing charge of 75 cents for loading and 50 cents a car for unloading live stock at the Union Stock Yards, Chicago, to one dollar a car, and to provide for the absorption of such charges by the principal roads bringing live stock to the city.

The Commission has suspended until July 23 the operation of all schedules published in a supplement to a Minneapolis, St. Paul & Sault Ste. Marie tariff which name increased switching charges and proposed restrictions in the absorption on carload freight switched between industries on the line of the Minneapolis & St. Louis and the Railway Transfer Company of the City of Minneapolis and points of interchange with the Minneapolis, St. Paul & Sault Ste. Marie.

The Commission, on the petition of the Tennessee railroads, has ordered an investigation of the situation created by the re-

fusal of the Railroad and Public Utilities Commission of Tennessee to permit the carriers to increase their intrastate rates on common brick, sewer pipe, concrete and stone and gravel when for use in the construction of public highways and consigned to government authorities, to correspond with the increase permitted by the Commission for intrastate traffic.

State Commissions

The Railroad Commission of the State of Louisiana has taken up with the Interstate Commerce Commission the matter of the charge by the railroads of 50 to 75 cents on each passenger crossing the Mississippi River on railroad transfer boats.

The Northwestern Pacific has applied to the Railroad Commission of California for authority to lease a branch line in Mendocino County, Cal., known as the Albion branch, to the Albion Lumber Company. The lumber company agrees to operate this branch and to render the same service as that now given by the Northwestern Pacific.

The Public Service Commission of Missouri has acted upon the application of the carriers in the state for authority to make increases in freight and passenger rates similar to those prescribed by the Interstate Commerce Commission, by ordering that the temporary increases authorized in August, 1920, shall be effective for a period of 12 months from September 1, 1920. The order provides that at the expiration of this twelve-month period, the basis of the rates shall be restored to that in effect on February 29, 1920, unless extended or changed by the commission.

State Rates Advanced

The Interstate Commerce Commission has rendered its decision in the Indiana, Nebraska and South Carolina intrastate rate cases ordering advances in the intrastate rates to correspond to those allowed by the interstate commission in the general rate advance case.

Overcharge Claims

The Interstate Commerce Commission announces that on February 17 the Railroad Administration notified the railroads that claims against the director-general for overcharges in connection with freight, passenger, demurrage, storage, etc., should be no longer accepted. Claimants must file such claims with the Interstate Commerce Commission.

The circular says: "A statement of unsettled overcharge claims on hand shall be prepared and filed with the Interstate Commerce Commission on or before February 28, 1921. Such statements shall be entitled 'Claims against Director General, as Agent, for alleged violation of Section 6.' . . . Such claims shall be handled to conclusion in accordance with established practice. Statements shall be rendered to the Interstate Commerce Commission monthly showing disposition of each claim settled or rejected during the month."

The commission says that these instructions were issued after conference with the commission, and that it will co-operate in the effort to make the plan inexpensive and expeditious.

Court News

In an action under the federal Employers' Liability Act to recover for the death of a repair man in the signal department who, while engaged in oiling a switch, was run over by an engine running backwards, the Pennsylvania Supreme Court holds that the failure of the engineman to give the customary warning was unusual and unexpected, not to be ordinarily foreseen, and the risk of which was not assumed by the employee.—*Dutrey v. P. & R. (Pa.)*, 108 Atl. 620.

The Pennsylvania Supreme Court holds that an asphalt used as a mere yard convenience for the purpose of cleaning and overhauling engines after completing their day's run and putting them in condition for subsequent use for either state or interstate traffic is not an instrumentality of interstate commerce.—*Reynolds v. P. & R. (Pa.)*, 109 Atl. 660; certiorari denied, 252 U. S. 507.

Foreign Railway News

Spanish Northern Will Electrify

The Spanish Northern is asking for bids, through the Spanish government, for materials to electrify a portion of its line, according to cable advices from Commercial Attache Cunningham at Madrid. Bids will be opened also on April 22 covering the construction of a steam railway from Soria to Castejon. It is also said that the government will soon be in the market for more cars and locomotives.

Chinese Railway Manager Visits America

Dr. Yen Te-Ching, managing director of the Canton-Hankow Railway, arrived in San Francisco February 8. It is understood that he intends to make an investigation of railway and lake transportation in this country and that he will avail himself of all opportunities afforded to visit plants where quantity production is demonstrated.

France Borrowing Money for Equipment

New York investment houses are offering to the public 6 per cent bonds to the value of 50,000,000 francs of the Paris-Orleans Railway. These bonds are guaranteed by the French government and will net about \$65.50 per 1,000 franc bond, at the prevailing rate of exchange and at the prevailing price of 92. The proceeds of this loan, it is understood, will be expended in this country for locomotives and cars.

Work Started on New Mexican Line

The Mexican government has begun the construction of a line to extend from Durango, capital of the state of that name, to Mazatlan on the Pacific coast. Work has commenced on the Mazatlan end of the line. The proposed railway has been laid off in sections of 10 kilometers each. The construction offices are located at Mazatlan. Work will soon begin at Durango, also, it is said. It is estimated that from two to three years will be required to complete the work.

English Firm Secures Contract for

Repairing Russian Locomotives

LONDON.

Sir W. G. Armstrong, Whitworth & Co., Ltd., has signed a provisional contract for the repair of locomotives in Russia. It is estimated that 50 per cent of the locomotives owned by the Russian railways are in need of repairs and that the contract will amount to many thousands of engines. The work is to be done at the company's Scotswood Works and arrangements are being made to bring 20 locomotives a month to the works for some years.

Chinese Eastern Asks Bids for Tie Treating Plant

The Chinese Eastern is asking for bids from this country for the construction of a "sleepers impregnation works" (tie treating plant). The proposed plant is to be, insofar as is possible, on wheels so that it may be moved from place to place with little difficulty. Any company bidding on the plant will be expected to offer also bids for its operation during the first year. The bids are open until June 1. Plans and specifications may be obtained from Engineer Alexandroff, Chief of Maintenance of Way and Works, Chinese Eastern Railway, Harbin, Manchuria.

Committee Reports on English Railway Agreements

LONDON.

The Colwyn Committee, made up of members of Parliament, which was to investigate and report on the various agreements made by the government with the railways dur-

ing the period of government control, has made an extended report in which it is estimated that the total claims of the railways covering arrears of maintenance, abnormal wear and tear and replacement of stores will amount to £150,000,000 (approximately \$600,000,000 at the current rate of exchange). The Committee has indicated that these claims are more than what the railways should receive. The committee feels that the existing agreements should not be given their legal interpretation but should be considered in the light of the circumstances under which they were made and that the spirit of the agreements should govern their interpretation. It is claimed by the committee that some of the railways have already received more than they rightly should for deferred maintenance.

Railway Supply Exports in 1920

The exports of steam locomotives and passenger cars in 1920 were greater than in any previous year. The totals for the exports of all other railway materials, however, fell considerably below similar totals for 1919. The detailed figures, as reported by the Bureau of Foreign and Domestic Commerce, follow:

	1920	1919	
Railroad spikes.....	37,185,246 lb.	\$1,607,672	55,487,231 lb. \$2,896,073
Steel rails.....	594,634 tons	36,066,505	652,443 tons 38,986,855
Switches, frogs, etc.....	.....	7,569,430	..... 9,280,725
Steam locomotives.....	1,711	53,629,847	..... 30,275,728
Passenger cars.....	123	1,171,674	104 1,606,540
Freight cars.....	21,676	37,192,502	27,317 57,473,824
Car wheels and axles.....	.....	9,061,305	..... 11,843,738

Locomotives to Be Built in Poland

LONDON.

It is stated by the Warsaw correspondent of the London Times that with the object of encouraging home industries the Polish government has recently signed contracts with a number of manufacturers in Poland for the delivery of large quantities of rolling stock for the Polish railways within the next 10 years. The firms chiefly concerned are the Polish Locomotive Works, Sosnowice, which has received an order for 1,100 locomotives; Lilpop, Rau & Lowenstein, Warsaw, which has received an order for 1,000 locomotives, 20,000 freight cars and 3,000 passenger cars; and the Ostrow Wagon Works, which has received an order for 18,000 freight cars and 2,800 passenger cars. None of these firms are in a position to carry out these orders with their present plants. The Polish Locomotive Works does not at present build complete locomotives, although it manufactures locomotive boilers. Neither has the Lilpop, Rau & Lowenstein plant built locomotives previously. The Ostrow Works is an entirely new enterprise and its factory is still in course of construction. Obviously these firms will need foreign capital and machinery to enable them to complete their orders.

Locomotive Exports in December

The figures for the exports of steam locomotives in December show a total of 154 valued at \$4,746,907. This is the largest figure in point of number since September and in point of value since August. The largest exports in December to any one country were for Cuba. These shipments totaled 52 and were valued at \$1,593,023. The detailed figures by countries, as compiled by the Bureau of Foreign and Domestic Commerce, follow:

Countries	Number	Dollars
Canada.....	8	121,046
Honduras.....	1	3,323
Salvador.....	3	61,550
Mexico.....	4	33,000
Jamaica.....	1	14,350
Cuba.....	52	1,642,100
Argentina.....	7	297,500
Brazil.....	46	1,593,023
Chile.....	1	10,000
Colombia.....	1	2,000
China.....	6	383,024
Dutch East Indies.....	4	19,000
Japan.....	5	33,500
New Zealand.....	1	11,000
Philippine Islands.....	2	14,900
Egypt.....	12	507,329
Total.....	154	4,746,907

Equipment and Supplies

Locomotives

THE PEKING-SUIYUAN is inquiring through the locomotive builders for 26 locomotives.

THE ATCHISON, TOPEKA & SANTA FE is inquiring for 10 Pacific, 15 Mikado, 15 Mountain and 10 Santa Fe type locomotives.

THE COLOMBIAN NORTHERN (South America) reported in the *Railway Age* of January 28, as inquiring for some 2-8-2 type locomotives, has ordered one locomotive from the American Locomotive Company.

Freight Cars

THE AMERICAN SMELTING & REFINING COMPANY, New York, is inquiring for 15 ore cars of 60 tons capacity.

THE HONOLULU IRON WORKS COMPANY, Woolworth building, New York, is inquiring for 30 cane cars of 30 metric tons capacity, for export.

THE UNITED FRUIT COMPANY, New York, reported in the *Railway Age* of January 7, as inquiring for 40 box and 40 flat cars, has ordered 50 box and 40 flat cars, of 20 tons capacity, from the Gregg Company, for use on its division at Banos, Cuba.

Passenger Cars

THE CARNEGIE STEEL COMPANY is inquiring for one all-steel pay-car.

THE UNION PACIFIC, reported in the *Railway Age* of December 24, as inquiring for 14 dining cars, has ordered this equipment from the Pullman Company.

Iron and Steel

THE INDIANAPOLIS TERMINAL has ordered 500 tons of rails from the Illinois Steel Company.

THE HONOLULU IRON WORKS COMPANY, Woolworth building, New York, is inquiring for 300 tons of light rails and accessories, for export to Honolulu.

THE DELAWARE, LACKAWANNA & WESTERN is advertising for bids to be received until noon March 9, on serial contract No. 13, for fabricated steel plate work for the following: Washington, N. J., bridge, 170 tons; Cortland, N. Y., grade elimination, 64 tons; Coventry, N. Y., bridge, 56 tons; Sherburn, N. Y., bridge, 101 tons; Buffalo, N. Y., bridge at Delavan avenue, 1,155 tons.

Track Specialties

THE INDIANAPOLIS TERMINAL has ordered 100 per cent rail joints from the Rail Joint Company for 500 tons of rails ordered from the Illinois Steel Company.

THE ATCHISON, TOPEKA & SANTA FE has ordered 100 per cent rail joint equipment from the Rail Joint Company for 100,000 tons of rails purchased for installation in 1921.

THE BOSTON & MAINE will receive bids until noon March 14 on Inquiry No. 3,578; 600 kgs 7/8 by 4 3/4 track bolts, for delivery at Salem, Mass., and 550 kgs 1 in. by 5/4 track bolts, delivered, Fitchburg, Mass.

THE BOSTON & MAINE will receive bids until noon March 14 on Inquiry No. 3,579; 15,360 joints for 100 lb. rail, for delivery at Fitchburg, Mass., and 28,000 joints for 85 lb. rail, for delivery at Salem, Mass.

THE BOSTON & MAINE will receive bids until noon March 14 on Inquiry No. 3,551; 320,000 tie plates for 100 lb. rail, for delivery at Fitchburg, Mass., and 325,000 tie plates for 85 lb. rail, 47,000 for 75 lb. rail, and 8,000 for 72 lb. rail, for delivery at Salem, Mass.

Supply Trade News

W. J. Rochl, formerly assistant purchasing agent on the Missouri Pacific, has been appointed sales representative on the St. Louis, Mo., district for **A. M. Castle & Co.**

The **Independent Pneumatic Tool Company**, Chicago, on February 26, removed its Pittsburgh, Pa., office from 1208 Farmers Bank building, to 718 Bessemer building, corner of Fort and Duquesne Way.

Marcel Garsaud has been appointed New Orleans sales agent of the Whiting Corporation, Harvey, Ill., succeeding **J. S. Barelli**. Mr. Garsaud's office is in the Whitney Central Bank building, New Orleans, La.

Dwight P. Robinson & Company, Inc., engineers and contractors, New York, recently opened branch offices in the Dominion Express building, Montreal, Que. **Alexander C. Barker**, vice-president, is in charge of the office.

Robert C. Weller has been appointed general sales manager of the **Lakewood Engineering Company**, Cleveland, Ohio, and **Carlton R. Dodge** has been appointed western sales manager, with headquarters at 1215 Lumber Exchange building, Chicago.

The **O'Malley-Bear Valve Company** of Chicago has been appointed exclusive agent for the **Chapman Valve Manufacturing Company** of Indian Orchard, Mass., and will have charge of the sale of the Chapman lines of valves in the railway field in the United States.

William C. Wilson, formerly connected with the Taylor-Wharton Iron & Steel Company and William Wharton, Jr., Company, in the capacity of manager of sales, northeastern territory, has become associated with the **Pittsburgh Screw & Bolt Company**, Pittsburgh, Pa. He will be located at its New York Office, 50 East Forty-second street.

Roy G. Owens, vice-president and general manager of sales of the **Lakewood Engineering Company**, Cleveland, Ohio, is now giving his entire time to the executive department and **Robert C. Weller**, assistant general manager of sales at Cleveland, has been promoted to general manager of sales, succeeding Mr. Owen, effective February 25. **Carlton R. Dodge**, manager of field sales at Cleveland, has been appointed Western sales manager with headquarters in the Lumber Exchange building at Chicago, effective March 1.

The **Liberty Car & Equipment Company** and the **Illinois Car & Manufacturing Company**, both of Hammond, Ind., have been consolidated and will now conduct their joint business under the name of the **Illinois Car & Manufacturing Company**, with general offices at Hammond, Ind., the officers of the consolidated company are: **P. H. Joyce**, president; **J. W. O'Leary**, vice-president; **J. F. Farrell**, vice-president; **J. E. Fitzgerald**, treasurer, and **O. R. Shearman**, secretary. The plant at Chicago Heights will be known as the Liberty plant and the one at Hammond as the Hammond plant.

After March 1, the **Richmond, Va.**, office of the **Vapor Car Heating Company, Inc.**, will be discontinued and all future business from the Southeastern territory will be handled from the offices of the company in Washington, D. C. The Washington office is in charge of **Harry F. Lowman**, who will be assisted by **L. B. Rhodes, Jr.**, previously connected with the sales department of the **U. S. Light & Signal Corp.** Mr. Rhodes, Jr., has been assigned to the Southeastern territory formerly handled by his father, **L. B. Rhodes**, whose death was noted in the *Railway Age* of February 4 (page 348).

The **Millholland Sales & Engineering Company** has been organized at Indianapolis, Ind., by **W. K. Millholland**, formerly president and general manager of **W. K. Millholland Machine Company**, Indianapolis, and **Ernest Millholland**, formerly works manager of that company, to handle machine

tools. **W. K. Millholland** was educated in mechanical engineering at Lewis Institute, Chicago, and entered business with the **International Machine Tool Company** at Indianapolis as a draftsman. After two years' service with this company he went with the **Warner and Swasey Company** at Cleveland, Ohio, as a designer, and after serving this company for four years, was appointed sales engineer for several large machine tool companies. Not long thereafter he took over the management of the **W. K. Millholland Machine Company**, which company he had been with for six years. **Ernest Millholland** was educated in mechanical engineering at Lewis Institute, Chicago, and then attended the University of Illinois for two years. On leaving college he entered the service of the **W. K. Millholland Machine Company**, where he has served as works manager for the past ten years.

E. E. Hudson, vice-president and general manager of the **Waterbury Battery Company**, Waterbury, Conn., has been elected president of the company to succeed **Charles B. Schoenmel**, deceased,

and **Francis T. Reeves** has been elected treasurer. Mr. Hudson for the past 22 years, with the exception of a little over a year's time, has been in the sales and managerial departments of concerns manufacturing primary batteries and has been identified with the installation of the primary battery. In July, 1898, he served as chief clerk in the primary battery sales department of the **Edison Manufacturing Company**, remaining in that position until June, 1902. Shortly afterward, he served as an accountant in the controller's department of the **United States Steel Company**. In December, 1903, he became secretary and treasurer of the **Battery Supplies Company**, Newark, N. J., and in 1905 was appointed sales manager of that company. When the Edison company absorbed the **Battery Supplies Company**, in 1908, he was appointed assistant manager of sales in the primary battery department. He became sales manager of that department in February, 1909, and in September, 1913, was elected also vice-president. In October, 1914, in addition to these duties, he was given charge of the manufacturing, as well as the sales, and in March, 1915, was made division manager in general charge of the entire primary battery business of **Thomas A. Edison, Inc.** In 1914, he was chairman of the **Railway Telephone & Telegraph Appliance Association** and in 1916, he was chairman of the **Signal Appliance Association**, previously having been a director. He also served for seven years as a director of the **National Appliance Association**, which is to the **American Railway Engineering Association** what the **Signal Appliance Association** is to the **Railway Signal Association**. On January 1, 1917, he was elected vice-president and general manager of the **Waterbury Battery Company** and now becomes president of the same company.



E. E. Hudson

Railway Steel-Spring Company

The annual report of the **Railway Steel-Spring Company** for the year ended December 31, 1920, contains a consolidated income account which includes the **Canadian Steel-Tire & Wheel Company, Ltd.** This shows the net earnings for the year to be \$4,435,350. After deducting a reserve of \$1,000,000 for taxes and \$2,025,000 for dividends (7 per cent on the preferred stock and 8 per cent on the common), there was left a surplus of \$1,410,350 for the year.

President **F. F. Fitzpatrick** speaking to the stockholders in the report says: "The results of the Canadian subsidiary were

entirely satisfactory and fully justified the establishment of the plant at Montreal.

"The financial condition of your company continues to show improvement and it is expected that the results for the year 1921 will be satisfactory. The fore part of the year will, no doubt, be a period of readjustment and stabilization, while the last half of the year will probably show an improvement in the general business conditions."

Locomotive Superheater Company

The election of three new vice-presidents is announced by the Locomotive Superheater Company, New York. Gilbert E. Ryder, in charge of the service department, has been elected vice-president in charge of sales, with office at New York; Henry B. Oatley, chief engineer, has been elected vice-president in charge of engineering, with office at New York, and Charles H. True, works manager, has been elected vice-president in charge of production, with office at East Chicago, Ind.

Gilbert E. Ryder, vice-president in charge of sales, was born at Minneapolis, Minn., in 1880, and studied engineering at the University of Wisconsin, and also at the University of Illinois. His railroad experience began with an apprenticeship on the Chicago, Milwaukee & St. Paul, and included service as a journeyman in the mechanical department of that road at Dubuque, Ia.; Ottumwa, Ia., and West Milwaukee, covering five years. His engineering experience followed in the fuel testing bureau of the Technologic Branch of the United States Geological Survey. He later served the city of Chicago as deputy smoke inspector in charge of locomotives, which placed him again in

superheating and has been an active factor in its development. He is, in a large measure, responsible for putting superheater design upon a practical operating and manufacturing basis in locomotive, marine and stationary practice, and, without sacrifice of efficiency, has developed uniformity of sizes and design.

Charles H. True, vice-president in charge of production, was born in Boston, Mass., and was educated at the public schools of Schuyler, Neb., and the University of Nebraska, graduating in 1898 with the degree of electrical engineer. Immediately upon graduation he entered the service of the Union Pacific at Omaha, and served in both the locomotive and car shops. In 1902 he became roundhouse foreman at Grand Island, Neb., and in 1903 resigned from the Union Pacific to take a similar position at Trenton, Mo., with the Chicago, Rock Island & Pacific. In October of the same year he was transferred to the Silvis shops as assistant superintendent of shops. In 1905 he was appointed mechanical engineer with the Railway Materials Company, at Chicago, and was engaged in the design of metallurgical furnaces for blacksmith shops and boiler shops. In 1910 he refitted and took charge of the Phoenixville, Pa., plant of this company. Two years later he resigned his position with the Railway Materials Company to become works manager of the Locomotive Superheater Company at East Chicago, which position he held until his election as vice-president, as above noted.

Pressed Steel Car Company

The earnings from operations of the Pressed Steel Car Company for the year ended December 31, 1920, were \$3,060,985. Dividends on stocks and money from other sources



G. E. Ryder



H. B. Oatley



C. H. True

contact with the locomotive fuel conservation problem. This was followed by editorship of the Railway Review at Chicago, after which he entered the service of the Locomotive Superheater Company ten years ago. He became a member of the service department and later took charge of that department. He also developed and had charge of the publicity department. Mr. Ryder takes responsibility of the sales of the company (railroad, stationary and marine), with an unusual preparation in wide and very valuable engineering and practical experience.

Henry B. Oatley, vice-president in charge of engineering, was born at Rochester, N. Y., and attended the public schools at that place. He received his engineering education at the University of Rochester and the University of Vermont, graduating from the latter in 1900 with the degree of mechanical engineer. He then entered the service of the Schenectady Locomotive Works, his experience while on this work embracing locomotive design and shop testing. He was associated with F. W. Cole in the early development of the superheater for locomotives by that company. In 1910, upon the formation of the Locomotive Superheater Company, he was appointed mechanical engineer, and in 1916 he was appointed chief engineer for the company, which position he held at the time of his election, as above noted. In April, 1917, he was granted a leave of absence and served as an officer in the U. S. Navy on the battleships Ohio and Indiana. He entered service with the 1st N. Y. Naval Militia, which was the first body of armed troops to move after the declaration of war with Germany. Mr. Oatley is a recognized authority on

brought the gross earnings for the year up to \$3,194,278. From this there was deducted \$662,472 for depreciation, obsolescence, etc., leaving a net of \$2,531,805. Dividends amounting to \$1,875,000 were paid during the year. The working capital—surplus and undivided profits—on December 31, 1920, was \$15,120,993.

The annual report signed by President F. N. Hoffstot says: "The year 1920 was a difficult one for all manufacturers, and especially for our class of business. . . . In the early Fall it looked as if there would be a considerable buying movement, but the action of the government in failing to make partial payments tied the railroads' hands and has made it very difficult for them to carry out their commitments and has prevented them from entering into new ones. About 60,000 cars were ordered during the year and 25 per cent of these were bought by private owners in order to protect the execution of their obligations. This condition of affairs, with inefficiency and lack of co-operation on the part of labor, has helped to bring about a depression which will last until there is a readjustment. . . . The government has granted rates which, with old-time efficiency, would produce earnings ample to take care of improvements and betterments, but when the same government fails to promptly pay its debts, and make good the depletion of properties loaned to it during the war period, it paralyzes all the advantages from the increased rates. The public, as usual, pays the bill."

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company and the California, Arizona & Santa Fe have been authorized by the Interstate Commerce Commission to abandon a part of the Barnwell branch in San Bernardino County, Cal., extending from mile post 30, near Barnwell, to Ivanpah, a distance of 15.18 miles.

BALTIMORE & OHIO.—This company is preparing plans, in co-operation with the city of Dayton, Ohio, for the construction of a viaduct 60 ft. long over the railroad tracks at Springfield Pike, Dayton. A definite time for undertaking the project has not yet been decided on.

CHICAGO UNION STATION.—The announcement in the *Railway Age* of February 18 (page 437), that this company was accepting bids for the construction of a new railway mail terminal between Harrison and Van Buren streets and the Chicago river at Chicago, was partially incorrect. The company was accepting bids for the excavation work in connection with this project and has awarded a contract for the work to the Chicago Foundation Company, Chicago.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—This company has prepared plans, in co-operation with the city of Springfield, Ohio, for a subway to eliminate a grade crossing on Main street, Springfield.

ILLINOIS CENTRAL.—This company will extend nine passing tracks on the Paducah district between Central City and Paducah, Ky., at an approximate cost of \$75,000. The company has also authorized the extension of passing tracks on the Dubuque district between Freeport, Ill., and Waterloo, Ia., at an estimated cost of \$65,000. A new 100-ft. turntable will be installed at Waterloo, Ia., at an estimated cost of \$45,000, and another new 100-ft. turntable will be installed at Dubuque, Ia., costing \$35,000. The company will build two bridges at Council Hill, Ill., to cost \$30,000 each.

INTERSTATE.—This company has been authorized by the Interstate Commerce Commission to construct an extension from Norton, Wise County, Va., to a point about 9 miles west of St. Paul in Scott County, a distance of about 25 miles, and a branch line therefrom extending from Coeburn up a stream called Tom's Creek, a distance of 15 miles.

JEFFERSON & NORTHWESTERN.—This company is constructing a freight and passenger station, with facilities also for the general office, at Jefferson, Tex., to replace the joint facilities now being used with the Missouri, Kansas & Texas.

KENTUCKY & TENNESSEE.—This company has applied to the Interstate Commerce Commission for a certificate of convenience and necessity authorizing the construction of an extension in McCree County, Kentucky, 2½ miles.

PACIFIC FRUIT EXPRESS.—This company will build an icing plant at Council Bluffs, Iowa, with a capacity of 50 cars a day.

TEXAS & PACIFIC.—This company contemplates improvements and additions to its terminal facilities at Ft. Worth, Tex., including new yards, a new freight house and additions to its shops.

TOLEDO, ST. LOUIS & WESTERN.—This company has awarded a contract for a 300-ton all-steel coaling station, with sanding facilities, at Delphos, Ohio, to the Ogle Construction Company, Chicago.

THE PACIFIC RAILWAY CLUB will hold its annual election of officers at Oakland, Cal., on March 10. The following members have been nominated: For president, G. H. Harris, general superintendent, San Francisco-Oakland Terminal Railway; for first vice-president, F. S. Foote, professor of railroad engineering, University of California; for second vice-president, J. N. Clark, chief of fuel bureau, Southern Pacific; for treasurer, G. H. Baker, assistant general freight agent, Atchison, Topeka & Santa Fe.

Railway Financial News

ATLANTA, BIRMINGHAM & ATLANTIC.—Receivership.—Col. B. L. Bugg, president of this road, was appointed receiver on February 25 by Judge S. H. Sibley in the United States District Court at Atlanta. The order was issued on petition of the Birmingham Trust & Savings Company of Birmingham, Ala., which alleged that it held a note for \$90,000 due March 7 which the road was unable to pay. In its petition the Birmingham Trust & Savings Company said that while the road's gross receipts were \$9,000 per mile per year, it was losing \$100,000 per month.

The Atlanta, Birmingham & Atlantic operates 640 miles of line in Georgia. Its receivership is the climax of the wage controversy caused by a notice of the company issued December 29 making a cut of 50 per cent on all increases given to the employees since December, 1917. The case was taken before the Railroad Labor Board as noted in the *Railway Age* of February 11, page 367, and February 18, page 411. Latest developments in the dispute may be found on another page of this issue.

CHICAGO & EASTERN ILLINOIS.—Sale Postponed Again.—The sale of this road, set for March 1, has been postponed again owing to disagreement between holders of the company's two chief defaulted bond issues on the price to be paid for the company to be formed to take over the road.

CHICAGO, BURLINGTON & QUINCY.—Stockholder Comments on I. C. C. Decision.—Robert J. Frank, a minority stockholder of the Chicago, Burlington & Quincy, who opposed the proposed issue by the road of bonds to be distributed as a dividend, commenting on the decision of the Interstate Commerce Commission against such an issue, said:

In event that the Great Northern and Northern Pacific Railways are now unable to perfect plans for refunding so-called C., B. & Q. joint 4s when they become due, without the aid of the Burlington company, holders of these bonds need not necessarily suffer any loss in consequence of the Interstate Commerce Commission decision. On the contrary, if these bondholders act collectively they may avail themselves of the provision in collateral trust agreements whereby C., B. & Q. stock pledged thereunder can be appropriated by holders of joint bonds. Such course would avoid any financial disturbance, and not unnecessarily embarrass either of the northern lines. It is my opinion that a merger or consolidation of Great Northern with the Burlington system should now be undertaken.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—Asks Authority to Purchase Road.—This company has applied to the Interstate Commerce Commission for authority to acquire the capital stock of the Evansville, Indianapolis & Terre Haute.

DENVER & RIO GRANDE.—Stockholders Lose on Appeal.—The United States Circuit Court of Appeals on February 28 affirmed the action of the Federal District Court of Denver in denying stockholders of the Denver & Rio Grande the right to intervene in the case of the Equitable Trust Company of New York, in which the latter obtained an order for the sale of the road.

ERIE.—Asks Authority to Issue Equipment Trusts.—This company has applied to the Interstate Commerce Commission for such authority as may be necessary for an equipment trust agreement entered into before the effective date of the provisions of the Transportation Act relating to the issuance of securities, providing for the issuance of \$4,600,000 equipment trust certificates to be delivered to the Standard Steel Car Company for equipment upon the delivery of the cars.

LEHIGH VALLEY.—Order to File Dissolution Plan in Sixty Days.—The mandate of the United States Supreme Court ordering the dissolution of the combination effected by the Lehigh Valley Railroad Company, the Lehigh Valley Coal Company, the Lehigh Valley Coal Sales Company, Coxe Bros. & Co., Inc., Delaware, Susquehanna & Schuylkill Railroad Company, has been filed in the United States District Court for the Southern District of New York. The District Court has issued a temporary decree ordering dissolution of the combination within 60 days.

The companies are given by the decree of the court 60 days in which to file a plan with the Federal Court for the dissolution of the combination, "with such provisions for disposition of all shares of stocks, bonds or other evidence of indebtedness and all property of any character of any one of said companies, owned or in any manner controlled by any other of them as

may be necessary to establish their entire independence of one from each other. If defendants shall fail to file a plan within the period stated the court will take such further steps as may be deemed necessary to dispose of the stocks and bonds referred to and dissolve effectually the unlawful combination so as to recreate out of the elements composing the combination a new situation in harmony with the law."

LOUISVILLE & NASHVILLE.—*Authorized to Issue Bonds and Equipment Trusts.*—The Interstate Commerce Commission has authorized this company to issue \$3,500,000 of first mortgage 50 year, 6 per cent bonds, to be dated March 1, 1921, and to exchange them so far as possible for 6 per cent first mortgage bonds maturing March 1, 1921, and to sell any remaining bonds to J. P. Morgan & Co. at not less than 99. Authority was also granted to the Southeast & St. Louis to assume obligations in respect of these bonds by executing a first mortgage upon its property and franchise. The Louisville & Nashville has also been given authority by the commission for the issuance of \$11,025,000 of equipment trust certificates to be sold on a basis not exceeding 7 per cent, for the purchase of equipment at an estimated cost of \$14,933,379.

PENNSYLVANIA RAILROAD.—*Application to Lease New York, Philadelphia & Norfolk.*—This company and the New York, Philadelphia & Norfolk have filed a joint application with the Interstate Commerce Commission authorizing the lease to the Pennsylvania of the railroad property and franchises of the New York, Philadelphia & Norfolk for 999 years from July 1, 1920. The entire capital stock of the company is owned by the Pennsylvania.

PENNSYLVANIA.—*Annual Report.*—The annual report for the year ended December 31, 1920, which was published on Monday, shows a net income of \$32,801,673, a decrease of \$10,066,425, as compared with the year 1919. Other important figures shown in the income statement are as follows:

	1920.	*1919.
Government compensation for January and February, 1920	\$13,156,968	
Income accrued March 1—August 1, 1920.	37,981,814	
Net railway operating income	11,965,085	
Total compensation and net railway operating income	63,103,867	4,022,596
Total non-operating income	24,562,834	671,072
Gross income	87,666,701	4,693,668
Total deductions from gross income	54,865,028	5,372,757 (in.)
Net income	32,801,673	10,066,426
Sinking fund	2,239,790	176,887
Dividends	29,950,404	300
Balance of income for the year.	611,479	9,889,238

*Decrease shown in every item except total deductions from gross income.

This report will be treated more fully in next week's issue of the *Railway Age*.

PEORIA & PEKIN UNION.—*Guarantee of Notes.*—The Interstate Commerce Commission has authorized the Lake Erie & Western, the Peoria & Eastern, the Chicago, Peoria & St. Louis and the Chicago & North Western to assume liability as guarantors for the payment of the principal and interest of 5 separate notes aggregating \$1,529,150, to be issued by the Peoria & Pekin Union, payable to the Secretary of the Treasury, for a loan of \$1,799,000 from the revolving fund.

READING.—*Hearing on Dissolution Plan.*—At a hearing in the United States District Court at Philadelphia before Judges Buffington, Wooley and Davis, on March 1, representatives for the common stockholders presented petitions for leave to intervene, and suggestions for modification of the dissolution plan recently filed, as noted in the *Railway Age* of February 18, page 425. J. D. White, appearing for the Prosser committee in behalf of the common stockholders, asked a modification of the plan, providing that the Reading Company reduce its capital stock.

C. C. Leffingwell, of New York, appearing for the railroad, and A. F. Myers, special attorney general, approved of the railroad plan with modifications. Mr. Myers said that the government would be compelled to ask the court for a strict compliance with the mandate of the U. S. Supreme Court that the Jersey Central stock be disposed of within a reasonable time. He said the Transportation Act provided for a consolidation of railroads after leave granted by the Interstate Commerce Commission, and such matters and formalities take so long a time that the government would have to insist that the dissolution plan of the Reading and Central of New Jersey be effected as promptly as possible.

After hearing the discussion the court decided not to pass on the case but gave the stockholders two weeks to intervene in the proceedings.

The following statement was made by Seward Prosser, president of the Bankers' Trust Company, as chairman of the committee representing Reading common stock:

"As the committee views the situation, the plan in effect, though not in form, distributes to the preferred and common stockholders alike the existing earned surplus of over \$30,000,000, in which the preferred stock, except on dissolution, has no interest. The elimination from the statement of such surplus will result from the proposed plan of complying with the decree requiring the segregation of the coal and iron company's property. The equities between the stocks can be maintained, in the opinion of the committee, by a proper reduction of the capital stock of the corporation spread over all classes of stock alike."

ST. PAUL AND KANSAS CITY SHORT LINE.—*Asks Authority to Issue Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue \$619,000 of first mortgage gold bonds at 4½ per cent interest to reimburse the treasury for expenditures. The bonds are to be delivered to the Chicago, Rock Island & Pacific.

SEABOARD AIR LINE.—*Loan Approved.*—The Interstate Commerce Commission has approved a loan of \$1,173,500 to this company to enable the company to meet its maturing indebtedness.

SOUTHERN.—*Asks Authority to Pledge Bonds for Security.*—This company has applied to the Interstate Commerce Commission for authority to pledge and repledge from time to time as security for short term notes all or any part of \$7,229,000 of its development and general mortgage 4 per cent gold bonds payable April 1, 1956, which have been nominally issued and are held unincumbered in its treasury.

TEXAS CITY TERMINAL.—*Asks Authority to Issue Certificates.*—This company has applied to the Interstate Commerce Commission for authority to issue \$1,984,300 of first mortgage 20 year, 6 per cent bonds and \$500,000 of common stock, to be delivered, with the exception of directors' shares, to A. S. Peabody, in payment for the railway and terminal property formerly owned by the Texas City Transportation Company, which was in part leased to and operated by the Texas City Terminal Railway to March 17, 1920. On that date the mortgage was foreclosed and the property was later sold to Mr. Peabody.

TEXAS MIDLAND.—*Asks authority to issue bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue bonds to the amount of \$500,000 or such part thereof as is necessary to cover the construction of an extension of 14 miles.

THE ST. LOUIS-SAN FRANCISCO.—*Asks Authority to Sell or Pledge Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue and sell or pledge from time to time \$4,232,000 prior lien mortgage, 6 per cent gold bonds, dated July 1, 1928. It is stated that there are no present plans for the disposition of the bonds, but that it is proposed to sell them at not less than 90 or pledge them at not less than 75.

WASHINGTON & LINCOLNTON.—*Asks Authority to Issue Notes.*—This company has applied to the Interstate Commerce Commission for authority to issue three short term notes to the amount of \$13,000, to the Atlantic Coast Line and the Louisville & Nashville.

WHEELING & LAKE ERIE.—*Asks Authority to Pledge Securities as Collateral.*—This company has applied to the Interstate Commerce Commission for authority to pledge as collateral for short term notes which may be issued from time to time any bonds, stocks or other securities which now are or may be held in its treasury.

Dividends Declared

- Boston & Albany.—Two per cent, quarterly, payable March 31 to holders of record February 28.
- Buffalo & Susquehanna.—Common, 1½ per cent, quarterly, payable March 31 to holders of record March 16.
- Fonda, Johnstown & Gloversville.—Preferred, 1½ per cent, quarterly, payable March 15 to holders of record March 10.
- Pittsburgh, Ft. Wayne & Chicago.—Common, 1½ per cent, quarterly, payable April 1 to holders of record March 10; preferred, 1½ per cent, payable April 5 to holders of record March 10.

Railway Officers

Executive

J. L. Wilkes, general manager of the Jacksonville Terminal, Jacksonville, Fla., has been elected president and a director of the company.

Financial, Legal and Accounting

C. E. Coomes has been appointed auditor of the Florida East Coast, with headquarters at St. Augustine, Fla., effective February 21, succeeding **E. Y. Quinn, Jr.**

Arthur L. Parmelee, whose appointment as auditor and assistant secretary of the Grand Rapids & Indiana, with headquarters at Grand Rapids, Mich., was noted in the *Railway Age* of January 28 (page 309), was born at Grand Rapids, Mich., on June 7, 1880. Mr. Parmelee was educated at Ferris Institute and entered railway service in the maintenance of way department of the Grand Rapids & Indiana on December 1, 1895. During the next six years he served in this department except for two different periods when he left the service to complete his schooling. In February, 1901, he transferred to the transportation department with headquarters at the local freight office at Grand Rapids but four years later he returned to the maintenance of way department, entering the office of the division engineer as chief clerk. He entered the service of the accounting department on December 5, 1911, as a clerk and has served successively as assistant chief clerk, chief clerk from 1913 to 1920, special agent in closing out federal accounts and general division accountant, the last being the position which he has retained in addition to his new duties and which service he was performing at the time of his recent appointment.

Operating

J. P. Darling, superintendent of the Northern division of the Bangor & Aroostook, has been granted a leave of absence on account of illness. **J. H. Curtis**, trainmaster of the Northern division, will act as superintendent until such time as Mr. Darling is able to resume his duties.

E. F. McPike, superintendent of refrigerator service of the Illinois Central, with headquarters at Chicago, who was granted a leave of absence to serve as chairman of the perishable freight division of the American Railway Association, has resumed his duties with the Illinois Central, effective February 15.

H. S. Taylor, chief dispatcher of the Southern division of the Gulf, Colorado & Santa Fe, has been appointed acting trainmaster of the same division succeeding **F. H. Christian**, who has been assigned to special duties. **J. J. Paul**, assistant chief dispatcher, has succeeded Mr. Taylor as chief dispatcher.

Traffic

S. C. Rhodes has been appointed general agent, passenger department, of the Union Pacific, with headquarters at Kansas City, Mo., effective March 1.

J. D. McCartney has been appointed assistant general passenger agent of the Central of Georgia with headquarters at Savannah, Ga., effective March 1.

E. A. Shreve has been appointed district passenger agent of the Union Pacific, with headquarters at Salt Lake City, Utah. The position of general agent, passenger department, at that point has been abolished.

A. C. Hilton, general agent passenger department of the Erie, with headquarters at Buffalo, N. Y., has been appointed general eastern passenger agent, with headquarters at New York, effective March 1, succeeding **J. Buckley**, deceased.

J. H. Webster, general agent of the Erie, with headquarters at Cincinnati, O., has been appointed general agent passenger department, with headquarters at Buffalo, N. Y. **J. A. Dolan** succeeds Mr. Webster as general agent at Cleveland.

J. O. Goodsell, assistant general passenger agent of the Union Pacific, with headquarters at Kansas City, Mo., has been transferred to Omaha, Neb., in the same capacity. Mr. Goodsell will have charge of work in connection with the organization and solicitation of outside agencies.

E. P. Fisher, traveling freight agent on the Atchison, Topeka & Santa Fe, with headquarters at Cincinnati, Ohio, has been appointed to general agent, with headquarters at Indianapolis, Ind. **Charles Moore**, city passenger agent at Wichita, Kan., has been promoted to general agent, with headquarters at Des Moines, Ia., succeeding **S. Larimer**, who has been transferred to Atlanta, Ga., succeeding **W. J. Curtis**, who has been transferred to Buffalo, N. Y.

C. W. Dorfinger has been appointed district freight and passenger representative on the Baltimore & Ohio, with headquarters at Los Angeles, Cal. **A. G. Mariner** has been appointed district freight representative with headquarters at San Francisco, and **S. M. Tate** has been appointed district passenger representative, with the same headquarters, effective February 1, the date on which these new outlying agencies were opened by the company. Other appointments on this road are **L. G. Reynolds**, recently made district freight and passenger representative at Omaha, Neb., and **J. P. Hanley**, freight representative at Chicago.

Mechanical

J. B. Merritt has been appointed road foreman of engines on the Second district of the New Mexico division of the Atchison, Topeka & Santa Fe, with headquarters at Raton, N. M., succeeding **J. T. Stuvort**, who has been transferred to the Third district.

Engineering, Taintenance of Way and Signaling

C. T. Jackson, district engineer on the Chicago, Milwaukee & St. Paul, with headquarters at Chicago, has been promoted to principal assistant engineer, with the same headquarters, effective February 21, and the two offices of district engineer on the Southern district have been consolidated.

E. R. Lewis, whose appointment as office engineer of the Michigan Central, with headquarters at Detroit, Mich., was announced in the *Railway Age* of February 18 (page 440), was born on November 20, 1869, at Raritan, N. J. He graduated from the State University of Iowa in 1890 and entered railway service with the Missouri Pacific in 1885. During the next two years he served as axeman and rodman on construction work with that company and during the next seven years he served successively as levelman, clerk in the timber department, levelman on bridge location, division engineer, and as a reclamation engineer in Wyoming. In 1896, he was appointed division engineer in charge of work on the government levees in connection with Mississippi river improvements. Mr. Lewis spent seven years in construction work on the Cape of Good Hope government railways in South Africa, and from August, 1906, to June, 1912, he served as division engineer on the Michigan Central, with headquarters at Bay City, Mich. On the latter date he was appointed assistant to the general manager of the Duluth, South Shore & Atlantic, with headquarters at Duluth, Minn. His jurisdiction was later extended over all matters pertaining to the engineering department of this road. He resigned this position in February, 1919, to become editor of the *Maintenance of Way Cyclopeda*, a Simmons-Boardman publication, at the conclusion of which work he resigned to return to the Michigan Central, as announced above.

Obituary

F. E. Shrimpton, general auditor of the Canadian Pacific, died of heart disease in Montreal, on March 2, aged 53.

EDITORIAL

Railway Age

EDITORIAL

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An Opportunity To Regain Lost Traffic

When the recession in business activity commenced several months ago the automobile industry was one of the first to feel the effects. In view of this, there is special significance in the fact that the demand for automobile cars was well sustained, even after a large surplus of other types had developed. If the supply of such equipment is hardly adequate during a depression, there is every reason to believe that a serious shortage can be anticipated when business again assumes normal proportions. During the war the railroads lost a large amount of this high grade traffic through inability to handle it. Automobiles were sent under their own power for distances up to 1,000 miles from the factories. The cost of furnishing drivers is much greater than the freight charges and manufacturers will not continue this expensive practice unless they are forced to do so. Automobile traffic not only carries a fairly high freight rate, but on many roads it would also provide a back haul to balance merchandise traffic. The special features of automobile cars do not add materially to the cost of construction nor to the expense of maintenance. Practically all commodities, including grain, can be carried with entire success in cars of this type and they are more adaptable traffic units than box cars. For this reason, the roads when ordering new equipment should provide enough automobile cars to meet the demands of the maximum traffic.

British Supply Exports Increasing

The exports of railway equipment and supplies from Great Britain in 1920, the totals of which have recently been made public, afford concrete evidence of the strenuous and far from unsuccessful efforts of British supply manufacturers to regain their foothold in the markets which during and immediately following the war depended to a large extent upon American industry. Shipments of locomotives during the year were valued at \$23,949,576 (at the present rate of exchange), a figure more than three times as great as the similar total for 1919. At the same time exports of locomotives from this country in 1920 showed an increase in value of about 75 per cent over 1919. In the matter of steel rails, the exports from the United States in 1920 actually declined from the totals of the previous year, while British manufacturers increased their foreign sales by more than 25 per cent. The value of passenger cars exported from Great Britain in 1919 was \$2,377,408 and, in 1920, \$6,780,028. Similar figures for the United States are \$1,606,540 and \$1,171,674 respectively. These figures speak for themselves. In the value of freight car exports, British manufacturers increased their business from \$9,496,568 to \$22,838,844 in the course of the year. These figures, which are given in detail elsewhere in this issue, do more than indicate a condition as it existed at a particular time; they show a trend and that trend is away from American manufacturers and American goods, and toward foreign competitors and their products. One of the strongest factors militating against American goods in foreign markets is the unfavorable exchange rate. The efforts of those who are planning to solve this problem by arranging to extend long term credits to foreign purchasers,

consequently, deserve the whole hearted support of everyone. The opening up of a brisk export trade at the present time would be of tremendous assistance in restoring normal business conditions in this country.

Convention of the Mechanical Section

For many years, with only one exception, we believe, the manufacturers of railway equipment and supplies have made exhibits in connection with conventions of the railway mechanical associations. Because of bad business conditions the Railway Supply Manufacturers' Association, through which these exhibits are made, is seriously considering not making an exhibit this year. Its executive committee met this week and before this editorial is published a decision upon the question of giving the exhibit probably will be reached. Whether the exhibit is given or not, the conventions of the Mechanical Section and of the Purchases and Stores Section of the American Railway Association ought to be and doubtless will be held. There never was a time when the mechanical officers of the railways were confronted with more important and difficult problems than now. Many of these problems demand associated action by the railways, and all of them need thorough discussion. A decision in the interest of economy not to give the exhibit of equipment and supplies would be in keeping with the conditions and spirit of the present period. These very same conditions, however, demand that the various sections of the American Railway Association shall meet and transact the business assigned to them. There is need for the greatest practicable economy in the operation of the railways, but with the conditions confronting the roads at the present time it would be false economy for them to save the comparatively small amount that would be saved by not holding these conventions this year. The savings which will be made if the various sections of the American Railway Association meet and transact the business that they should, will be vastly larger than the amounts that would be saved by not holding the conventions.

Central of New Jersey

The hearing on the Reading segregation plan held at Philadelphia on March 1 brought out many interesting points, not the least interesting of which were those relating to that part of the plan dealing with the disposition of the majority stock of the Central of New Jersey now owned by the Reading Company. The Reading in its plan asked the court to postpone action in this matter pending the grouping of the railroads by the Interstate Commerce Commission under the terms of the Transportation Act. Comment has already been made in these columns concerning the government's objection to such postponement and the opinion was expressed that the government's attorney was not acting according to the intent of the people as expressed in the Transportation Act. Nor are we made to feel otherwise by the government's contention that the Supreme Court's decision was handed down after the passage of that act. The attorney for the Reading brought out at the hearing that to require the Reading to dispose of

the Central of New Jersey stock at this time is a much more serious affair than might at first be supposed. The argument was advanced that to require the Reading to sell the Jersey Central stock now or in the immediate future would be an actual hardship and the Reading attorney asked the mercy of the court not to require such sale. The Interstate Commerce Commission is now working out its plan for railroad consolidations. No one knows what disposition the plan may finally make of the Central of New Jersey. In other words, with that in mind, no other carrier would be justified in purchasing the stock because that carrier would not be in a position to know whether such purchase would be approved. The result would be that there would be no market for the stock and it would have to be disposed of at a great sacrifice. The situation is further complicated, the attorney pointed out, by the fact that the Reading has pledged its Jersey Central stock to the par value of \$14,000,000 under bonds amounting to \$23,000,000 which bonds may not be redeemed under 105. It is hard to believe that the Supreme Court wants such action as this taken and we repeat that we do not see how there can be any objection from the point of view of the law in a postponement of the sale of the stock until the consolidation plan is finally determined as provided in the Transportation Act. The tendency today is toward consolidation and the public approves of it. No argument is needed to show that the Jersey Central is a natural adjunct to the Reading in giving it entrance into the big railroad center of New York. It is difficult to agree with the government's contention in this aspect of the case; we feel that its objection to the postponement of the sale of the Jersey Central stock represents retrogression rather than progress.

The *Railway Age* apologizes to its readers for an erroneous statement regarding loss and damage which was made in our last week's issue. This statement indicated loss and damage on American railroads for the year 1920 amounted to \$280,000,000. Detailed figures for the year 1920 are not yet available. In 1919 payments for loss and damage of all kinds, including damage to property, loss to live stock on right of way and in transit, loss and damage to freight and baggage and injuries to persons, amounted to \$156,275,579. Of this amount \$106,804,861 was chargeable to loss and damage of freight. What we meant to do was to give an estimate for 1920, and in making the estimate a miscalculation was made which resulted in the total estimate being about \$100,000,000 too large. Even when correctly stated, however, the figures for loss and damage are quite large enough. No other part of operating expenses affords opportunity for relatively so great a real saving.

We publish elsewhere in this issue a paper entitled "The Spirit of Safety First" which was prepared by Charles E. Norman, a switchman on the Chicago & Alton, and read by him at a recent safety meeting of employees of this railroad in Chicago. The principal reason why we publish and call attention to it is that it is an excellent and very human discussion of the problem of safety on railroads. It emphasizes the means by which safety may be promoted, the direct and indirect advantages to the employee and his family, and the fact that "safety first goes beyond the conservation of life and limb—it brings out efficiency, economy and co-operation." Mr. Norman has stated the philosophy and purpose of safety work in a few sentences. The paper is all the more interesting because it was prepared not by some railway

officer specializing upon safety work, but by a switchman whose everyday life brings before him constantly the hazards of railway employment. It bespeaks not only the right attitude toward his work and toward his fellow employee, but also toward the general operation of the railroad. While controversies always will occur between railways and their employees regarding wages and conditions of work, it is a great mistake to assume that these things indicate any want of an adequate sense of duty and responsibility on the part of a large majority of employees. It is easy to criticize railway employees and their unions, and they give much justification for criticism, but it would be impossible to find among any class of workmen in the world a better spirit or more intelligence than can be found among the railway employees of this country as a whole, and especially among those directly concerned with the operation of trains.

The report on determining the cost of reproduction new of all-steel freight cars, which is abstracted on another page of this issue, is another important contribution to the subject of railway equipment valuation. Like an earlier report of the equipment committee of the Presidents' Conference Committee on Federal Valuation—the report relating to the cost of reproduction new of locomotives, which was abstracted in the *Railway Age* of September 3, 1920—the present report represents the results of detailed study and scientific analysis. The equipment committee has worked out a method characterized by simplicity; it is similar to that which was utilized for determining the cost of locomotives. It permits the determination of the cost of reproduction new of a steel freight car on the basis of its weight, multiplied by the cost per pound, with proper additions in the form of net prices for the specialties. In working out this plan the committee had the advantage of the assistance of two of the larger car builders. Its figures for the period 1910 to 1914, inclusive, are based on the prices of no less than 71,108 cars of the four types considered—hopper, gondola, coke and tank. The report is further of interest in that there is worked out a price relationship of the year 1910 to the first half of 1920 in the form of percentages of the 1910 to 1914 average price as 100. As we have noted in these columns before, this is something concerning which there has been a great deal of surmise but until this investigation little of authoritative value. The *Railway Age* in abstracting the report has given it considerable space, which is fully justified by the importance and value of the investigation upon which the report is based. The report has much use from other than valuation viewpoints. Mechanical officers, in particular, are often called upon to figure the prices of old equipment. They now have as valuable assistants in such work the report on the cost of reproduction new of locomotives and that on all-steel freight cars. The reports on wooden and composite freight cars, as well as those on passenger cars, will probably be available shortly.

The vital importance of adequately trained foremen in any attempt to reduce transportation costs was one of the keynotes of the recent address by George M. Basford before the Western Railway Club, reported in the *Railway Age* of February 25. A forceful simile used in the address, and one which will appeal particularly to those familiar with army organization, was the quotation, "the foreman is the top sergeant of industry." Foremen must not be mere time servers, or men selected solely for their ability as master craftsmen. They should be

Cost of Freight Cars

Foremen Hold a Strategic Position

executives who can understand and direct the men in their respective departments, outlining the department work and creating a better feeling between the workers and the managements. The ability to visualize the work of other departments also is desirable in order that the efforts of all may be co-ordinated for the single purpose; namely, maximum transportation at minimum cost. Foremen with the above qualifications are in direct line for promotion and with enough of these men carefully trained, no railroad need call in outsiders to fill executive positions. What is the conclusion when "an important department of one of our fine big railroads has not once in twenty years been presided over by an officer who grew up on that road and in that department?" The conclusion is that a large majority of the foremen are not adequately trained and encouraged to qualify for higher positions. Why should foremen and men strive for advancement when they see the high positions being filled by strangers? As has been emphasized many times in these columns, it is important to make the position of foreman attractive and worth striving for. Under the piece work system, a knockout blow was struck at the efficiency and morale of railroad foremen when they were allowed to make less pay than some of the men working under their direction. Hardly a more important problem confronts the railway managements today than the proper selection, training and support of foremen in all departments. There will always be problems and difficulties in railway operation, but attention to personnel problems in the past would have prevented many of the present difficulties. Experience, therefore, teaches a lesson which should not be forgotten.

Another Coal Crisis on the Way

IF PRESENT TENDENCIES in the production and transportation of coal are not speedily changed the American people within a few months will be confronted with the most serious danger of a coal famine ever known. The production and transportation of bituminous coal have been rapidly declining, and within recent weeks have reached the lowest levels for years, except during the coal strike in November and December, 1919.

It is but two months since the week ended December 11, when the mines produced and the railroads transported 12,865,000 tons of bituminous coal. They are now producing and transporting only 7,300,000 tons weekly, a decline of 43 per cent. It is but a few months since the railways were being generally denounced because they could not haul all the coal the country needed. Today 175,000 coal cars are standing idle because consumers and dealers are not buying and the mines are not producing coal with which to load them.

The situation demands the immediate attention of coal consumers, dealers and operators, railway officers and the Interstate Commerce Commission. There has been a plethora of propaganda in the past because the railroads could not handle enough coal when people wanted it. There is need to make all concerned understand now that if the railroads are not soon given opportunity to haul more coal, the coal situation developing will be far more acute than any previously experienced.

The only time within recent years, except during the miners' strike, when the production and transportation of coal were anywhere near so small as they are now was early in 1919. The situation now, however, is much more threatening than then. Not only is less coal being produced than then, but the country entered the year 1919 with a storage supply of about 58,000,000 tons, the largest amount ever on hand at the beginning of a year, while it entered the year 1921 with comparatively small storage supplies.

The production of coal continued to be small throughout the first half of 1919. Everybody knows the sequel. The storage supplies were almost exhausted. Business suddenly revived, and with it the demand for coal. The railways were unable to transport it as fast as it was wanted and could be produced, and a howl went up all over the country that there was danger of a coal famine and that the railroads were to blame. In November, 1919, came the strike in the coal mines, which was followed by a coal shortage of several months' duration, due not only to the strike but to the small production in the early part of 1919. The railways throughout 1920 had to make herculean exertions to get enough coal to the northwest to keep it from freezing and enough to New England and other parts of the country to keep their industries going. Priority had to be given to the use of open top cars for the transportation of coal, with the result that many business activities, especially building and highway construction, had to be practically stopped.

We are moving toward a repetition of this experience, but in a more serious form and with more serious consequences. The annual average consumption of coal in this country for four years has been 535,000,000 tons, or more than 10,000,000 tons a week. The reduction of consumption owing to mild weather and industrial depression has been large, but far from sufficient to justify a reduction of production to 7,300,000 tons a week.

The main reason for this reduction, as shown by the reports of the United States Geological Survey, is "no market." Consumers and dealers won't buy. Probably the main reason they won't buy is the present prices. They are lower than those of a few months ago, but still high. The main reason they stay so high is the excessive wages being paid to the miners. In the two years March 31, 1918, to March 31, 1920, the mine workers in the Central Competitive Field were given five advances. This field embraces Pennsylvania, Ohio, Illinois, Indiana and the southwest, and has set the pace for the country. Repeatedly wage scales were made to remain in effect for specified periods and advances granted before these periods had expired because the mine workers refused to abide by their contracts.

The advance in the daily wage rate between 1918 and 1920 was from \$3.00 to \$7.50, or 150 per cent. Many consumers and dealers are not buying because they expect coal prices to be further reduced and believe they should be. Because of this buyers' strike, hundreds of thousands of miners are unemployed, a large part of all the coal cars are idle, and the country is drifting toward a serious crisis.

The present wage scale was adopted to stay in effect until April 1, 1922. Since the miners in the past have repeatedly demanded and secured advances in wages before contract periods have expired, there is no reason why the mine operators should not demand and secure a reduction of wages before the present contract period expires. The entire industry of the country is suffering from the present prices of coal. This is especially true of the railroads. They consume one-third of all the coal produced. Their fuel bills now amount to about \$750,000,000 a year. One of the principal reasons for their present high operating expenses is the excessive cost of coal. The question whether there is to be any reduction of miners' wages and consequent further reduction of the price of coal this year should be settled as soon as possible so as to reduce the length of the buyers' strike.

In every year for four years the transportation and business of the country have been demoralized by demands that the railroads should in certain periods to prevent a coal shortage handle more coal than they are physically capable of handling. The railroads and the Interstate Commerce Commission should definitely announce at an early date in terms leaving no possibility of misunderstanding, that no priority will be given to coal this year, no matter what may

because the alleged necessities of coal producers and consumers, or of those of any section. The railroads can transport all the coal the country needs if given opportunity to handle it in reasonably uniform volume, and if the stupidity and selfishness of the coal producers, dealers and consumers which have caused one coal crisis after another cause another this year, their stupidity and selfishness should be allowed to produce their natural results. The railroads should cease to be made the "goat" for these coal crises.

Meantime, where are the construction concerns which made such a howl last summer when, owing to priority being given to coal, they could not get enough cars to ship materials? Why are not they "shipping early" in some of the 175,000 open top cars now standing idle? A few months ago when the railways were moving the largest volume of freight ever handled, many people were charging they had "broken down" because they did not move more. Now, when over one-third of the railroad capacity of the country is idle, many people are saying private operation has "broken down" because with this enormously reduced traffic the railways are facing a financial crisis. The most varied and bitter experience does not seem to teach the American people anything regarding transportation matters.

What Kind of a Railroad Are You Trying to Make?

NO GREAT THING ever was done by any man or group of men who did not consciously have an ideal and work steadily and powerfully to attain it. "Where there is no vision, the people perish." The great railroad systems of the United States have been developed by men, or groups of men, who knew what kinds of railroads they were trying to create, and consciously and steadily used the best means available for accomplishing their purposes. They had enormous difficulties to overcome. They encountered obstacles and enemies at every step. They had failures behind them that they could look back to, as well as successes ahead of them that they hoped for. In the long run they won. The present great railroad systems prove that. They are monuments to the courage, vision, energy, resolution and resourcefulness of men such as Commodore Vanderbilt, Thomas A. Scott, A. J. Cassatt, James J. Hill, E. H. Harriman, E. P. Ripley, Milton H. Smith and others.

The great railroad men of the generations to which these men belonged had the advantage of doing most of their work before government regulation and government operation intervened. In making and carrying out their plans they hardly had to think about interference from public authorities, and very little about co-operation with the managers of other railroads. When they thought of other railroads they usually thought of them in terms of competition, not co-operation. They did not trouble themselves much about what their employees were going to think. Most of their employees were not organized, and the unions that did exist were small and weak compared with those that exist at present.

Government regulation, growth of labor organizations and other changes in conditions make it necessary for a man or group of men now engaged in developing and operating a railroad to consider many things their predecessors did not have to consider. But in the most important respect of all there has been no change. It is just as important now as ever that the head of a railroad and his principal officers should have a definite ideal of the kind of a railroad they are trying to make, and definite means for making this kind of a railroad and should work constantly with indomitable resolution and perseverance in carrying out their plans. Only in this way can they make railroad systems which will

be physically sound and well rounded, and which will produce good operating and financial results.

There are those who will contend that present conditions are so unfavorable as to render it impracticable to form definite ideals of what kind of railroads they are going to make and to adopt and successfully carry out plans for making them. But there were people who thought and talked that way when James J. Hill started to build the Great Northern to the Pacific coast. There were others who thought E. H. Harriman had undertaken a task beyond human power when he started to rehabilitate and reconstruct the Union Pacific. There were even those who thought at certain stages of Mr. Hill's and Mr. Harriman's careers that they were not perfectly sound mentally. They were subsequently enlightened by the discovery that if there was anybody insane it wasn't Mr. Hill or Mr. Harriman.

The year 1921 is not the first when conditions were unfavorable in this country to developing railroads and making them pay. It is not the first when many of the railroads were on the verge of bankruptcy. After the panics of 1873 and 1893 many of the predecessors of the present generation of railway officers either changed unfavorable conditions, or adapted their methods to them. They didn't change their ideals, or refuse to have any. All the railway officers of that period did not achieve their ideals. Many were discouraged by conditions and gave up or lost the fight. Their names can be found in large numbers by searching in Poor's Manual; but they do not appear in any histories of the period. On the other hand, there were those who never forgot their ideals and never quit, no matter how discouraged they may have been at times. The great railroad systems of this country are monuments to men who talked less about what had been done to them and their railroads than they did about what they and their railroads were going to do and who didn't quit. Their names can be found in many histories.

Private management of railroads in the United States is on trial. This is not the first time it has been on trial. It may be the last time unless the railway leaders of this generation squarely and fully meet the test. They were put to a severe test last year. It looked for awhile as if they were not going to meet it. They were called on to move the largest freight business in history with deteriorated facilities, with serious strikes on their hands and without any organization to bring about needed co-ordination in their operation. They showed at first a disposition to pull apart instead of pulling together. They waked up in time, however, organized themselves, gave the finest example of railroad team work ever seen, moved more freight than had ever been handled in the same length of time, and almost wiped out the car shortage before the slump in business began.

They are confronted today with a situation more perilous than that. They need courage, energy, breadth of vision, unity of purpose and foresight, to meet it. They are displaying a want of unity of thought and purpose regarding certain most important matters that demand unity of thought and action. We have no doubt, however, that private operation will pull through the present crisis. But the country is getting tired of transportation crises. It is up to the railroad managers not only to pull the railroads through this crisis, but to adopt measures for preventing future crises.

They must develop more unity of thought and purpose in dealing with their labor problem and with public opinion. But the future of the railroads is mainly in the hands of their individual managements. If each railroad could and would solve its own problems, there soon would hardly be any national railroad problem. Solution of the problems of each individual railroad demands that it shall individually establish better relations between it and its own public and its own employees. This will not be done until the chief executives and principal officers of each railroad have a

definite ideal as to what kind of a railroad they intend to make, definite plans for making it and indomitable resolution in carrying them out.

The prime requisite to the solution of the railroad problem under private ownership is the development and operation of each railroad so that under the particular conditions to which it is subject it can render the best practicable service at the lowest practicable cost. Without success in this there will be no success. The railroad manager who has such an ideal and such plans must, under present conditions "sell" them to his public and his employees, as well as to the financiers. But he cannot "sell" them to anybody else if he does not first sell them to himself so that he really believes in them. Once he has sold them to his public and his employees he will get the support of his public and his employees, and they will help change the most unfavorable conditions with which the railroads are now confronted.

The thing has been done in the past. It is being done by some railroad managers now, as bad as conditions are. They have ideals. They know what they are trying to do and how they are trying to do it. By taking their public and their employees into their confidence they are getting their support and making progress.

The Accident at Porter, Indiana

ON SUNDAY EVENING, February 27, a New York Central passenger train crashed into a Michigan Central passenger train at an interlocked crossing of these lines at Porter, Ind., resulting in the death of 37 people. It would seem at times that human toll is a necessary part of railroad operation. However, even this high penalty may be warranted if the lessons learned from such accidents are applied to remedying conditions so that similar accidents may not occur in the future.

Practically every precaution of modern signaling had been taken to protect trains at this busy grade crossing. Derails were placed ahead of the home signals as a means of enforcing a stop if an engineman should fail to heed the signals. Electric locks were placed on the interlocking machine as an additional check on the mechanical locking, these locks with their control circuits so arranged that when a route was lined up for a train on one road it was locked electrically for that train and could not be released until that train had passed unless the leverman had again placed his signals at the stop position and released himself by means of a time release. The operation of this release required a predetermined time in order to insure that a train which might have accepted the route had either been brought to a stop at the home signal or had passed over the plant. This added precaution was deemed necessary to prevent a leverman, in a moment of confusion, from throwing a derail in front of a train. Yet, in spite of all these precautions two fast passenger trains collided on the crossing through no fault of the mechanical and electrical equipment which had been designed to prevent just such accidents and through no fault of the men operating the plant.

What, then, was the cause of the accident and what lessons may be learned as a result of it?

Analyzing the conditions, three factors are seen to enter into the cause of the accident, (1) a "man failure" on the part of the engineman and fireman on the Michigan Central train; (2) a derail located too near the crossing and (3) a train order signal so located with respect to the home signal that there was a possibility of its light being confused with a clear home signal indication.

Treating each in order: The engine crew failed to see the red light on the home signal and may have mistaken the green light on the train order signal for the home signal indi-

cation, as the smoke of a train standing on a siding near the home signal may have obscured its light momentarily. No one will question the fact that the engine crew believed they had a clear signal as it would be suicidal on their part to run past a stop signal at a high rate of speed knowing that there was an open derail ahead.

The derail, which was of the split point type, was 311 ft. from the nearest crossing frog, with a trailing point switch located about midway between the derail and the crossing. Here, then, the effective distance of the derail might be only about 165 ft. as the trailing switch would have a tendency to derail an engine or cars.

The train order signal was in line with the interlocking signal when viewed on the tangent track, although the indications ought not to have been confused by the engineman of a train approaching around the curve which lies between the distant and the home signal at this particular point.

As a result of this accident it is evident that many derails in high speed routes should be moved back to meet present operating conditions. Thirty years ago a distance of 300 ft. was deemed sufficient but since that date heavier and more powerful motive power has come into use and train speeds have increased while the derail has not been moved back to keep pace with this development.

The train order signal is but little used in automatic signal territory where railroads make proper use of their signal systems. Provisions should be made at interlocking plants to interlock with the home signals or other steps should be taken to remove the possibility of its light being mistaken for the home signal indication. There are many places throughout the country where such an indication may be so mistaken today.

"Man failure" was the primary cause of the accident. The best signaling and interlocking apparatus did not in this case, as in many others, prevent the man failure from resulting in a great catastrophe. There is good reason to believe that an automatic train control or train stop would have prevented this accident as well as a large number of others such as at Ivanhoe, Amherst, Corning, Mount Union and South Byron. When it is considered that automatic block signals on many lines are located only about one mile apart and that an engineman on a fast passenger train may pass a signal on an average of every 50 sec. it is not to be wondered at that "man failures" sometimes occur. This accident, like many others that preceded it, pointedly and seriously raises the question whether it is not time to supplement the signal system with train control on lines where it is necessary to maintain high speed schedules under all weather and operating conditions.

Pennsylvania Railroad

CONSIDERING THE SIZE of the Pennsylvania Railroad, the amount of traffic carried over its rails and the varied nature of that traffic, it is natural that there should be plainly reflected in the operations of the system those features which characterize the operations of the railways of the country as a whole. The Pennsylvania Railroad, of course, has problems of its own, as has any railroad, but it constitutes so large a proportion of the country's total railway mileage that, speaking generally, it can be said that to analyze its present difficulties is to analyze those of all the railroads.

The Pennsylvania Railroad Company, the parent company of the system and itself operating 7,425 miles of railway, in 1920 had a total compensation and net operating income of \$63,103,867, including compensation of \$13,156,968 for January and February when the road was still under federal control; the guaranteed return of \$37,981,814 for the six months from March 1 to August 31 and net operating income

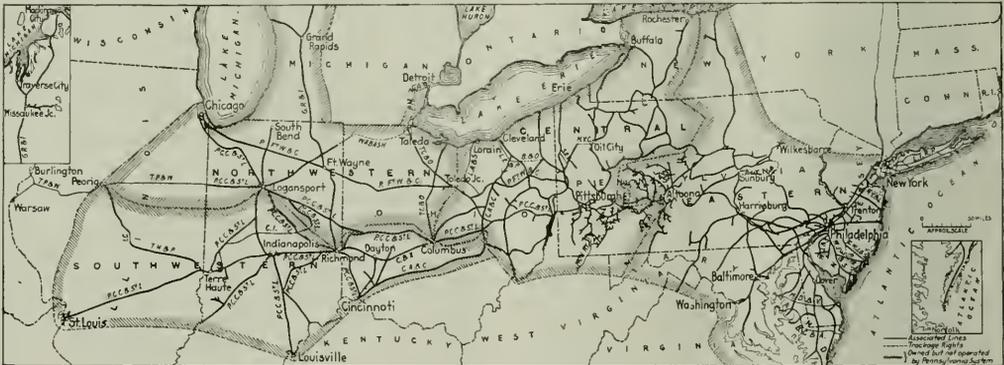
of \$11,965,085 for the four months from September 1 to the end of the year. This total of \$63,103,867 was \$4,022,596 less than the compensation in 1919. The company's non-operating income was \$24,562,834, an increase of \$671,072 over 1919. The gross income totaled \$87,666,701. Deduction from gross income totaled \$54,865,028, an increase of \$5,372,757 over 1919, represented in the main by increased interest payments on funded and unfunded debt. The net income for the year was \$32,801,673, a decrease of no less than \$10,066,425 from 1919. The six per cent dividends amounted to \$29,950,404 and \$2,239,790 was applied to sinking and other reserve funds. The balance transferred to profit and loss—namely \$611,479—was \$9,889,238 less than in 1919.

It is interesting that although the Pennsylvania is our largest railroad system and its operations among the most complex, it is the first of all the railroads to issue its annual report. This is caused by the necessity of having the report ready for the annual meeting of the stockholders on the second Tuesday in March. The result is that the report does not include the figures for operation and maintenance, which will explain the omission of any reference to such figures in the present review. These figures, however, will be issued later

operations of the Pennsylvania Railroad during the year 1920.

The Pennsylvania Railroad on its return to private control on March 1, 1920, introduced a new form of organization whereby the road was divided into four regions, each in charge of a vice-president. In reviewing the results of the year's operations it would be natural to see how this new form of organization has worked out. The many unusual conditions existing in 1920, however, have made this difficult, and President Rea does not attempt it in his report. That it has enabled improvements to be made is, however, well known. It is the consensus of opinion that the morale of the forces on the Pennsylvania is improving from month to month. The officers of the road realize the extreme importance of this morale and regret only that the present uncertain labor situation on the railways as a whole prevents more rapid progress toward restoring the old time efficiency and favorable attitude on the part of the men towards their jobs and towards the railroad by which they are employed.

The stockholders on March 8 voted on a number of things which are of leading importance to the progress of the Pennsylvania System. One of these was a proposal to authorize an increase in the indebtedness of the company by \$100,000,000 to provide for future financing. The other relates to



The Pennsylvania System

as soon as they become available. The stockholders voted on March 8 to change the date of the annual meeting to the second Tuesday in April so as to give more time for the preparation of the voluminous information which the Pennsylvania makes available for those interested in the details of its operation. The omission of these operating statistics from the present report does not, however, rob the report of value. There are so many things considered in its pages that it is of more than ordinary interest.

The Pennsylvania Railroad System prior to the advent of federal control, was noted for its splendid organization and the excellent morale of its forces. It was also noted for its engineering characteristics and its excellent up-keep. No doubt the extremely high standards of the latter had their effect upon morale and made it something more real and tangible. At any rate it would be almost trite to say that the 26 months of federal control added nothing to these things and subtracted much. The Pennsylvania Railroad today does not have that new and finished appearance it once had and the morale of the forces cannot be said to compare with what it was before the disturbing circumstances of the war had come into play. Organization and morale are most important on any railroad, but on a system the size and complexity of the Pennsylvania they have an unusual importance. These facts must be borne in mind in any analysis of the

leases of certain of the subsidiary lines. The Pennsylvania Railroad System was made up of some 600 constituent transportation corporations. This number has gradually been reduced through acquisition or merger so that at the end of 1919, for instance, there were a total of but 177, including railroad, bridge, real estate, water supply companies, etc. The list of operating companies owned or controlled by or affiliated in interest with the Pennsylvania System in 1920 totaled 20, operating a total of 11,749 miles of line. These companies operate some 50 companies whose properties are under leases or operating agreements. Of the operating companies the largest is the Pennsylvania Railroad itself which operates 7,425 miles of line. There are also included the Pittsburgh, Cincinnati, Chicago & St. Louis, 2,434 miles; the Grand Rapids & Indiana, 562 miles; the New York, Philadelphia & Norfolk, 122 miles; the West Jersey & Seashore, 356 miles; the Long Island, 395 miles, etc. It is now proposed to co-ordinate several of these lines more closely into the system by leases, particularly the Pittsburgh, Cincinnati, Chicago & St. Louis, the Grand Rapids & Indiana, the New York, Philadelphia & Norfolk, etc., which lines are now made parts of the system by ownership of stock.

The Pennsylvania Company, which since 1917 has been purely an investment company, until recently owned over three-quarters of the stock of the Pittsburgh, Cincinnati,

Chicago & St. Louis. More recently it offered to purchase the minority shares by exchanging P. C. C. & St. L. 5 per cent bonds, guaranteed by the Pennsylvania Railroad, par for par for the stock. The Pennsylvania Company and the Pennsylvania Railroad Company have thus secured about 98 per cent of the total stock. The proposal now is to lease the railroad for a period of 999 years from January 1, 1921, for a rental amounting to the fixed charges and for a period of five years 4 per cent on the stock and thereafter 5 per cent.

The case as to the Grand Rapids & Indiana is similar. The Pennsylvania Company by an offer to exchange for the minority stock 4 per cent second mortgage bonds of the Grand Rapids & Indiana which it held in its treasury has acquired about 97 per cent of the outstanding Grand Rapids & Indiana stock. The lease of the latter carrier is like that of the Pittsburgh, Cincinnati, Chicago & St. Louis except that the rental agreed upon is the fixed charges and 4 per cent on the stock. These leases are already agreed and were approved by the stockholders at their annual meeting.

The stockholders were on March 8 also asked to approve long term leases of the New York, Philadelphia & Norfolk, the Cincinnati, Lebanon & Northern, the Cumberland Valley & Martinsburg, and certain of the operating companies, as well as leases of various of the companies whose properties are at present under operating agreements. All of these companies are controlled through majority or in some cases practically entire ownership of stock. There will still be left some 12 operating companies, the two most important of which are the Long Island, 395 miles, and the West Jersey & Seashore, 356 miles, which it is not proposed to lease at this time. These leases represent a most important step in the development of the Pennsylvania Railroad System. They are the present stage in a process of development and integration which extends over a long period. The lines in question have been operated as parts of the system for many years, but it is expected that if they are operated as leased lines, increased efficiency and economy in administration will be facilitated. There will also be simplification and reduction of accounting and the change will permit the system to route traffic and use the terminals and facilities of all the companies for the system without regard to the separate ownership and results to each of the leased companies. Another important feature is the financial aspect. The development of the subsidiary lines which it is now proposed to lease has been assisted by the Pennsylvania Railroad, and in fact their credit has been based chiefly upon the guarantee of the latter; nevertheless it is expected that the proposed arrangement will even further assist the credit of the system.

The balance sheet of the Pennsylvania Railroad Company as of December 31, 1920, shows that on that date there was outstanding funded debt of the Pennsylvania Railroad itself amounting to \$362,851,260. This was an increase of \$56,780,000 over 1919. The amount given of course does not include the recent financing in the form of the \$60,000,000 fifteen-year 6½ per cent bonds maturing February 1, 1936, as this sale was not made until the latter part of January, 1921. The organization of the constituent companies of the Pennsylvania system is so complex that it is not generally realized that these increases in funded debt represent to an extent only increased indebtedness of the system and to a greater extent refunding of the indebtedness of the subsidiary companies. Thus there appears for the first time in the balance sheet an item of \$50,000,000 ten-year 7 per cent secured gold bonds, due April 1, 1930. These notes are secured by \$50,000,000 6 per cent bonds, due April 1, 1970, which were issued in 1920 but which do not show as increased indebtedness on the balance sheet for the reason that they are held by trustees and have not been issued to the public. The proceeds of the \$50,000,000 ten-year notes were used in part

to pay off funded debt of the Philadelphia & Erie, an acquired company. The funded debt had been assumed by the parent company. It matured July 1, 1920, and was as follows: \$7,928,000 of 6 per cent bonds; \$5,263,000 of 5 per cent bonds and \$5,880,000 of 4 per cent bonds.

The \$60,000,000 fifteen-year 6½ per cent bonds maturing February 1, 1936, and which were issued in January, 1921, are to be used as follows: \$20,000,000 to purchase from the Pennsylvania Company locomotives, cars and other equipment acquired by the Pennsylvania Company for operation on roads which that company leases, but the leaseholds of which are now held by the Pennsylvania Railroad; \$22,000,000 to purchase also from the Pennsylvania Company stock of the Pittsburgh, Fort Wayne & Chicago (a leased line) and stock of other companies embraced in the system; \$6,138,000 to pay installments on equipment trusts due in 1921 and \$1,151,000 for certain real estate mortgages. Carrying the matter now to the Pennsylvania Company it should be noted that the proceeds paid over to the latter in these transactions are to assist in meeting maturities of long term indebtedness of the company due June 15 and July 1, 1921. Thus of the total of \$60,000,000, the sum of nearly \$50,000,000 is to be used for refunding although at a higher rate of interest than the present indebtedness.

Returning now to the increases in the funded indebtedness of the Pennsylvania Railroad in 1920 reference should be made to the \$6,780,000 of 6 per cent collateral note due November 11, 1930, issued to the United States government to cover a loan from the revolving fund for additions and betterments including a grain elevator, engine house facilities, yard tracks and shops. In the matter of equipment trust obligations, note should be made of the issuance to the United States government of equipment trust certificates amounting to \$52,012,000 for cars and locomotives allocated to the Pennsylvania System by the United States Railroad Administration. The Pennsylvania followed a liberal policy in connection with the standard equipment and took a large amount of it. The equipment has been assigned to various lines of the system and these lines will assume the obligations accordingly.

On December 31, 1920, the Pennsylvania Railroad had 133,068 stockholders, an increase of 13.03 per cent over December 31, 1919. The average holding was 75 shares. It would be difficult to point to any other single factor to show the respect in which the Pennsylvania Railroad's prestige and policies are held in this country or abroad. This wide distribution of stock is the result of the conservative and sane financial policy and the efficient management for which the Pennsylvania is noted. We point to these facts to show how unfortunate it is that the progress that the system has made in the many years of its existence should have been impeded in any way by the results of the war as shown in the effects of federal control. However, the Pennsylvania Railroad may be looked upon merely as a large part of the country's entire railway system. We have enough confidence in the general railway situation to believe that railway conditions as a whole are going to improve in satisfactory fashion as time goes on. Those who have invested in Pennsylvania Railroad securities will bear in mind that the Pennsylvania has no special conditions that should prevent it in any way from realizing its share in the general improvement. It may seem a simple thing to say, but it is important to realize that the measure in which the company will realize the benefit of improvement will naturally depend principally upon operating efficiency. The Pennsylvania, like any road, has before it not only the task of restoring its operations to their pre-war efficiency but its management will also give due regard to the changed conditions embodied in the working out of the provisions of the Transportation Act.

The following table shows the principal figures of the operations of the Pennsylvania Railroad in 1920 and 1919:

	1920	1919
Mileage operated	7,425	7,327
Freight revenue	\$384,372,254	\$318,996,194
Passenger revenue	133,241,548	123,903,032
Total operating revenues	566,860,758	489,270,945
Maintenance of way and structures	89,190,602	72,448,041
Maintenance of equipment	177,897,960	144,113,675
Traffic expenses	3,046,930	4,113,754
Transportation expenses	293,230,169	215,463,217
General expenses	13,617,083	11,428,801
Total operating expenses	590,049,937	455,387,461
Taxes	19,014,599	15,412,661
Net railway operating income.....Def.	48,447,371	13,908,663

The following gives in brief the corporate income account:

	1920	1919
Compensation, January and February	\$13,156,968	
Guaranty, March 1 to August 31.....	37,981,814	
Net railway operating income, September 1 to December 31	11,965,085	
Total	\$63,103,867	\$67,126,463
Non-operating income.....	24,562,834	25,233,906
Gross income	87,666,701	92,360,369
Deductions from gross income	54,865,028	49,492,271
Net income	32,801,673	42,868,099
Dividends	29,950,404	29,950,704
Balance to profit and loss.....	611,479	10,500,717

New Books

Steam Locomotives of the Present Time (Die Dampflokomotiven der Gegenwart). By Robert Garbe. 7½ in. by 10½ in., illustrated. Volume 1, 859 pages; volume 2, 54 lithographed tables and drawings. Published by Julius Springer, Lindestrasse 23, Berlin W. 9, Germany.

This is a second edition of this well-known work originally published in 1907. The test has been brought up to date and an attempt has been made to present the same well-rounded survey of locomotive development in all countries that was given in the earlier work. Apparently the war interfered with the compilation of data and some parts of the book are unfortunately incomplete.

The book opens with a historical sketch of the use of highly superheated steam in locomotives and a discussion of the essential progress in locomotive building in the past 20 years. The first chapter deals with superheat as a working medium, the question being discussed largely from the theoretical viewpoint. The succeeding chapters are devoted to the calculation of the main dimensions of superheated steam locomotives, two-cylinder and multi-cylinder locomotives with simple and double expansion and the uniflow engine of which a rather extended discussion is given. Various types of superheaters are described and noteworthy structural details of more recent locomotives are discussed. A section is devoted to the latest developments in feed water heating. The superheated steam locomotives of the Prussian State Railways are described and the section following is devoted to superheated locomotives of various railroads in countries other than Germany. The American locomotives are described in this and in a previous chapter but the types shown cannot be classed as typical examples of the latest developments in motive power in this country. The results of numerous tests of superheated steam locomotives principally in Germany are set forth and it is notable that these are nearly all from seven to ten years old.

Apparently the principal shortcoming of the book is the lack of complete and up-to-date information concerning the locomotives built by the allied countries. This, however, is not of primary importance as American readers would be chiefly interested in the book for the information they might obtain regarding the progress that has been made in Germany in the years during which communication was interrupted. Apparently the descriptions of German motive power have been given painstaking attention and the work of German designers during and since the war, is here presented for inspection for the first time.

Letters to the Editor

"Economics at Small Expenditures"

HAILEYVILLE, Okla.

TO THE EDITOR:

The *Railway Age* of December 17 contained a letter on the above named subject by H. L. Reed, general superintendent of the Rock Island Lines. While no doubt the managers of the railroads are looking for men with new and effective methods for handling railroad work that can be put into practice without the expenditure of a great deal of money it has occurred to the writer many times that while they were looking for such men they would also look for men who can produce results with the facilities at hand and the methods already in effect.

Two of the important factors in connection with railroad operation are the cars and the locomotives. The capacity of the box car and the locomotive is about the same the year around.

Day after day train crews are called at terminals to leave at a certain time, but for some reason or other the greater per cent are late; some excuse is always offered: engine late, train not made up, bad order cars to set out, cars without bills in train, held up for incoming trains, etc., etc. Some conductors and engineers are always ready to go on time and some others are always late. It has been found that some crews make more overtime than others; yet the fellows who are behind seem to get along just as well as the one who gets over the road and saves the overtime.

When business slacks is the time to reduce all expenses and not wait two or three weeks to see if it will not come back and in the meantime the railroads are paying men for short days and the like.

Freight trains will leave a terminal and after they are out on the road some distance will begin to receive messages about certain work to be done on the trip. Except in the case of emergency, such instructions should be given them at the time the conductor is cleared at the terminal, thus giving him a chance to line up his brakemen and the engine crew in order to be ready to do it on reaching the designated places.

It does not seem right that a train crew should be permitted to live at one end of the run and the engine crew at the other and the company pay deadhead miles when any member of the train crew lays off or becomes sick simply because he lives away from the home terminal.

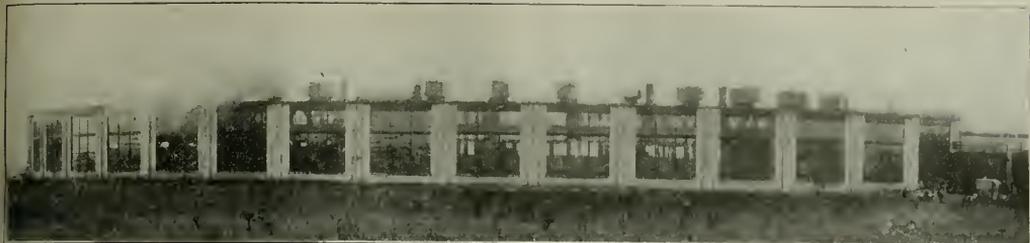
When engines are scarce, it does not look well to have two or three engines standing around idle and the railroad blocked with cars. Every day a foreign car is on the rails means an expense.

A great deal of expensive overtime can be eliminated by reducing train service on Sundays, thereby doing away with the services of many car men, machinists, etc.; dead freight and empties can lay in the yards over Sunday without any great inconvenience.

When trains exceed the speed limit and encroach upon the time of other trains, thereby inviting accident, it is time something is being done to remedy the condition. It does not require college graduates to detect the above lost motion in the operation of the railroads; and it is just the things mentioned above, and many more of a similar nature, which need correcting. The payrolls covering supervisory forces have been increased to an enormous extent during the past five or six years but the same old conditions still rock along. Who is responsible?

J. L. COSS,

Train Dispatcher, Chicago, Rock Island & Pacific.



The Outer Wall of the Engine House Is Largely Glass

Small Engine Terminal Embodies Novel Details

Pere Marquette Roundhouse at New Buffalo Is Characterized
by a Number of Unique Developments

THE PERE MARQUETTE has recently completed the construction of a new locomotive and freight terminal at New Buffalo, Mich., as the principal feature of a project to readjust the length of engine districts between Grand Rapids, Mich., and Chicago, and thereby obtain an improved operating arrangement. The engine terminal is of particular interest as an example of modern thought in details and arrangement as applied to a relatively small layout. A somewhat similar layout was completed about the same time for the Pere Marquette at Plymouth, Mich.

The New Buffalo project is an entirely new development designed to supersede the existing terminal at Benton Harbor, 29 miles further east. This change lengthens the Grand Rapids engine district from 86 miles to 115 miles and

Buffalo is a town of only a few hundred inhabitants, provision has also been made for a 50-room hotel for the accommodation of the terminal employees and train crews. The classification yard comprises a simple drill yard of 15 tracks averaging about 4,000 ft. in length in addition to running tracks for the main line and the La Crosse (Indiana) branch. A separate grid of tracks to the east of the classification yard provides a scale track, a caboose track and four tracks for car repairs. The operation of the classification



View from the Top of the Coaling Station



The Coaling Station

shortens the Chicago district to 63 miles, or to 50 miles to South Chicago. The district to the east of New Buffalo is thus made of a normal engine length, while that to the west is of a length that can be operated as a turn-around for certain classes of traffic. The primary advantage of the new arrangement lies in the fact that the New Buffalo terminal is located very near to a point marking a change in ruling grades, so that while engine rating east of New Buffalo is 2,400 tons, west of New Buffalo it is 3,200 tons. Consequently, one of the primary functions of this terminal is to adjust the train lengths to the ruling grades. It will also serve as the primary point for classifying trains for movement over the various branches of the road.

The facilities comprise a complete engine terminal, a classification yard and a car repair yard and, since New

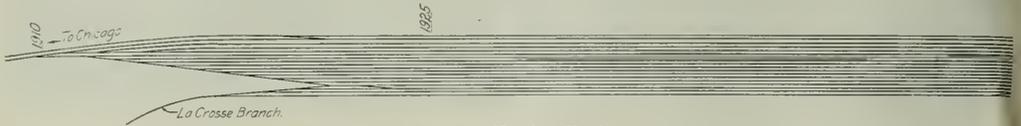
yard is facilitated appreciably by long switch leads extending 7,000 ft. to the east and 4,500 ft. to the west respectively. The track arrangement for the engine terminal is so simple as to require no explanation.

The Engine House

The roundhouse has been built with 16 stalls with space left for 11 additional stalls without interfering with the existing track arrangement. The design of the roundhouse is marked by the efforts made to secure adequate light and ventilation. To this end the roof is generally higher than in

most roundhouses of the same general type. For instance, the windows in the outer walls have a clear height of nearly 20 ft. Further light is afforded by clerestory windows placed one panel back from the doors and also by 80 sq. ft. of glass area in each of the doors and the transoms over them. As a means of insuring permanent value to the glass area in

flood lights fitted with 100-watt nitrogen lamps. They are mounted in such a way as to be adjustable, both horizontally and vertically, so that in addition to providing general illumination, it is possible to concentrate the light on any portion of the space between the locomotives where work may be in progress. Further illumination is made possible by provision

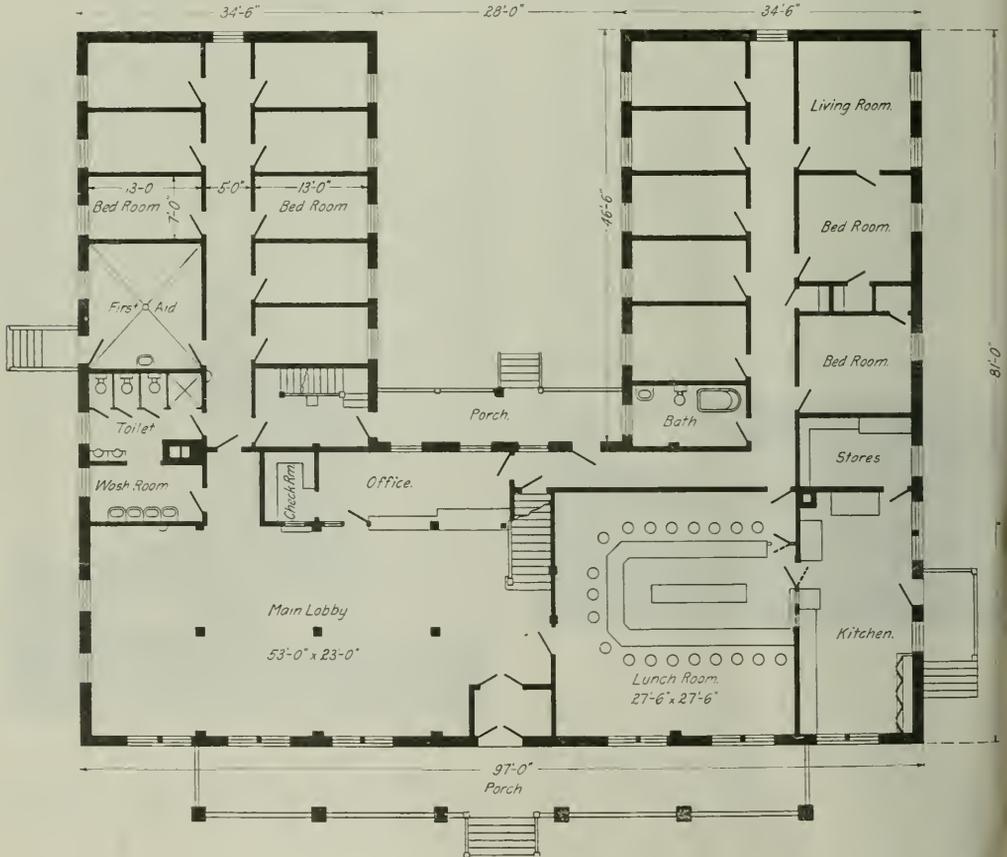


The Classification Yard

the clerestory windows, a gallery or permanent scaffolding has been provided throughout the entire length of these windows, so that the roundhouse forces will have no excuse for not keeping them clean.

Special pains have been taken also to provide adequate

for a plug receptacle in each stall for the use of extension cord lamps. The provision of high ceilings is only one measure taken to assure good atmospheric conditions in the house. A further effort in this direction is provision for smoke jacks of



First Floor Plan of the Employees' Hotel

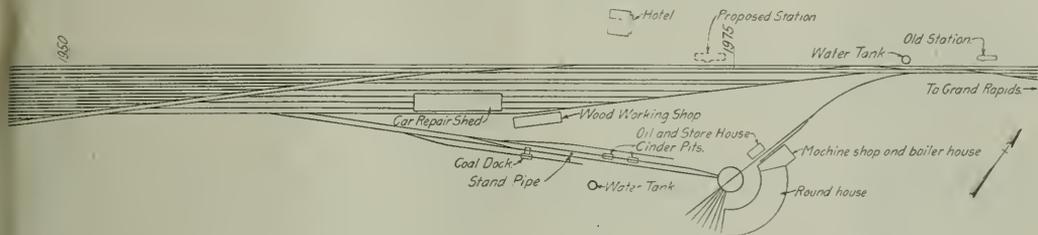
artificial light with rather unusual results. Instead of vertically hung lights, flood lights have been provided as shown in the plan with three in each line of posts, one on the pilaster in the outer wall, one on an intermediate line of posts and one on the door posts. These are the Utility type

wide spread, these being Johns-Manville Transit board jacks with a bottom length of 12 ft. To insure the elimination of smoke and gases which fail to enter the smoke jacks, a large ventilator of wooden construction has been provided over the midpoint of each stall. The results secured in the operation

of the engine house thus far, with these facilities for ventilation, have been fully up to expectations.

The roundhouse is of frame construction with brick walls, and follows the usual practice except for the use of cast iron door posts. Cast iron is also used extensively in the framing

at its inner end with a pit or manhole in which the return pipes for condensation from the heating coils is connected to the main return pipe, these catch basins being connected by a line of eight-inch sewer pipes through which the main return extends to a pit in the boilerhouse. From this the condensa-



The Engine Terminal

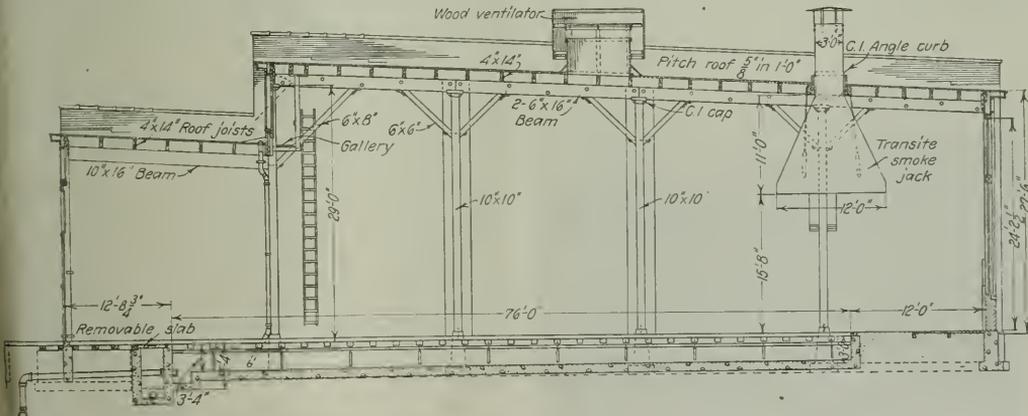
connections, following high-grade mill construction practice. Another unique feature of the locomotive doors is the use of old rails as door stops. These rails extend the full height of the door and are braced from the lintels by angle irons. The advantage of the full height door stop is that it eliminates a tendency to warp the door. The roof consists of 1 1/2 in. D. and M. boards on 4-in. by 14-in. joists, spaced 3 ft. to 3 ft. 9 in. center to center and covered with a five-ply tar and gravel roofing.

The Engine Pits

A refinement in the engine pit construction is seen in the extension of the pit walls in the direction of the turntable for

tion is returned by a steam trap to the boilers. A drop pit embracing Tracks 1 and 2 follows the usual construction except that it is fitted with angle iron bridges for the skidding of the rail girders, these bridges being so placed that they do not interfere in any way with the dropping of the wheels. For the present a heavy spread of cinders serves as a floor for the roundhouse with the exception of an 8-ft. walk extending the length of the outer wall.

Owing to the fact that all engines served by the New Buffalo terminal are pooled in the two adjoining engine districts and would, therefore, frequently run into Grand Rapids where the system repair shops are located, provision has been made at the new terminal for only minor repairs.



Longitudinal Section Through a Typical Stall

about nine feet beyond the inner ends of the pits, thus putting the pit rails on the same character of support to a point three feet outside the house. This insures perfect grade and alignment of the track within the house. The rails are spiked to 6-in. by 7-in. ties imbedded in the concrete walls at intervals of 2 ft. 6 in. These ties also serve as spiking timbers for the jacking planks which flank the track on either side. Owing to the fact that the roundhouse is heated by direct radiation with pipe coils in the pits, the tops of the pit walls are provided with a coping or overhang to serve as a support for the steam coil hangers and also to protect them from falling objects. The engine pits drain to a small catch basin at the inner end which is connected by a drain with a drainage system outside the house. Each engine pit is also provided

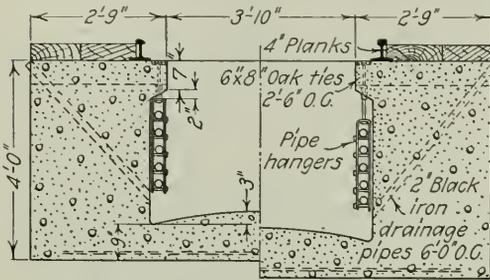
Consequently, the machine shop, the boilerhouse and the necessary offices were readily housed in a small wing located at one end of the roundhouse. The requirements for the boilerhouse are not extensive since all electric current for lighting and power use is being purchased from a local public utility, the only boiler capacity required being for heating purposes. The boiler room is equipped with two 150-hp. horizontal tubular boilers and the pumps required for boiler feed and for a National boiler washing system. The machine shop is floored with Kreolite creosoted wood blocks and the boiler room with paving brick.

The turntable is a 90-ft. deck table built by the American Bridge Company and operated by a Nichols tractor. Special pains have been taken to provide adequate subdrainage with

the use of a bed of cinders and a circle of six-inch drain pipes connecting with the catch basin.

The Turntable

The auxiliary facilities of the engine terminal include a 250-ton Roberts & Schaefer coaling station of reinforced concrete and structural steel, a sand drying plant, two Robertson cinder handling plants, an oil and storage house and a 100,000-gal. conical bottom water tank built by the Chicago Bridge & Iron Works. The last named serves a standpipe between the inbound and outbound tracks. The water service



Typical Half Section of the Engine Pits

involves no particular problem at this point because of the existence of a pumping station and sand serving trains on the main line. The new work consisted of an extension from the existing pipe lines to the new tank and standpipe. The combined oil and storage house consists of a building 31 ft. by 63 ft. with one story and basement and having a reinforced concrete floor, while an area 18 ft. by 33 ft. on the first floor used for handling oil is provided with a reinforced concrete roof. The oil tanks are housed in the basement and the



The Inner Side of the Round House Is Well Lighted

portion of the first floor used for handling oil is separated from the remaining portion by fire walls with tin-clad fire doors.

The Car Repair Shed

The car repair yard is served by a building 35 ft. 10 in. by 184 ft., of which a length of 42 ft. will be used as a woodworking shop, 70 ft. as a lumber shed, 21 ft. as a casting shed, 20 ft. as a storeroom and 30 ft. as a lunch room, toilet and office. This building will be entirely of frame construction. The lumber and casting sheds will be furnished with continuous rolling doors for easy access.

The hotel is a two story building in the shape of a "U." In addition to a main lobby, restaurant and some 50 rooms, shower baths, toilets and wash rooms, a small first-aid room has been provided owing to the absence of anything in the nature of a hospital in the community. In the absence of a public sewerage system, the outfalls of the sanitary plumbing of the roundhouse, car repair house, hotel and station, are to be run into two septic tanks.

In addition to the facilities above described which are now nearing completion, the plans for this terminal include a new passenger station with provision for office space on the second floor.

This terminal was designed and constructed under the direction of Job Tuthill, chief engineer of the Pere Marquette, Detroit, Mich., with Frank Manning as assistant engineer in charge. H. V. Snyder & Son, Battle Creek, Mich., was the general contractor. Work on this project was started during the period of government control but the progress was slow on account of two protracted interruptions. With the return to private control the work was prosecuted more vigorously and the engine terminal was turned over to the mechanical department on November 4, but other portions of the plant were not completed until sometime later.

No Time to Reduce Rates

WASHINGTON, D. C.

THE PRESENT RAILROAD situation affords little prospect of reductions in freight rates, says Chairman Clark of the Interstate Commerce Commission in a letter to Senator Harris of Georgia, in reply to a letter inquiring as to the possibility of a reduction. Earlier correspondence between Chairman Clark and Senator Harris, who expressed the opinion that a reduction in rates would stimulate traffic, had previously been made public. Under date of March 5 Mr. Clark wrote:

"I wish it were possible for me to write you encouragingly in response to your letter of the third instant, but I do not see that I can add to what I said in my letter to you of December 22 on the same subject, to wit, the probability of reductions in freight rates.

"The situation is not so good now as it was in December. There has been quite a substantial falling off in general traffic.

"The average operating ratio of the railroads of the United States is something over 90. That means that for every dollar that the railroads earn they pay out in operating expenses more than 90 cents. Due to the narrow margin between revenue and operating expenses a great many roads are not earning their operating expenses and fixed charges and a good many are not even earning their operating expenses.

"Under these circumstances it is difficult to find an argument in favor of reducing rates unless in instances in which it can be shown that the rates are stifling the traffic and that lower rates which would still be compensatory would effect a movement from which there would be some return.

"I have just been going over some figures of the shipments of fruits and vegetables from Florida for the season 1920-1921 as compared with the season 1919-1920. These figures show that from November 1, 1919, to February 28, 1920, both dates inclusive, the number of carloads of fruits and vegetables shipped from Florida by rail was 26,886 as compared with 28,420 carloads during the same period in the season of 1920-1921."

A similar letter was also sent to a Florida senator who has been urging reductions in rates on the ground that the high rates have prevented the movement of Florida products.

Employees Win Verdict in Erie Controversy

Labor Board Finds Carrier Guilty of Violating Wage Rulings—
National Agreements Hearings Continue

THE ACTION of the Erie Railroad in ordering reductions in the wages of its track laborers, the re-establishment of the seven day week for the train dispatchers and the deduction of one day's pay from all employees, without negotiation with the men affected, was condemned by the Railroad Labor Board in a decision dated March 2 and announced on March 7. This decision found the Erie guilty of violating the Board's Decision No. 2 on six counts and denied jurisdiction in the controversy over wages until proper conferences have been held and a disagreement reached.

The progress of this controversy has been reported in the *Railway Age* of February 18 (page 412), and of March 4 (page 520).

After reviewing the history of the controversy the Board handed down an opinion which follows in part:

The intent of Congress in enacting Title III of the Act was to prevent interruption to the operation of any carrier growing out of disputes between the carrier and its employees. To accomplish this intent the Act (Section 301) makes it the duty of all carriers, their officers, agents and employees to exert every reasonable effort and to adopt every available means to avoid any interruption to operation growing out of disputes between the carrier and its employees. The same section requires the carriers and their employees to consider and if possible to decide all such disputes in conference between the representatives designated and authorized so to confer by the carrier or the employees directly interested in the dispute. This section also requires that if the dispute is not decided in conference, it shall be referred by the parties thereto to the Railroad Labor Board, which board by Section 307 is required to hear and decide such disputes so referred.

In April, 1920, an organization of railroad yard employees which was not a party to the conference of March 10, 1920, referred to above, after unsuccessful efforts to decide their disputes with the carrier by conference, abandoned the service in concert and made application to this Board for a determination of what should constitute just and reasonable wages for them. Prior, however, to the application, the Labor Board had adopted Order No. 1, which provided in part as follows:

It is decided and ordered by the Labor Board as one of the rules governing its procedure that, as the law under which this Board was created and organized makes it the duty of both carriers and their employees and subordinate officials having differences and disputes to have and hold conferences between representatives of the different parties and interests, to consider and if possible to decide such disputes in conference, and where such dispute is not decided in such conference to refer it to this Board to hear and decide; and as it is further contemplated and provided by the law that pending such conference, reference to and hearing by this Board it shall be the duty of all carriers, their officers, employees and agents to exert every reasonable effort and adopt every available means to avoid any interruption to the operation of any carrier growing out of any such disputes; therefore, this Board will not receive, entertain or consider any application or complaint from or by any party, parties or their representatives who have not complied with or who are not complying with the provisions of the law or who are not exerting every reasonable effort and adopting every available means to avoid any interruption to the operation of any carrier growing out of any dispute between the carrier and employees.

The intent and plain meaning of Order No. 1 was to serve notice on employees and carriers alike that the law required carriers and their employees to consider their disputes in conference and refer them, if undecided, to this Board and to refrain, pending this Board's decision, from any act which would tend to bring about an interruption to commerce.

The application of the striking yard employees was not entertained, as they were not acting in obedience to the mandate of the Act.

The officers of the Erie Railroad Company have been at all times aware of Order No. 1.

On December 17, 1920, the Labor Board issued an announcement, which said in part:

The Labor Board calls upon the officers of all carriers subject to the Act to obey it in letter and spirit and particularly calls upon them to meet in conference representatives of the employees seeking the decision of disputes to decide such disputes in conference, if possible, and if not possible to join in referring such disputes to this Board, and to refrain from in any manner intimidating employees seeking the redress of grievances or punishing representatives of employees seeking conference.

The Labor Board also calls upon all organizations of employees of carriers subject to this Act to obey it in letter and spirit and particularly calls upon them to join in a reference of the dispute to this Board if it is

not possible to decide it in conference, and to refrain from submitting strike ballots to the membership in advance of such reference.

The interest of the public as well as that of the officers and employees of carriers requires that such officers and employees faithfully observe the provisions of the Act. Departures from its letter and spirit, if persisted in, will be widely imitated, its purposes destroyed, transportation interrupted and the well-being of our people impaired.

The purposes of this announcement have been fulfilled by the compliance of substantially all carriers and organizations of employees of railroads.

The officers of the Erie were furnished with copies of this announcement, and it is believed they were fully aware of its contents long prior to the promulgation by them of the orders complained of herein.

At the hearing on February 23, 1921, the position of the carrier on the charge of violation of Decision No. 2 was stated by its counsel. This statement, it is believed, may be fairly thus summarized:

The decision alleged to have been violated is Decision No. 2. Decision No. 2 found the wages therein determined to be just and reasonable, to be such on July 20, 1920; the decision did not find those wages to be now just and reasonable. The Labor Board is without power to determine wages for an indefinite time. The decision did not specify how long it was to remain in effect. When certain conditions upon which the Labor Board had predicated its findings have substantially changed since the decision, as in this case, the relation between wages and the cost of living and the scale of wages paid for similar work in other industry, departure by the carrier from the decision does not constitute such a violation of Decision No. 2 as to justify a finding of violation by this board.

It was contended that the said condition had in fact changed. Evidence of such change was offered in the shape of statements by the general manager tending to show a reduction in the scale of wages paid common labor and a reduction in living costs.

No evidence was offered of any change in the scale of wages paid for work similar to that of train dispatchers.

As to the carrier's departure from the rules and working conditions assumed as a basis of wages by Decision No. 2, and as to which the Labor Board had directed no changes should be made except by agreement, it was contended that the carrier had never accepted that portion of the decision, although it had, prior to the orders complained of, obeyed such direction, and is now participating by its representative in the proceedings to determine the reasonableness of such rules.

The position of the carrier and the evidence submitted have had careful consideration.

It was not the intention of this Board that Decision No. 2 should constitute a perpetual edict, nor is there any expression therein to justify such an inference. The carriers and the organizations of their employees were left free by that decision to negotiate such agreements as they saw fit, subject to the power of this Board to suspend any such agreement if it should involve such an increase in wage as would be likely to necessitate a substantial readjustment of the rates of any carrier. No restraint was attempted to be placed upon the power and legal duty of the carriers and their employees, if it was not possible to agree upon a readjustment of wages, to refer the dispute to this Board for decision. This Board sits day and night to hear, consider and decide such disputes. It was the intention of the Labor Board, however, that the rates found therein to be just and reasonable should be paid by carriers parties to the decision until other rates should be agreed to by the parties or until this Board on proper reference should determine other wages to be just and reasonable.

A decision voidable in whole or in part by one party to proceedings at its option upon any change in conditions determined by that party to be substantial is a novelty in law and as fantastic as novel. Its bare statement would seem to carry refutation, yet it was gravely advanced by the learned counsel for this carrier. Its consequences are, therefore, stated.

This position, of course, renders nugatory and vain the elaborate and costly processes established by the Act and applied by this Board. It sweeps aside at the will of one party a decision arrived at after the presentation of evidence and argument by the many parties to the dispute, accepted by all and now obeyed by substantially all carriers. It justifies a disregard of the factors specified by Congress for the ascertainment of just and reasonable wages and substitutes for these factors the financial benefit of the carrier. If valid, the intent of Congress that conference,

reasonableness and justice should be substituted for power, violence and disorder in the settlement of railroad labor disputes is utterly destroyed and legislation enacted after the most careful consideration rendered ridiculous and even fraudulent. If a carrier may arbitrarily reduce wages decided to be reasonable and set aside rules while a party to proceedings with regard to such rules, no reason appears why railroad employees may not announce an immediate intention of abandoning the service in concert unless demands for increased wages or more favorable working conditions are at once satisfied, provided a trend toward higher living costs shall have appeared or wage scales in similar industries shall have advanced. Such conduct is highly provocative of interruption to traffic and is not only not consistent with the Act, but is thereby clearly condemned and prohibited.

It is the judgment of this Board that no carrier may, without violating the spirit and letter of Decision No. 2, in case its revenue for any month should be estimated to be insufficient to meet its expenses for labor and material for that month, arbitrarily appropriate to itself wages due its employees in such amount as to make expenses for labor and material equal or exceed revenues for that month.

It was not, in the judgment of this Board, the intention of Congress that, consistently with Title III of the Transportation Act, a carrier may join in the reference of a wage dispute to the Labor Board, accept its decision, apply increases in rates in part authorized by the Interstate Commerce Commission to provide for wage increases decided by this Board to be just and reasonable, and, if revenues of any month are estimated to fall below expenses for that month, arbitrarily reduce wages to such a point as to bring estimated expenses for any month within estimated revenues for such month.

There is a simple, orderly and legal method open to all carriers to secure appropriate relief in case they are of the opinion that the wages fixed by Decision No. 2 are not just and reasonable. If, after the failure of conference between duly authorized representatives of the carriers and of the employees directly interested to decide a dispute and reference to the Board thereof, the carrier is able to show that the wages fixed by Decision No. 2 are not now just and reasonable, this Board will, as its duty is under the law, decide what wages are just and reasonable.

This procedure was at all times well known to the officers of the Erie Railroad.

The Transportation Act makes it the duty of this Board in case of disputes as to wages duly referred to it to determine what wages are just and reasonable. It is, therefore, clear that Congress intended that carriers should pay just and reasonable wages in order that transportation should not be interrupted by strikes over wage disputes. Congress was aware that there might be disagreement between the parties as to what constituted just and reasonable wages and in order to secure uninterrupted transportation during the pendency of the controversy made it the duty of the officers of carriers to confer with the representatives of the employees interested. Section 301 clearly expresses this intent and requires the performance of this duty. The relation between the scale of wages paid for similar kinds of work in other industries and the relation between wages and the cost of living are not the only factors determining reasonable and just wages.

Five other factors are named in the Act and other relevant circumstances are required to be considered by this Board and also inferentially by carriers, in determining just and reasonable wages. Furthermore, it is clear that Congress intended that the scale of wages paid in other industries and the relation between wages and the cost of living should be of sufficient certainty and stability to warrant the increase or reduction of wages by reason of changes in this factor. It will require time to determine whether the scale of wages now paid by other industries for the classes reduced in pay by the Erie is temporary or of sufficient permanence to be considered as a factor affecting justness and reasonableness of railroad wages. This necessity was recognized by the President of the United States on August 25, 1919, when he urged railroad employees to refrain from pressing their demands for increased wages pending a better opportunity to estimate the permanency of high living costs. This request was obeyed by such employees, although obedience required the endurance of heavy economic pressure for eleven months, and living costs continued to rise during this entire period. No evidence except a claim of general information to that effect was offered by the Erie of a substantial reduction in living costs. According to the Department of Labor statistics, these costs have receded 11.4 per cent from July 1, 1920, to February 1, 1921.

No evidence was offered by the carrier of any changes in the scale of wages paid for similar kinds of work in other industries except as to common labor.

No relation was shown or attempted to be shown between the changes claimed in the factors specified and the reduction made. It is the opinion of this Board, accordingly, that the action of

the Erie is not even consistent with the legal theory advanced by its counsel.

It was also suggested by the counsel for the company that Title III imposed no duty on officers of carriers to confer with representatives of organizations of employees. This suggestion is contrary to the plain meaning of the requirement of Section 301 that all available and reasonable means and efforts must be adopted and exerted to avoid interruptions to operation growing out of any dispute between carriers and their employees. All such disputes are to be considered and if possible decided in conference between representatives designated and authorized so to confer by the carriers and employees directly interested in the dispute. The evidence shows that the representatives of the employees directly interested so designated and authorized were the designated officers of the complaining organizations. It was clearly the legal duty of the carrier's designated officers to confer with such designated officials of these organizations. This duty was admitted by the general manager of the carrier, but as to the complaining organizations it was not performed.

It was the position of the general manager that the financial necessities of the property compelled the action taken. The evidence of necessity offered consisted of the statement that the estimated expense for labor and material for December exceeded the estimated income for that month by 1 per cent and for the month of January by 7 per cent.

This is not a proceeding to determine what wages are now just and reasonable as to this carrier for the classes of employees concerned herein. It is to determine whether or not there has been a violation by this carrier of Decision No. 2 of this Board.

When the Erie Railroad Company shall have rescinded the orders set out above and shall have paid the wages determined by Decision No. 2 to be just and reasonable, to such of its employees as have not agreed to receive other rates of wages and when also it shall be made to appear that the officers of this carrier have had or sought a conference with the authorized and designated representatives of the employees directly interested and when, if it has not been reasonably possible to decide the disputes in conference, the dispute shall have been referred to this Board by the parties thereto or by either of them, this Board will hear and determine such dispute and decide what wages are now just and reasonable.

This Board cannot consider in this proceeding what wages are now just and reasonable for the employees concerned herein.

The management of the Erie, in reducing wages and in altering working conditions without seeking conference with the representatives of the employees interested, in the opinion of this Board, has acted in conflict with Section 301 of the Act and in conflict with Order No. 1 quoted above. Therefore, this Board may not, consistently with Title III of the Act and with the said order, determine just and reasonable wages in this dispute.

The actual decision of the Board was rendered as follows:

It is the judgment and decision of this Board that the management of the Erie Railroad Company has violated Decision No. 2 in the following respects:

(1) By deducting the January 31st earnings from the January earnings of all monthly rated employees not consenting to such deductions.

(2) By deducting four-twenty-eighths of the February earnings of all monthly rated employees not consenting to such deduction.

(3) By deducting January 31st earnings from the January earnings of such daily and hourly rated employees classified prior to wage awards as monthly rated employees who have not consented to such deduction.

(4) By deducting four-twenty-eighths of the February earnings of the employees set out in (3) above who have not consented to such deductions.

(5) By arbitrarily reducing the wages of trackmen to 30 cents per hour and to other hourly rates contrary to Section 6, Article III of Decision No. 2.

(6) By arbitrarily requiring train dispatchers to work seven days per week for wages determined by this Board in Decision No. 2 to be just and reasonable for six days' work per week, contrary to Article V of Decision No. 2.

This decision is not to be construed as a finding that the carrier has not violated Decision No. 2 in other respects.

Atlanta, Birmingham & Atlantic Employees Strike

Employees of the Atlanta, Birmingham & Atlantic, the first carrier to come before the Board to justify a reduction in wages on March 5, went on the first "authorized" strike since the Board was created. About 1,500 men walked out and traffic on the road is at a standstill. B. L. Bugg, president and receiver of the road, has announced that new men will be employed and operation resumed as soon as possible.

This development came after a series of rapid events commencing with the carrier's announcement of a wage reduction effective on February 1. The progress of these developments was recited in the *Railway Age* of February 4 (page 319), of February 11 (page 367), of February 18 (page 412), of February 25 (page 454), and of March 4 (page 520). After appointing Mr. Bugg receiver of the road, Judge S. H. Sibley of the United States District Court of Atlanta, Ga., issued an order putting into effect the wage reductions which Mr. Bugg had previously asked the Labor Board to authorize. It is against this ruling that the men are striking.

Heads of railroad unions in Chicago declare that the strike has been called to enforce compliance on the part of the carrier with the provisions of the Transportation Act. Their position is that the wage cut is in violation of the order of the Labor Board that no reduction be made pending further conferences between the line and its employees.

Members of the Labor Board have unofficially taken the ground that an "extremely delicate" situation has arisen out of the action of the carrier in cutting wages under the order of Judge Sibley. The present issue therefore is whether or not a federal court can override a decision of the tribunal established by the Transportation Act. Some of the union chiefs hold that nothing short of a decision from the United States Supreme Court will make clear the relation of the Board to the federal courts.

March 26 has been set by Judge Sibley as the date upon which hearings on the revised wage scales will be held. The Labor Board has taken no further action.

Missouri & North Arkansas Strike Continues

A situation somewhat similar has already arisen on the Missouri & North Arkansas, where the employees have been on strike for over a week. The latest returns from Harrison, Ark., the headquarters of the road, indicate that with the return of some of the strikers, together with the employment of new men, normal service is gradually being resumed. C. P. Phelan, general manager of the road, has announced "that no unions will be recognized hereafter and that Missouri & North Arkansas will be operated from now on as an 'open road.'"

The development of this controversy was described in the *Railway Age* of February 25 (page 454), and of March 4 (page 520). These three cases are viewed by many as means whereby the prerogatives and power of the Labor Board, and the intent of the labor provisions of the Transportation Act may be definitely settled.

Individual Carriers Act to Reduce

Wages of Unskilled Labor

Acting in accordance with the suggestions made by the Labor Committee of the Association of Railway Executives recently several of the carriers have requested representatives of their unskilled labor to participate in conferences at which the justness and reasonableness of proposed reductions in their basic wages are to be discussed. This course is in conformity with the provisions of the Transportation Act. It is not probable that agreements will be reached at these conferences and they will accordingly be referred to the Labor Board for settlement. Among the roads which have already requested conferences with their unskilled labor are the New York Central, the Pennsylvania, the Delaware, Lackawanna & Western, the New York, New Haven & Hartford, the Boston & Albany, the Boston & Maine, the Michigan Central, the Cleveland, Cincinnati, Chicago & St. Louis, the Northern Pacific, and the Missouri Pacific.

Executives Abolish Labor Committee

At a meeting of the Association of Railway Executives held at New York on March 4 the labor committee, of which

General W. W. Atterbury is chairman, was abolished, the Association asserting that the committee had virtually completed its work and that its further maintenance was a constant invitation to seek a uniform settlement of labor matters which ought to be settled between each railroad and its own employees. The Association also decided to stand clear of national boards of adjustment, declaring itself in favor of decentralization of labor relations.

Following the meeting, Thomas DeWitt Cuyler, chairman of the Association, issued a statement which said:

At its meeting today the Association determined to abolish its labor committee. This action was taken on the recommendation of the committee itself. The committee has now substantially performed its work and its further maintenance is a constant invitation to seek additional and uniform settlement of labor matters which ought to be settled between each carrier and its own employees. Many of these settlements should differ on different railroads and in different parts of the country.

The railroads never have desired national and uniform action on labor matters. But on the termination of federal control they were faced with certain arrangements which had been applied on each and every railroad without variation.

In connection with national boards of adjustment, the national agreements now before the United States Railroad Labor Board, and the wages of unskilled labor, the railroads have been moved by one fundamental policy, namely: the endeavor to restore to the individual managements the opportunity of dealing directly with their own employees and of having a reasonable voice in determining the conditions under which they fulfill their individual responsibilities to the public for efficient and economic management.

Since the whole effort of the railroads' labor matters has been directed toward a reasonable decentralization, with its opportunities for variation in close relation to differing conditions in different parts of the country, the decentralization of the handling of labor problems would seem now to be warranted, and is taken as an evidence of good faith behind the fundamental policy which the railroads have been pursuing.

Jewel Asks Board to Subpoena Labor Committee

B. M. Jewell, president of the Railway Employees Department of the American Federation of Labor, on March 5 asked the Labor Board to subpoena the members of the Association's labor committee, which was abolished, to appear as witnesses when he resumed his reply to the presentation made on behalf of the carriers in the national agreements controversy. The request was filed by Mr. Jewell as an answer to the action of the Association in abolishing the committee.

Several days previous Mr. Jewell filed a letter with the Board charging that the railway executives are in a state of dissension over the question of abrogating national working agreements. He urged that before proceeding further with the cases now pending the Board should rule on the request of the unions for a national conference with the railway managements over the agreements.

The letter charged that a year ago a majority of the railroad executives were in full accord with the union leaders on the question of establishing bipartisan boards of adjustment and declared that Gen. W. W. Atterbury as a "minority of one had ridden roughshod" over the other executives.

"He prepared a minority report," the letter states, "and presumably because of the support which he was able to secure from the financiers who dominate the transportation industry, was able to thwart the will of the other executives, prevent the establishment of the national boards of adjustment, and refuse any conferences on national agreements."

Pennsylvania Proposes Blanket Reductions

The Pennsylvania Railroad has announced its intention to reduce wages not only of unskilled labor but of all employees and officers as well. An announcement issued Wednesday by the Board of Directors points to the necessity of reducing expenses and says, "a foundation for the restoration of normal business cannot be laid until there has been a frank recognition of the real situation and a readjustment of wages

to meet the altered conditions." The announcement read as follows:

In view of the changed economic conditions it is a manifest obligation to the public generally, and especially to shippers, passengers, investors and stockholders, that railroad expenses be reduced. The management of the Pennsylvania Railroad has already made a reduction of over 70,000 men in its personnel, seriously curtailing maintenance of roadway and equipment, consolidated divisional organization and has stopped all expenditures on new work.

Even with such economies as have already been enforced, it takes almost the whole of current earnings merely to pay current operating expenses. It is evident that the requirements of the Transportation Act that railroads shall be administered in an efficient and economical manner cannot be satisfied without still further reductions in expenses. In February, 70 per cent of all Pennsylvania System operating earnings were absorbed by charges for labor against a normal charge for labor of less than 50 per cent of earnings.

A foundation for the restoration of normal business cannot be laid until there has been a frank recognition of the real situation and a readjustment of wages to meet the altered conditions. The more promptly an adjustment to the inexorable facts is made, the more promptly can those who are now idle be re-employed and a basis established for renewed prosperity. In making a readjustment of salaries and wages, it is but fair and proper that the burden should be borne by all officers as well as employees.

It is accordingly resolved that the executive officers of the Pennsylvania Railroad Company are directed to give as promptly as possible proper notice that it is the intention of this company to reduce the salaries and wages of officers and employees to accord with economic conditions.

In readjusting salaries and wages, the management shall have due regard among other relevant circumstances, to

1. The scale of wages paid for similar kinds of work in other industries.

2. The relation between wages and the cost of living.

3. The hazards of employment.

4. The degree of responsibility.

5. The training and skill required.

6. The character and regularity of employment, and

7. Inequalities of increases in wages or of treatment, the result of previous wage orders or adjustments, certain of which items are variable, differing materially as between various localities over so large an area as that covered by the Pennsylvania System. This differentiation shall be recognized in all readjustments.

Such reductions as are made in salaries and wages shall bear an equitable relationship to the increases in pay made since January 1, 1918. The equitable differentials which should apply between various classes of employees shall be maintained or restored.

All procedure in effecting such readjustments of salaries and wages shall be taken in an orderly manner and in strict accord with the Transportation Act.

National Agreements Hearings Continue

The presentation of rebuttal statements on behalf of the clerks, train dispatchers, signalmen and maintenance of way workers continued during the past week. The remarks of the representatives of the United Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station Employees were outlined in the *Railway Age* of March 4, (page 519). E. H. Fitzgerald, grand president of that organization, was followed on the stand by J. G. Luhrsen, president of the American Train Dispatchers Association, who opened his presentation with the charge that the following roads have violated the "existing" agreement with the American Train Dispatchers Association: the Atlanta, Birmingham & Atlantic, the Atchison, Topeka & Santa Fe, the Atlantic Coast Line, the Boston & Maine, the Bessemer & Lake Erie, the Buffalo, Rochester & Pittsburgh, the Baltimore & Ohio, the Chicago & North Western, the Central Vermont, the Chicago, Rock Island & Pacific, the Chicago & Alton, the Central of Georgia, the Chicago Great Western, the Chicago, St. Paul, Minneapolis & Omaha, the Chesapeake & Ohio, the Chicago, Terre Haute & Southeastern, the Chicago, Burlington & Quincy, the Central Railroad of New Jersey, the Denver & Rio Grande, the Detroit, Toledo & Ironton, the Davenport, Rock Island & Northwestern, the Delaware, Lackawanna & Western, the Detroit & Mackinac,

the Erie, the El Paso & Southwestern, the Fort Dodge, Des Moines & Southern, the Grand Trunk, the Georgia & Florida, the Gulf, Colorado & Santa Fe, the Great Northern, the International & Great Northern, the Illinois Central, the Joplin & Pittsburg, the Kansas City Southern, the Long Island, the Lehigh Valley, the Louisville & Nashville, the Los Angeles & Salt Lake, the Missouri, Kansas & Texas, the Missouri, Kansas & Texas of Texas, the Minneapolis, St. Paul & Sault Ste. Marie, the Michigan Central, the Missouri & North Arkansas, the Mississippi Central, the Mobile & Ohio, the Missouri Pacific, the Maine Central, the New York Central, the Northern Pacific, the Nevada Northern, the Oregon Short Line, the Pennsylvania, the Pere Marquette, the Philadelphia & Reading, the Pacific Coast, the Quincy, Omaha & Kansas City, the Southern, the Southern Pacific, the St. Louis Southwestern, the St. Louis-San Francisco, the Spokane International, the Spokane, Portland & Seattle, the Toledo, St. Louis & Western, the Texas & Pacific, the Tidewater Southern, the Utah, the Union Pacific, the Wabash, the Western Pacific and the Western Maryland.

Mr. Luhrsen later supplemented these charges with specific instances in which these individual roads are alleged to have violated various rules of the "existing" agreement.

To a large extent the testimony offered by the organizations so far has been an attempt to refute the statement made by Mr. Whiter to the effect that economical and efficient operation cannot be obtained as long as the national agreements are continued in effect. Mr. Luhrsen voiced the employees' stand in saying, "I charge that the greatest single factor today making for the dissatisfaction of employees is inequality of treatment in the matter of both wages and working conditions by employers. With the elimination of the greatest source of discontent and dissatisfaction you will have gone far toward the securing of employees who will labor in harmonious co-operation for the common good of their employers, and thus have increased the efficiency of the carriers."

That the carriers have taken advantage of the absence of rules and regulations governing the working conditions of train dispatchers to deprive them of the agreed return for their labor, was charged by Mr. Luhrsen in his presentation to the Board.

In support of this charge he cited numerous instances where it is alleged train dispatchers have been deprived of their full pay as interpreted by the employees.

In summarizing his presentation on March 7, Mr. Luhrsen said:

"We have shown that train dispatchers have suffered the disadvantage attaching to both officers and employees without enjoying the advantages of either class. We have demonstrated by actual illustration the injustice that has resulted and is resulting by reason of the lack of rules and regulations at issue before this Board. In clear and unmistakable language we have shown the necessity for, and beneficial effect of, the establishment of these fundamental principles governing the working conditions of train dispatchers. We have pointed out in minute detail the chaos, dissatisfaction, discontent and general inefficiency that will result by failure to establish or maintain these fundamental principles in some concrete form that will permit of their enforcement. We have submitted argument and evidence to refute the theory advanced by the carriers that the establishment of these fundamental principles will in any manner destroy confidential relations between train dispatchers and their superior officers and have uncovered the motives of the carriers in objecting to the establishment of the rules and regulations we have presented here. The distinction of the carriers, despite their repeated statements to the contrary, to negotiate rules and regulations governing the working conditions of dispatchers on the individual properties have been clearly demonstrated.

"We have waited patiently for the carriers to offer any reasonable or sound objection to the establishment of these rules and regulations and have so amended and modified our original presentation as to eliminate those portions to which merited objection was raised by the carriers. The carriers have signally failed to show wherein any single rule is either unfair, impracticable or un-

reasonable and we stand ready and willing either at this late date to so amend or modify our proposed regulations as to eliminate any rule which upon analysis proves unfair or impracticable."

The representatives of the signalmen and maintenance of way workers followed Mr. Luhrs on the stand. Ab-

stracts of the testimony presented by these organizations will be included in next week's *Railway Age*.

On account of the time consumed in these rebuttal statements, the date of the reappearance of Mr. Jewell before the Board has been postponed until March 14.

What Can Be Done to Reduce Freight Claims

Loss and Damage Payments Becoming Increasingly Larger
—Steps Must Be Taken to Reduce Them

By W. P. Holabird

Inspector Freight Claim Dept., Erie Railroad, Huntington, Ind.

THE FREIGHT LOSS and damage claim payments made by the carriers have been increasingly large during the past two or three years. In a measure this increase has been due to the higher market value of the freight transported. Consequently when reductions in market values occur, the carriers will possibly be able to show some reduction in loss and damage disbursements. However that may be, freight claims are much higher than they should be and can be attributed to one or another of 11 general causes, namely, losses from stations, pilferage, careless sealing of cars, errors of employees, rough handling of cars, mishandled waybills, careless inspection of equipment, failure to safeguard perishable freight, neglect in reporting stray shipments, carelessness in handling refrigerator cars, and incomplete bills of lading.

Losses from stations frequently occur when a shipment is unloaded at destination and one or more pieces in the shipment are found to be damaged and are sent to the cooperage shop for reconditioning. These articles are often delayed at the shop and the balance of the shipment is delivered with too brief an explanation of the cause of the delay. The tally, as well as the delivery portion of the freight bill, should contain enough information to enable the delivery clerk to know the exact location of the freight that he would otherwise check short.

Should it develop that a shipment is complete when it is checked out of a car but is short when delivered, the clerk should be notified immediately. The police department should also be notified so as to enable its representative to investigate at once.

All freight house labor, especially at the larger stations, should be required to pass through one gateway or door in going to and from work. Police department representatives should always be present at these times to see that employees do not carry away company property. It is impossible to formulate any special measures which the police department should follow in the discharge of its general duties, as circumstances alter cases in this line of work. But from a freight claim standpoint, there are two very important preventive measures which should be employed. One is a complete and accurate seal record made at all stations. The other is a system for sending to the police department promptly a copy of all damage and short reports when the circumstances indicate pilfering.

Side doors of merchandise cars (except peddler cars) should be secured by a small block of wood at the rear of the door about two feet below the roof of the car. End doors should be cleated on the inside. Cars of merchandise should be assembled in terminal yards and if delay can be avoided these cars should be put into one train. The police department should appoint a representative to ride on these trains periodically over the entire division.

It is advisable to make frequent checks of seal records. This check should be made by obtaining billings from yard officers in terminal yards, not only to find the contents of the cars, but also to determine the car numbers and the junction points where the cars reached the carrier's rails. A complete record of seals should be made at this time. Finally a visit ought to be made to the different junction points to verify the seal record taken by the junction agent in order to discover whether he is properly recording the full reading of the seals.

Waybills Frequently Mishandled

A loading system should be in effect at all merchandise transfers and large stations which will verify the proper loading of each shipment. Such a system falls short, however, unless it is followed by a system of invoicing and mailing of waybills on freight shipped in less than carload lots. It should be made known that waybills are being properly mailed to points where the cars are listed and that there is a waybill for each piece of freight in the car. This refers to all merchandise cars (with the exception of way cars) where the waybills accompany the cars. If freight is shipped to the wrong destination and is buried in the car in such a manner that it cannot be removed at the loading point, the waybill should by all means accompany the shipment to avoid separation of the shipment from the waybill when making its return journey. It is safe to say that 75 per cent of the "over freight" on all railroads is due to the mishandling of waybills.

To prevent freight claims resulting from defective cars, a low grade of equipment should be used for the loading of hides, oil and similar commodities to save cars in good condition for high class merchandise. These low grade cars should be marked, not by a tag or chalk mark, but by a stenciled wood block. Car inspectors should be instructed to assume responsibility for the inspection of all equipment placed for loading, and should keep a record of all cars inspected, showing whether they are fit for loading and if they are, for what class of freight.

Carload perishable freight which is transferred on account of mechanical defects should be placed promptly by yard crews, and the transfer started immediately. In warm weather the car to which the freight is to be transferred should be sufficiently cooled so that the lading will not be injured when the transfer has been completed.

Stray Shipments Must Be Reported

One of the greatest contributors to shortages under loading seals is the failure of junction agents to issue over reports covering stray shipments which are moving to connecting lines. When claims for shortage of entire packages are filed covering shipments destined to foreign lines, there is no

way to locate the route traveled by the shipment if no over reports have been issued.

This difficulty might be overcome by having the agent issuing the stray waybill make the necessary over report. In any event, these shipments should not be delivered without complete proof of ownership. If this is to be secured from consignees by a personal call or a letter, stray waybills should be carefully checked against each shipment to ascertain order numbers, requisition numbers, the name of the shipper and any other information shown on the shipments. They should then be sent to the consignee or shipper with some information that will be of benefit to him in securing the information desired.

A standard form of ice plug should be adopted on all refrigerator cars. To keep the dispatchers well posted, all train temperature records should be taken at least every four hours. It might be well for dispatchers to send messages to conductors in charge of such trains reminding them when the temperature is at the freezing point, so that they can close all ventilators, except on those cars which are billed to travel otherwise. Standard thermometers should be placed at all water stations and important stations where it is the custom of conductors to look over their trains. This will enable the conductors to keep proper temperature records should it be necessary for them to operate the ventilators while the cars are in their charge.

Periodical checks should be made at junction points and ice houses and also on trains carrying cars under ventilation, to see that the crews are operating the vents properly. This check should be made especially during changeable weather conditions.

Thorough Organization Necessary

The question naturally arises as to how the carriers can accomplish all the preventive measures referred to in this article. Much can be done if every railroad employs a freight claim representative on each division, reporting to the freight claim agent. These men should have station and warehouse experience and should co-operate closely with officers and department heads.

Regular monthly claim prevention committee meetings should be held on all divisions, attended by the heads of all the departments, with the superintendent presiding and the freight claim department representative acting as secretary. All business brought up at these meetings should be carried on the minutes until it has been disposed of or corrected. In addition to this, a general committee should be organized consisting of officers having jurisdiction over two or more divisions, to handle all matters that cannot be taken care of by the divisional committees.

To prevent claims, we must prevent the causes which lead to claims.

"The Spirit of Safety First"*

By Charles E. Norman

Switchman

SAFETY FIRST should be the uppermost thought of employees at all times. It is our duty to use safe methods of doing our work so as to avoid accident and keep our casualty lists down. Mistakes will sometimes be made which cause an accident. Mistakes can be remedied, but the loss of life or limb to a fellow employee and the loss by damage to property cannot be replaced. So let us study the cause, discuss it with fellow employees, get in harmony with one another and try to make the Safety First spirit dominate our every act.

Many accidents are the result of some employees taking a chance. In my judgment this is one of the greatest debits against Safety First. Chance has no place in railroad work. The man who takes a chance will get in bad sooner or later.

If an accident is caused by a defect in track or equipment, report the facts at once to the proper officer, so that it and similar defects may be corrected at the earliest moment. If caused through negligence, free discussion will cause other employees to be on the alert.

Many personal casualties are the result of bad practices which should be avoided. These are the ones we are trying to correct. You are all familiar with them but I want to mention one or two in particular; I refer to employees not familiar with the movement of engines and train trying to hit the footboard of a fast approaching engine or trying to grab the side ladder or steps of fast moving train and giving us a shock that is to say the least unpleasant. I am sure the men who belong on the footboard do not encourage it, but we should go farther and warn inexperienced men not to take these chances. We footboard men already on the engine should also give the fellow employee about to get on the footboard plenty of room to land safely.

Another point I wish to emphasize is a strict compliance with the rules and regulations of the company. If we study the rules and all understand them alike we lessen the danger of a misunderstanding and possible accident.

After a day's work without an accident or casualty we go home in a happy frame of mind and it reflects on the family and all about us—it's contagious. On the other hand, after an accident we go home out of sorts and if we are responsible and it is serious and we get crippled or lose our job, prosperity stops right there and in place of happiness there is gloom and despondency. Therefore, if for no other reason, we owe it to our families to keep the Safety First spirit alive and it ought to have first place on our seniority list.

We have been hearing a great many comments on Safety First—some good and some bad—but I am glad to say the good is in the majority. Let us hope it won't be long until they are all good. The knocker knows right down in his heart that he is wrong. He knows he would not last long on a railroad if he followed unsafe methods. So let us meet the issue square-faced. Don't beat around the bush with it. Get right down to honest, fair-minded safety work. It means so much to all of us and those dependent on us.

I often wonder how many of our terminal employees read a new time table. I try to read all of them and yet I found something in the last one I did not know or had overlooked. It's a good reminder on Safety First, so don't pass it up idly—read it and digest it with the other rules and regulations.

Finally, let me say that Safety First goes beyond the conservation of life and limb—it brings out efficiency, economy and co-operation. What more can officer or employee expect? Let us all make it our signal board and always try to have a clear board.



American Red Cross First Aid Train at Krasnoyarsk, Siberia

*Paper presented at the Chicago Terminal "Safety First" Meeting of the Chicago & Alton, on February 4, 1921.

The Cost of Reproduction New of Steel Freight Cars

Method Developed by Presidents' Conference Committee Permits
Ascertainment on Basis of Weight

THE EQUIPMENT COMMITTEE of the Presidents' Conference Committee on Federal Valuation has recently issued its studies on the Method of Determining the Cost of Reproduction New of All-Steel Freight Cars*. The report deals with gondola, hopper, coke and tank cars but not with box cars. The interesting feature is that the committee has worked out a method whereby a price is figured based on the weight of a so-called base car and to which price are added certain net figures to cover the cost of the specialties. This is an adaptation of the method used for determining the cost of locomotives, which method was described in the *Railway Age* of September 3, 1920, in an article entitled "The Cost of Locomotives for Valuation Purposes."

The present report was worked up in co-operation with two of the leading car building firms. These two firms were requested to furnish information as to all-steel freight cars of the classes noted as follows: (1) Description of the so-called base car; (2) list of the specialties; (3) light weight

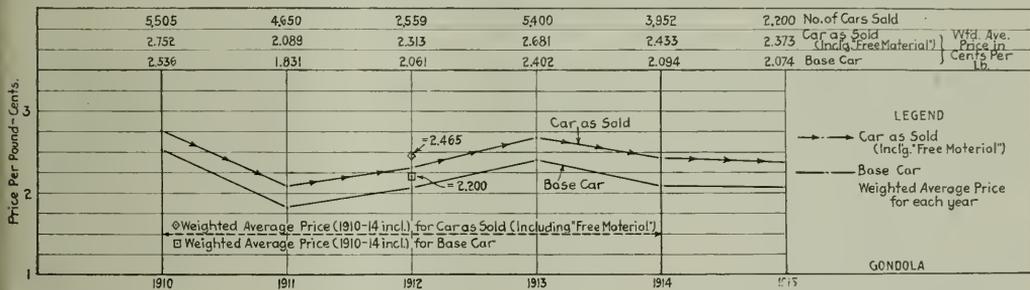
The sub-committee having the work in hand was thus furnished with data covering sales of 84,158 all-steel freight cars of a total light weight of 3,552,118,237 lb.

The Base Car

The term "base car" as worked out was meant to cover a car of simple design selected so as to reduce the data to a common basis.

The "specialties" are those parts not included in the base car, or parts similar to parts on the base car but of different construction, weight or cost. It is noted in the report that "as further explanation a 'specialty' item might properly be called an 'accessory' similar to the term commonly used in the automobile business."

Several pages of the report are devoted to a list of the "net prices" of the specialties and the list in question will be found below. The net price of a specialty is a figure obtained by deducting from the excess price of the specialty its excess weight multiplied by 2.5 cents, the average price



Weighted Averages for the All-Steel Gondola Car

of each car sold 1910 to 1915, inclusive; (4) date of contract for each sale of 100 cars or more from 1910 to 1915, inclusive; (5) price per pound of the base car for each sale of 100 cars or more from 1910 to 1915, inclusive.

This information was asked for each sale of all-steel cars in the period mentioned 1910 to 1915 with the following exceptions: (a) All cars sold to foreign countries, except to Mexican and Canadian railroads operating lines in the United States; (b) all cars sold to industries, except those used in interstate traffic, and (c) all sales less than 100 cars.

*This report was prepared by a sub-committee, consisting of:
H. E. Hale (chairman), engineer, Eastern group, Presidents' Conference Committee.
K. C. Gardner, manager of sales, Central district, Pressed Steel Car Company.
W. R. Maurer, engineer, equipment and machinery, New York, New Haven & Hartford.
T. F. McCormack, general manager's department, Pressed Steel Car Company.
A. W. Neel, assistant engineer, Eastern group, Presidents' Conference Committee.
J. I. Sutherland, chief estimator, Standard Steel Car Company.
A. W. Wille, sales department, Standard Steel Car Company.
W. L. Wilt, special accountant, Pennsylvania Railroad.
and was reviewed and approved for distribution by the equipment committee, consisting of:
J. Howland Gardner (chairman), vice-president, New England Steamship Company.
P. F. Smith, Jr., works manager, Altoona shops, Pennsylvania Railroad.
W. I. Tollerton, general mechanical superintendent, Rock Island lines.
F. O. Walsh, superintendent motive power, Atlanta & West Point Railroad.
W. H. Wilson, assistant vice-president, Northern Pacific Railway.
W. L. Wilt, special accountant, Pennsylvania Railroad.
H. E. Hale (secretary), engineer, Eastern group, Presidents' Conference Committee.

per pound of the base car for 1910 to 1915. (The average "base car price" of 2½ cents applies to the determination of the net price of the specialties only.) The excess weight and price of the specialty as referred to, are the difference in the weight and price of the base car device and the specialty device. This is pointed out possibly more clearly by the following example:

Item	Weight	Price
Specialty—KC 1012 Westinghouse air brake.....	415 lb.	\$35.75
Base Car Part HC 812 Westinghouse air brake.....	305 lb.	23.00
Difference (Increase)	110 lb.	\$12.75
110 lb. multiplied by 2.5 cents.....		2.75
Net price of specialty..... (plus)		\$10.00

In arriving at the allowance for specialties and component parts of cars purchased, the actual average prices were used. The weights were ascertained from manufacturers, railroads and by actual weights determined by car companies.

The term "light weight" of the car refers to the manufacturer's weight as the car left the shop and is the weight upon which the unit prices in the report are based. In estimating the "cost of reproduction new," it is noted that the manufacturer's weight should be used, and where additions and betterments have been added, due allowance should be made for additional weight of the additions and betterments, if any.

On a rebuilt car, or where the character of the car

has been changed, the weight of the rebuilt car as it left the shop where it was rebuilt must be used.

All prices as given in the report are f.o.b. car companies' works. The date of contract of sale was used in the report, in classifying the data by years.

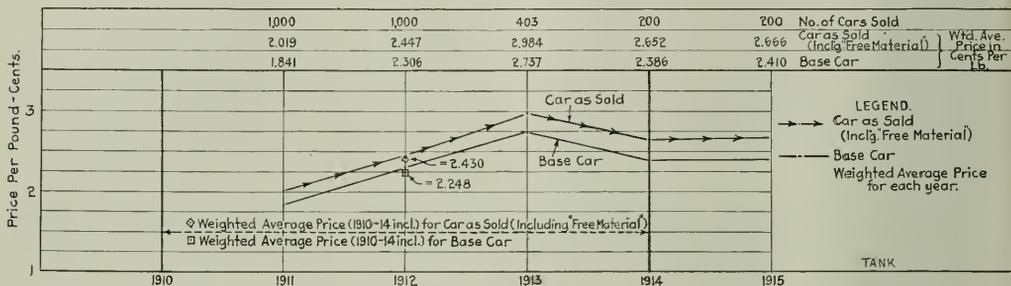
The price per pound of the base car for each sale was obtained by deducting the total net price of all specialties from the total price of the car as sold by the car manufacturer (including "free material") and dividing by the total light weight of the car as it left the shop. Any so-called "free material" that may have been furnished by the carriers was allowed for by setting up an amount equal to that which

The following example illustrates the method:

(1) Price paid the manufacturer, which does not include "free material".....	\$864.00
(2) Price of "free material" furnished by the carrier.....	76.00
Total.....	\$940.00
Total net price of all specialties.....	60.00
Total price of base car for one sale.....	\$880.00
(4) Light weight of car as it left the shop.....	40,000
(5) Price per pound of base car for one sale, \$880.00, divided by 40,000 lb.....	2.2

Price Per Pound Not Influenced by Car Weight

Diagrams and studies were made for the consideration of the sub-committee and the equipment committee, showing



Weighted Averages for the All-Steel Tank Car

would have been charged by the car manufacturer, if the car manufacturer had furnished this material. (Note: In making up these prices for so-called "free material," no account has been taken of any special discounts that may be given to a particular carrier.)

the trend of prices, which indicated that the price per pound was not influenced by the total weight of the car; therefore, it was decided to give a weighted average price per pound for each year and also for the five-year period 1910 to 1914, inclusive. An average price curve on locomotives for the

LIST OF SPECIALTIES FOR ALL-STEEL FREIGHT CARS

Item No.	Description of Specialty	Years 1910 to 1915, incl. Net prices per car	Price
1	Air Brake (Base car—Westinghouse H.C.—812 or H.D.—812)		
2	Westinghouse K.C.—812 or K.D.—812.....	\$5.00	
3	Westinghouse H.C.—1012 or H.D.—1012.....	5.00	
4	Westinghouse K.C.—1012 or K.D.—1012.....	10.00	
5	New York F—8—C.....	(a) See note	
6	New York F—8—C K triple.....	5.00	
7	New York F—10—C or F—10—D.....	5.00	
8	New York F—10—C K triple.....	10.00	
9	Asles (Base car—all sizes—smooth forged between wheel seats)		
10	Rough turned between wheel seats.....	4.00	
11	Brake Adjuster (Base car—none).....		
12	Acme.....	8.00	
13	Brake Beams (Base car—rolled I-beam or similar section)		
14	Trussed brake beam—all makes.....	5.00	
15	Brake Masts and Hand Brake Ratchets (Base car—ordinary arrangement with malleable brake wheel)		
16	All patented brake shafts and hand brake ratchets, such as Fenible, Ureco, Blackall, H.R. and Perfection.....	3.00	
17	Bolsters—Body (Base car—pressed or structural steel)		
18	Cast steel.....	19.00	
19	Bolsters—Truck (Base car—pressed or structural steel)		
20	Cast steel—all makes.....	20.00	
21	Simplex.....	20.00	
22	Note—(a) Price and weight same as base car device, or extra price offset by extra weight.		
23	Center Plates (Base car—ordinary type)		
24	All roller center plates.....	12.00	
25	Coupler Centering Device (Base car—none)		
26	Any patented coupler centering device.....	6.00	
27	Coupler Operating Device (Base car—ordinary arrangement)		
28	Patented devices, such as Imperial, Carmer, etc.....	3.00	
29	Coupler Yoke (Base car—forged yoke)		
30	Cast steel—all makes.....	5.00	
31	Universal draft attachment with cast steel yoke.....	8.00	
32	Cross Ties (Base car—structural or pressed steel)		
33	Cast steel cross ties on all cars.....	16.00	
34	Draft Springs (Base car—ordinary types of round section)		
35	2 Harvey draft springs—all sizes.....	13.00	
36	4 Harvey draft springs—all sizes.....	26.00	
37	Draft Gears (Base car—tandem 8-in. by 8-in. or 6 1/2-in. by 8-in. made by car builder)		
38	Cardwell friction—all types.....	17.00	
39	Farlow single spring.....	17.00	
40	Farlow heavy twin spring.....	19.00	
41	Farlow-Westinghouse.....	36.00	
42	Farlow sessions—all types.....	30.00	
43	Farlow-Forsythe.....	36.00	
44	Forsythe friction.....	17.00	
45	Gould friction.....	11.00	
46	Gould-Farlow.....	32.00	
47	Miner tandem—all types.....	12.00	
48	Miner twin spring.....	12.00	
49	Miner friction—all types.....	25.00	
50	Murray friction.....	16.00	
51	Sessions friction—all types.....	12.00	
52	Vaugh friction.....	17.00	
53	Westinghouse friction.....	15.00	
54	Draft Gear, Body Bolster, Etc. (Combination) (Base car—structural or pressed steel body bolster, ordinary draft sills and forged yoke)		
55	Commonwealth combination cast steel transom draft gear and body bolster, including coupler extension and draft yoke.....	60.00	
56	Ends, Steel (Patented) (Base car—plain steel, fixed or drop ends)		
57	Any patented steel end on gondolas or hoppers.....	23.00	
58	Journal Boxes (Base car—cast iron—all sizes)		
59	All boxes of any size other than cast iron.....	10.00	
60	Roller Device for Truck (Base car—none)		
61	Barber roller device with 2 or 3 rollers.....	6.00	
62	Side Bearings (Base car—friction type)		
63	Any patented roller side bearing.....	8.00	
64	Side Frames (Base car—arch bar type)		
65	Andrews or other similar type cast steel frames.....	34.00	
66	Bettendorf cast steel frames, including spring planks.....	80.00	
67	Scullin cast steel side frame with divided journal box.....	41.00	
68	Sills, End (Base car—structural or pressed steel)		
69	Cast steel end sills on all cars.....	28.00	
70	Sill Pockets (Base car—none)		
71	Westinghouse railway equipment—malleable iron.....	4.00	
72	Wheels (Base car—33-in. cast iron of any weight)		
73	Rolled steel, 33-in.....	47.00	
74	Cast steel, 33-in.....	124.00	

period 1910 to 1914, inclusive, was requested by Director C. A. Prouty of the Bureau of Valuation and for that reason a similar average for the freight car data was prepared.

In line with the foregoing, diagrams were prepared showing the yearly weighted average price per pound of the base freight car—all steel (also car as sold, including "free material"). The total output of the two car companies was used (excluding certain cars as previously stated) and data was grouped by years according to date of contract of each sale. These diagrams are given in this article and are shown for gondola, hopper, coke and tank cars. Figures for box cars are not shown.

Method of Determining Prices 1916 to 1920

Having thus worked out the method of determining the costs of the car for the period 1910-1914, inclusive, the com-

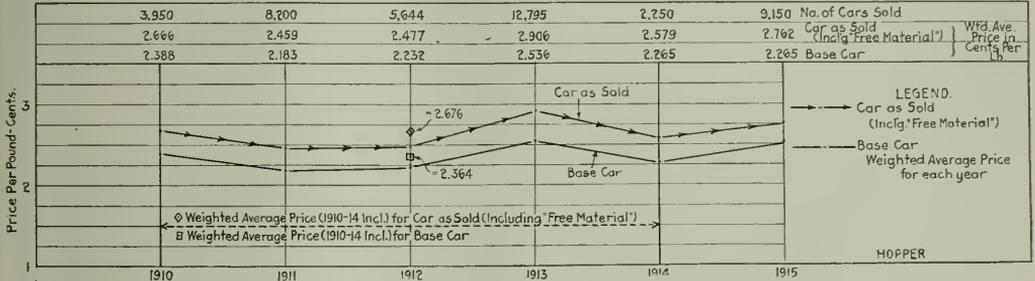
material," for the all-steel freight cars mentioned in above paragraph (a).

From the above information the following data was prepared:

Year	No. of cars sold	Wt. aver. price per pound of car as sold (incl. "free material")	Percent of price, 1910 to 1914, incl.
1910 to 1914, incl.	71,168	2.57 cents	100
1916	21,307	4.01 cents	156
1917	4,750	5.11 cents	199
1918	12,383	6.36 cents	247
1919	Nine	Nine	347
1920 (1st 6 mos.)	2,900	7.70 cents	300

Note: No sales of all-steel freight cars were made by these two companies in 1919.

The period of 1910 to 1914, inclusive, was selected as the base period for determining the range of prices in other years, largely due to the fact that there was available a large amount of information for that period on which to establish

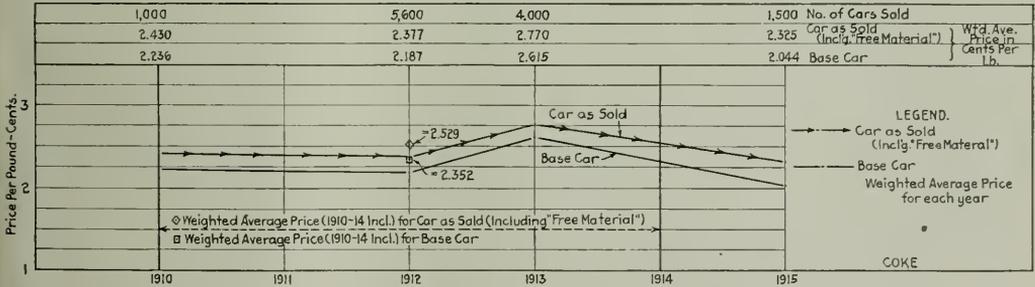


Weighted Averages for the All-Steel Hopper Car

mittee was next called upon to establish a guide for determining the cost of reproduction new for the years following.

On account of war conditions, etc., causing very erratic fluctuations in the prices of cars and more especially prices

a base. Other base periods for index numbers have been used by the government, such as 1890 to 1899, inclusive, or the year 1913, etc., and it should be clearly understood, it is noted in the report, that nothing in the report is intended



Weighted Averages for the All-Steel Coke Car

of specialties pertaining thereto, the equipment committee felt that it was not advisable to attempt to set up a base car price with an accompanying net price of specialties for the years subsequent to 1915. It was therefore decided to present a trend in prices of cars showing the increase in average price for the years 1916 to 1920, inclusive, over the average price of 1910 to 1914, inclusive, taken as base or 100 per cent. For this period, the following data was secured from the two car manufacturers:

(a) Total light weight of all-steel freight cars sold by them for each calendar year for the period 1910 to 1920 (first six months) inclusive, including certain sales as before mentioned.

(b) The total price received including the so-called "free

to suggest that the 1910 to 1914, inclusive, period should be a pricing period for valuation purposes.

A Typical Example

With this information available it becomes a simple matter to determine the cost of reproduction new for any year from 1910 to the first six months of 1920.

(a) All steel gondola car, 100,000 lb. capacity, light weight 42,000 lb. at 2.20 cents (1910 to 1914, inclusive, weighted average price)	5924.00
(b) Coupler centering device, patented	6.00
Coupler operating device, patented	3.00
Bolsters, cast steel truck	20.00
Side frames, patented cast steel truck side frames (Andrew's)	34.00
Draft gear, Miner tandem	12.00
Brake beams, M.C.B. of patented design	5.00
Brake equipment, Westinghouse K.C.—1012	10.00
Side bearings, patented design (Wood's body)	8.00
Roller device, Barber (3 rollers)	6.00

(c) Carrier's cost of inspection during construction, and inspection and testing of materials.....	4.00
(d) Cost of engineering.....	6.00
Total.....	\$1,038.00
(e) For 1918 apply 24.7 per cent.....	2,564.00
(f) Add freight charges, using 1918 tariff rates, from manufacturer's shop to carrier's line or point of distribution, determined by the construction program (unless cars to carrier's lines are, under a proper construction program, delivered under load).....	18.00
(g) Total "cost of reproduction new" of all-steel gondola car in 1918.....	\$2,572.00

gestions made while the transportation act was under consideration, for the creation of a department of transportation with a cabinet officer at its head, which would place the whole subject of transportation within the responsibility of a cabinet officer who would be much more closely in touch with the executive than an independent organization such as the Interstate Commerce Commission.

Reorganization of Department of Commerce to Include Transportation

WASHINGTON, D. C.

HERBERT HOOVER, the new Secretary of the Department of Commerce in President Harding's cabinet, is working out plans for the reorganization and enlargement of the activities of the Department of Commerce, which it is understood will be announced very shortly, which will give his department a considerable degree of jurisdiction over the subject of transportation in all of its phases. Mr. Hoover,

Freight Car Loading

WASHINGTON, D. C.

THE NUMBER OF CARS loaded with revenue freight continues to decline, according to the reports compiled by the Car Service Division of the American Railway Association for the week ended February 26. The total for that week was 658,222, as compared with 695,506 for the previous week, but a large part of the reduction is undoubtedly accounted for by the holiday on Washington's Birthday. For the corresponding week of 1920, the loading was 783,295 and for 1919 it was 666,708. The summary follows:

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO AND FOR WEEK ENDED SATURDAY, FEBRUARY 26, 1921

Districts:	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Merchandise	Miscellaneous	Total revenue freight loaded			Received from connections		
										This year	Corresponding year 1920	Corresponding year 1919	This year 1921	Corresponding year 1920	Corresponding year 1919
Eastern	1921	5,830	2,260	38,352	866	7,953	566	41,522	51,402	148,751	.....	.....	168,781	.....	.....
	1920	5,040	3,343	48,468	3,492	5,122	1,847	26,360	79,515	.....	173,087	160,693	.....	210,430	231,433
Allegheny	1921	2,317	2,783	42,131	4,952	3,106	2,176	30,827	43,870	132,362	.....	.....	87,147	.....	.....
	1920	2,752	2,970	49,790	3,827	4,032	2,535	34,069	66,678	.....	166,643	142,752	.....	123,252	164,027
Poconantas	1921	166	87	13,602	67	1,409	37	2,228	4,851	22,457	.....	.....	11,188	.....	.....
	1920	142	138	19,095	641	1,859	230	141	8,870	31,116	.....	.....	28,208	.....	17,392
Southern	1921	4,569	1,969	21,811	555	13,731	815	36,137	31,980	111,567	.....	.....	57,881	.....	.....
	1920	3,503	2,290	24,274	145	16,694	2,566	20,127	55,394	.....	124,993	103,393	.....	79,615	63,322
Northwestern	1921	11,000	8,425	5,601	1,326	16,120	1,129	23,126	25,417	92,138	.....	.....	41,607	.....	.....
	1920	10,243	8,023	11,511	1,180	19,721	1,715	19,283	39,448	.....	111,124	98,568	.....	58,935	77,014
Central Western	1921	12,570	9,826	16,220	219	2,896	2,035	25,402	27,743	96,911	.....	.....	43,245	.....	.....
	1920	9,044	9,803	23,715	426	5,746	2,392	21,739	45,367	.....	118,222	88,687	.....	67,555	66,238
Southwestern	1921	4,566	1,535	4,509	124	6,042	438	14,442	22,380	54,036	.....	.....	38,494	.....	.....
	1920	4,029	2,409	6,060	198	6,922	556	14,523	23,583	.....	58,110	44,407	.....	51,297	50,841
Total, all roads	1921	41,218	26,885	142,226	8,109	51,257	7,196	173,678	207,653	658,222	.....	.....	448,343	.....	.....
	1920	34,753	28,776	182,913	9,909	60,102	11,831	136,232	318,775	.....	783,295	.....	668,476	.....	.....
	1919	29,445	31,981	138,356	.....	52,866	13,828	.....	400,232	.....	.....	666,708	.....	.....	674,634
Increase compared 1920	1921	6,465	.....	.....	.....	.....	.....	.....	37,446	.....	.....	.....	.....	.....	.....
Decrease compared 1920	1920	.....	1,891	40,687	1,800	8,849	4,635	.....	111,122	125,073	.....	.....	.....	160,133	.....
Increase compared 1919	1921	11,773	.....	3,870	.....	8,109	.....	175,678	.....	.....	.....	.....	.....	.....	.....
Decrease compared 1919	1920	.....	5,096	.....	.....	1,609	6,632	.....	192,579	8,486	.....	.....	.....	226,291	.....

L. C. L. merchandise loading figures for 1921 and 1920 are not comparable as some roads are not able to separate their L. C. L. freight and miscellaneous of 1920. Add merchandise and miscellaneous columns to get a fair comparison.

February 19	1921	36,059	27,892	146,438	8,735	54,417	11,702	187,064	223,199	695,506	772,102	700,913	471,877	579,452	540,123
February 12	1921	32,879	27,456	151,786	9,426	53,882	8,094	184,892	213,612	681,627	786,633	687,128	488,983	610,331	537,109
February 5	1921	36,875	31,277	155,917	10,381	54,066	8,501	182,221	217,759	696,997	762,689	692,614	495,860	599,454	551,312
January 29	1921	39,830	32,368	162,652	9,749	53,677	7,693	179,123	214,844	699,936	803,332	718,297	489,184	588,838	577,709

in announcing his acceptance of a cabinet office, stated that he had stipulated that he should be left free to carry out some of his ideas for reorganizing the department, which included the possibility of taking over some of the functions exercised by other departments, and President Harding has stated that he is in sympathy with the general idea.

Mr. Hoover's plans are understood to contemplate the division of the present Bureau of Foreign and Domestic Commerce into two bureaus, one for foreign commerce and one for domestic commerce, the latter of which it would be his purpose to make an important factor in the development of the whole field of domestic commerce. In this department the plan provides for a sub-bureau of transportation which would co-operate with the Interstate Commerce Commission and the Shipping Board for the purpose of effecting a greater degree of co-ordination between rail and water transportation, including inland water transportation now under the jurisdiction of the War Department, as well as in the government regulation of transportation.

Such a plan as is proposed by Secretary Hoover would to some extent carry out the idea which was behind the sug-

The car surplus for the week ending March 2 declined slightly to 413,450. The week before it was 423,193.

Virginian 120-Ton Cars

AMONG the illustrations accompanying the description of the 120-ton coal cars for the Virginian, published in the issue of February 18, there is a plan and side elevation of the body, which appeared on page 402. Several incorrect dimensions are shown on this drawing. The distance from the center line of the body bolster to the striking plate, should be 7 ft. 3½ in., instead of 6 ft. 11 in. The distance between truck centers should be 36 ft. 1¼ in. and not 36 ft. 10¾ in. Both these dimensions are correctly given in the details of the underframe on page 404. The wheel base of the truck is shown on the drawing of the car body as 8 ft. 8 in., whereas the wheel base of the Buckeye truck used was 8 ft. 6 in., of the Lewis truck 9 ft., and of the Lamont truck, 8 ft. 3 in.

A Reduction of Rates vs. Improved Service

Interesting Railway Income Catechism Used by R. B. A. in
Argument Against Decrease

ISSUE HAS BEEN TAKEN by the Railway Business Association with those who believe that a reduction in railway rates should be made for the purpose of encouraging traffic over the railroads. It believes that while there is a possibility that such a reduction in rates might expedite the resumption of business in 1921 by a few weeks or months, the step would be at a too great risk. "America's contribution to civilization," it says, "is to give American railroads an opportunity to rebuild the system so that they can face with confidence the approaching strain of traffic burden which is to make or break non-government roads in this country." This objection to any proposal to decrease rates is contained in a circular recently distributed to members of the organization. The bulletin is entitled "Making or Breaking the Railroads." The introduction is signed by Alba B. Johnson, president, and one of the features of the bulletin is a Railway Income Catechism prepared by Frank W. Noxon, secretary of the organization:

An abstract of the bulletin follows:

Making or Breaking the Railroads

There is a serious proposal to reduce transportation rates. The aim as set forth is to affect favorably the return of normal traffic movement. Most often this is accompanied by the assumption that there will be a reduction in railway wages and is predicated upon other economies hoped for.

Net Income the Crux

To you it need not be said that any plan of rate reductions will invite headlong national disaster unless considered in the light of its competently estimated effect upon one basic essential—*net railway operating income*. If we ignore *net railway operating income* we may hasten general business resumption by a few weeks or months in 1921, but in doing it we may break transportation down at the next peak of load, bringing an irresistible demand for government seizure.

There is nothing upon which to base an expectation that with operating costs as they now are 100 per cent capacity tonnage would net the railroads 6 per cent income on the present rates, any more than capacity tonnage yielded 6 per cent in September, when the disparity was \$33,000,000, or in October, when the disparity was \$20,000,000—two record months neither of which had been previously exceeded even during the war. Little more could be carried now than was carried in September. The roads have waited for overdue payments on the guaranty from the government. Beginning with September, shortages of income have dictated prudence. Hence the roads have been doing little or no construction. At lower rates, with present carrying capacity, the failure to yield 6 per cent would be still wider. Nor is there certainty or even probability that a reduction of rates would bring 100 per cent capacity tonnage. The depression is due to other and deeper causes. It began, indeed, with a downward curve in merchandise purchases as early as June (some compilers say May 15). Wage reductions are too dubious a possibility to count upon.

Shall Roads Equip Themselves?

Our railroad problem is primarily to make the experiment prescribed by Congress and which is now being conducted by the Interstate Commerce Commission. What tonnage the roads carry now or a few weeks from now is of secondary

importance. The foremost question is whether they shall equip themselves to carry the cargo—vastly greater than all previous demands—which as history repeatedly shows will again overwhelm them almost before we are conscious that unemployment and commercial failures are waning. In any event to project a reduction in rates now, with hearings and consideration consuming nobody knows how long, would not stimulate any business to which rates are of consequence, but put a brake upon it, as does a pending bill to change the customs tariff or as does an unstable price situation.

Continuity of Policy

Our besetting sin in America, as with the peoples of every clime and every age, is to clutch at the immediate and forget the permanent. The problem of administering regulation is to require the railroads to treat the citizens fairly and so to treat the railroads that they will be able to serve the citizens adequately. This balance involves underlying principles which will take a long time to work out. They can only be applied with ultimate success if public policy be continuous and measurably indifferent to momentary shifts in business conditions. The public should regard the Interstate Commerce Commission as an engineer, who is employed for a specific function, who is hungry for information, but who is likely to know a great deal more about the actual needs and the sufficiency of given means for attaining stated ends in this field than all the rest of the nation individually or collectively.

It may be that a wiser organization of federal regulatory agencies could have been made. The Railway Business Association was among those who urged Congress to make a different arrangement. But this is the arrangement Congress did make. We must take somebody's technical judgment. The thing now is to get in behind the commission for a full trial of what Congress has authorized it to undertake. The integrity of the commission, a national boast before the Act was signed, was never more signally exemplified than when some of those members who had not favored the aims of the Act promptly announced their determination to execute it with zeal and joined in electing as transition chairman out of his rotary turn the Commissioner who had been the spokesman for the commission before committees of Congress. That these pledges have been scrupulously kept is the impression of an overwhelming majority of shippers' representatives whose occupation involves contact with the commission's work.

Transfer of Initiative

What is that work in relation to rates? A very different responsibility from what it was under the old act. One of the most difficult conceptions for writers and others to fix in their minds is that Congress has transferred the initiative in revenue rate adjustments. Congress places this initiative not upon the railroads, where it formerly rested, but squarely upon the commission. Those proposing rate reductions have referred to the roads as having carried on a campaign for advances and gotten all that they asked for. This comment discloses a misunderstanding of the new act which calls for earnest efforts toward its correction. The commission ordered a proceeding. It invited all concerned to participate in hearings, including not only the railroads but the shippers. It decided the valuation basis upon which to compute the net income percentage. It chose as between 5½ per cent

and 6 per cent in favor of 6 per cent as the net income to be aimed at. Finally it directed the carriers to file tariffs accordingly. In other words, the people of the United States, acting through an agency created by their Congress, on their own motion took up the question whether railroad income and railroad rates were adequate in the national interest and required the railroad companies to correct in a prescribed manner such inadequacy as had been found.

The public cannot better provide for its own welfare than by strengthening the hands of its chosen agent and protecting that agent from one of the easiest types of clamor to stimulate and one of the hardest to deal with—clamor for rate reductions without consideration of railroad responsibilities to the public or of railroad income wherewith to discharge those responsibilities.

Stability of Rates Essential

The Commission aims at 6 per cent. It makes transportation rates which it computes will suffice, supplemented by economies, to approximate that income. Not every month. Not every year. To shippers stability of rates is as essential as avoidance of excessive rate levels. The commission could not if it would and would not if it could constantly slide the rate level up and down responsive to temporary business fluctuations. Bonds run for years. The money with which to pay interest upon them is the aggregate of sums earned in all the years of the period. The proceeds of a stock issue (if our railroads shall ever again be able to sell stock) is determined by the conjecture of investigators and their advisers as to the net income which will on the

average through years to come be available for dividends. One of the obligations of the commission is to observe how the rate level acts in times of various tonnage volume. They are only at the vestibule of their experience with the rates which were made effective last August. Imagine a family crowding around the physician every few hours and entreating him to turn from the remedy he has given and try something else before the first has shown what it can do.

Net railway operating income is the indispensable theme for adequate consideration in discussing any proposal for rate reductions. Net railway operating income must in future attract more capital than has been attracted to our railroads in years past or—

First—we shall lose our transportation primacy;

Second—we shall lose our foreign trade opportunity, which is utterly dependent upon our domestic superiority in every process cognate to manufacture, including inland rail transportation;

Third—we shall lose our private ownership of railroads and with it our individual initiative, followed by rapid loss of private control and of individual initiative in other lines of business if not in all;

Fourth—we shall take the swift final step to loss of our representative political institutions.

Is it worth while to expedite the resumption of business in 1921 by a few weeks or months at such risk?

America's contribution to civilization is to give American railroads an opportunity to rebuild the system so that they can face with confidence the approaching strain of traffic burden which is to make or break non-government railroads.

Railway Income Catechism

Q. Are not railway rates too high?

A. Some rates, perhaps. Others are perhaps too low. The Interstate Commerce Commission is constantly correcting such inequities.

Q. But are there not particular rates that impede or stop freight movement?

A. Yes. The rate on news print paper from Maine to Chicago impedes the movement; it prevents it. Wisconsin takes the Chicago market. The rate on shoes from Brockton to Denver will be too high for Brockton to compete with St. Louis in the Denver market. If so the rate stops the movement. Brockton would then have its selling area restricted by a development just as truly economic as was the establishment of shoe factories at St. Louis.

Income the Test

Q. Ought not rates to be made so as to move the business?

A. Yes, if the business ought to move.

Q. What is the test whether a given business ought to move or not?

A. Generally speaking, whether total net railway income can be kept at the required point in case that business is moved at a rate which will move it; in other words (if the rate adds nothing to railway income), whether giving an unduly low rate to one kind of business either will create new and profitable business in related directions sufficient to offset the lost revenue or can be made up by rate increases on existing traffic. More volume of tonnage as such has no value to the railroad or to the general public. The public stake is primarily in having a railroad at all and in keeping it at service pitch. The railroad's stake is in earning enough net income to maintain and improve itself so that service can be satisfactory.

Q. Who is to judge what traffic shall move and what shall not?

A. The Interstate Commerce Commission.

Q. Upon what does the Commission base its judgment?

A. Thirty years' experience and present continuous contact with all kinds and conditions of shippers and railroads.

Too Soon to Judge New Rates

Q. As a matter of fact is not the whole level of rates too high?

A. Nobody knows yet. The Interstate Commerce Commission fixed the present level so short a time ago as August 26, 1920. Their function was and is to find out whether that level will in fact as they believed and hoped yield to each group of railroads as a

whole 6 per cent on the value of the aggregate property. The demonstration has only begun.

Q. But is it not evident already that earnings from the present rates are disappointing?

A. Those who hoped that there might not be a depression in tonnage just yet are disappointed that one came so soon; but everybody knew there would be depressions, and it can hardly be called a disappointment to have a slump in earnings with a slump in traffic.

Income Disappointing, Not Earnings

Q. Was not October, 1920, a great traffic month and was not October railway income disappointing?

A. Precisely—railway income; but not railway earnings. The tonnage produced gross—record gross—but expenses ate it up. Income lacked \$20,000,000 of 6 per cent. Whether traffic moving at present rates will or will not yield 6 per cent will depend upon (1) how often the tonnage reaches capacity of the roads to haul it and how long it continues at capacity, (2) how severe and how protracted are the slumps and, (3) how much decrease can be accomplished in operating expenses.

History Says "Don't Risk It"

Q. Would not a reduction in rates expedite the return of traffic flow in general business and ultimately give the roads the income?

A. That is what the Interstate Commerce Commission thought in the first large-scale rate-advance cases.

In 1910 the Eastern and the Western roads sought advances. These were denied as the Commission believed increase in traffic would afford larger income. The actual result suggests the man who admitted he had a loss on every unit of business he did but said, "Where I make is by doing so much of it." Gross hit a high peak in 1913 at \$3,125,135,798 as compared with the \$2,750,667,435 in 1910, an increase of \$374,468,363. Contrast this with net railway operating income. This in 1910 was \$824,241,201 and in 1913 it was \$829,863,248—a gain of less than \$5,000,000, although the investment in road and equipment had meantime risen by \$1,931,242,689 and the interest on funded debt by \$35,170,704. The great gross tonnage in that heavy year 1913 was a great opportunity to lay something by for a rainy day. It was worse than lost, because the rates had not been raised. The owners of the roads actually had in 1913 many millions fewer dollars available for dividends, improvements out of earnings or surplus against lean years than they had in 1910 with \$374,468,363 more gross

earnings. Traffic later fell off and the roads had neither volume nor rates. The Commission then accepted the verdict of the facts and granted increases.

The average net income in the three years 1915-17 was only 5.2 per cent. Mr. McAdoo raised rates during government control. Volume of traffic was not affected by this one way or the other, because war needs forced on the roads every ton, every passenger they could carry. The people are being taxed now to pay the amount by which peak of load plus, not on reduced rates but on greatly increased rates, fell short of the guaranty—itself an average of three previous years one of which was lean.

September and October, 1920, were record months in gross, exceeding any war month. The facilities were strained to the utmost, shippers co-operating with full loading and prompt car handling. The new rates had gone into effect August 29, yet failed by \$33,000,000 to yield 6 per cent in September and by \$20,000,000 in October.

Doing 110 Per Cent Capacity

Q. Is it true that in any business the highest profit is made on the last 10 per cent, in railroading perhaps the last 5 per cent of volume transacted and do not the railways make the largest income per unit of work done when running full capacity?

A. In any business when the plant is in poor repair, so that heavy use swells maintenance, or when the plant has to be enlarged to take all the business that is offered so that overhead has to be paid on new capital, expenses rise faster than gross and up goes income. Our railways, or many of them, are constantly but a few jumps ahead of dilapidation on the one hand and of saturation on the other. While they are doing the last 10 per cent of present capacity they are meeting increased labor cost inevitable during congestions and pouring money into repairs, yet driving rescuable facilities to an untimely scrap heap, or they are doing 110 per cent or more of present capacity by enlarging the plant; and if they enlarge on any considerable scale they enlarge for the future and are thus once more in the position of any business which is developing its gross up toward that theoretically most profitable 10 per cent.

Road's Own Tonnage

Q. Is there no tonnage they could better be handling than to sidetrack cars and store engines?

A. Yes. Their own. A general merchandise depression should be the signal for vigorous use by the roads of their tracks and rolling stock in the conveyance of material for the manufacture and reconstruction of their own facilities. The Railway Business Association has a Committee on Stability of Railway Purchases, which urges precisely this program, emphasizing that at no other kind of period can building and rebuilding of railroads be done so economically, with so little inconvenience to general traffic and yet with so beneficial an effect upon employment of labor in industry and trade.

Q. Why do not the railroads come into the market?

A. Some of them have come in and are getting bargains. Most of them have not the money and cannot get it. The 5.2 per cent which they realized from 1915 to March, 1920, was not enough as now officially certified. The 5.2 per cent promised them for the six months ended September 1 last, they have not received. The income since September 1 has averaged what would represent an annual rate between 3 per cent and 4 per cent.

Other Factors Brought Depression

Q. Were not freight rates an important factor in bringing on the present depression?

A. Probably they had almost nothing to do with it. The commodities most often mentioned—building materials—were not moving and would not have moved on any conceivable freight rate because capital had been driven from building by causes which are well known. The large factor in the present depression is that consumers stopped buying. The beginning of that strike was weeks before the August rates went into effect. The rate increases applied previously to August, except in a few cases were an insignificant part of the rise in commodity prices. Prices generally, regardless of freight rates, dropped as soon as buying fell off; and the August rate increase came without in the least retarding the price decline.

Economies Essential

Q. Ought not railway wages to come down?

A. The Railway Business Association does not discuss labor controversies. We can, however, see no wage reduction in such immediate prospect that it can be counted upon to offset rate reductions in 1921.

Q. Will not other economies provide net income?

A. It is to be hoped they will. President Willard, chairman of a committee for the railway executives to lay conditions before the Interstate Commerce Commission when the present rate level

was being adopted, said that the roads did not rely upon these advances for the whole increase in net income, but would do their utmost to supplement the revenue by economies. The object in applying for abolition of the so-called national agreements affecting labor cost was economy.

Major Economies

Q. Do not the railways obstinately neglect to introduce methods which would save millions a year?

A. That is what Louis D. Brandeis said in 1910. He declared that the railways as a whole could save a million dollars a day from shop economies through installation of "scientific management." Later a railroad bulletin announced that through economies sums much larger than that had been actually realized and Mr. Brandeis issued at Boston a statement claiming that his admonition had been heeded and his prediction fulfilled. Inspection of the bulletin itself disclosed that the economies referred to had preceded the admonition and the prediction. The comparison was for a period of years ending before Mr. Brandeis ever took part in a rate case. The economies were preponderantly not shop economies but economies from major capital investments such as those in straightening of curves, elimination of grades, multiplication of tracks, installation of signalling, enlargement of vehicles, with rebuilding of road and bridges to carry heavier trains, and development of terminals. Of the future it has been said by the Committee on Adequate Facilities of the Railway Business Association:

"Heavy investment in additions and betterments, with corresponding adjustment of income through economies or rates or both is the only means of getting ultimately to a lower rate level or even avoiding in the future a chronic condition of indefinitely rising rates."

There is a great group of industries maintaining special facilities and expert staffs, engaged all the while in the quest for inventions or methods which will promote safety, efficiency and economy. This has been the situation for many decades. Under that system American railways have won esteem abroad as the most progressive in the world. The one obstruction at this date to the most vigorous prosecution of progressive experimentation and installation of demonstrated improvements is weakness of railway credit.

Public Wise if Kept Informed

Q. Will not the public resist wage reductions if not accompanied by rate reductions?

A. Experience suggests that this will depend upon the vividness with which the public continues to be reminded of its stake in adequate net railway income. The bracketing of rates with wages implies that there was some year in the past when wages and rates were both correct, so that both having been raised both should now come down. But wages had been rising steadily for many years before any increase in rates was granted. A point that looks large to some writers is that the railroads have exaggerated the perfection of their physical condition before the war. This is an issue of fact which will be determined by agreement between the individual road and the government or by the courts in suits to determine over- or under-maintenance during governmental control. For the present discussion it is enough to remark that the worse anybody can show the condition of the roads to have been before they were taken over, the more must fair observers be convinced that railway income, and hence maintenance, credit and improvements, had suffered in the years preceding.

Ravages Regulatory

Q. Has not the damage to the railroads in the war been exaggerated?

A. It is not the ravages of war which created the need for the present rate level. It is the ravages of the old regulatory act, under which the average net income for the three years 1915-17 was 5.2 per cent on the cost of road and equipment—a rate which Congress in 1920 authorized the Commission to raise to 6 per cent. It is true this increase of income was not made to cover the war period. Congress said the roads needed at least 5.5 per cent and might need 6 per cent. The Commission says 6 per cent. For the 22 months of governmental control the guaranty was only 5.2 per cent. On the other hand the government is under contract to make good any neglect to keep the properties up under government control. If this is done they can ultimately be put in relatively good repair and their problem will be the improvement and enlargement of facilities; the roads will begin, so to speak, where they left off when the President took them, with inadequate facilities but with the Commission endeavoring to give them an increase in their average income from the 5.2 per cent actual just before the war and guaranteed during the war to the 6 per cent of the new act, or to such rate after March 1 next as the Commission then may compute to be essential.

Investigation of the Railroad Situation Proposed

WASHINGTON, D. C.

SENATOR CUMMINS, chairman of the Senate committee on interstate commerce, has announced his intention of introducing in the Senate at the opening of the extra session of Congress a resolution for a general investigation by his committee, or a sub-committee, of the railroad situation under the Transportation Act, with particular reference to the operating expenses of the railroads since their return to private management a year ago. The proposed investigation is intended not only to bring out clearly the facts and the reasons for the enormous increase in railroad operating expenses during the past year, which were \$1,400,000,000 greater than in 1919, but also to consider how a more economical basis of operation may be made possible so as to carry out the declared purpose of the Transportation Act of assuring the railroads a fair return on their valuation, in view of the fact that there is almost unanimous agreement that any further advance in rates no longer presents a feasible solution of the problem. In other words the senator and others with whom he has conferred are anxious to bring out as speedily as possible what may be done to bring down the cost of transportation to a more normal and reasonable basis and believe that such an investigation should precede any attempt to further amend the Transportation Act.

Senator Cummins has in mind a thorough inquiry into the reasonableness of the expenditures, including a comparison of the costs under private and under government operation and going into the question as to whether there has been any reckless and extravagant management of the railroads since March 1, 1920, as has been charged in some quarters, and if so, as to who is responsible. His talks on the subject, however, do not indicate that he has any particular idea of making a "goat" of the railroad managers or that his proposed investigation is of the accusatory type of many Congressional investigations. They indicate rather that he is inspired by a desire to develop the real facts of the situation and the proper remedy before the new Congress gets into a frame of mind for desultory tinkering with the Transportation Act. One or two senators have already proposed to meet the situation by reducing the percentage which the law declares to be a fair return or by repealing the percentage rule of rate-making entirely, ignoring the fact that the present rates, with a low volume of traffic and a high level of expenses, are not producing anything like the expected return.

Senator Cummins has expressed the opinion that unless something is speedily done to improve the present condition the railroads are headed straight for government ownership, which he is not in favor of, but he is counting on a considerable improvement in general business conditions. He proposes to find out whether there is any truth in the charges that have been given much publicity that the railroads have been extravagant while under a government guaranty and while under a law which many people have been fooled into thinking guaranteed them a specific return under any conditions.

The senator is by no means aligned with the labor faction that has been making most of the charges. He understands full well that the railroad managers are in no way to blame for the \$400,000,000 increase in wages from May 1 to the end of the year, nor for the increased cost of coal, and that a large part of the increased operating cost is a direct inheritance from the Railroad Administration because an increase in wages and time and one-half for overtime awarded by Director General Hines in the latter part of 1919 naturally loomed up heavier in the accounts for the full year 1920 than for the few months they were in effect in 1919, and the National Agreements executed by Mr. Hines with the labor

organizations affiliated with the American Federation of Labor cost considerably more money during 1920 than they did in 1919. He doubtless appreciates also that the fact that the railroads had been promised a guaranty payable in the indefinite future, hardly gave them either the incentive or the means for extravagance in the six months from March 1 to September 1, 1920, any more than the fact that the present rates are supposed to net 6 per cent gives them any money to throw away at a time when traffic is so light and expenses are so heavy that most of them are earning no return at all. However, he is by no means convinced that all of the necessary reductions in operating expenses can be expected to be made in the payroll and he has some ideas of his own that railroad methods can be improved in many ways that will reduce costs. In fact, he used the expression "obsolete" in referring to some methods of operation as well as some managers. It is well known that he believes economies would result from a consolidation of the railroads into a small number of systems and he also believes that large savings could be effected by consolidating railroad purchases.

Senator Cummins has consulted several of the members of his committee regarding the proposed investigation and believes there will be sufficient support for his plan. He has also been conferring on the subject of the railroad situation with members of the Interstate Commerce Commission, railroad officers and others for the purpose of gathering facts and ideas. Senator Cummins has been in close touch with President Harding during his recent sojourn in Florida before the inauguration, and it is known that railroad matters were also brought to Mr. Harding's attention there by several prominent railway executives.

The uselessness of investigation by Congressional committees has become proverbial, and is frequently commented upon by members of Congress themselves, but many of the members of the Senate committee on interstate commerce have been almost so steadily engaged on a study of the railroad problem since the beginning of the Newlands investigation in the fall of 1916 that they are learning the language of the subject and many of them have gained a deep insight into the problem. More is to be expected, therefore, from this committee than, for example, from the three senatorial committees that during the past year or so have been investigating the coal industry and have produced nothing in the way of results except a large additional amount of publicity for the fact that the price of coal has been very high and that somebody must have been profiteering.

The hearings conducted by the Newlands committee in 1916 and 1917 constituted a very general investigation of the railroad problem, but because of the intervention of the war and the taking over of the railroads it failed to produce definite results or even a report. The protracted hearings before the Senate and House committees on the federal control bill amounted to almost another general investigation and the exhaustive study made by both committees leading up to the passage of the Transportation Act naturally covered a very wide range, while both committees have had hearings since on several phases of the subject.

The Interstate Commerce Commission, of course, is closely in touch with most phases of the railroad situation at the present time except possibly the details of the labor situation that comes within the province of the Railroad Labor Board, and, aside from its general familiarity, it has been and is making, under the provisions of the Transportation Act, a close analysis of the operating expenses during the six months following the termination of federal control for the purpose of ascertaining the amounts which may be charged for maintenance and of certifying the amount of the guaranty. What the commission has to say, therefore, will undoubtedly constitute an important part of the evidence to be taken by the committee.

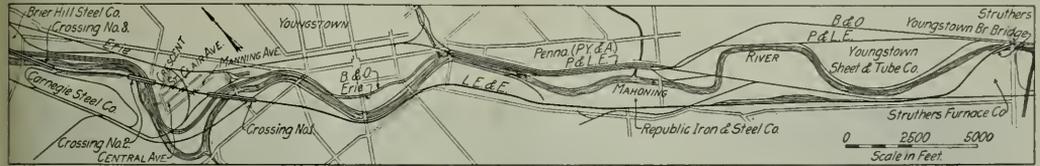
P. & L. E. Conducts an Extended Paint Test

Coatings Supplied by Eleven Manufacturers Subjected to Severe Service for a Period of Six Years

THE PITTSBURGH & LAKE ERIE recently completed an interesting experiment in the painting of steel bridges which had been undertaken to test the relative merits of several brands of paint for given conditions of exposure and to determine the effect of dispensing with the shop painting of structural steel. Conjecture on this latter point was founded on two premises, namely, the difficulty frequently encountered in securing proper workmanship in shop painting, and also in the fact that steel is covered with a mill scale which has a tendency to loosen after a period of expo-

town Branch bridge which was built about the same time as the other structures.

The paint used was supplied by eleven paint manufacturers, each of whom was permitted to select the paint most suitable for the conditions of exposure described by the railway officers. The manufacturers were also invited to specify methods of application which in their opinion would accomplish the best results, but after being afforded an opportunity to examine the railway company's specifications for paint workmanship, they all expressed their willingness to have



The Bridges Are Located in a District Where They Are Subjected to a Variety of Exposures

sure. It was felt that if this scale was afforded an opportunity to flake off before any painting was done, the paint coatings subsequently applied might prove more permanent, particularly as this practice is followed to a considerable extent in England.

An opportunity to work out these ideas in a comprehensive way was afforded about 1913 on the occasion of the building of the Lake Erie & Eastern, a subsidiary of the Pittsburgh &

their paints applied according to the methods adopted by the railroad.

The bridges were fabricated and erected during 1913 and 1914 under specifications eliminating all shop painting except on surfaces concealed in shop assembly and erection and for necessary marking. Exceptions to this occurred in three cases which were all given shop coats according to usual practice. The exigencies of the construction schedule were



1. Badly Deteriorated Coating. 2. An Example of Paint Coat Subjected to Abuse by Pounding and Scratching. 3. Typical Pitted Surface After Brushing and Scraping

Lake Erie serving as a terminal utility in the Youngstown, Ohio, industrial district. Within a distance of two miles near the north end of this line there is practically a mile of railway bridge structures involving seven independent bridges of various designs and conditions of exposure. These include three crossings of the Mahoning river, several railway undercrossings, two overhead highway bridges, one overhead foot bridge and two street subways or undercrossings. These bridges involved both ballasted floor girders of "through" and "deck" types and open floor truss spans of considerable length. In addition to this group of structures, the painting tests also included an open-floor through-girder bridge of the Pittsburgh & Lake Erie at Struthers, known as the Youngs-

such that the bridges were field painted from four months to fourteen months after erection, the erection having been done in from two weeks to seven months after fabrication of the steel. Thus, the steel surfaces were allowed to stand exposed to the elements for a variable time before the two field coats of paint were applied.

The condition of the spans at the time that the field painting was done varied widely. Some were badly rusted and scaled, while on others considerable areas of the mill scale were still intact.

In general, from 80 per cent to 95 per cent of the mill scale was well rusted and was easily removed by scrapers, wire brushes, etc., in the usual manner for cleaning surfaces. The

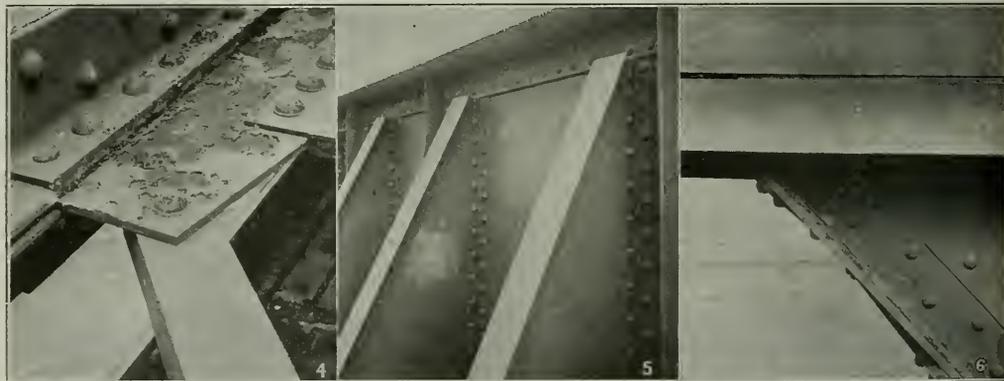
remainder of the mill scale was removed by chipping with hammers; sand blasting was not used.

The painting conformed to the usual methods. It was the intention to give the bridges a third field coat in lieu of the missing shop coat after a sufficient interval to disclose any defects in the earlier coatings which were to be corrected and spot-painted before the third field coat was applied. Unfortunately, the vicissitudes of the war period prevented the execution of this feature of the plan.

Any study of this test must be founded on the thorough understanding of one important fact, namely, that the exposure to which these bridges are subjected is unusually severe. In the first place the atmospheric conditions in Youngstown correspond with those to be encountered in any important center of steel manufacture. Moreover, all or portions of many of the structures are subjected to local exposure of greater severity, foremost of which is the presence underneath, at a number of places, of railway tracks carrying heavy traffic. Another important item is the peculiar condition encountered at the crossings of the Mahoning river. The water in this stream is used repeatedly by the various industries in its passage through the Youngstown

tures which with two exceptions varied from 66 per cent to 89 per cent, the average being 79 per cent. The two exceptions were 37 per cent and 44 per cent, and the cause of this poor showing is not at all apparent. An idea of the wide variation in the conditions may be obtained from an examination of the photographs. In general all horizontal surfaces were in a worse condition than the vertical surfaces. The most common condition where rusting has taken place, is a general roughness of the surface, produced by the breaking of very small blisters, which in general are easily removed with a wire brush.

One or two of the highway overcrossings suffered from what may be termed "malicious mischief," scratching, cutting and hammering, presumably done by children in the neighborhood. In one case the paint was injured by the paste used to stick war posters on the webs of the girders where this paste was smeared on the surface beyond the edge of the paper. The influence of filth accumulation was also noted at the bottom of some of the girders. The painting was all done between July 1, 1914, and Jan. 16, 1915, in which time the thermometer registered as low as 4 degrees below zero. Painting was only done under favorable condi-



4. Severe Scaling of Horizontal Surface. 5. An Example of Well Preserved Paint. 6. Paint in a Generally Fair Condition Subjected to Slight Pitting, with Bad Peeling in Certain Places

district, with the result that it rises to a temperature of as much as 150 deg. F. which, with the manufacturing waste and sewage which it accumulates, gives the water a character entirely different from a normal stream of fresh water. One of the bridges crosses the river almost directly over the wasteway of a dam where the resultant spray is high in impurities.

A study of these structures after six years of service shows such a wide variety of conditions of the painted surfaces that it is difficult to draw more than general conclusions. The officers of the railroad, however, have been enabled to learn something of the relative merits of the paint coatings used. In one place in particular there was a rather marked difference in the results secured with two brands of paint under practically identical conditions.

As regards the other purpose of the test, to determine the advantage, if any, of omitting the shop coat, the conclusion is not so clear because of the wide variation in results. As stated previously, there was a wide variation in the condition of the steel at the time that the field coats were applied and there were also wide variations in exposure. The condition of the paint surfaces determined from a careful inspection and graded according to carefully weighted values for the various attributes of the paint, resulted in the establishment of conditions-per-cent for the coatings of the various struc-

tions, and the general results do not seem to have been influenced in any way by the time of year the paint was applied.

Owing to the widely different exposure conditions, it is very difficult to reach a thoroughly satisfactory conclusion. The cost of cleaning the surfaces in the field before applying the paint, was considerably greater than the cost of applying the shop coat, and the results obtained are apparently in favor of the shop coat, but it must be borne in mind that these structures have three coats as against two coats of the all-field-painted structures, and also that it was not the intention to expect the two coats to last for the six year period.

An important point to be considered in putting this idea into use is the greater burden of responsibility placed on the field painting forces in thorough cleaning before the painting is done. Structures allowed to stand without paint protection for a considerable period are obviously covered with considerable coatings of rust and scale and unless the surfaces are thoroughly cleaned, the result will probably not be as good as if a shop coat had been applied to the metal with its mill surface.

This study has been carried on by the engineering department of the Pittsburgh & Lake Erie. We are indebted to A. R. Raymer, chief engineer, for an opportunity to compile the information presented above.

Repair and Maintenance of Steel Freight Cars*

Necessity for Adequate Shop Facilities and Proper Organization Strongly Emphasized

By Samuel Lynn

Master Car Builder, Pittsburgh & Lake Erie

HEAVER MOTIVE POWER, with greatly increased train tonnage, has created a demand for cars of increased capacity. The limit of capacity apparently has not yet been reached, since one of the large car companies has, within the year, constructed cars of 120 tons capacity.

While no accurate figures are available, it is estimated that approximately 70 per cent of the two and one-half million freight cars in service in North America are either of all-steel, steel underframe or steel center construction. As this number of cars represents an investment of over three billions of dollars, the importance of keeping them in good repair and in service is self-evident.

Maintenance Badly Neglected

A casual inspection in almost any classification yard will reveal the fact that repairs to steel cars have been badly neglected during the past few years. Large numbers of cars may be seen with floor, hopper and side sheets badly corroded and in many cases rusted and worn entirely through. A close inspection will usually develop the fact that center sills are buckled either in front of, or between the body bolsters. This condition is due either to faulty construction, sills of insufficient area, abuse in service, or neglected maintenance. Conditions existing during the recent world war imposed many hardships upon the railroads generally, making it almost impossible for them to keep the maintenance of their freight equipment up to pre-war standards. Shortage of labor and materials, coupled with the pooling of equipment, had a tendency toward deferred maintenance, which resulted in merely patching up worn out cars and keeping them in service long after they would have been shopped for rebuilding under a normal maintenance program. The large percentage of home cars on foreign roads resulted in neglect, since proper material for repairs of foreign cars was not generally carried in stock. This resulted in makeshift repairs, most roads doing only enough work on foreign equipment so that it would haul one more load, in the hope that it would carry that one load off the line and never return. The results of this practice are now most evident when cars are being returned to the home roads in large numbers and in almost universal bad order.

The speaker believes that the exterior of steel cars should be kept well painted, as by this process at least one side of the steel is protected against corrosion; in addition to this, well painted equipment is a good advertisement for any road. It is obviously impracticable to attempt painting the interior of open top steel cars, since the commodities usually carried in such cars consist of coal, coke, iron ore, limestone, furnace slag and mill products, which in the process of loading and unloading so badly damage the paint that it would serve no purpose—as a protective coating. The interior of steel equipment is where corrosion is the most evident and is probably due to moisture laden with acids from the products of the mines and mills, or to electrolysis caused by impurities existing in the steel itself.

I would like to here state a few things that in my opinion are necessary to maintain steel car equipment properly and economically.

First: Shops should be provided at points where heavy repair steel car work is to be performed. They should be well lighted and ventilated, and in the colder sections of the country should be properly heated. Overhead crane service is desirable, and by proper arrangement eliminates the necessity for material tracks between the working tracks. Small wall or jib cranes should be installed for handling yoke riveters, etc. The money expended for shops will repay the investment many times over in a few years. While I would not say that a steel car cannot be repaired outside under adverse weather conditions, I believe that the work can be carried on more successfully where shops are provided.

Second: Shops should be well equipped with suitable machinery, properly located so that repair parts may be made economically without any lost motion or backward movement. It is a question whether or not it pays to attempt the manufacture of all steel car parts in the average railroad shop. Some of the larger railroads buy most of their car repair parts already punched and pressed into the proper shape ready for application. However, it is necessary to have sufficient machinery to make odd parts or to extend the supply when exhausted, as it is almost impossible to keep sufficient parts on hand to meet all conditions.

Punches, shears, hydraulic presses, heating furnaces, and a good supply of efficient pneumatic tools are indispensable in the modern shop and will soon repay the initial cost of installation. Sufficient compressor capacity with facilities for supplying dry air at all times is necessary for the economical use of pneumatic tools. Proper facilities should also be provided to take care of the scrap parts that will accumulate, and the shop and surroundings should be kept clean at all times. While this may not seem important to some, nevertheless it has a certain moral effect on the workman, which should not be underestimated.

Third: Other facilities must be provided, such as storehouses, storage yards, air brake shops, paint shops, oil houses, etc., depending on the size of the shops. The storehouse or material supply house should be located as near the shops as possible and electric tractor service or other means installed for convenient and economical transportation of materials. Fuel supplies and stores should be under direct supervision of the foremen in charge, or if the shop organization does not permit this, the storekeeper and car foreman should be very close together and work in perfect harmony.

The Importance of Supervision

Fourth: Another and probably one of the most important factors in repairs to steel cars is the quality and quantity of supervision. Sufficient intelligent supervision must be furnished or the work will lag and both the quality and quantity of the output will suffer. The gang foreman who comes into daily personal contact with every man under him is the keystone of any organization. He forms the contact point between the management and the men and when the contact is broken, the current ceases to flow. These men should be selected from the ranks, if possible, and should be men who have developed ability and initiative in their work and they should also have ability to handle the workmen. While a thorough knowledge of how to perform the work is necessary, this is not the first requisite, as ability

*Abstract of a paper read before a meeting of the Canadian Railway Club, March 8, 1921.

to handle men and personality stand above this qualification. Foremen should be intelligent and fairly well educated in order that they may read the rules, blueprints and instructions and apply them intelligently, and also that they may be eligible for promotion to higher positions as vacancies occur. Wages paid foremen should be sufficiently attractive to create an incentive for the men to fit themselves for such positions.

The successful supervisor, in addition to his knowledge of the work, should show loyalty toward his employer, have the courage to enforce discipline, insist on and obtain a fair day's work from every man in the service, and be absolutely impartial in handling his men in order to obtain and hold their co-operation and respect. He should also have the vision and ability necessary to discover trouble makers and weed them out before the remainder of the organization becomes contaminated. No man should be placed in the position of foreman unless the appointing officer feels that the man selected is capable of developing the necessary initiative and ability to accept any position up to the top of the shop organization, as those men selected for the bottom round of the ladder should be capable of advancing step by step until they reach the top. Most higher supervisory officers have not the time to mingle with the workmen and they must depend on their foremen to provide the little touches of personality and co-operation that are the life of any organization.

Fifth: Another important feature is the personnel of the shops. Wages paid and working conditions should be such that they will attract capable young men to seek employment in railroad shops. Unless this is done, there is a tendency for skilled mechanics to seek more remunerative employment in industrial work. This is particularly true in the large industrial centers. The tendency prior to federal control in some sections of the country, due to shortage of mechanics and inability to induce young men to enter the service, has been to hire foreigners from central and southern Europe, men who have never had any mechanical training, and to try to make mechanics out of them. These men come to us wholly unacquainted with our language, our customs, and our laws, and must be assimilated into our organizations. While at first a rather costly proposition, with proper and tactful handling they usually learn rapidly, and have become the mainstay of some of our car shop organizations. It is important that those charged with the handling of these men, should by careful and tactful treatment instill in them the principle of loyalty to their employers; with proper encouragement and fair dealing on the part of their foreman the majority of these men readily become acquainted with our methods of work. The nationalization of foreigners has become important and it is very generally conceded that they are more easily reached in the shops than in their homes. However, any tendency toward radicalism should be carefully watched and immediate steps taken to circumvent it.

The only commodity a railroad has to sell is transportation. Anything that tends to increase the quantity or speed of transportation is a distinct addition to the wealth and resources of the country. Good, efficient motive power may be essential, but without freight cars the railroads would have little use for locomotives. Estimating that four per cent of all the cars in the country are shopped, every day of unnecessary delay in returning them to service represents a per diem loss to the railroads of approximately \$100,000. The importance of providing adequate shop facilities is self-evident.

Suggestions as to Repairs

In the actual work of repairs it is suggested that draft attachments and center construction be sufficiently strengthened so that the shocks incident to modern service will be absorbed and distributed throughout the car, without causing extensive damage to the superstructure. Center and draft

sills should have sufficient area and should be protected against buckling by the use of cover plates. A common cause of failure is due to bodies of hopper cars not being securely fastened to center sills. A few rivets are driven in inside hopper sheets to hold the body to the sills, and the heads corrode and wear off, allowing the rivets to pull through the sheets. This results in the whole strain being thrown on the body bolsters, which are usually of a wide single plate type, with the result that they are unable to stand up under the strain. The sills start moving back and forth under the car and it soon gets in such condition that permanent repairs become a rather expensive proposition. Sides and ends of steel equipment should be properly reinforced to prevent bulging out under load. Drop door equipment should be kept in proper working order to facilitate unloading. Care should be taken in repairing trucks to provide side bearing clearance and to see that brakes and all running gear are kept in good condition.

A well defined program of reinforcement should be outlined and put into practice on all roads. The cost of such additions and betterments is usually insignificant when the future life and productive service of the car is considered. Money appropriated for such features is a good, sound investment when judiciously used, and should pay large dividends. Many roads make the mistake of repairing their older equipment in kind as they do not have exacting conditions on their lines. Such equipment should either be reinforced or kept on their own lines and not offered in interchange, where there is a possibility of it getting out into the large industrial centers and in heavy tonnage trains, when it is almost an impossibility to keep it off the repair tracks.

This places an unnecessary burden of expense on both the owner and the handling line. As cars come into the shop for general repairs, a careful inspection should be made, and if the car has not deteriorated to the extent that it is felt advisable to scrap it, it should be repaired in accordance with a well defined reinforcement program, as outlined. Otherwise, if this is not done, after considerable money has been spent on the car, due to inherent weakness, it will again be back on the shop track.

In conclusion, if the railroads were provided with the facilities and a maintenance program similar to that suggested in the paper was adopted by all roads, and an honest effort was made to maintain the cars in accordance with that program, the steel cars in the country would give the owners a better return for the money invested in the way of better service and in increased life of the cars.

Discussion

There were about 500 in attendance at the meeting; the discussion lasted two hours and had to be cut off because of the lateness of the hour. It was opened by Vice-President Grant Hall of the Canadian Pacific and Vice President W. D. Robb of the Grand Trunk. A large number of visitors were present from the "States."

In general the discussion indicated that there were few roads owning steel cars which had adequate shops or facilities for taking care of them. The problem has been greatly complicated in the United States by the return of badly deteriorated cars to the home roads at the end of federal control. One road converted an old roundhouse and an old storehouse into steel car repair shops by equipping each of them with facilities and tools costing about \$70,000. Five heavy repairs per day are now being turned out of each of these plants.

The metal used in steel cars was seriously criticised because of the rapid rate at which it deteriorates. It was suggested that a better steel be used, similar in composition to the iron used in the Baltimore & Ohio box cars which were built in 1862, the bodies of some of which are still in

existence and have not suffered to any extent from rust and corrosion.

Heavier motive power and careless switching of cars has been responsible in part at least for the failure of some of the earlier designs of steel freight cars.

What is needed more than anything else is a systematic program for making heavy repairs to freight cars so that a certain percentage of the equipment will be given such repairs each year—this percentage to be based upon the number of years which a car can safely run between heavy repairs. Locomotives are shopped on a mileage basis. Why not establish a reasonable and scientific basis upon which to shop freight cars and then see that it is lived up to? This will keep the equipment in prime condition and at a minimum of expense after the program has been well established. It will be necessary to speed it up for some time, however, in order to catch up with the deferred maintenance.

Partial Payments Being Made on Railroad Guaranty

WASHINGTON, D. C.

THE FIRST certificates issued by the Interstate Commerce Commission for partial payments to the railroads for their guaranty for the six months from March 1 to August 31, 1920, under the provisions of the Winslow law, were paid by the Treasury Department on March 3 and were followed shortly by the issuance and payment of additional certificates. The first of the partial payment certificates were for \$6,000,000 for the Great Northern and for \$637,190 for the Chicago, Milwaukee & St. Paul. On March 5 the Treasury announced the payment of \$7,000,000 to the Northern Pacific and on March 7, \$7,000,000 to the Chicago, Burlington & Quincy. The Chicago, Milwaukee & St. Paul had previously received \$14,297,702 in six advances on applications filed before September 1. The Great Northern had received \$5,000,000 in two payments, and the Northern Pacific had received \$5,000,000. The Burlington had not received any advance.

The commission has also announced the issuance of certificates to the Illinois Central for \$2,376,000, the Chicago & Alton for \$800,000, the Minneapolis & St. Paul for \$400,000 and the Tennessee Central for \$115,000. The Illinois Central had received two advances amounting to \$8,000,000, the Chicago & Alton had received \$700,000, and the Minneapolis & St. Louis had received five advances amounting to \$1,750,000. The certificate for the Alton was paid on March 8 and that for the Illinois Central on March 9.

The commission's certificate form states that it is not at this time able finally to determine the whole amount due under Section 209 but it has definitely ascertained and hereby certifies to the Secretary of the Treasury that the amount for which the certificate is issued, in addition to any sums heretofore certified in favor of the carrier, is due under Section 209.

The Treasury Department has recently announced the payment of loans from the revolving fund on certificates of the Interstate Commerce Commission as follows: Ann Arbor, \$400,000; New York, New Haven & Hartford, \$700,000; Louisville & Jeffersonville Bridge & Railway Company, \$162,000; Virginia Southern, \$38,000, and the Seaboard Air Line, \$1,173,600. The total payments made under the transportation act to date are summarized in a Treasury Department statement as follows:

(a) Under Section 204, for reimbursement of deficits during Federal Control	\$841,813
(b) Under Section 209:	
(1) To carriers to which final payment of the guaranty has been made under paragraph (g) including previous advances made under paragraphs (h) and (i) ..	1,311,700
(2) For advances under paragraphs (h) and (i) to carriers as to which a certificate for final payment has not been received by the Treasury from the Interstate Commerce Commission	263,022,874

(c) Under Section 212, for partial payments in respect to the guaranty provided in Section 209	3,813,190
(d) Under Section 210, for loans from the revolving fund of \$300,000,000 therein provided	185,016,137
Total	\$474,652,714

Additional funds for meeting the payments to the railroads as well as other requirements of the Treasury will be provided by new issues of Treasury certificates of indebtedness amounting to \$400,000,000 announced by the new Secretary of the Treasury, A. W. Mellon, on March 9. In a letter to bankers regarding the new issue, Mr. Mellon said that payments under the recent legislation authorizing partial payments on account of the railroad guaranty may amount to as much as \$200,000,000 during the course of the next month.

The United States Railroad Administration reports the following final settlements with railroads that were under federal control and has paid out to the several roads the following amounts:

Iowa Transfer Railway Company	\$7,200.00
Rapid City, Black Hills & Western Railroad Co.	4,000.00
Green Bay & Western Railroad Company; Annapee & Western Railway Company, and Kewaunee, Green Bay & Western Railroad Company	400,000.00
Southern Steamship Company	207,800.00
Wausapea Green Bay Railway Company	6,383.07
Escanaba & Leke Superior Railroad Company	140,000.00
New Orleans Great Northern Railroad Co.	190,000.00
Minneapolis Eastern Railway Co.	55,000.00
Louisiana & Arkansas Railway Co.	200,000.00
Chicago & Eastern Illinois Railroad	3,000,000.00
Lehigh & Hudson River Railway Co.	225,000.00
Charleston Terminal Company	90,000.00
Cumberland & Pennsylvania Railroad Co.	550,000.00
Gulf, Mobile & Northern Railroad Co.	100,000.00
Meridian & Memphis R.R. Co.	100,000.00

The payments of these claims on final settlement is largely made up of balance of compensation due, but includes all other disputed items as between the railroad companies and the administration during the 26 months of federal control. The settlements were in most cases on the basis of lump sum settlements in which it is impossible to distinguish the separate items of the claims.

Regan Automatic Train Control Exhibited in France

THE REGAN TRAIN CONTROL system which is in operation on the Chicago, Rock Island & Pacific, and which was described in the *Railway Age* April 30, 1920, page 1293, was exhibited on January 28, 1921, on the State Railway of France before a representative gathering of public and railway officers. A special train consisting of a standard



Regan Control Apparatus on French Locomotive

passenger engine and ten cars—including a dynamometer car—was used. The section of line selected for the test is on the Paris-Dieppe line between Liancourt St. Pierre and Chaumont en Vexin. The grade is descending, one per cent. Special distant and home signals were erected and track circuits

were installed in accordance with R.S.A. standards, the train control circuits on the roadside being connected through the several track relays and signals.

The following tests were made:

1. *Ordinary Working*
Position of Signals: Distant at caution; home at proceed.
Result of Test with the apparatus in operation: The speed of the train was automatically reduced to 18.5 m.p.h. at which the controller was set throughout the distant signal section, and on passing the home signal in the proceed position, the train was automatically restored to unrestricted speed.
2. *Non-Observance of Signals*
Position of Signals: Distant at caution; home at stop.
Result of Test: The speed was automatically reduced, as before, to 18.5 m.p.h. between the distant and the home signals, and the train was automatically stopped at the home signal location.
3. *Engine on Main Line Between Distant and Home Signals*
Position of Signals: Distant and home signals at proceed position.
Result of Test: Notwithstanding that the signals were in proceed position and that the train approached the distant signal at full speed, an automatic application of the brakes at the distant signal brought the train to a stop immediately after passing the distant signal location.
4. *Engine on Main Line Just Beyond Home Signal*
Position of Signals: Distant at caution; home signal at proceed position.
Result of Test: Automatic speed reduction to 18.5 m.p.h. at the distant signal; automatic stop application, stopping the train at the home signal.

The apparatus is so designed as to repeat three conditions of the track and signals on the engine: (a) Unlimited speed. (b) Limited speed, and (c) Stop. It provides three indications, though the visual signals in France (as well as in England) are two-position. In the Regan system the train, at each signaling point, has its speed regulated properly for the approach to the signal next ahead, and the speed is reduced automatically, before passing any signal, whenever the signal next ahead indicates stop.

Single Pedestal Swivel Type Car Seat

A CAR SEAT INVOLVING several important changes from the usual type of construction has been invented and patented recently by Frank Smolar, Dayton, Ohio, and will be placed on the market by the Dayton Car Seat &



Fig. 1. Normal and Inclined Positions of Smolar Car Seat

Manufacturing Company of the same city. One of the principal objects of the new invention is to provide a car seat with a back not normally inclined. The occupant inclines the back at will against springs in the arm rests to whatever

position may be most comfortable and the springs return the back to its normal upright position when the seat is vacated. The inclined position of the back is shown by dotted lines in Fig. 1.

The new car seat is light in weight, easy to install, and is not connected to the wainscoting. The latter feature eliminates drilling and tapping the wainscoting and using the window sill as an arm rest. The seat may be easily and quickly assembled and dismembered for cleaning purposes without the use of tools. A greater height than usual is available for steam pipes and there is ample room for suit cases and traveling bags under the seat bottom. A special effort has been made to secure simplicity of construction

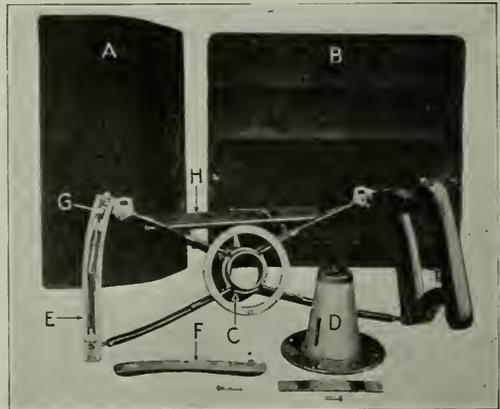


Fig. 2. View of Car Seat Parts Disassembled

without complicated parts to break or get out of order; also a minimum weight consistent with strength and rigidity. The seat may be automatically locked when in either extreme position and is stated to reverse easily, no lubrication being required. The swiveling feature makes it necessary to provide only one foot rest.

A view of the Smolar car seat, disassembled is shown in Fig. 2: *A* and *B* are the seat and back cushions respectively. The main seat support consists of a steel casting or pressed steel framework supported upon and guided by the frusto-conical pedestal *D*. Each arm rest *E* is divided horizontally, the lower section having a deep longitudinal recess, containing the anchor piece, spring, slide piece *G* and guide. Tension of both arm rest springs through the connections shown holds the back cushion in its normal upright position. The top section *F* is provided to cover the recess and parts enclosed in the arm rest.

The foot rest *H* is secured by means of two hinges to the main seat frame. A dog is provided which engages the slot in the pedestal and holds the seat firmly in either of its extreme positions. A small spring holds the dog in engagement with the slot and foot pressure on a small pedal casting fastened to the foot rest releases the dog and allows the seat to be swiveled.

Owing to the fact that the back does not need to be pulled over, cushions for the new car seat can be made to practically any desired height, width or shape to provide the greatest comfort for the passengers.

GOVERNOR CHARLES R. MAREY, of Utah, has vetoed a legislative joint memorial to Congress to amend the Transportation Act so as to give the state control of railroads in the making of intrastate rates.

General News Department

The New York Railroad Club will hold its regular monthly meeting on Friday, March 18, at the Engineering Societies' Building in West 39th Street. F. M. Brinkerhoff will present a paper entitled "Safety of Passengers in Steel Cars."

The Chicago & Alton has opened a new inbound and outbound local freight house on West Harrison street and the Chicago river, Chicago. This house is a two-level structure of fireproof construction, with a track capacity for 125 cars at the house, and a team track yard accommodating 150 cars.

John F. Wallace, chairman of the Chicago Railway Terminal Commission, has resigned on account of the pressure of personal business, this resignation to take effect as soon as the commission is reorganized by the City Council. Mr. Wallace will continue to co-operate with the commission in its future work.

The employees of the Gainsville Midland, a road operating 74 miles of line, with headquarters at Gainsville, Ga., have had their wages reduced about 33 per cent by an order issued on March 3 by Judge Evans of the United States District Court, to the receivers, who are in charge of the road. The receivers, G. C. Carson, vice-president of the road, and W. B. Veazey, general manager, took charge on February 15. It is proposed to reduce the total of the payrolls from \$180,913 to \$116,950.

The general managers of the New York Central, at a meeting in New York City on March 8, conferred with representatives of the unskilled laborers on the proposal of the company to make important reductions of pay on April 1. The workmen took the proposal under consideration and another conference is to be held on March 22. It is proposed to reduce the pay of workmen on the freight piers in New York City from 57 cents an hour to 45 cents; and trackmen at "principal points" will be paid 40 cents an hour, with lower rates at "intermediate" points. For some classes of men it is proposed to reduce the rates to those in effect prior to the issuance of decision No. 2 of the United States Railroad Labor Board.

The "Hummer," Chicago & Alton, eastbound train No. 10, Kansas City to Chicago, was stopped by two robbers on February 25 near Quincy Junction, Ill., and three registered letters and a package were carried off. The train had just crossed the Mississippi river when the bandits, who had boarded the train at Louisiana, Mo., climbed over the tender and ordered the engineman to stop the train. One of the engine crew was then ordered to cut the train behind the combination baggage and mail car and the engineman was forced to run the engine and car a mile up the track. In the meantime the car had been entered, the loot gathered and the robbers then made their escape. An attempt to hold up this train earlier in the month failed when the engineman drifted past the point where he was ordered to stop by a lone highwayman.

Executives and counsel of the Great Northern and Northern Pacific, accompanied by some New York bankers, conferred informally with the members of the Interstate Commerce Commission on Wednesday regarding a new plan for meeting the maturity on July 1 of the \$215,000,000 joint 4 per cent bonds, secured by the 97 per cent of the stock of the Chicago, Burlington & Quincy owned by the two roads, in view of the fact that the Interstate Commerce Commission has spoiled the plan which had been proposed for paying off about \$80,000,000 of the bonds with the proceeds of the \$80,000,000 Burlington bond dividend which the commission declined to authorize. The majority report of the commission suggested that the joint bonds be refunded by new bonds secured in part by mortgages on the two roads and in part by Burlington stock as collateral.

Atlantic City Exhibit Abandoned

At a meeting of the executive committee of the Railway Supply Manufacturers' Association at Pittsburgh on March 10, it was decided not to exhibit at the annual convention of Division 5 (Mechanical) of the American Railway Association, scheduled to be held at Atlantic City June 15-22 next.

The Classification of Bridges

C. F. Loweth, chief engineer of the Chicago, Milwaukee & St. Paul, will present a paper on the "Classification and Maintenance of Old Railroad Bridges" before the Western Society of Engineers, Chicago, on Thursday evening, March 17.

Change in Time Zone Boundary

A bill to transfer the Panhandle and Plains section of Texas and Oklahoma to the Central Time zone was passed by both houses of Congress in the last hours of the session on March 4 and the Interstate Commerce Commission on Monday last issued an order readjusting the western boundary line of the Central Time zone in accordance with the law.

Pennsylvania Orders Reduction in Service

The Pennsylvania Railroad, to further reduce expenses, announced on Tuesday the withdrawal of one passenger train between Philadelphia and Washington and one between Baltimore and Washington; also the combining of two through trains into one from Philadelphia westward in the morning and another similar combination in the evening. Since the beginning of the retrenchment policy, in December, the Pennsylvania has reduced its total force from 279,000 persons to 218,000.

Chief Interchange Inspectors and Foremen Meet

A meeting of the Chief Interchange Car Inspectors' and Car Foremen's Association of America was held at the Hotel Sherman, Chicago, on March 3 and 4, for the purpose of discussing and recommending proposed changes in the M. C. B. Interchange rules. The meeting was attended by about 100 members of the association and recommendations were adopted proposing a number of changes in the rules, which will be placed before the appropriate committees of the mechanical division of the American Railway Association.

Annual Railroad Conference of the A. A. E.

The third annual railroad conference of the American Association of Engineers will be held at the Congress Hotel, Chicago, on Monday, March 14. The main object of this meeting is to develop co-operation between employers, employees and the public. Among the papers to be presented are: The Effect of the Railway Labor Board's Decision on the Salaries of Railroad Professional Engineers, by T. D. Trueblood, assistant engineer, Chicago & North Western; Educational Co-operation with the Management, by Prof. Lewis Gustafson; An Educational Plan Now in Effect, by W. L. Lewis; and Railroad Occupational Classification.

Employee Educational Work on the Great Northern

To meet a desire expressed by a number of employees, particularly in the engineering department, for an opportunity to acquire a broader knowledge of railroading than comes to them through the routine work of their own departments, the Great Northern is developing a course of study to be taken up at bi-monthly meetings, in St. Paul, of a class of several hundred

employees. The course is designed to cover a period of about six months and the class is open to employees of all departments who are interested.

The extent of the interest is indicated by the fact that over 400 employees responded to the call for the first meeting. Interest in the plan is also developing among employees at outlying points and consideration is being given to means of extending it. This work had its inception among employees and officers at the headquarters of the road at St. Paul. Consideration is also being given to the development of a course of study that will meet the special requirements of interested employees in the mechanical department.

Large Coal Cars

The Pennsylvania Railroad System now has in service 37,437 open-top cars of 70 tons capacity; and the average capacity of all its open-top cars is almost 55 tons—109,958 pounds. This, together with other interesting information, is shown in Quarterly Supplement No. 1, to the Railway Equipment Register. The company has also 168 such cars of 75 tons capacity and one each of three larger capacities. The Norfolk & Western has 1,110 of 100 tons capacity and the average of all its open-top cars is 110,289 pounds. Some totals for these roads and for the Virginian, are shown in the following table:

OPEN TOP CARS—AVERAGE CAPACITIES			
1	2	3	4
Road	Cars holding 50 tons or more	Total open top cars	Average capacity all open top cars, lb.
Norfolk & Western.....	34,299	37,856	110,289
Pennsylvania.....	170,260	174,279	109,988
Virginian.....	7,294	7,477	105,679

All of these roads have, of course, some smaller cars, the number of which is indicated by the difference between the number in column 2 and that in column 3. Of the 21 roads shown in the list referred to, the following nine report the average capacity of their open-top cars as 45 tons or more; Central of New Jersey; Chicago & Northwestern; Chicago, Burlington & Quincy; Erie; Illinois Central; Missouri, Kansas & Texas; New York Central; Southern Pacific (in Texas and Louisiana); and Southern.

Information of this kind concerning other roads is in preparation for future issues of the Supplement. The lists include box cars and other revenue cars also, and altogether they include a total equal to about 30 per cent of the total freight car equipment of North America. The roads in the present lists which report the average capacity of their box cars at 45 tons or more are the Pennsylvania (84,873 cars), 94,952 lb., and the Southern Pacific (in Texas and Louisiana), (9,124 cars), 93,860 lb.

This Supplement, containing the various compilations heretofore appearing in the regular monthly issues of the Railway Equipment Register, and also the complete list of names of all the railroads and private car companies in the country, with names of officers in charge of car maintenance, car records, etc., is issued in February, May, August and November at two dollars a year.

Western Union Wires on L. & N.

The litigation concerning the rights of the Western Union Telegraph Company on the lines of the Louisville & Nashville railroad seems destined to go on forever. A new complication was introduced on February 16, when Judge William Rogers Clay, Court of Appeals, at Louisville, granted an injunction to the telegraph company to prevent the railroad from removing poles from the railway right-of-way.

The injunction was issued on the ground that the telegraph company is entitled to a full opportunity to have the merits of its case decided by the Supreme Court.

This case has been going the rounds of the Federal and State courts for more than eight years. It probably will be more than a year before the Supreme Court renders a final decision.

The case was taken before the Court of Appeals after Judge Samuel B. Kirby had denied the telegraph company an injunction. Previously, Judge Walter Evans, in the Federal District Court, granted an injunction, but the Circuit Court of Appeals dismissed it. Then Judge Evans fixed nine months as the time the telegraph company should have to remove its poles. Attorneys for the telegraph company contended that this time might expire before the Supreme Court gave its decision.

The basic point before the Supreme Court is whether the Western Union lost its condemnation rights in an act passed by the Legislature in 1916. Prior to that time it had sued to condemn portions of the railway right-of-way for its poles. A jury fixed the sum to be paid for this privilege at \$500,000. Judge Evans set this verdict aside as excessive and fixed the sum in a second trial at \$5,000.

Matters were complicated further when the Legislature passed an act repealing the statute on which the Western Union was basing its contentions. The railroad then moved that the case be dismissed on the ground that the telegraph company had lost its condemnation rights.

Judge Evans held that repeal of the law applied only to the future and not to rights acquired previously. This decision was reversed by the Circuit Court of Appeals and the injunction dissolved. The question of condemnation rights then was taken before the Supreme Court.

Four Vacancies on Interstate Commerce Commission

President Harding is expected to act with reasonable promptness in appointing members of the Interstate Commerce Commission to fill the four vacancies that now exist and it is understood he will also appoint a new director general of railroads to succeed John Barton Payne, who retired as Secretary of the Interior on March 4. There has been one vacancy on the Interstate Commerce Commission ever since the membership was enlarged because James Duncan, who was given a recess appointment, never accepted the position. There has also been a vacancy since December 31 when the term of Robert W. Woolley expired, and Commissioners Potter and Ford were serving under recess appointments which expired on March 4, because their appointments had not been confirmed by the Senate. There have been rumors that Commissioners Potter and Ford will be reappointed and it has been the general understanding that John J. Esch, who has been chairman of the House committee on interstate and foreign commerce, would be appointed.

Michigan Central Train Crew Held Responsible for Porter Collision

At the conclusion of the inquest following the Porter, Ind., train disaster, held at Valparaiso, Ind., on March 4, the Michigan Central engine crew who were charged with responsibility for the wreck were arrested but were immediately released on bail furnished by the Brotherhood of Locomotive Enginemen and Firemen. Both men attended the inquest but neither testified. After the finding of the coroner's jury the two issued a statement in which they set forth that the interlocking home signal governing the route over the derail 311 feet from the crossing where the New York Central train plunged through the Michigan Central train, gave them a clear right-of-way, although the distant block showed a yellow light. This last signal they claimed to have complied with by bringing their train under control. Witnesses at the inquest claimed that the home signal had been set against the train, these witnesses including the engineman and fireman of a freight train which was standing on a siding to allow the passenger trains to pass. Two brakemen of this same train testified that they had tried to flag the Michigan Central train with the white lanterns at hand, and it was their belief that the strong headlight of the train had made these invisible. The engineman of the freight train, in testifying, said that smoke from his engine might have interfered with the engineman of the Michigan Central train having a clear vision of the home signal. It was brought out at the inquest that the Michigan Central train normally had the right of way at the crossing but on the night of the wreck it was eight minutes behind schedule.

Meanwhile the joint board of inquiry of the State Public Service Commission of the State of Indiana and Interstate Commerce Commission met at Gary, Ind., on March 8, to investigate the causes for the wreck and testimony was taken from the towerman and the crew of the freight train which was on the siding at the time of the disaster. E. J. Lewis presided, while others at the hearing were John W. McCardle, vice-chairman, Glenn Van Auken, H. B. Lyon and J. S. Hawley, representing the Interstate Commerce Commission.

Traffic News

The consolidated ticket offices at Tacoma and Seattle, Wash., were discontinued March 1, each line establishing an office of its own in these cities.

"The Port of Astoria," Astoria, Oregon, has established a traffic and transportation department and has appointed as its manager, Roger D. Pinneo.

The Arkansas & Louisiana Missouri Railway announces that its road has been rehabilitated and that through trains are now being run from Monroe, La., north to Crossett, Ark., 52 miles. The company operates freight service between Bastrop, La., and Huttig, Ark., 31 miles.

Intrastate passenger fares in Michigan may be kept at three cents a mile, this being the decision of the Federal Court at Detroit on March 4 in the suit of the railroads for an injunction restraining the Public Utilities Commission of the state from enforcing a rate of 2.5 cents.

The six New England special committees appointed by the governors of the New England States on February 27 to consider the traffic crisis in that territory, met in Boston on March 8 and had a further conference with representatives of the railroads. An executive committee was named to formulate a plan of action.

Senator Phipps of Colorado has presented to the Senate a concurrent resolution of the general assembly of Colorado petitioning Congress to so amend the transportation act as to protect and preserve the powers of the several states with relation to intrastate rates, services and facilities and the local fares of the common carriers within the states.

The Texas City Transportation Company which formerly owned the Terminal Railroad and dock facilities at Texas City, Tex., has been reorganized and a new company has been recently incorporated under the name of the Texas City Terminal Railway Company. The new organization has taken over and will operate the facilities of the old company.

The Traffic Club of Oklahoma City, Okla., was organized on February 14 and the following officers were elected: President, H. C. Conley; first vice-president, H. H. Hunt; second vice-president, H. D. Driscoll; secretary, K. C. Baker; treasurer, D. D. Decker; directors, J. L. Carleton and M. C. Burton. A meeting is planned on March 7 at which time the object and purpose of the club will be explained to invited guests eligible for membership.

Passenger Traffic for November

The number of passengers carried by the railroads in November, 1920, after the increased rates had been in effect for three months, was still greater than for November, 1919, but the average journey was slightly less. The total was 96,632,000 passengers, an increase of 1.6 per cent, but the average journey was 36.38 miles as compared with 37.2. As a result the passenger-miles for the month showed a decrease of .6 per cent. Passenger revenues for November were \$106,829,660, an increase of 15 per cent over November, 1919. The average receipts per passenger mile were 3.62 cents as compared with 2.61 cents.

Last Year's Grain to Be Moved

Larger stocks of grain of last year's crops were held on the farms on March 1 this year than on that date in almost any other year in history, according to estimates announced by the Department of Agriculture. The wheat on the farms on March 1 amounted to 207,000,000 bushels as compared with 164,000,000 bushels a year ago. This quantity had been exceeded in March, 1916, when 244,000,000 bushels were held, but the stock on hand on March 1, this year, represented 26.4 per cent of the crop, whereas that of March, 1916, represented 23.8 per

cent. On March 1, 1920, the wheat on the farms was 17.6 per cent of the crop. Of the corn crop 1,572,000,000 bushels, or 48 per cent, were held on the farms on March 1, as compared with 1,070,000,000 last year. There were also 689,000,000 bushels of oats as compared with 418,000,000 last year and 69,000,000 bushels of barley as compared with 36,000,000 last year. In 1919 there were 81,000,000 bushels of barley.

Revised Regulations for Explosives

The bill recommended by the Interstate Commerce Commission to modify and strengthen the existing law regulating the transportation of explosives, including more specific penalties and bringing within the jurisdiction of the commission's regulations a number of recently developed explosives and other dangerous articles, was passed by Congress on March 3.

Anthracite Shipments—January, 1921

Shipments of anthracite in January, as reported to the Anthracite Bureau of Information, amounted to 5,740,538 gross tons, against 6,436,320 tons in December, 1920, a decrease of 695,782 tons. There were 25 working days, but three of these were observed as religious holidays in some parts of the region, and a strike in the Panther Creek valley helped reduce the total output. The month's total was nevertheless almost equal to that of November, 1920, 5,765,347 tons, and was slightly in excess of the record for the corresponding month of January, 1920, when 5,713,319 tons were shipped.

Shipments by originating carriers were:

	January, 1921	December, 1920
P. & R. Ry.....	1,172,873	1,324,604
L. V. R. R.....	1,058,127	1,161,305
C. R. of N. I.....	470,704	497,735
D. L. & W. R.....	910,260	940,515
D & H. Co.....	814,491	896,475
Penna. R. R.....	451,879	437,242
Eric. R. R.....	606,602	675,979
N. Y. O. & W. Ry.....	156,564	164,557
L. & N. E. R. R.....	99,038	318,508
Total.....	5,740,538	6,436,320

1920 Traffic and Car Performance Break Records

WASHINGTON, D. C.

The fact that the railroads in 1920 broke all previous records for the volume of freight service performed and that they also established new records for efficiency in freight car performance has been known for some time but the final figures for the year, just compiled by the Interstate Commerce Commission, show some interesting comparisons with the three previous years of the period of war and of federal control. New records were established for ton mileage, car and train load and net ton miles per car day.

The net ton miles of freight handled by the railroads during the year aggregated 445,975,000,000, exceeding the total for 1918, heretofore the record, by eight billions, or about two per cent. In 1919 the railroads handled 393,684,000,000 ton miles; in 1918, 437,000,000,000; in 1917, 430,000,000,000, and in 1916, 396,000,000,000.

The average load per loaded car for 1920 was 29.4 tons, which also breaks all previous records for a year. For 1919 the average car load was 28 tons, for 1918 it was 29.2 and for 1917 it was 27. The average mileage per car per day for 1920 was 24.9. This was greater than the average for 1919, which was 23.0, but was the same as the average for 1918 and less than that for 1917, which was 26.1.

The average train load in 1920 was 728 tons as compared with 718 in 1919, 681 in 1918 and 653 in 1917. The average ton miles per car per day was 497 as compared with 441 in 1919, 487 in 1918 and 495 in 1917. The average number of serviceable freight cars on line daily was 2,293,758 as compared with 2,287,769 in 1919; and the average percentage of unserviceable cars was 7 per cent, as compared with 7.1 per cent in 1919.

The average cost per freight train mile (selected accounts) was \$2.046, as compared with \$1.649 in 1919. The average cost per mile for locomotive repairs was 51.4 cents as compared with 43.2; enginemens, 23.9 as compared with 23.2; fuel, 63.8 as compared with 49.6; other locomotive and train supplies 12.7 as compared with 11.6; enginehouse expenses, 12.2 as compared with 10.5, and trainmen 34.7 as compared with 26.8.

Court News

Commission and Court News

Interstate Commerce Commission

By a second supplemental order the Interstate Commerce Commission has suspended until July 10, various schedules which propose to increase the existing charges of 50 cents per car for loading and unloading live stock at stock yards at East St. Louis, Ill., Sioux Falls, S. D., and various other points to \$1 per car and provide for the absorption of these increased charges by the carriers reaching such points.

The Interstate Commerce Commission has announced a supplemental hearing on March 24, at Topeka, Kan., before Examiner Disque, in the matter of rates, fares and charges in Kansas on the lines of the Arkansas Valley Interurban, the Union Traction Company, Kansas City, Kaw Valley & Western, Joplin & Pittsburg, and such other common carriers of freight or passengers operating by electric power in the state as shall appear.

The Commission has made public a tentative report of Examiner H. C. Keene, recommending the dismissal of a complaint filed by the Arizona, Nevada and New Mexico state commissions asking for a reduction in passenger fares between points in Arizona, Nevada and New Mexico and between points in those states and other states, on the ground that they have not been found to be unreasonable, unduly discriminatory or unduly prejudicial.

The Interstate Commerce Commission has announced a hearing on March 21, at Chicago, Ill., before Chief Examiner Quirk, in the matter of rates, fares and charges in Illinois, maintained or participated in by the Pullman, Chicago & Calumet River, Chicago Heights Terminal Transfer, Chicago River & Indiana, East St. Louis Connecting, Manufacturers Junction, Aurora, Elgin & Chicago, Chicago, Lake Shore & South Bend, Chicago, Ottawa & Peoria, Danville, Urbana & Champaign, Bloomington, Decatur & Champaign, Illinois Central Traction, St. Louis Electric Terminal, St. Louis, Springfield & Peoria, East St. Louis & Suburban, St. Louis & Belleville, St. Louis & Ohio River, and such other common carriers of freight or passengers operating by steam or electric power in the state as shall appear.

The Interstate Commerce Commission has issued its decision in the Louisiana intrastate rate case, in which it orders an increase in the passenger fares including the surcharge for Pullman passengers, but excepting commutation fares or fares for special occasions, corresponding to the increase allowed for interstate traffic. Similar increases were ordered in the rates for the transportation of milk in passenger trains, but the commission deferred for later consideration the issue with respect to rates on sugar cane for the reason that there is no discrimination as between intrastate shippers of sugar cane and interstate shippers of the same commodity. The question of sand and gravel rates was also reserved for later determination and the issue as to rates on rice and cotton was withdrawn.

State Commissions

A temporary injunction enjoining the Ohio Utilities Commission and the attorney general of the state from interfering with action of the railroads in Ohio in charging increased passenger rates was issued in the United States District Court at Columbus, on March 3. The injunction, which supersedes a temporary restraining order granted recently, is to stand until the case is decided on its merits. Appeal to the United States Supreme Court will be taken by the state, it was reported. Although Ohio, together with several other states, already has a case before the United States Supreme Court contesting application of the increased rates to intrastate traffic, appeal of the decision, it was pointed out, would bring the matter up as a separate action wherein the Ohio three-cents-a-mile law and other conditions peculiar to the state could be taken into consideration.

Statute Imposing Tax on Gross

Receipts of Freight Line Held Void

The Mississippi Supreme Court holds that the provision of section 112 of the State Constitution of 1890 that taxation shall be equal and uniform, and that property shall be assessed for taxes according to its true value, can be complied with only by taxing all property at the same rate on its true value, and the Legislature is without power to provide for the taxation of property by any other method. Consequently chapter 113, Mississippi Laws of 1912, which provides for a fixed charge on the gross receipts of a freight line company in lieu of all taxes on the property of the company used in its business, is void.—*Rock Island v. Robertson* (Mass.), 84 So. 449.

United States Supreme Court

Limitation of Liability Without Choice of Rates

On March 10, 1915, a consignor delivered to the Pacific Mail Steamship Company at Yokohama, Japan, 56 cases of "Drawn Goods and Renaissance," consigned to his own order at New York, and received a bill of lading for ocean transportation to San Francisco and thence by the Southern Pacific and its connections, by rail, to destination. The property was totally destroyed in a collision on the Union Pacific. A successor in interest claimed, in an action against the Union Pacific, the fair invoice value of the goods, \$17,449, and the railroad conceded his right to recover, but only to the amount of the agreed valuation of \$100 per package, \$5,600, to which it contended he was limited by the bill of lading. The New York Appellate Division rendered judgment for the plaintiff for \$5,600, with interest and costs. This was reversed by the New York Court of Appeals and judgment directed for the plaintiff for \$17,449, with interest and costs. The case was taken to the Supreme Court of the United States on certiorari, and that court has affirmed the judgment, against the carrier.

On the face of the bill of lading received at Yokohama was the notation: "Weight 26,404 lbs.; Ocean weight rate, 50 cents; Freight \$132; Rail, minimum carload weight, 30,000 lbs.; Weight rate, \$1.25; Freight, \$375." "On the back of the bill of lading a printed provision limited the value and the liability of the companies therefor in case of total loss to \$100 per package. In the schedules of the Union Pacific was a rule, Rule 9A, providing that when property is transported subject to the provisions of the Western Classification, the acceptance and use are required, of the Uniform Bill of Lading. For the purposes of the case only, it was admitted, and accepted by the Supreme Court, that this rule 9A permitted and required that the property should be treated as moving east of San Francisco under the Uniform Bill of Lading, although, in fact, no other than the Yokohama bill of lading was issued. The railroad contended that the agreed valuation of \$100 per package in the Yokohama bill of lading was necessarily imported into the Uniform Bill of Lading; it became the valuation "agreed upon" within the terms and conditions quoted from that bill, and limited the plaintiff's recovery to that amount, \$5,600, regardless of the value of the property and of the fact that it was lost by the carrier's negligence.

The Supreme Court holds that "this valuation rule, where choice is given to and accepted by a shipper, is, in effect, an exception to the common law rule of liability of common carriers, and the latter rule remains in full effect as to all cases not falling within the scope of such exception. Having but one applicable published rate east of San Francisco the petitioner [the Union Pacific] did not give, and could not lawfully have given, the shipper a choice of rates, and therefore the stipulation of value in the Yokohama bill of lading, even if treated as imported into the Uniform Bill of Lading, cannot bring the case within the valuation exception; and the carrier's liability must be determined by the rules of the common law. To allow the contention of the petitioner would permit carriers to contract for partial exemption from the results of their own negligence without giving to shippers any compensating privilege." *Union Pacific v. Burke*. Decided, February 28, 1921. Opinion by Justice Clarke.

Foreign Railway News

Serious Competition by Germany

LONDON.

The Russian Soviet government recently asked for bids for 1,000 locomotives to be delivered over a period of years. The price quoted by two German firms backed by Krupps was approximately \$52,000 rate of exchange as against the lowest British quotation of \$80,000.

German Locomotives for Spain

LONDON.

German firms have secured a large contract for locomotives for Spain. They have agreed that 90 per cent of the purchase price shall be paid when the locomotives are under steam on the Spanish railroads, the other 10 per cent to be paid six months after they have been proved satisfactory.

Westinghouse Brakes in France

According to a Paris cable to the New York Herald, the Westinghouse air brake is being tested by the French minister of public works, and will, according to present indications, be adopted as standard for the French railways. Several other brakes are being tested under the direction of the minister. Among them are the Kunz Knorr, the Lipowsky and several French, German and English models.

Railway Strike in Mexico

A general railway strike is in effect in Mexico, resulting, according to newspaper reports, from the failure of the administration to recognize what is described as a radical union of all classes of railway workers. It would appear that there is considerable violence in connection with the strike. Reports of bridges blown up, engines disabled and attempted destruction of railway buildings appear with frequency in the daily press. It is also reported that a number of strikers have been executed for deeds of violence.

Receipts and Expenditures on English Railways

LONDON.

The Ministry of Transport has issued a statement regarding the financial results of the working of the railways during the eight months ended November 30, 1920. The total revenue earned was approximately \$597,406,558 at the present rate of exchange. The total expenditure was \$564,848,273, giving a balance of revenue over expenditure of \$32,558,284. The standard year proportion of net receipts under the given guarantee was \$116,637,500, to which is added for interest on capital works brought into use, or \$2,761,500. Thus the net government liability for the eight months ending November 30, 1920, is \$89,255,659.

England's Exports of Railway Materials

LONDON

The returns of the Board of Trade of Great Britain for December give the value of railway material exported during the year 1920 to be as follows as against the exports for the year 1919:

	1920	1919
Locomotives	\$23,949,576	\$7,124,936
Rails	10,792,760	8,036,736
Passenger cars	6,780,028	2,377,408
Freight cars	22,858,844	9,496,568
Wheels and axles	7,700,028	3,286,300
Tires and axles	5,668,812	3,603,820
Chairs and metal ties	5,263,208	1,270,816
Miscellaneous track materials	9,475,140	3,115,620
Total track materials	39,388,672	12,572,568

These figures are quoted at the present exchange rate. The weight of rails exported was 131,079 tons for the year 1920, as against 125,256 tons for the year 1919.

Equipment and Supplies

Locomotives

THE PEKING-HANKOW has ordered 30 Prairie type locomotives from the Baldwin Locomotive Works.

THE SEISEN-SHOKUSAN (Korea) has ordered 1, 0-6-0 type locomotive from the Baldwin Locomotive Works.

THE TEXAS-MEXICO, reported in the *Railway Age* of February 18, as inquiring for some 0-6-0 and 4-6-0 type locomotives, has ordered one of each of the above types from the Baldwin Locomotive Works.

Freight Cars

THE PEKIN-MUKDEN, reported in the *Railway Age* of January 21, as inquiring through the car builders for 300 or more 44-ton capacity gondola cars, is now inquiring for 200, 40-ton gondola and 200, 30-ton box cars.

Iron and Steel

THE MISSOURI PACIFIC has ordered 150 tons of plate girder spans from the American Bridge Company.

THE CHICAGO UNION STATION COMPANY has received bids for 6,000 tons of structural steel to be used in the construction of the new railway mail terminal, Chicago. The company has also received bids for 420 tons of structural steel to be used in building the Madison street viaduct, Chicago, and for 320 tons for use in widening Canal street, Chicago, between Van Buren and Jackson streets.

Track Specialties

THE MAINE CENTRAL is in the market for 1,000 tons of tie plates.

THE PITTSBURGH & LAKE ERIE is asking for from 1,400 to 1,500 kegs of standard spikes.

THE BANGOR & AROOSTOOK is inquiring for 500 tons of tie plates and for frog and switch material.

Signaling

THE LOUISVILLE & NASHVILLE has ordered from the General Railway Signal Company an electro-mechanical interlocking-machine for Biloxi, Miss.; four mechanical levers and four electric.



Ph. to by Underwood & Underwood

The New York, New Haven & Hartford Fighting the Snow on Cape Cod

Supply Trade News

Langley Ingraham has been appointed general sales manager of the railroad department of **The Lowe Brothers Company**, at Dayton, O., effective March 1.

J. F. Duesenberry, heretofore with the commission on car service, American Railway Association, at Washington, has been appointed Auditor of Camps, of the International Lumber Company, International Falls, Minn.

H. M. Pratt, manager of the branch office of the **Southern Iron and Equipment Company** at New Orleans, La., has been appointed general sales manager with headquarters at Atlanta, Ga. A. C. Wood succeeds Mr. Pratt at New Orleans.

The **Southwark Foundry & Machine Company**, Philadelphia, Pa., has opened a district office at 804 Swetland building, Cleveland, Ohio, under the management of its representative, Stewart Bolling, who has served for seven years as engineering salesman for this company.

H. J. DeLaney, formerly railroad representative at Houston, Tex., of the **United States Rubber Company**, New York, has been appointed special railroad representative of its Southern division, in charge of the railroad business at its New Orleans, Birmingham and Houston branches.

The **National Malleable Castings Company**, Cleveland, Ohio, has bought the draft gear business, assets and goodwill, as of January 1, 1921, of the **Butler Drawbar Attachment Company**, Cleveland. The business of the latter company has been transacted for many years through the **National Malleable Castings Company**.

W. J. Roehl, whose appointment as sales representative in the St. Louis, Mo., district for **A. M. Castle & Co.**, Chicago, was announced in the *Railway Age* of March 4, entered the railroad business on May 4, 1906, as a clerk in the office of the supply agent of the **Misouri Pacific**. In May, 1910, he was promoted to chief clerk, remaining in that position until March 1, 1913, when he was promoted to chief clerk to general purchasing agent. On June 1, 1918, he was appointed assistant purchasing agent on the same road, holding that position until January 31, 1921, when he resigned to enter the service of **A. M. Castle & Co.**, as above noted. Mr. Roehl's headquarters are at 1946 Railway Exchange building, St. Louis,



W. J. Roehl

William P. Wescott, district manager at New York of the **Galena Signal Oil Company**, Franklin, Pa., has been elected also treasurer and a director. He succeeds as treasurer, J. French Miller, who was secretary and treasurer, Franklin, Pa., and is now secretary; he succeeds as director E. V. Sedgwick, New York, who has resigned.

At the annual stockholders' meeting of the **H. Channon Company**, the number of directors was increased from 5 to 7, and **Geo. E. Scott**, vice-president of the **American Steel Foundries**, and **F. C. Honnold**, president of the **Chicago & Big Muddy Coal Company** were added. The officers and the other five directors were re-elected.

The **Power Equipment Company**, 131 State street, Boston, Mass., has been appointed New England representative of the **Conveyors' Corporation of America**, Chicago, for the sale of its American trolley carrier monorail conveying equipment, and **Colwell & McMullin**, 79 Milk street, Boston, are the New England representatives for its American steam ash conveyor.

On March 1, the **Locomotive Superheater Company**, New York, changed its name to the **Superheater Company**. For years the **Locomotive Superheater Company** has served the steam railroads of the world, and necessity for greater conservation of fuel in other fields has resulted in the expansion of its organization to serve the marine and all fields where steam is used for power. Through the application of **Elesco** superheaters, railroad shop plants, industrial plants, public utility operations and excavating equipment are operating more effectively and more economically. The development of feed water heating equipment for locomotive and marine use has further broadened the activities of the company, and it was felt that with this expansion, the name of the organization was inadequate.

Bucyrus Company

Net earnings of the **Bucyrus Company**, Milwaukee, Wis., for 1920 were \$1,010,984, against \$982,563 in 1919. There was carried to surplus \$530,984, bringing that item to \$3,113,606. The income account for the year and balance sheet as of December 31 with comparisons, follow:

INCOME ACCOUNT		
	1920	1919
Net earnings after interest and taxes.....	\$1,010,984	\$982,563
Dividends	480,000	220,000
Surplus	580,984	762,563
Previous surplus	2,582,621	1,820,058
Total surplus	3,113,606	2,582,621
BALANCE SHEET—ASSETS		
Cash	567,083	249,483
Accounts and bills receivable.....	1,764,076	1,745,585
Inventories	3,179,007	2,568,872
Liberty bonds, other securities.....	163,903	235,237
Property account	7,126,091	6,868,583
Total	\$12,800,163	\$11,668,960
LIABILITIES		
Preferred stock	\$4,000,000	\$4,000,000
Common stock	4,000,000	4,000,000
Accounts payable	624,673	355,403
Advance payments	296,367	53,342
Accrued dividends	210,000	70,000
Accrued taxes, reserved.....	553,516	606,693
Surplus	3,113,606	2,582,622
Total	\$12,800,163	\$11,668,960

New York Air Brake Company

The annual report of the **New York Air Brake Company** for the year 1920 shows sales of \$6,545,846 compared with \$3,551,667 in 1919. Total income including profits from sales was \$1,779,315 compared with \$1,665,000 in the preceding year. These figures are equal to \$7.51 and \$6.24 respectively earned on the capital stock in each year.

After the payment of dividends on the capital stock the company reported a deficit for the year of \$222,017, but this does not include depreciation in inventory which was deducted from the profit and loss surplus, thereby reducing that account from a total of \$6,054,168 at the close of 1919 to \$4,047,628 at the end of 1920. The writoff for inventory loss amounted to \$1,534,522 and in addition \$250,000 was written off for contingent services.

President Charles A. Starbuck in his report says:

"Owing to the stringency in the money market during the past year, the railroads were not able to purchase very large amounts of new equipment, and while our sales were nearly double the year before, over one-half of the amount was for repair parts which the railroads were compelled to purchase to keep their trains in operation.

"You will note that provision has been made for federal taxes, reserve for depreciation and an additional substantial reserve for contingencies, and further that a very large amount has been written off various assets to meet the present-day deflated condition.

"Your property has been maintained in the highest state of efficiency, and liberal allowance expended for maintenance and repairs.

"The indebtedness to banks for borrowed money has been decreased substantially \$2,000,000 during the past year, and this has been accomplished largely through the reduction of merchandise inventories.

"Now that the Winslow bill has become a law and the railroads are receiving the money due them from the government we expect that they will soon place orders for large amounts of new equipment."

American Locomotive Company

The unfilled orders of the American Locomotive Company on December 31, 1920, as shown by its annual report, amounted to \$24,270,702 as compared with a total of \$8,999,921 at the close of 1919. Of the unfilled orders, about 64 per cent was for domestic work and 36 per cent for foreign business, while in the previous year 32 per cent was domestic and 68 per cent foreign.

The gross earnings for the company in 1920 amounted to \$66,884,613 as compared with \$70,073,582 in 1919. After deducting from the gross earnings \$58,137,473 for the cost of manufacturing, maintenance, administrative expenses, interest on bonds of constituent companies and an allowance for depreciation of \$1,326,811 on all classes of property there remained a gross profit for the year of \$8,747,140 from which has been deducted an allowance of \$1,636,014 for estimated United States and Canadian income and profits taxes, the remaining balance of \$7,111,126 being the available profit for the year. Dividends of seven per cent on the preferred stock and 6 per cent on the common, amounting to a total of \$3,250,000, were paid during the year. There remained a surplus of \$3,861,126 from which \$2,000,000 was reserved for additions and betterments to the present plants of the company and \$1,861,126 was credited to surplus.

President Andrew Fletcher in his report to the stockholders said: "The available profit for the calendar year was 10.6 per cent on gross earnings in comparison with 13.5 per cent for the calendar year 1919. An amount equal to \$21.45 per share was earned on the common stock of the company after providing for the regular \$7.00 per share on the preferred stock.

"For the future extension of the company's business it was decided to obtain property for a plant in the midwest section of the country and after careful consideration the St. Louis, Missouri, industrial district was decided upon as being a very advantageous location, not only because of the great number of railroads centering there, but also from the fact that it has been estimated that approximately 80 per cent of the materials entering into the manufacture and construction of locomotives and their tenders can now be obtained within a comparatively small radius of miles of that section. The company therefore negotiated the purchase before the close of the year of approximately 160 acres of land in the St. Louis district for the proposed plant. It is not at present the intention of the company to proceed with the erection of the plant and building operations will be deferred until general business conditions of the country become more stable.

"The excess of current assets over current liabilities December 31, 1920, was \$37,318,565. There has been included in current liabilities a reserve of \$1,911,538 to provide for current shrinkage in value of notes and bills receivable carried as current assets, and for the estimated loss at the prevailing discount on December 31, 1920, which would obtain in converting to United States dollars that part of the net working capital of the Montreal Locomotive Works which is expressed in Canadian dollars on the balance sheet of the Montreal Locomotive Company.

"The reserve of \$5,970,422 in current liabilities set up for accruals for United States and Canadian income and profits taxes, is, we believe, sufficient to provide for any differences in interpretation of the laws by the Internal Revenue Departments of both countries.

"The company has no bills payable outstanding and of the \$8,685,186 cash on hand on December 31, 1920, a considerable part of it since the first of the year has been invested in United States Treasury 5 3/4 per cent certificates.

"The amount of materials and supplies of inventory account together with work in progress December 31, 1920, was \$14,609,096 in comparison with \$7,170,805 as of December 31, 1919. The materials and supplies have been valued at cost or market price whichever was lower.

"The prospect in the immediate future of orders for equipment

of any appreciable volume is not promising. The unsettled general business conditions of the country at this time with the consequent drop in traffic on the railways, the conditions of railway finances, of labor and of materials are not conducive to any great amount of purchasing on the part of the railroads; however, it is a fact, that the effective equipment of cars and locomotives of the railroads of the United States has not kept pace the past few years with the natural growth and development of the country."

CONDENSED INCOME ACCOUNT OF THE AMERICAN LOCOMOTIVE COMPANY, MONTREAL LOCOMOTIVE WORKS, LIMITED, AND AMERICAN LOCOMOTIVE SALES CORPORATION COMBINED

	Twelve months ended December 31, 1920	Twelve months ended December 31, 1919
Gross earnings	\$66,884,613.18	\$70,073,581.93
Manufacturing, maintenance and administrative expenses and depreciation.....	58,043,172.51	58,115,819.50
Gross profit	\$8,841,440.67	\$11,957,762.43
Interest on bonds of constituent companies, etc.	94,300.77	228,189.02
	\$8,747,139.90	\$11,729,573.41
Deduct for United States and Canadian income and profits and taxes.....	1,636,013.60	2,235,304.32
Available profit	\$7,111,126.30	\$9,494,269.09
Dividends on preferred stock.....	1,750,000.00	1,750,000.00
Dividends on common stock.....	1,500,000.00	1,375,000.00
	\$3,861,126.30	\$6,369,269.09
Reserve for additions and betterments.....	2,000,000.00	4,000,000.00
Net credit in surplus account.....	\$1,861,126.30	\$2,369,269.09

Trade Publications

TAP DRILL SIZES.—A table of tap drill sizes for S. A. E. or A. S. M. E. machine tool standards has been prepared in pocket form by the Greenfield Tap & Die Corporation, Greenfield, Mass. Larger charts containing similar data and suitable for hanging in the shop for ready reference by the workmen, have also been brought out.

ACHIEVEMENT.—This is the caption of a folder being distributed by the J. G. White Engineering Corporation, 45 Exchange place, New York. It gives information about and illustrations of power developments, hydro-electric developments, transmission systems, and other important engineering projects in this and in foreign countries.

STEEL STRUCTURES FOR RAILROADS.—In a 12-page booklet issued by the McClintic-Marshall Company, Pittsburgh, Pa., are given views of a large number of structural steel buildings and bridges, fabricated and erected by that company for railroads in various parts of the country. Included among these are freight houses, shops, roundhouses, bridges, viaducts, and miscellaneous structures.

OIL DRIVEN AIR COMPRESSORS.—The oil engine driven air compressors manufactured by the Chicago Pneumatic Tool Company, are described and illustrated in bulletin 607, recently issued. The booklet opens with a short general description of the machine and the type of fuel required. This is followed by a condensed illustrated description of the important details of construction. One of the interesting features of the bulletin is a comparison of the cost of operating an oil engine compressor unit and the comparative cost of operating an equivalent sized steam driven compressor. The concluding pages are devoted to illustrations of the various types of machines with tables of sizes, weights, etc.

THE EASTERN REGION of the Pennsylvania Railroad in January broke all records for punctuality since the company resumed the management of its property last March. Of the total of 81,713 trains run 91.7 per cent arrived at destination on time and 95.8 per cent made schedule time. In January last year only 77 per cent of the trains were on time and 87.4 per cent of them made schedule time.

RAILROAD WORKMEN of various crafts at a number of places in the southern states announce that, throughout that region, a vote will be taken in the unions to see if a strike shall be ordered to support the strike of the employees of the Atlanta, Birmingham & Atlantic. Commissioner Chambers of the United States Board of Mediation, has tendered the services of that board as mediators in the strike on the A. B. & A.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company has authorized the construction of a blacksmith shop at San Bernardino, Cal., with dimensions of 80 ft. by 306 ft., to cost \$107,000. The company will also build a lavatory building at Needles, Cal., to cost \$22,500.

CHICAGO UNION STATION COMPANY.—This company will shortly accept bids for the construction of a 260 ft. viaduct at Madison street, Chicago. The company will also widen Canal street 40 ft., between Van Buren and Jackson streets, Chicago.

ILLINOIS CENTRAL.—This company contemplates building a passenger station at Gilman, Ill., replacing a structure burned recently. The company also contemplates the construction of passenger stations at Baton Rouge, La., and Grand Junction, Tenn., replacing facilities no longer adequate.

MISSOURI PACIFIC.—This company contemplates rebuilding its shops at St. Louis, Mo., which were recently destroyed by fire at a loss of \$150,000.

MONTANA RAILROAD.—This company has applied to the Interstate Commerce Commission for a certificate authorizing the operation of its recently constructed line of 6 miles.

SAN ANTONIO & ARANSAS PASS.—This company is adding a second story to its freight station at Yoakum, Tex.

ST. LOUIS-SAN FRANCISCO.—The Employes Hospital Association of the St. Louis-San Francisco contemplates the construction of a new 120-bed hospital at Springfield, Mo., replacing the present structure.

UVALDE & NORTHERN.—The Interstate Commerce Commission has denied this company's application for a certificate of public convenience and necessity for the construction of a line of 37 miles in the counties of Uvalde and Real, Tex., on the ground that the Commission cannot find in the record that degree of assurance of a reasonably successful enterprise which would warrant the issuance of a certificate.

WICHITA FALLS & SOUTHERN.—The Interstate Commerce Commission has issued a certificate authorizing this company to construct a line from Newcastle to Breckenridge, Tex., a distance of approximately 44 miles. Protests against the granting of the certificate were filed by the Eastland, Wichita Falls & Gulf, the Cisco & Northeastern, the Texas & Pacific, and the Gulf, Texas & Western, on the ground that the construction of the new line would reduce their revenues.



Photo by Underwood & Underwood

Parts of Big German Guns Being Shipped as Scrap to the Foundries in Accordance with Terms of the Treaty

Railway Financial News

ALABAMA & VICKSBURG.—*Loan Approved.*—The Interstate Commerce Commission has approved a loan of \$1,564,000 to this company to assist it in meeting its maturing indebtedness aggregating \$1,936,900, and in providing itself with additional locomotives at a total estimated cost of \$340,000. The carrier itself is required to finance about \$715,000 to meet the loan of the government.

BERGEN COUNTY.—*Asks Authority to Extend Bonds.*—This company has applied to the Interstate Commerce Commission for authority to extend for 10 years the maturity date of \$200,000 of first mortgage bonds maturing on April 1.

BUFFALO, ROCHESTER & PITTSBURGH.—*Bonds Paid.*—The \$1,300,000 6 per cent bonds due February 1, 1921, were paid off at maturity at the office of A. Iselin & Co., 36 Wall street, New York. The company obtained a government loan of \$1,000,000 to help it in meeting this maturing debt.

CENTRAL OF NEW JERSEY.—*Coal Company Dividend.*—The Lehigh & Wilkes-Barre Coal Company has declared a special cash dividend of 150 per cent on its \$9,210,000 stock outstanding. Of this dividend, amounting to \$13,815,000, the Central of New Jersey gets \$12,734,000 on the stock which it owns. The decision to declare the special dividend resulted from a necessity imposed on the Jersey Central by the Reading segregation of disposing of its Lehigh & Wilkes-Barre stock. By a modification of the Reading decree the coal company was permitted to declare any dividend warranted by its financial condition.

CHICAGO, MILWAUKEE & ST. PAUL.—*New Directors.*—Mortimer N. Buckner, of the New York Trust Company, and W. E. S. Griswold, of the Lima Locomotive Works, have been elected directors to succeed Percy A. Rockefeller and John A. Stewart, resigned, in compliance with the provisions of the Clayton Act.

CHICAGO, ROCK ISLAND & PACIFIC.—*Asks Loan from Revolving Fund.*—This company has applied to the Interstate Commerce Commission for a loan of \$1,905,000 for five years from the revolving fund, to pay off at maturity on October 1, 1921, a like amount of bonds of the Cedar Rapids, Iowa, Falls & North Western.

CHICAGO & NORTH WESTERN.—*Authorized to Issue Equipment Trust Certificates.*—This company has been authorized by the Interstate Commerce Commission to enter into a proposed trust agreement providing for the issuance of \$9,630,000 of equipment trust certificates, with interest at not exceeding 7 per cent, to be sold at not less than 97 per cent of par, for the purchase of equipment authorized by the board of directors to the amount of \$9,684,093.

DENVER & RIO GRANDE.—*Confirmation of Sale Deferred.*—Postponement of confirmation of the sale of this road until March 25, during which time the stockholders would be given an opportunity to purchase the road for \$10,000,000, has been ordered by Federal District Judge Lewis, of Colorado, sitting at Kansas City, Mo., with Federal Judge W. H. Sanborn. Judge Lewis announced the decision after an all-day hearing on an action to enjoin confirmation of the sale fixed by the court November 20 at \$5,000,000.

"It is ordered," the court instructed, "unless the stockholders shall make or cause to be made a deposit of \$100,000 with the clerk of the court, and also cause such depositary to consent in writing filed with the clerk, the said \$100,000 may be and shall be paid over to the receiver for the benefit of the property under administration if the depositary fails to bid and purchase the equities in the properties described in the master's sale for the sum of \$10,000,000 or more within twenty days after March 5, 1921. Unless no higher bid is made or accepted by the court the sale already made will be confirmed."

GAINESVILLE MIDLAND.—*Receivership.*—Gordon Carson and W. B. Veazey of Gainesville, Ga., have been appointed receivers. The road operates between Gainesville and Athens, 42 miles, with a branch line to Monroe, 32 miles. President George J. Baldwin recently said that the road would have to cease operations as a result of the refusal of employees to vote a reduction in their wages. Mr. Baldwin submitted the following statement to the employees:

The Gainesville Midland has lost in operating expenses over and above all income and revenue during the last twelve months, \$84,484.87, and this loss is continuing with no apparent prospect of improvement. Under these conditions, which have crippled the road, it is clearly apparent to everyone that unless immediate relief can be secured it can no longer continue to operate. We have no credit or means of securing additional funds.

The wages of employees have increased from the sum of \$83,343.20 paid in 1917, to \$180,913.02 in 1920.

The principal owners of the road and mortgage creditors have indicated a willingness to defer any interest or income on the investment of over a million dollars to adjust the situation as far as they can.

The proposition is therefore made to the employees to devote all income from the operation of the road during this period to the payment of necessary operating expenses and to the wages of employees for the above period of the wages of employees on this basis:

This is the only possible way the road can continue to operate and we therefore urge your serious consideration and immediate acceptance of this plan.

NORFOLK & PORTSMOUTH BELT.—*Asks Authority to Issue Notes.*

—This company has applied to the Interstate Commerce Commission for authority to issue \$63,900 of notes to the Baldwin Locomotive Works for new locomotives.

NORTHERN PACIFIC.—*Forms Company to Develop Oil Lands.*

—This road has joined with experienced oil interests in creating a new concern known as the Absaroka Oil Development Company. George T. Slade, formerly vice-president of the road, will be president of the new company, which will take up and deal with all applications for leases received by the railway during the last few months. An announcement of these changes says:

It is the intention and desire of the new company so to develop the Northern Pacific lands as to promote the interests not only of the Northern Pacific, but as well of the states in which the lands are situated.

The Northern Pacific owns a substantial acreage of land and of oil and gas rights in parts of North Dakota, Montana and Wyoming, where there are possibilities of oil production. Preliminary investigations have disclosed some 35 so-called "structures" in these states where geological conditions indicate there may be oil and gas. Some of these structures have already been tested and in two locations oil has been produced in commercial quantity, namely, Elk Basin district, mostly in Wyoming, and the Cat Creek district, in the central part of Eastern Montana.

In order to handle its land and rights in the most intelligent and progressive manner and so as to further the development of the oil and gas resources of North Dakota, Montana and Wyoming, the Northern Pacific Railway Company has joined with interests experienced in the oil business in creating a company known as the Absaroka Oil Development Company. This company will be the medium through which the railway company will continue a thorough investigation of all the oil and gas possibilities of its land holdings and make explorations for its own account or lease to others the right to explore and develop. The company will have its main headquarters in New York City with an office in Billings, Mont., in charge of responsible managers and agents.

PENNSYLVANIA.—*Annual Meeting.*—The stockholders at their annual meeting in Philadelphia on March 8 approved, subject to a formal stock vote, the resolution authorizing the corporation to increase its indebtedness \$100,000,000 for such expenditures as the directors deem necessary. All leases of subsidiary lines presented to the meeting were also approved, subject to a stock vote, and the annual meeting was changed from the second Tuesday in March to the second Tuesday in April.

Annual Report.—The Pennsylvania Railroad's annual report is reviewed editorially in this issue.

Authorized to Issue Bonds.—The Interstate Commerce Commission has issued an order authorizing the issuance of \$60,000,000 of 15-year, 6½ per cent secured gold bonds which were recently sold, subject to the Commission's approval, to Kuhn, Loeb & Co., at 95.40, and also for the issuance of \$60,000,000 of general mortgage bonds at 6 per cent, to be pledged as security in part for the 6½ per cent bonds.

New Director.—Edgar C. Felton, of Philadelphia, has been elected a director to succeed Andrew W. Mellon, of Pittsburgh, resigned.

Reading.—*Call for Proxies.*—A letter has been issued by the common stockholders' protective committee of the Reading Company, of which Seward Prosser, president of the Bankers Trust Company of New York, is chairman, calling for proxies and stating proxies have been received for about 300,000 shares. The committee has taken the position that the Reading Company's accumulated surplus of \$33,000,000 belongs to the common stockholders, and will support this contention at future hearings.

John L. Clawson, in a letter to William A. Law, president of the First National Bank and a member of the preferred stockholders' committee, objects to that section of the plan which provides for payment of \$10,000,000 to Reading general mortgage bondholders upon signing of discharge of coal company from lien of mortgage. Mr. Clawson says:

"If the \$10,000,000 to be paid should be used for the purchase of Reading bonds in the open market, it would relieve the railroad of at least \$400,000 a year interest which would accrue to the benefit of all the stock. The

mortgage would then be reduced by this amount, and the bonds which are to be received in additional consideration for releasing the coal stock, could be held by the trustees as security for the balance of the general mortgage bonds.

"In reference to the Reading Iron Company it will be found the decree states that the Reading company shall become a railroad company alone; therefore, this stock should be distributed among the holders in same manner as the coal stock. This would be a considerable advantage of great value to the present stockholders which you represent."

Intervention Sought.—The Penn Mutual Life Insurance Company as the owner of \$1,000,000 par of the Reading general mortgage 4 per cent bonds has filed a petition in the District Court of Philadelphia for leave to intervene in the Reading segregation plan for the protection of its rights in the distribution of the assets of the company. Because of its holdings the company states it is vitally interested in the distribution of the assets of the Reading Company. This is the first petition for intervention filed since the hearing on the plan on March 1. At that time Judge Buffington stated that all interests would be allowed two weeks to file petitions to intervene in the suit. The Prosser Common Stockholders Committee, the Iselin Preferred Stockholders Committee and the Central Union Trust Company of New York, trustee under general mortgage, are already on record as having intervened in suit.

SAVANNAH & ATLANTA.—*Receivership.*—C. E. Gay, Jr., president and general manager of this road, was appointed its receiver on March 4, by Judge Evans, of the United States District Court at Savannah, Ga. The petition for the receivership was filed by Theodore G. Smith and John B. Johnston, receivers for Imbrie & Co., of New York, who own a majority of the common and preferred stock of the Savannah & Atlanta. The financial difficulties of this banking firm forced it into the hands of receivers on March 3, and hence the receivership of the road, which was heavily indebted to it. The Savannah & Atlanta operates between Camak, Ga., and Savannah, 147 miles.

SEABOARD AIR LINE.—*Authorized to Issue and Pledge Bonds.*

—This company has been authorized by the Interstate Commerce Commission to issue \$715,000 of first and consolidated mortgage gold bonds at 6 per cent, maturing September 1, 1945, and to pledge various securities with the Secretary of the Treasury as security for loans aggregating \$2,625,000 from the revolving fund.

ST. LOUIS-SAN FRANCISCO.—*Not to Take Over A. B. & A.*—E. N. Brown, chairman of the St. Louis-San Francisco, denies the road is negotiating to take over the Atlanta, Birmingham & Atlantic, with which it connects by subsidiary line at Birmingham.

VALDOSTA, MOULTRIE & WESTERN.—*No Bids at Sale.*—There were no bids made for this road when it was offered for sale at the upset price of \$165,000 at Valdosta, Ga., on February 22.

WASHINGTON & CHOCTAW.—*Sale.*—This 11-mile line has been sold to the Cochran Lumber Company, of Meridian, Miss.

WESTERN MARYLAND.—*Authorized to Issue and Pledge Equipment Notes.*—This company has been authorized by the Interstate Commerce Commission to issue \$1,500,000 of equipment gold notes, preferred series, and \$1,500,000 junior series, and to pledge the \$1,500,000 of the junior series with the Secretary of the Treasury as part security for a loan from the revolving fund. The notes are to represent the deferred payments on the purchase price of 40 freight locomotives now under construction by the Baldwin Locomotive Works.

WILLIAMSPORT & NORTH BRANCH.—*Foreclosure Sale.*—Holders of \$540,000 bonds of this company bought in the railroad property at the upset price of \$25,000 fixed by the court. There are holders of \$5,000 bonds who did not join in the purchase.

Dividends Declared

Kansas City, Ft. Scott & Memphis—Four per cent preferred, 1 per cent quarterly, payable April 1 to holders of record March 23.

Lehigh & Wilkes-Barre Coal Company—Special cash 150 per cent, payable March 5 to holders of record February 28.

Lehigh Valley—Common, 1¾ per cent quarterly; preferred, 2½ per cent quarterly; both payable April 2 to holders of record March 12.

Minneapolis, St. Paul & Sault Ste. Marie—\$2, semi-annually, payable April 1 to holders of record March 19.

Northern Pacific—1¾ per cent, quarterly, payable May 2 to holders of record March 18.

St. Joseph, South Bend & Southern—Common, 1 per cent, quarterly; preferred, 2½ per cent, quarterly; both payable March 15 to holders of record March 11.

Western Pacific—Preferred, 1½ per cent, quarterly, payable April 1 to holders of record March 18.

Railway Officers

Executive

Henry Ford has been elected president of the Detroit Toledo & Ironton, succeeding **J. A. Gordon**, who will remain on the board of directors.

C. H. Drazy, assistant to the vice-president of the Illinois Central, has resigned, effective March 1, to engage in the automobile accessory business.

Charles Hicks, formerly general manager of the Tennessee, Alabama & Georgia, and who since December 15 has been temporary receiver of that company, was, on February 5, appointed permanent receiver.

Financial, Legal and Accounting

H. B. Crane, chief clerk to the president of the Chicago, Indianapolis & Louisville, has been promoted to cashier, with headquarters at Chicago.

W. E. Kennedy, auditor capital expenditures of the Louisville & Nashville, with headquarters at Louisville, Ky., has been promoted to assistant controller, succeeding **G. W. Lamb**, who has resigned, effective March 1. Mr. Kennedy will continue to have jurisdiction over the auditor capital expenditures department.

Operating

J. A. Gleason, special assistant to the general manager of the Chesapeake & Ohio, has been appointed superintendent of telegraph, with headquarters at Richmond, Va., effective February 15.

Traffic

D. R. Peck has been appointed general agent of the Kansas, Oklahoma & Gulf, with headquarters at Chicago, effective March 1.

M. Broadbudd has been appointed commercial agent of the Norfolk & Western, with headquarters at Ft. Worth, Tex., effective February 16.

F. S. Olds has been appointed general live stock agent of the New York, Chicago & St. Louis, with headquarters at Cleveland, O., effective March 1, succeeding **W. L. Ryan**, deceased.

D. S. Romney has been appointed assistant to the general manager of the Utah-Idaho Central, with headquarters at Ogden, Utah, effective March 15, succeeding **E. F. Muller**, who has resigned.

G. A. Howard has been appointed chief dispatcher of the Brownville division of the Canadian Pacific, with headquarters at Brownville Junction, Me., succeeding **J. H. Todd**, transferred, effective March 4.

J. E. Hutchinson, commercial freight agent of the Western Maryland, with headquarters at Minneapolis, Minn., has been transferred to a similar position with headquarters at Cleveland, O., effective March 1. **C. C. Gray** succeeds Mr. Hutchinson at Minneapolis.

H. P. Hathaway, division freight agent on the Chesapeake & Ohio, with headquarters at Chicago, has been promoted to assistant general freight agent, with the same headquarters, succeeding **William Fitzgerald**, who has resigned. **F. J. Vanderblue** succeeds Mr. Hathaway.

Engineering, Maintenance of Way and Signaling

J. A. Gorr, division engineer of the Shreveport division of the Louisiana lines of the Southern Pacific, has been transferred in a similar capacity to the Lafayette division, Lafayette, La., succeeding **J. A. Lambert**, resigned.

C. T. Jackson, whose promotion to principal assistant engineer of the Chicago, Milwaukee & St. Paul, with headquarters at Chicago, was announced in the *Railway Age* of March



C. T. Jackson

4 (page 534), was born at Miami, Mo., on July 13, 1881, and graduated from the University of Missouri in 1903. He entered railway service in the same year as an instrumentman on the Montana Railroad, being employed in the construction of the road's Harlowtown and Lewistown line. When the Montana Railroad was purchased by the Chicago, Milwaukee & St. Paul, Mr. Jackson remained in the employ of the latter company, and from 1905 to 1909 served as assistant engineer and locating engineer, with headquar-

ters at Helena and Butte, Mont., being engaged in the construction of the Coast extension of the St. Paul. In 1909 and 1910 he was assistant engineer on the LaCrosse division, with headquarters at Sparta, Wis. In 1910 he was appointed locating engineer, and served in both that capacity and as district engineer until 1915, being engaged in building the line from Lewistown to Great Falls, Mont. In 1915 he was appointed pilot engineer in connection with valuation work, and district engineer with headquarters at Butte, Mont., and later at Chicago. He was serving in the latter capacity at the time of his recent promotion.

Obituary

J. G. Walker, chief dispatcher of the Houston division of the Texas lines of the Southern Pacific, died at San Antonio, Tex., on February 28.

C. G. Hedge, formerly vice-president of the Missouri, Kansas & Texas, died at Garden City, Long Island, on March 6, at the age of sixty-nine.

C. W. Hillard, vice-president of the St. Louis-San Francisco, died at his home in New York on March 8. Mr. Hillard was born in England in 1855. He came to this country in 1876

and entered railway service as private secretary to the president of the Chicago, St. Paul & Minneapolis (later absorbed by the Chicago & North Western). He was later appointed assistant secretary of this road and continued in this capacity until 1882. In 1885 he became secretary and treasurer of the Chicago & Indiana Coal Railway. When this road was absorbed by the Chicago & Eastern Illinois in 1887, Mr. Hillard became vice-president and treasurer of the latter company. When this road came under the control of the Chicago, Rock Island & Pacific in 1906 he became fourth vice-president of the Rock Island. From 1907 until his death Mr. Hillard was vice-president of the St. Louis-San Francisco.



C. W. Hillard

EDITORIAL

Railway Age

EDITORIAL

DAILY EDITION

A layman who attended a meeting of engineers was deeply impressed with the way in which they discussed the various questions. "They arm themselves with facts and lay them on the table face up," he said. It is because of these characteristics that engineers can be a large factor in

The Engineer and the Public

helping to place the needs of the railways clearly and forcefully before the citizens of the communities in which they live. There is little question as to the roads being given a square deal by the public if the exact conditions under which they are working and their resources are clearly understood by the public. Here is a real opportunity for the engineer if he will but realize his importance and value as an educator.

It is perhaps trite to suggest that a railway man can learn more in a given space of time at an exhibit like the one now in progress at the Coliseum than it would be possible for him to absorb in any other way. However, it would seem rather strange to advocate the supply show as a source of economy for the exhibitor, yet many of the manufacturers are actually finding this to be the case. As one exhibitor expressed it yesterday, "I have been planning to make an extended trip to call on a number of railway men I have not seen for a considerable time, but I have met so many of them here today and expect to find most of the rest of them before the show is over that I can call my trip off." The exhibit is just another evidence of efficiency in modern business.

The Exhibit as a Money Saver

When business is good most people think it is going to get better. When business is bad most people think it is going to get worse. The wise minority knows that when it is very good it is going to get worse, and that when it is very bad it is going to get better, and profits by its superior wisdom at the expense of the majority which always thinks that present tendencies are going to continue to prevail. Business is now very bad and, therefore, the man who says that it is soon going to get better takes the chance of having most people think he is either whistling to keep up his courage or is a little crazy. The fact is, however, that business already is getting better. There is no surer measure of business activity than the amount of freight handled by the railways. There was a tremendous decline in freight business which began in October. About six weeks ago the decline stopped and the business remained small but steady until the week ended March 5. In that week car loadings increased to 712,822, or about 50,000 over the preceding week. This is the first week in which there has been a substantial increase since the big decline began. The increase may not be maintained, but all indications

Will Business Get Better?

are that the decline in business has stopped and that its tendency hereafter will be more or less slowly upward. It will be recalled that a lady once asked a sea captain whether it was going to quit raining. He replied that he thought it was. "It always has, you know, ma'am," he said. Likewise, the decline in business activity was bound to stop sooner or later. It always has. Furthermore, business never stands still very long. When it is not getting worse, it is almost always getting better. It is risky to make predictions, but we venture to predict that future developments will show the railroads and the country are now seeing the very worst that they are going to see for a long time to come.

Engineers of all kinds—civil, mechanical and electrical—can be important factors in helping the railroads through the present difficult situation. It is vital that waste and lost motion be eliminated from all departments and operations. This will require the most searching and scientific analysis of operating and other conditions, a task for which men with an engineering training are specially fitted. The Federation of American Engineering Societies, under the leadership of Herbert Hoover, has a strong commission at work looking into conditions in industry with a view of suggesting ways and means by which waste of all kinds may be eliminated. The engineer has restricted his energies in this direction in the railway field almost entirely to studies made in relation to improvements and betterments in facilities and equipment. It would appear that he must be called upon to accept larger and broader responsibilities.

Engineers and Improved Operation

The March stated meeting of the present Signal section of the Engineering division, American Railway Association, which has been held each year in connection with the annual meeting of the American Railway Engineering Association and National Railway Appliances Association at Chicago, has been called off for the first time. Because of the benefits derived from the meeting itself and from the opportunity to view the exhibit of railway appliances, which are used in the railway maintenance of way and signal fields, the March stated meeting has been considered by many of us as great or greater importance than the annual meeting. The members present at these meetings in the past have had the opportunity to talk over their problems with the experts in the railway field who are in attendance at the Coliseum for this purpose, and as a result they have returned to their respective railroads broader and better men. The cancellation of the Signal section meeting, as well as other section meetings of the A. R. A., cannot help but react unfavorably on the members of these sections, as it raises a question in their minds as to whether their particular associations have

Cancellation of
March
Signal Meeting

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been strengthened by an amalgamation with the A. R. A. or whether it would not have been better to co-operate with the A. R. A. along the lines adopted by the A. R. E. A.

Twenty-six years ago the eleventh of March, the Railway Signaling Club was organized to advance the science of signaling and 18 years ago its name was changed to the Railway Signal Association, which name it retained for 16 years, when in 1919 it became the Signal division, Engineering section, American Railroad Association, the name being again changed to the Signal section, Engineering division, American Railway Association, under the last reorganization of the A. R. A. At the time of its amalgamation some members were bitterly opposed to its change in status. Others were neutral, preferring to pass judgment at a later date, and still others were favorably disposed to the change. Good arguments were advanced both for and against the change. A difference of opinion still exists which will be strengthened by the cancellation of the meeting, and the best work cannot be accomplished without the whole-hearted support of the entire membership.

It is a fact that much good work has been accomplished by the association since it became a part of the A. R. A. and for the benefit of the railroads it is desirable that this good work be continued. This, however, cannot be done if the feeling is allowed to prevail that the meetings may be arbitrarily cancelled. As it is now, it will be necessary for the section to overcome increased opposition to the amalgamation made two years ago.

The Value of Exhibits of Railway Appliances

TWO LARGE EXHIBITS of appliances and supplies have been given almost every year by the railway equipment and supply companies for many years in connection with railway conventions. One of these has been the exhibit of the National Railway Appliances Association on the occasion of the annual convention of the American Railway Engineering Association. The other has been that of the Railway Supply Manufacturers' Association on the occasion of the conventions of the railway mechanical associations. The Railway Supply Manufacturers' Association decided last week not to give its annual exhibit in connection with the mechanical conventions in June. This decision was made in order to save money at a time when owing to bad general business conditions the earnings of both the supply companies and the railways are seriously depleted. The action of the Railway Supply Manufacturers' Association raises the question whether and how often such exhibits should be given. The cost to supply companies that exhibit is a substantial amount of money. The expense incurred directly or indirectly enters ultimately into the price that the railways must pay for equipment and supplies. The consensus of opinion of railway officers and railway supply men always has been, however, that the opportunity given railway officers to examine in a short time a large amount of appliances and machinery used by the railways, including the new ones and the improvements made from year to year in the old ones, had a very direct and important tendency to enable the railway officers to select and buy those things which would contribute most towards increasing the efficiency and economy of operation.

The savings indirectly resulting it has been believed far exceed the direct cost of exhibits. The *Railway Age* always has shared this view and we still have no doubt

whatever that it is correct, but there are times and circumstances which may justify the abandonment of the exhibits and even of the railway conventions. It would, however, be a great mistake to abandon the exhibit under such conditions. There never was a time when there was such pressing need for reducing railway operating expenses as now. Temporary reductions may be obtained by drastic retrenchments. These, however, usually involve the deferring of large amounts of maintenance and in the long run deferred maintenance never is economical. The large permanent reductions in operating expenses needed cannot be obtained except by constant, thorough study of all the reasons why expenses are high and the utmost effort in devising and carrying out measures that will change the conditions which make them high.

The development of means of permanently reducing expenses must include thorough investigation of all new and improved railway appliances. If railway officers can and do learn more about these things within a few days by inspecting large exhibits than they could learn in weeks or months if such exhibits were not held, then the value of the exhibits as a means of increasing railway efficiency and economy is justified. In periods of stress and depression such as the present time every measure anybody may suggest which will cause immediate savings is likely to be adopted regardless of its ultimate and larger consequences. The question of giving large exhibits of railway appliances in connection with conventions is one which may properly be considered at any time, but acute conditions such as exist at present should not be allowed to cause snap judgment to be taken which ignores the larger and broader effects of the important policies of the railways and of the railway supply companies. Temporary emergencies make necessary the adoption of temporary expedients to meet them, but temporary emergencies should not be allowed to dictate or even suggest the abandonment of the exhibits or of any other means which have been successfully used for a long period of years to promote the development and increase the efficiency of the railroads.

Annual Meeting of the National Railway Appliances Association

The annual meeting of the National Railway Appliances Association will be held in the dining room at the Coliseum at 11 o'clock this morning. Reports will be received from retiring officers and new officers will be elected. It is also expected that the question of holding an exhibit next year will be discussed at length.

The Nominating Committee appointed by President J. B. Strong to select officers of the Association for the ensuing year submitted its report last evening. The selections were as follows:

President—George C. Isbester, American Chain Company, Chicago.

Vice-President—T. W. Aishton, National Malleable Castings Company, Chicago.

Directors for three years—A. A. Taylor, Fairbanks, Morse & Company, Chicago, and G. E. Geer, Wyoming Shovel Company, Chicago.

The secretary-treasurer will be elected later by the new board.

According to the by-laws Mr. Strong will become honorary director. Mr. Taylor, who was elected to a full three-year term, was filling an unexpired term of one year. P. C. Jacobs, who has served as honorary direc-

tor during the past year, now retires. Messrs. Johnson, Shugg, Gillingham and Filkins remain on the board.

The nominating committee consisted of P. C. Jacobs, Johns-Manville, Incorporated; L. B. Sherman, *Railway Age*; E. E. Hudson, Waterbury Battery Company; A. S. Anderson, Adams & Westlake Company, and G. R. Lyman, William Wharton, Jr., & Company.

A. R. E. A. Convention Program

The following is the program for the American Railway Engineering Association convention which will open this morning. The morning sessions will extend from 9:15 a. m. to 12:30 p. m. and the afternoon sessions from 2 p. m. to 5:30 p. m.

Tuesday, March 15

	President's address.	
	Reports of secretary and treasurer.	
	Reports of standing and special committees.	
X.	Signals and Interlocking.....	Bulletin 230
II.	Ballast	Bulletin 230
XVIII.	Electricity	Bulletin 231
Special.	Stresses in Railroad Track.....	Bulletin 230
V.	Track	Bulletin 234
IV.	Rail	Bulletin 231
Special.	Standardization	Bulletin 231
XX.	Uniform General Contract Forms.....	Bulletin 232

Wednesday, March 16

IX.	Signs, Fences and Crossings.....	Bulletin 232
III.	Ties	Bulletin 232
XV.	Iron and Steel Structures.....	Bulletin 232
XXII.	Water Service.....	Bulletin 232
XXI.	Economics of Railway Labor	Bulletin 231
XXI.	Economics of Railway Operation	Bulletin 234
XVI.	Economics of Railway Location	Bulletin 233
XXIII.	Shops and Locomotive Terminals.....	Bulletin 233
VI.	Buildings	Bulletin 235
	Annual dinner at 6:30 p. m.	

Thursday, March 17

VIII.	Masonry	Bulletin 233
I.	Roadway	Bulletin 234
XVII.	Wood Preservation	Bulletin 233
VII.	Wooden Bridges and Trestles.....	Bulletin 233
XIV.	Yards and Terminals.....	Bulletin 235
XII.	Rules and Organization.....	Bulletin 234
XI.	Records and Accounts.....	Bulletin 235
XIX.	Conservation of Natural Resources....	Bulletin 235
	New Business.	
	Election and Installation of Officers.	
	Adjournment.	

Mark W. Potter Confirmed

The Senate on Saturday confirmed the appointment of Mark W. Potter as a member of the Interstate Commerce Commission. It will be recalled that Commissioners Potter and Ford were serving under recess appointments made by President Wilson; these expired on March 4, since they were never confirmed by the Senate. President Harding nominated Mr. Potter and John J. Esch, but Senator La Follette objected to Mr. Esch and has insisted on the right to file a minority report to the action of the Committee Interstate Commerce in recommending confirmation. This will delay Mr. Esch's confirmation until the extra session of Congress called for April 11. There are still two more commissioners to be appointed; one to fill the vacancy which has existed since the expiration of Robert W. Woolley's term on December 31, and the other to fill the vacancy which has existed since the Commission was enlarged and caused by the fact that James Duncan did not accept the recess appointment made by President Wilson.

The Railroad Labor Board

Subpoenas Railroad Officers

The Railroad Labor Board at the instance of representatives of the labor unions yesterday issued subpoenas for the following railway officers to appear before it on Friday: W. W. Atterbury, vice-president of the Pennsylvania Railroad; C. R. Gray, president of the Union Pacific; W. T. Tyler, vice-president of the Northern Pacific, and Robert S. Binkerd, assistant to the chairman of the Association of Railway Executives.

Frank P. Walsh, attorney for the labor organizations, some time ago presented a request that all members of the Labor committee of the Association of Railway Executives should be subpoenaed for the purpose of explaining to the board the attitude of the railways regarding national boards of adjustment and national agreements. The Association's Labor committee was abolished at its last meeting. Robert S. Binkerd was secretary of this committee and the labor organization asked that he be subpoenaed to bring before the board papers showing the deliberations of the railway executives and national agreements. General Atterbury was chairman of the Labor committee.

Mr. Gray was a member of the Labor committee and also formerly was director of operation of the Railroad Administration. W. T. Tyler succeeded Mr. Gray as director of operation of the Railroad Administration, but was not a member of the Association's Labor committee. He evidently was subpoenaed because of his former position in the Railroad Administration. Mr. Tyler has been very sick and it is regarded as doubtful if he will be able to appear before the board.

While the labor spokesmen asked that these men be subpoenaed for the evident purpose of getting them to tell about the deliberations of the railway executives before they determined upon their policy regarding boards of adjustment and national agreements, it is a notable fact that the subpoenas issued by the Labor Board require them merely to appear and give testimony upon the subject of national agreements.

The attorney for the labor unions, in demanding that the subpoenas be issued, gave notice to the board that unless they were issued the labor unions would refuse to go on with the hearings on national agreements and would withdraw.

The Annual Dinner

The annual dinner of the American Railway Engineering Association will be held in the Gold Room of the Congress hotel at 6:30 Wednesday evening. The speakers will include John F. Wallace, consulting engineer, New York City, and formerly chief engineer and general manager of the Illinois Central and chief engineer of the Panama Canal; Dr. David Kinley, president of the University of Illinois, and the Honorable William Renwick Riddell, justice of the Supreme Court of Ontario, Canada.

New Superintendent of Telegraph

on Canadian National

William Gerard, assistant superintendent of telegraph of the Canadian National Railways, at Winnipeg, Man., has been made plant superintendent of the Canadian National telegraphs with jurisdiction over the railroad and commercial lines over the territory from Port Arthur to Edmonton, with the same headquarters.



A. H. McKeen, system signal engineer of the Union Pacific, was on the train which was wrecked at Agnew, Ill., yesterday. Mr. McKeen came to attend the committee and the A. R. E. A. meetings.

* * *

With this convention E. H. Fritch has completed 22 years' continuous service as secretary of the American Railway Engineering Association. This is a most unusual record which reflects credit on both the association and Mr. Fritch. His many friends in the association hope that he may be able to serve for 22 years more at least.

* * *

The uncertainty prevailing in the railway industry at present is reflected in the fact that a considerable number of signal engineers and other signal department officers, who at first contemplated attending the stated meeting of the Signal division of the A. R. E. A., had decided to remain at home after the meeting was called off, but later received word at the last minute to be in attendance and are present at the A. R. E. A. meeting and the exhibit of the National Railway Appliances Association at the Coliseum.

* * *

Dean F. E. Turneure, of the University of Wisconsin, will be unable to attend the convention this year. He was here yesterday to attend the meeting of the Board of Directors of the American Railway Engineering Association, but had to return to Madison last night. Dean Turneure's anxiety to get away was prompted by the holding of a legislative budget hearing at the Wisconsin state capital and the dean feels that his presence is necessary in the interests of the College of Engineering which must be represented.

* * *

V. C. Armstrong, president of the Rail Joint Company, presided yesterday at a luncheon and business meeting of representatives of that company from various parts of the country. It was stated that the company has enough orders on hand at present to keep it busy for the next four months and the outlook is good for increased business. J. G. Greer, district sales agent from San Francisco, was on the Overland Limited of the North Western which was wrecked at Agnew, Ill., yesterday morning.

* * *

Louis Yager, engineer maintenance of way of the Northern Pacific, at St. Paul, was among the early arrivals at the convention yesterday. Mr. Yager is now recovering from a long illness, having been taken sick during the summer while in Washington on work incident to the liquidation of claims against the Railroad Administration. After being confined to a hospital in Washington for four months, he recovered sufficiently to return

to his home in St. Paul only about the first of January. Mr. Yager has been active in the work of the Committee on Economics of Railway Operation during the past year, serving as chairman of one of its sub-committees.

* * *

Among the interesting visitors at the Coliseum yesterday was Mr. Yoshiyuki Hashimoto, who plans to spend the week at the exhibit with Mr. K. Asakura, a member of the German Reparation Commission. Mr. Hashimoto is a civil engineer by profession and is a member of the committee of three delegated by the Imperial Government of Japan to investigate the relative merits of narrow gage and broad gage railways in foreign countries, with a view to recommending the extension of the present narrow gage system of the Imperial Government Railways or of remodeling the narrow gage system to a broad gage system. Mr. Hashimoto called attention to the fact that the Imperial Government Railways comprise about 8,500 miles of road within the confines of Japan and a total of about 10,000 miles, including Formosa and Manchuria. 6,000 miles of this railway system being owned by the Imperial Government and the remainder owned by private interests but subject to the regulations of the Imperial Government. He also stated that the Japanese parliament in its last session had authorized the expenditure of a billion dollars to improve the present system. Mr. Hashimoto has been making a study of this problem for a period of two years and is now returning to Japan. He expressed the opinion that the American railways were the finest that he had encountered in his extensive study, while the African system was the finest of the narrow gage railways. Mr. Hashimoto stated that the Japanese railways are also experiencing the general depression in business following the war, at the present time, but are still handling a fairly large amount of business and that the wages and prices of materials have not yet begun to decrease materially.

* * *

A. G. Shaver, consulting signal and electrical engineer, has returned within the past month from a trip through Great Britain and France where he was investigating the railroad situation. In discussing the railroad situation in England Mr. Shaver felt that the facilities were quite inadequate, particularly around the vicinity of London, the lack of room seriously handicapping expansion. The signaling also appears to be inadequate to handle the traffic properly. However, the signal engineers are alive to this question and are taking such steps as they can to relieve the situation. In this connection the use of automatic block signals is being seriously considered and is a very live question at present. Unlike the practices in the United States some of the larger railroad shops manufacture a number of small articles such as screws, bolts, nuts, etc., instead of buying them. The railroads are still under government supervision and it is hard to tell what the future holds for them as they are handicapped materially by the lack of finances.

Speaking of conditions in France, Mr. Shaver said the railroads were handicapped by government regulations and that the situation was almost identical to that which exists in Great Britain. The railroads mostly are in a fair condition and the French have applied certain American practices to railroad operations to a more or less extent, particularly with reference to train despatching and the application of air brakes. The signaling consists almost entirely of the manual type, much of it being uncleanly and cumbersome. Nearly every railroad yard of the Nord, Etat and Est show evidence of American operating practices. Electrification is a live subject because of high price of coal and it is receiving particular attention in the south of France.



A. R. E. A. Board of Direction in Session Yesterday.

Seeing the A. R. E. A. as Its Own Officers See It

How the Association May Be of Greatest Help in Solving the Serious Problems of the Day

THE AMERICAN RAILWAY ENGINEERING ASSOCIATION is a factor of ever increasing importance in the affairs of the railways. Conceived for the purpose of uniting the efforts of individual railway engineers in the advancement of railway practices, it has ever fostered individual initiative while winning the utmost confidence and respect of the railway managements. Three years ago, when the movement for centralized control of all railway activities was in its ascendancy, a strong effort was made to effect an affiliation with (or shall we say—subordinate to) the American Railway Association, but those in command of the engineering association's affairs were successful in consummating an arrangement which insures the perpetuation of the association in its established form, yet affording that means of contact with the superior body which will assure the necessary degree of conformity and full measure of co-operation. This has left the A. R. E. A. with that degree of independent action so necessary for the free play of individual initiative. The thoughtful member is conscious of the debt he owes to those leaders of the association who were instrumental in effecting this happy arrangement.

Under the pressure of the kaleidoscopic changes which are confronting the railroads from day to day, every officer, every employee and, with them, every association of railway men: is being constantly put to a new test which will determine what each and all of them may accomplish to help the railroads in the serious problems imposed upon them. Surely every loyal member of the association is anxious that the A. R. E. A. shall adjust its activities so as to be of greatest benefit to that end, and by the same token he is interested in knowing what the officers of the association have in mind as to the proper relations which the society shall bear to the problems of the day. To this end we present below statements by the president, vice-presidents and seven of the directors, expressing their views on various phases of

the association's activities and policies which are directed in the main toward the particular problems now in hand.

More Scientific Direction and Control Is Needed

By H. R. SAFFORD, President

Assistant to the President, Chicago, Burlington & Quincy, Chicago

The events and conditions incidental to the maintenance of railroads which have occurred and developed during the past three years are worthy of serious consideration by the maintenance engineer when viewed in the light of their effect upon future maintenance problems and policies. In this consideration the American Railway Engineering Association has a very direct and substantial interest.

If one thing is apparent above all others it is that maintenance policies and the execution of them in the future must be along more scientific lines than has been necessary in the past in order to obtain the highest degree of "economical and efficient management," to quote the language of the Transportation act. This comment is not made in a critical sense, with an implication that scientific effort has not been characteristic of the past practices. It is made because economic pressure increases and the history of the world has been, that the survival of the industry or the nation is wholly dependent upon the development and application of economic reforms and measures to combat that pressure.

The maintenance of way policy must have thoughtful and scientific treatment for two reasons: It is a very definite and basic element in operating expense and, therefore, in net earning power. It is now feeling the severe effect of the inflated costs of labor and material, particularly the former, and the reduced efficiency which has naturally gone along with them and the readjustment of these high costs will be accompanied with difficulties because this period of readjustment is more difficult in many ways than the period of the upward trend.

We have heretofore thought that we had developed very complete and satisfactory methods of handling the maintenance policy and program and the American Railway Engineering Association and corresponding agencies for the study of the problems of design and maintaining of equipment have done a tremendous work in perfecting practice, but these results were achieved under conditions not exactly like those we now see—they tended to create the picture of the ideal condition with perhaps less of the element of economic necessity that now has to be considered. The analyses which have characterized the application of the contract between the Government and the carriers to the adjustment of matters growing out of federal control have precipitated or at least stimulated a desire to apply measures of performance which heretofore appeared less necessary.

The maintenance policy on a railroad, both of fixed property as well as rolling stock, has been an evolution from years of growth and development of the property, wherein the intimate knowledge of officers of the property and its needs seemed sufficient to insure a high degree of efficient control. Then suddenly came a situation which called for an accurate measurement or analysis of the component parts to determine not only the elements thereof, but their weighted values, and we found difficulties in establishing them—first, because the measurement had to be based upon a relatively short period for a complete determination and, second, because the relative values were inconsistent and irregular. Of course, we hope we will not have to go through a similar experience again, but there are other reasons for applying ourselves more energetically than ever to the perfection of such measures for future requirements.

The determination of a proper net earning power depends upon a normal and consistent maintenance program almost as much as a normal transportation expense. But what is a normal maintenance program? Basically it would appear to be a restoration of service units as rapidly as the exhaustion of them—otherwise the program is not normal. There are very definite influences to which values must be given to enable the maintenance to be normal. In fixed property they are: Traffic, weather or natural exhaustion, and increasing investment. In equipment these same three influences exist plus the service and capacity unit in the case of locomotives in order to give consideration to their size and degree of earning power. These are the primary considerations and are capable of being valued with sufficient accuracy to help the manager to control his earning power.

Much good work has been done during the past two years in this study. Much remains to be done. The starting point is the accounting data and herein lies an important phase of the question in which the engineer has an interest and I believe that interest is being more appreciated by the accountants. As a matter of fact, the interdependence of the two departments is increasing; the accountant must recognize that the value of the accounts to the management must depend upon his cooperation with all departments spending money.

It is highly important that the engineer feel a greater degree of responsibility in perfecting his knowledge of accounting principles and practice. He must understand them to use them, and a failure to do so will react to his disadvantage. Without such knowledge he cannot properly analyze the economic features of his problems and cannot perfect his reports to his superiors to the degree necessary to enable the executive to pass properly upon them, and they need to be considered now in the light of strict economic benefit because the margin of earning is growing less.

It is the duty of the maintenance officer to devote

more time to training the young man along these lines of study in the earlier years of his experience. As a rule college courses do not develop a great deal of this and there is increasing need for it. The association can profitably direct its energies along these lines; somewhat remote perhaps from technical features and yet equally important. As construction standards reach perfection more time can be devoted to the economic and business features—this is still engineering.

Can the A. R. E. A. Aid in the Solution of Transportation Problems?

By L. A. Downes, First Vice-President

Vice-President of the Central of Georgia, Savannah, Ga.

As will be noted in Article 1 of its constitution, the American Railway Engineering Association has for its purpose the advancement of knowledge pertaining to the scientific and economical location, operation and maintenance of railroads. Since its inception over twenty years ago, the attention of the association has only been directed to engineering problems involving location and maintenance. It was not until recently that committees were formed to consider economics of railroad operation and the economics of railroad labor.

The European conflict, in which our country became involved, resulted in the exigency of federal operation of our railway lines as a unit, in order to facilitate the transportation of troops, supplies and munitions of war. The war itself created new conditions, and with the return of the railways to their owners by the Government, many new and complex problems resulted, and these must be solved. These problems are of such nature and magnitude that to solve them and meet the new conditions confronting us will require the skillful effort of railway managers to attain the utmost economy and efficiency as expressed in the Transportation act.

But little progress can be made in the work of some of the committees, whose scientific investigations and reports are based upon certain principles which the changed conditions do not govern. There are two committees, however, viz., the Committee on Economics of Railroad Operation and the Committee on Economics of Railroad Labor, which have a broad field in which to work and analyze the changed conditions, with a view to effecting necessary economies and improve transportation service.

As outlined in its constitution, it is within the province of the Association to take up the question of economic operation, and the report that is to be given to the convention this year by the Committee on Economics of Railroad Operation is worthy of careful study. The Board of Direction in its work next year should assign to this committee such subjects in the minds of railroad officers, which have considerable bearing upon the economical operation of railway property at this time.

It is quite improbable that conditions which prevailed on the railroads prior to 1917 will return soon, if ever, and the full value of the experience and scientific research of the American Railway Engineering Association should be dedicated to the solution of present and future transportation problems, and I cannot but feel assured that good work to that end will be done by this Association during the coming year.

Our Problems Are Still Essentially the Same

By J. L. CAMPBELL, Second Vice-President

Chief Engineer, El Paso & Southwestern, El Paso, Texas

In my opinion the problems of engineering and maintenance are still substantially what they have been heretofore, and that the outline of work of the American

Railway Engineering Association for 1920 is a fair representation of the general character and scope within which the work of the Association should continue to lie.

The problems of railway engineering and maintenance are modified by existing psychological, social, economic and political conditions which are adversely affecting the operating ratios of the railroads to such extent that the big emergency problem is one of avoiding receiverships and bankruptcy by performing transportation service at a cost less than the revenue received therefor, requiring an unusual degree of economy and efficiency in the engineering and maintenance departments.

The psychology of the situation originated in or began to crystalize with the enactment of the Adamson law. That phase of the general problem has been accentuated by subsequent federal legislation and control, perhaps not necessarily so, but certainly as to the particular things done and the results thereof.

One of the outstanding things in the present situation is the question of compensation of railway employees and the relation which it should maintain to other costs of transportation. Through its committee on the Economics of Railway Labor, the Association could establish working relations with this question, but it conceived that that matter does not fall within the field of its work. In the 1920 report issued in Bulletin 231, the committee indicates the broad contact which the association may make with the human element involved in the problems of engineering and maintenance.

The human heart with its frailties, virtues and aspirations is one of the big problems in the business of transportation. As the hearts of railway owners and employees are co-ordinated in the Spirit of Christ and the Golden Rule one of the big problems of transportation will approach a more satisfactory solution.

Better Accounting of Maintenance Expenditures Needed

By C. A. MORSE, Past-President

Chief Engineer, Chicago, Rock Island & Pacific, Chicago

Under the Transportation act the railroads are divided into certain groups which are permitted to charge a rate that will return for the group as a whole six per cent interest on the value of the railroads in that group. Consequently, it would seem as though it was going to be necessary for the railroads in each group to follow, as far as possible, the same practice in regard to maintenance, and that it is going to be necessary to follow some classification as to the importance of different portions of each railroad so that all the railroads in a group will maintain the portions of the road under each classification in practically the same way.

Following this line of thought, it would seem as though wages and working conditions should be the same on all the railroads in a group. It also appears desirable, if not absolutely necessary, to have some plan worked out by which the expenditures for different items included in maintenance could be classified, so that the expenditures of all roads in a group would be accounted for in the same manner. This would enable comparisons to be made not only between the different railroads but between different portions of the same railroad, in order to awaken interest in the most economical methods for handling the various classes of work.

Maintenance of way and structures comprises about 20 per cent of the total operating expenses, and it is the only portion of the operating expenses that is not analyzed in such a way as to give comparative costs as between operating divisions and between different railroads. The only basis of comparison today is the cost

of maintenance of way per track mile and the cost per 1,000 gross ton miles, which is of little value, owing to the fact that the operating expenses due to improvements and retirements are included in the general item of maintenance of way and structures, and the division or railroad that has a big improvement program under way shows large maintenance of way expenses as compared with the division or railroad that happens to have little improvement work in progress at the time.

If what may be termed ordinary maintenance was kept separate from maintenance in connection with the "A. & B." program, and from the items covering rail relaying, ballasting and the tie renewal programs, and if retirements could be set up separately, we would be able to make proper comparisons of: A—Ordinary Maintenance, B—Tie Renewals, C—Ballasting, D—Relaying of Rail, E—Retirements. These could be made per mile of operated line or per 1,000 gross ton miles, but the real comparison would be for ordinary maintenance, which should include all of the work of the regular maintenance of way organization, both labor and material.

One of the weak points in the present accounting rules is that which calls for contract work to be charged to material. There is no reason why it should not be divided into labor and material the same as company work. Altogether too much money is spent under the name of material, which is not properly supervised, owing to the fact that on many railroads the allowances only cover labor, the material being figured as a certain percentage of the labor charge. By doing certain work by contract local officers get a lot of work done which they could not otherwise get done and keep inside of their allowance.

While it does not seem as though this close supervision should be necessary, much expense is needlessly incurred in the maintenance of way department of railroads, due to personal equation in the local organization and an ambition to get the individual divisions or territory in as good condition as possible, regardless of the requirements of some other part of the railroad.

The American Railway Engineering Association with its splendid organization should be able to go into this matter and recommend a classification of tracks and also a set of accounting forms that would give the results outlined above. It looks as though the Interstate Commerce Commission would have to put something of this kind into effect and it would be a big help to the commission, and would insure the working out of a practical set of forms, if the American Railway Engineering Association would take hold of the matter and be able to make definite recommendations at its next convention.

A Readjustment Is Necessary

By J. G. SULLIVAN, Past-President

Consulting Engineer, Winnipeg, Man.

In my opinion the engineering problems of the railroads are so closely associated with financial questions, high wages and restrictive schedules, that before we can hope to see any material development these matters will necessarily have to go through some form of readjustment. The value of the dollar is about 50 per cent of what it was before the war and rates of interest nearly twice as high, making fixed charges on public utilities about four times what such charges are on those constructed before the war. This places such a handicap on any new development in the way of railway construction that we cannot hope to expect very much new construction in the near future.

With such unstable conditions, about the only thing the railway engineer can do is to practice strict economy, which should hasten the day of readjustment, even if this

plan does not offer very much encouragement for the immediate future.

Each Engineer Must Solve His Own Problems

By ROBERT TRIMBLE, Past-President

Assistant Chief Engineer, Pennsylvania System, Pittsburgh, Pa.

In my judgment the fundamental problems confronting the railroads at the present time are not those of engineering or maintenance, but very largely problems of finance and operation. The most serious maintenance problem that we have to contend with is that of getting rail, ties and track material delivered so as to be placed in the track with the minimum of labor. If the material was furnished so that ties could be put in and spaced, rail laid and surfacing done all in proper sequence, radical economies should be obtained. About all the engineers can do is to make suggestions. The deliveries of material will follow with the law of demand and supply. I believe that so far as the American Railway Engineering Association is concerned, it can hardly help us solve our individual or special problems.

Committee Service Offers an Opportunity

By E. H. LEE, Director

Vice-President, Chicago & Western Indiana, Chicago

Our Association is a lusty youngster. It has already passed its 21st birthday, but its growth in membership during the past year has been greater than ever before. Among the general objects for which the Association is working may be enumerated: The study, analysis and classification of the constantly growing body of knowledge, upon which the science of the construction and maintenance of railroads rests; the careful study of new ideas brought to its consideration, the endorsement of those which are approved, and the rejection of those which are believed to be unsound or unsuitable; the promotion of acquaintance and friendship among its members and their education along lines not otherwise available.

The Association can best fulfill its primary object of serving its members as individuals by rendering efficient service to their employers, the railroads. It is hard to overestimate the value of the services of those men, many of them leaders among the railroad men of the country, who as organizers and officers of the Association have directed its affairs; but after all it has been the work of its various committees that has given the Association its acknowledged standing among similar railroad organizations.

The rapid increase in the membership of the Association has provided new and valuable material for committee service. This has caused the officers to give renewed attention to the efficient use of this material in order that the past fine record of achievement may not only be maintained, but surpassed. An informal questionnaire has recently brought out the general opinion among committeemen that while some committees are now sufficiently large, others could be increased in size; that in the larger committees a distribution of the work among sub-committees might prove advisable; and that a reasonable rotation in committee membership would best promote the work, offering at the same time to the newer members that reasonable hope of a share in the committee work to which they are equitably entitled. The discovery and employment on committees of the brains and ability of the younger and less well known members would be of immense value, not only to the Association, but to the men themselves; in widening their horizon, in focusing their attention upon the larger underlying principles, and in avoiding the danger of giving undue weight to the

mass of detail inherent in their work. It is hoped that committeemen may consider it an important duty and privilege to bring to the notice of their chairmen good material for their committee personnel.

By the same token, "The Lord helps those who help themselves." Even under the favoring conditions of larger committees and more rapid rotation in membership, eligible men, ready and willing to serve, may fail of committee appointment. The wisdom of giving some thought and making some personal effort to secure his own share in work of this kind will therefore doubtless occur to the newer member of the Association, who is a man of energy and initiative.

The Vital Spark of Our

Association Is Brain Energy

By HADLEY BALDWIN, Director

Assistant Chief Engineer, Cleveland, Cincinnati, Chicago & St. Louis, Cincinnati, Ohio

The ineptitude of political control in its ponderous attempts to regulate certain segregable evils susceptible to separate remedy, has widened its grasp and tightened its hold upon the transportation industry. The genius of the industry which aforesaid, applying to its affairs its own home-made control that was generally quick, wholesome and happy, functioned freely in its gigantic achievements that redounded to the national welfare, now finds itself, in the cloudy dawn of a new era so-called, clamped, as it were, in a strait-jacket, its potentialities discounted, its natural prerogatives largely withdrawn, its internal discipline demoralized, its treasury empty and its engineering for public service depreciated.

In this state of affairs is wrapped the fundamental problem confronting the railroads, whose proper solution involves the welfare of the nation and its civilization.

When a soldier returns crippled from the war the fundamental problem is to restore him to normal health and functioning. The incidental or intermediate problem is to help him achieve what he can in spite of his unfortunate handicap for the time being and in the case of the crippled railroads presumably it is these secondary problems, real and immediate as they are, that have been suggested as a field for employing the energies of the American Railway Engineering Association.

There has never been a time, of course, when in the providing of facilities to meet traffic demands and in the upkeep of the properties of the railroads, the serious and thoroughgoing exercise of engineering education, experience and judgment was not vital, whether in the exhaustive determination of design or in a searching analysis of the elements of initial and current costs, to the end of determining the limits and methods of procedure in any contingency. More and more is this being recognized, and just to that extent is the physical development of railroads and their operation becoming really scientific.

The prosperity and development of the industry depends, in a simple analysis, upon three things: capital, labor and brains. The availability of capital for development is now greatly curtailed by virtue of conditions which we all know and partly understand. The availability of labor also is greatly curtailed by virtue of conditions we all know and partly understand. One of the causes, in the view of men who try to keep cool heads in the contemplation of events, is that a period of unfortunate schooling has tended to bring the workers to a point of view that in its logic looks somewhat away from patriotism if, indeed, it has not insinuated a betrayal of their own better natures. In the situation it is obvious that there should now be no embargo on the concentration of cool, honest brain power in its patriotic

application to the immediate, pressing problems of the time. The moment is one to which, for every reason, the American Railway Engineering Association should rise with an enlivened purpose. As between matters of academic discussion for remote application and current processes of maintenance and construction, the time compels the Association to work close to the ground and as simply, directly and intensively as possible. Every process now in motion must be stripped down to the strictest economy and efficiency—all waste eliminated, and all opportunities recognized.

What are the requirements for adequate and competent supervision? This is a pressing problem. How to obtain records that are reliable and how to use them is equally important. How to simplify control of effort and make it forceful and complete is a problem whose solution must defeat fairly and firmly and happily, let it be hoped, the slackening of honest effort and indifference to duty wherever it is manifest. Will this be through distant centralized control or by a local supervision clothed with big prerogatives and assuming immediate responsibilities?

After all, what about the great fundamental question, "What should be the nature and limit of government control of the railroad industry?" This is a question that the Association might ponder with profit. There is no danger of too much light from those who know. This question is not to be settled always politically instead of practically and scientifically. At the very least this Association should undertake the problem piecemeal and work to the end of having finally and reasonably clarified and determined governmental prescriptions of consequence that are vague or illogical, as, for instance, the definition between capital and operating charges and credits. The problem of rate making at bottom is one for the railway engineer.

The general range of the Association's committee work need not be disturbed or called in question except to have its prosecution leavened with an earnestness to provide quick help in those directions where the railroads are most particularly in distress. Committees should be bold in recommendations outside of the influence of precedents for we are in an unprecedented situation in which nothing must be taken for granted, except, perhaps, that human nature is essentially good and sound at bottom.

To repeat, about the only thing unleashed in the railroad industry today is brains. The vital spark of our Association is brain energy and nothing else. May it not be dimmed during the present relative prostration of the industry.

Should There Be Standardization?

By C. F. LOWETH, Director

Chief Engineer, Chicago, Milwaukee & St. Paul, Chicago

The railway problems are many and various. Railroad-ing is so complex and its evolution so rapid that it will always present many problems, perhaps in increasing number, and new problems come trooping up before the old ones are disposed of. Those pertaining to engineering and maintenance are no exception in these respects. The American Railway Engineering Association was brought into being to help relieve some of these problems. It has accomplished a large measure of excellent work in this direction and can confidently be expected to do even more. Its increasing usefulness will be brought about through many agencies. Among these will be increasing open-mindedness and progressiveness.

A successful contractor told me recently that he considered his success, from a financial standpoint, was dependent upon finding new methods for carrying on his

work; that if it was executed along the lines that such work had been previously done, or as most of his competitors would do it, his financial returns would be only those of the average contractor. He insisted on a larger return, and thought it only possible to get it by new and better methods than those commonly prevailing. So with the railroads; they must have new and better methods, materials and practices if they are to prosper and progress. Note the qualification of "new and better." The new is not on that account the better. Occasionally we are forced to return to the old because the new is not as good.

Can the railroad problems be lessened by more standardization in engineering and maintenance matters? Yes, but only as such standardization is wise and well thought out and not too ironclad. There are evidences today of some precipitate and unwise standardizations during the recent federal control of railroads. Standardization should be the tool and servant; not the mind and master. It tends to dull individual initiative and to limit progress; but, at the same time it is in many ways essential to efficiency and economy. Standardization will be of lasting benefit only as it is the result of careful investigation by open and progressive minds, thorough knowledge and ripe experience, and the emphasis must be upon these qualities. In many lines of business of late inventories have been radically scaled down and drastic readjustments brought about. The A. R. E. A. may well take account of stock and determine if its activities are along the best lines, and whether it is placing emphasis on the most important part of its activities.

When the A. R. E. A. was born, there was great and urgent need of standardization. Most engineers wrote their own specifications for cement, structural steel and rails, rail sections were innumerable and in these and other similar things there was no semblance of standardization, but rather confusion, lack of efficiency and wastefulness. This condition has been immeasurably improved, and to the A. R. E. A. is due a large portion of the credit for these changed conditions. But right here the question arises whether the practices of the Association have changed with the changed conditions in the field of its activities; is there not, to some degree at least, a tendency to set up a manual of standards or of recommended practices and make of it a closed book at the expense of progressiveness and up-to-date knowledge?

I have for a long time questioned the wisdom of going so far in formulating definite conclusions on the part of the Association and its committees. There is a natural antipathy in progressive minds to the setting up of rules for one's practices; to be told that this or that is proper and should be followed and by inference that other things are improper; this attitude tends toward controversy rather than investigation and deliberation. Contrariwise the tendency for the thoughtful and progressive mind is to take stock of the experience of those about him, select the best and improve it if possible. I have felt that there was at times an indication on the part of A. R. E. A. committees and conventions that the work of a committee was not fully appreciated, in some cases was perhaps even discredited, unless at least portions of its report were included in the Manual. The desire for definite conclusions on the part of a committee will not infrequently overshadow and compromise the more important work of investigation. Some of the most interesting and valuable committee reports have been those which have covered the subject and have brought it up to date but have not attempted to formulate final conclusions or perhaps have gone only so far as to submit tentative conclusions. There is an ever increasing field of usefulness for committee work in presenting periodically the results

of further study and investigation of the subject in hand, and in such way as to promote discussion and contribution from others. Tentative conclusions will be frequently of value and in time definite conclusions will be justified.

Of the conclusions and recommendations of the committees not all should receive the formal approval of the association. It seems to me both unnecessary and unwise that there should be a compelling desire to bring the conclusions of a committee's work and the deliberations of the convention into complete harmony. In our individual practice we do not feel bound to strict compliance with the recommendations of committees; why then should it be thought desirable that these recommendations should have the formal approval of the Association? It would seem that there are many matters in which it would be the part of wisdom to disseminate the conclusions of the committees without commitment of approval on the part of the Association as a whole. The recommendation of a committee carries considerable weight. Formal approval by the Association should carry a very much larger measure of authority. I cannot but feel that in the past the Association would have been wiser in many cases to have let its committees' recommendations go out for what they would be worth without giving them its formal approval. I think this would enhance the prestige of such recommendations as the Association would make, and at the same time would not detract from the interest, value and prestige of committee reports. Wherever there is a formal approval of recommended practices by the association it should, I think, be the result of something more than the mere majority of a viva voce vote of the convention. This seems desirable so that the action may be more representative, deliberate and authoritative and so that there may be a record of the degree of unanimity.

If the railroad engineer has the means of knowing what his compeers are planning and doing, what their problems are and how solved, what are the qualities of this material and the limitations of that method, all as developed by the study and experience of others, he will readily adapt the knowledge to his own particular needs, and in most cases will add something of permanent value to the general fund of knowledge and experience.

In conclusion: Should there be standardization? Certainly; some is essential. Should there be a Manual of recommended practices? Yes. To my mind, however, neither of these is at this time the most important work of the A. R. E. A.; the emphasis should rather be upon more investigation and dissemination of information along the particular lines coming within the field of the Association's work.

Prudent Economy Is Required

By F. L. THOMPSON, Director
Chief Engineer, Illinois Central, Chicago

Much of the work being done by the Association is by no means remote as to the problems now before the railroads of the country. In checking over the work of the committees I find that quite a number of them cover subjects that are live at this time. These include that carried on by the Committee on Economics of Railway Operation and the Committee on Economics of Railway Labor.

These two committees are very important at this time, due to the high cost of all items entering into the operation of a railroad. The expenses of operation and the methods of reducing them, in order to come within the income, probably comprise the most important subject before the railroads of the country today. This is a large problem and one which technically does not come

within the province of the American Railway Engineering Association, except in so far as the cost and expense of doing work apply to the maintenance of way department of a railroad.

Some of the present engineering and maintenance of way problems before the railroads are the following:

1. *Expenses*.—It is now more than ever the duty of an engineer to get the most units of work and material for each dollar expended.

2. *Labor*.—This is very important, as the price of labor has increased due to government control, in some cases, to two and one-half times what it was prior to government control, and in a great many cases this price is twice as much as others are paying for wages in a particular territory. This brings out the necessity of seeing that the best possible efficiency is secured from labor.

3. *Material*.—This is important to the extent that while material can be secured now more readily than in the past, the inspection service which was lax to a considerable extent during the war, needs more supervision so that the material now being received is exactly as called for.

Exhibits and the Railway Supply Industry

By J. B. Strong*

THE NATIONAL RAILWAY APPLIANCES ASSOCIATION, in opening its thirteenth annual exhibition of railway appliances yesterday morning, presents one of the largest and best exhibits in its history. It is on a much larger scale than last year, over 5,500 square feet of additional floor area having been provided by using the large ballroom in the Coliseum in addition to the main floor and annex. Even with this additional space more could have been utilized to advantage if it had been available, as that offered was oversubscribed.

Unusual interest and a large attendance at the exhibit are assured this year, especially as this will be the largest exhibition of railway materials to be presented during 1921, owing to the recent cancellation of the June exhibit of mechanical appliances at Atlantic City which had been planned in connection with the annual convention of the Mechanical section of the American Railroad Association (formerly the Master Mechanics' Association and the Master Car Builders' Association).

As in past years, the National Railway Appliances Association has endeavored to make this exhibit of railway appliances used in the construction, maintenance and operation of the railway fixed properties of the greatest technical interest and instructive value to railway officers and other practical railroad men. The practical nature of the exhibit has resulted in an unusually large attendance of roadmasters, supervisors and other officers in direct charge of field forces, as well as members of the American Railway Engineering Association. Railway managements have this year, as formerly, very generally encouraged all of their men who can be spared from their work to attend the convention and to inspect the individual exhibits, recognizing, as the managements do, that these men, many of whom are stationed at outlying points, can only in this way keep up-to-date and informed regarding the equipment and materials which are being offered them for the promotion of safety and economy in the operation and maintenance of their roads. While it is true that the larger manufacturers, with their agencies widely distributed, are in more or less close contact with railway men throughout the country, a condition that is

*Vice-President, Ramapo Iron Works, Hillburn, N. Y., and president, National Railway Appliances Association.

not possible for the smaller companies with their limited sales force, it is not possible for even the large companies to carry samples of heavy railroad materials to railway men. The exhibit gives both large and small manufacturers an opportunity to present their materials for the inspection of railway men in a manner that is not otherwise possible and railway men have not been slow to avail themselves of its benefits.

The manufacturers appreciate the opportunity of having their products inspected by an intelligent body of railroad men and benefit from the diversified opinions expressed by these men when designing or redesigning their products. Progressive users of railroad materials can best specify the most efficient equipment for their roads when they not only know but see what is available for

The conditions in the railway supply industry have been abnormally bad during the past year, although a spirit of true American optimism is now pervading it. The effects of the Winslow bill, which was passed by Congress during the past month, are already beginning to be felt, for the roads are now able to pay certain accounts of long standing and this in turn is enabling the supply manufacturers to improve their credit and to finance new orders placed by the roads. The railroads are now ordering those materials which are most vitally needed; true, they are ordering in small quantities, but these quantities are increasing. The important factor is that buying has started again. When did it start? The pessimist has not seen it yet; the optimist has scrapped the crepe and is on the job getting busy.

The President's Annual Dinner

H. R. Safford, president of the American Railway Engineering Association, gave a dinner to the members of the Board of Direction and past presidents in the president's suite on the convention floor of the Congress hotel last evening. Approximately 25 were present.

Signals and Interlocking

Committee Holds Meeting

Committee No. 10, Signals and Interlocking, held a meeting in the rooms of the American Railway Association yesterday to consider signal locations, take siding signals, train order indicators and light signals. In connection with the discussion on light signals the feeling

was expressed that these should be visible for a distance of 3,500 ft. on the brightest day, but it was finally decided that a range of 2,500 ft. would be ample, thus reducing the amount of energy required for lighting purposes. This committee is a joint committee of the Signal section and of the A. R. E. A.

Signal Supervisors Meet

The annual meeting of the American Railroad Signal Supervisory Association, composed of supervising officers in the signal departments, was held in the Green Room at the Congress hotel at 7:30 o'clock last night.

E. N. Johnson Promoted

E. N. Johnson, formerly frog and switch engineer of the Canadian National Railways, Lines West, has been appointed track engineer, reporting to the chief engineer, with headquarters at Winnipeg.

C. & N. W. Train Derailed by Broken Rail

Chicago & North Western Overland Limited train No. 2 eastbound was derailed at Agnew, Ill., 114 miles west of Chicago at 6:15 yesterday morning while traveling at a speed of about 50 miles per hour. Two men of the train crew suffered minor injuries. It is supposed that the rail was broken by the engine or first of the eight cars of the train as this part of the equipment was not derailed. The train followed the Los Angeles Limited by about 10 min., which train was reported to have had dragging equipment.

Signal Section Will Meet in Colorado

Colorado Springs, Colo., has been selected tentatively as the location for the next annual meeting of the Signal section of the American Railway Association, which will be held on June 6, 7 and 8.

C. M. Steinmetz Promoted

C. M. Steinmetz has been appointed signal supervisor of the Cleveland, Cincinnati, Chicago & St. Louis, with headquarters at Springfield, Ohio, succeeding J. H. Ross, who has gone to California on an extended vacation.



An All-Concrete Trestle on the Illinois Central

Solution of Labor Problem of Paramount Interest

Hearings on Rules and Working Conditions of Maintenance of Way Employees Now Completed

OF ALL THE PROBLEMS confronting the railroads today the most important and the one which will be discussed most freely about the corridors at the convention is the labor problem. Upon its solution depends to a large extent not only industrial peace and reconstruction, but the whole future of private ownership and operation. This problem has centered in Chicago where the Railroad Labor Board has been and is now holding public hearings on the demand of the railway labor organizations for the continuation of their national agreements formed during the closing days of federal control. The developments of the past few months have been so kaleidoscopic that at times the fundamental issues in the controversy have been lost sight of. Now, however, the decks have been cleared, irrelevant testimony has been ruled out of the hearings on national agreements, the procedure necessary to bring wages down has been clearly outlined and the powers and prerogatives of the Labor Board defined. The real issues in the controversy have been reduced to two: (1) Shall the national agreements be continued or discontinued, and (2) shall or shall not wages be reduced?

This labor problem is one which particularly concerns the maintenance of way department and its employees. There, among the unskilled track labor, individual efficiency and output have decreased, and particularly, the cost of living and the wages offered by other industries have fallen materially. During the eleven months ending November, 1920, the railroads spent \$961,642,407 for maintenance of way and structures as compared with \$421,925,611 during the corresponding period of 1917. This is an increase of \$539,698,796, or 128 per cent. This jump in the cost of maintaining rights-of-way and structures is attributable largely to: (1) the increase in the number of employees necessary to perform this work under the existing working rules; and (2) the increases which have taken place in the annual payroll. These factors may be illustrated as follows: During 1917 the railroads employed an average of 350,000 section men and unskilled laborers. During the first three months of 1920—before maintenance of way work was fairly under way for the year—they employed an average of 376,000 section men and unskilled laborers, an increase of 26,000 men and undoubtedly, the average number of men employed in this work increased greatly later in the year when more favorable weather conditions permitted heavy maintenance work to be done. Again, during 1917 the railroads paid these workers \$220,000,000, whereas in 1920 they were paid \$476,000,000, an increase of \$256,000,000 or 112 per cent.

As a result of this and similar situations in other departments, together with a serious decline in traffic, the railroads in the last four months of 1920 failed by \$175,000,000 to earn the return (6 per cent) fixed as just and reasonable by the Transportation Act. During the month of December they earned at the rate of but 1.17 per cent upon their total valuation as fixed by the Interstate Commerce Commission.

The carriers are therefore endeavoring to apply remedial measures by attempting: (1) to have all national agreements, including that with the maintenance of way workers, abrogated and the individual carriers given the right to negotiate new agreements with their own employees; and (2) to be given the right to pay

unskilled labor wages which are just and reasonable and which place these workers on a par with their brethren in outside industries.

The abrogation of the national agreements will not only aid materially in the restoration of individual efficiency, but actually reduce operating expenses by many millions of dollars. This, coupled with reductions in the basic wages of unskilled labor, may enable the carriers to so reduce their operating expenses as to obviate further increases in rates or reductions in all wages.

History of the Controversy Over National Agreements

The controversy between the carriers and employees over the maintenance of way agreement began on May 4, 1920, when representatives of the United Brotherhood of Maintenance of Way Employees and Railway Shop Laborers requested the Labor Board to sanction a new national agreement which was even more restrictive than the agreement placed in effect a month and a half before the end of federal control. This request was part of the demands made of the Labor Board in its first case which ended in the wage award of July 20, 1920. The carriers refused to discuss either the old agreement or the proposed agreement on the grounds that working conditions were not involved in the dispute and had not been the subject of conferences between the carriers and representatives of the employees as required by the Transportation Act. The Board in its decision of July 20 stated that the rules and working conditions in effect at that time should be continued until a decision was reached as to their justness and reasonableness.

When the hearings on working conditions were opened on January 10, the employees, including representatives of the maintenance of way employees, stated that they desired only to make rebuttal statements to the carriers' testimony.

Carriers Oppose Maintenance of Way Agreement

The carriers' opposition to the new national agreement requested by the maintenance of way workers was voiced as follows:

"Our objection to the proposed rules are summarized as follows:

1—The proposed rules extend their scope to classes of employees not heretofore represented by this organization, to many who are not employed in the maintenance of way department by all railroads.

2—The proposed rules are intended to be applied to officers, or to men who may be represented by other organizations.

3—There are vague and conflicting rules.

4—Some of the proposed rules are impracticable of application or contain requirements that involve unnecessary work.

5—The proposed rules will result in a reduction of efficiency and productivity of employees.

6—The proposed rules would prevent the giving to incapacitated employees employment suited to their capacity.

7—The proposed rules effect a further increase in earnings for work performed; also pay for time in which no work is performed."

Following this summary, the carriers' representatives presented testimony to show by specific examples occur-

ing under each rule, the wasteful, inefficient and unjust conditions which would be brought about by the universal application of rules which do not take into consideration varying local conditions. It will not be possible in this short article to take up these objections in detail. However, some of the more flagrant abuses which it was charged would be brought about by the application of the proposed national agreement can be pointed out.

The scope of the proposed agreement was objected to particularly in that its provisions refer not only to the maintenance of way department, but claim to cover all such classes of occupation in any department on any railroads and all such classes of employment not represented by other organizations prior to September 1, 1918.

Concerning this rule, it was said: "We submit that it is unjust and unreasonable to attempt to classify railroad employees according to the particular organizations that may lay claim to represent them. We believe that any rules that are established for the government of employees should be made in keeping with the class of service and in the departments in which the employees are engaged."

Again, the application of this rule would take in subordinate officers. In objecting, the carriers' representative said: "It would be a farce that subordinate officials, required by their duties to direct and supervise the work of employees, and to be responsible for its performance as well as to impose necessary discipline, should themselves be subject to the disciplinary rules of an organization in which they are overwhelmingly outnumbered by the same employees whose daily work they supervise and direct."

Another of the proposed rules deals with the basis for promotions, and bulletining vacancies and new positions, etc. In discussing this rule it was cited that: "A foreman may be taken sick. He may be expected to return for service in a few days, but he may not be able to return until the expiration of a little more than 30 days. Under this rule a number of positions would be changed and men moved to different locations for a few days only, and then all moved back again. The same conditions exist in all classes of this service, and the proposed rule would only result in decreased efficiency and endless confusion."

Another of these rules also makes it mandatory to bulletin within 30 days positions that are temporarily vacant. Regarding this, the following example was given by the carriers' representative: "To bulletin a temporary vacancy of two weeks in a position of pumper at station 'A' 29 days after it occurs, and then take 10 days more to announce the appointment, would make the process futile; or assuming that it was bulletined 30 days in advance that there would be a few weeks' temporary vacancy in the position of pumper at station 'A,' it is not in the interest of efficient and economical management that the pumper at station 'B,' 'C' or 'D,' many miles away, shall be permitted to bid in such a temporary position and thereby set up a train of other changes in personnel. To apply this illustration to the position of common labor seems to us to make the provision more objectionable; in fact, such a provision would be impracticable."

General Atterbury Asks for Immediate Action

The carriers' presentation against the perpetuation of the national agreements has just been completed, and the financial condition of the carriers was daily growing more critical when General W. W. Atterbury, vice-president of the Pennsylvania and chairman of the Labor Committee of the Association of Railway Executives, appeared before the Board and suggested:

(1) That the Board declare the national agreements terminated at once; that the question of rules and working conditions be remanded to negotiations between each carrier and its own employees; and that as the basis for such negotiations, the agreements, rules and working conditions in effect on each railroad as of December 31, 1917, be re-established.

(2) That the Board give immediate permission to the railroads to pay for unskilled labor not less than the prevailing rates of wages in the various territories served by each carrier.

The controversy was finally carried to President Wilson when the labor men petitioned him to present the issues involved to Congress, and representatives of the carriers followed with specific answers to the charges made by the labor leaders. The President, however, on February 6 declined to interfere in any way in the controversy.

Mr. Jewell then petitioned the Board for additional time and this petition was granted and Frank P. Walsh, the labor counsel, and W. Jett Lauck, economist, were retained to assist in bringing a "huge conspiracy" charge before the Board. Mr. Jewell planned to ask for postponement of hearings on national agreements and for an immediate hearing upon the evidence they wished to present in support of their charge that railway executives and financiers have conspired to re-establish autocratic control of the transportation industry. However, when the public hearings were resumed on February 10 this plan was killed by a resolution of the Board. The same ruling also denied both of General Atterbury's requests. These developments, in general, remanded the question of rates of pay for unskilled labor to the individual carriers to act in accordance with the terms of the Transportation Act, ruled out irrelevant charges and evidence and cleared the decks for completing the hearings in the controversy over national agreements.

Employees Ask for Joint Conferences

When Mr. Jewell again came before the Board on February 17, he requested it: (1) to refer the national agreements to a joint conference; (2) to request representatives of the railroads and of the labor organizations to meet the Board in conference on the establishment of national boards of adjustments, and (3) in lieu of raising the question of the wages of unskilled labor in accordance with the Board's decision of February 10, that the Board request a general conference between the representatives of the railroads and of unskilled labor.

The significance of these requests is that Mr. Jewell was asking the Board to recognize the principle of collective bargaining, which he interpreted as meaning only bargaining between employees and employers on a national scale. As an alternative to this proposal, Mr. Jewell asked for a postponement until March 14. This postponement was later allowed by the Board, which, in so doing, ignored Mr. Jewell's request for joint conferences. At the same time the Association of Railway Executives at a meeting held at Chicago flatly refused to consider the proposed joint conferences. Since that time Mr. Jewell has petitioned the Labor Board several times for an answer upon his proposal, but to date this has not been given.

At the present time Mr. Jewell is scheduled to begin his reply and reports of his plan of attack indicate that the Board will be requested to subpoena certain railway executives, particularly those who are members of the Association's Labor Committee which was abolished on March 4. By this means Mr. Jewell hopes to prove that the carriers are not unanimous in their labor policy.

The rebuttal statement of the maintenance of way em-

ployees began on March 9, J. C. Smock, grand vice-president of the United Brotherhood of Maintenance of Way Employees and Railway Shop Laborers, opening the testimony with an attack on capital. He charged, as evidence of a concerted movement, that thousands of Mexicans, in direct violation of law, have been brought into the United States within the past year and placed in competition with former employees of the railroads. This has been done, he said, for the purpose of lowering the level of the railway employees to the standard that exists in the country from which they came. In support of a national agreement, he stated, "an agreement applicable to all railroads establishing a uniform working condition will have a tendency to encourage the employees to become steady workers, thus being an agency in preventing the fluctuation of labor, which is authoritatively considered to be a waste of energy and a genuine loss to the country as a whole."

The charges made under the seven specific objections to the maintenance of way agreement were categorically denied by the employees who contended, as have the other organizations, that the proposed agreement serves as a protection to the workers, thus creating contentment and efficiency and that without the agreement the carriers would again begin indulging in alleged sharp practices.

The extension of the scope of the maintenance of way agreement was justified on the grounds that employees in various sub-departments had expressed their desire for protection and to be represented by this organization. Regarding the representation of subordinate officials, the employees contended that foremen in the maintenance of way department are really a part of their gang and their inclusion in an organization of the employees is more fitting than their inclusion in an organization of supervisory officials. Regarding the bulletining of temporary vacancies the employees contended that under no circumstances would regularly assigned men bid in on these positions, but, on the other hand, apprentice foremen and men who are preparing for higher positions would bid in on them to obtain the necessary experience to qualify them for promotion.

Today, then, the major part of the testimony for and against the maintenance of way agreement has been given. The question of national agreements is in the hands of the Board. In so far as the wages of unskilled labor are concerned, the carriers have had the proper procedure pointed out and they have consequently taken steps throughout the country to bring this subject into conferences from which it will probably be referred to the Labor Board.

Automatic Train Control Activities

A MEETING OF THE ENTIRE Joint Committee on Automatic Train Control of the American Railway Association will be held in the offices of the Association in the Manhattan Building, Chicago, on March 16. At the conclusion of the meeting a committee consisting of one member each from the Operating, Engineering, Signal and Mechanical sections, the executive secretary of the committee and two representatives of the Interstate Commerce Commission will start on an inspection trip on the Pacific coast to make an inspection of the National Safety Appliance Company's intermittent induction type of train control as installed on the Western Pacific. This committee consists of T. H. Beacom, vice-president and general manager of the Chicago, Rock Island & Pacific; F. Ringer, chief engineer of the Missouri, Kansas & Texas; T. S. Stevens, signal engineer of the Atchison, Topeka & Santa Fe system, and G. McCormick, general superintendent of motive power of the

Southern Pacific. W. P. Borland, chief of the Bureau of Safety, and H. D. Lyon, senior railway signal engineer of the Bureau of Safety, Interstate Commerce Commission, will be the government representatives. G. E. Ellis, executive secretary of the Joint Committee, will also accompany the sub-committee.

H. R. Safford, assistant to the president of the Chicago, Burlington & Quincy, has resigned as a member of the joint committee. Mr. Safford was one of the members chosen from the Engineering section of the American Railway Association and his successor has not as yet been appointed. M. S. Connors, general manager of the Hocking Valley, a member of this committee representing the Operating section, has also resigned and his place on the committee will be taken by W. M. Jeffers, general manager of the Union Pacific.

Payments Under Winslow Bill

WASHINGTON, D. C., March 14, 1921.

The effects of the Winslow bill are already being felt by the railways, as is shown by the fact that, since the passage of this bill, the Treasury department has already paid \$30,000,000 to the roads on certificates issued by the Interstate Commerce Commission to apply on their guarantee for six months following the termination of federal control. This amount is in addition to \$263,000,000 paid previously on advances applied for prior to September 1. The certificates paid by the Treasury department under the Winslow bill to date include the following: Great Northern, \$6,000,000; Northern Pacific, \$7,000,000; Chicago, Burlington & Quincy, \$7,000,000; Chicago, Milwaukee & St. Paul, \$3,137,190; Mineapolis & St. Louis, \$400,000; Chicago Great Western, \$835,000; Texas & Pacific, \$1,000,000; Ulster & Delaware, \$219,600; Tennessee Central, \$115,000; Gulf, Mobile & Northern, \$150,000; Philadelphia & Reading, \$2,000,000; Raritan River, \$60,000.

Forty-five Years from a Cross Tie

A cross tie was on exhibit in the corridor outside the convention room yesterday afternoon which had been removed from track after a service of 45 years. The following letter regarding this unusual tie explains the conditions under which this record was secured:

New Orleans, La., January 17, 1921.

E. H. Fritch, Esq.,
Sec'y American Ry. Engr. Ass'n,
431 South Dearborn St.,
Chicago, Ill.

Dear Sir:—

A cross tie has recently been taken out of the track of the Alabama & Vicksburg Railway about 76 miles east of Vicksburg, Miss., which was put in the track in September, 1875. We have this tie at Vicksburg and the stubs of the spikes in the tie can be seen where the gage was changed in November, 1885. This cross tie has been in the track over 45 years.

The history of the tie is that the railroad company owned a large tract of land about 90 miles east of Vicksburg and settled thereon a colony of Hollanders who cut the timber into cross ties and cord wood to pay for the land.

Mr. J. A. Speer, who was at that time in the employ of the company on an extra gang helped to put this tie into the track and is still in the service of the company.

The tie was cut from what is known as long straw yellow pine.

Yours truly,

(Signed) E. FORD,
Assistant to President,
Alabama & Vicksburg.

Track Committee Meets

The Track Committee met in all-day session at the offices of the association yesterday to discuss the report which will be presented today and to plan for the work of the next year.

American Association of Engineers Holds Meeting

The Third Annual Railroad Conference Convened Yesterday in the
Florentine Room of the Congress Hotel

THE THIRD ANNUAL RAILROAD CONFERENCE of the American Association of Engineers was held yesterday in the Florentine room of the Congress hotel, Chicago. The attendance, while representative of 66 different roads, fell below that of previous years, only approximately 100 members registering, in comparison with about 250 for 1920. The day's program was arranged to include a morning, an afternoon and an evening session in order to cover the subjects to come before the conference. The morning session was devoted to the reports of the different railroad sections, general business and one paper on the effect of the Labor Board's decision on the salaries of professional engineers, by J. D. Trueblood.

In this paper an analysis was made of the sources from which the engineers were recruited and some facts were brought out regarding the decrease in the number of graduate civil engineers. The curves illustrated the trend of the total enrollments of all students taking other than civil engineering courses and those taking that course in seven western technical schools. During the period from 1910 to 1920 the increase in enrollment for all engineering courses except civil was about 65 per cent, as compared to approximately 17 per cent for the civils. The more marked contrast was shown in the number graduating, for while there was an increase of about 20 per cent in other than civil there was a decrease of about 33 per cent in the number of students graduating in civil engineering, as compared with the number in 1910-11.

Two other curves were shown, giving a comparison of salaries of engineers as compared with those of the so-called craftsmen. These curves intended to show that the junior engineers had lost ground in the matter of comparative salaries. The curve on cumulative salaries covered three classes of employees, namely, (a) craftsmen, (b) engineers, not technical graduates, and (c) technical graduates.

The discussion of this paper brought out a variety of opinion bearing chiefly on the value of the engineer as an engineer and as a prospective operating man. The comparison of the engineer to craftsmen was not considered comparable, since the craftsman soon reaches a point when his rate of increase practically ceases, while the engineer's does not. In regard to the wage question it was felt that in general engineering service was a marketable commodity and that with exceptions a man was usually paid about what he was worth. Thus, if the engineers were to receive more they would have to make themselves worth more by a greatly increased knowledge of railway problems.

The afternoon session was opened by J. R. Leighty, assistant chief engineer, Missouri Pacific, St. Louis, Mo., as chairman. A paper on "Educational Co-operation with the Management," by Professor Lewis Gustafson, superintendent of the David Ranken, Jr., School of Mechanical Trades of St. Louis, was read. The history of apprenticeship practices was described, as well as the present growth of the student system as it is now being built up in industrial trade and vocational schools and in railway organizations. In effect the paper stated that trade schools were in a measure a revival of the old apprenticeship system and that excellent work was being carried out by means of long term courses varying from one to three years. Courses are given in all of the prin-

cipal trades, the work being so laid out that the student obtains both practical and technical knowledge of the subject specialized in, the intention of the method being to fit the men for ultimate positions of foremen, managers or superintendents.

W. L. Lewis presented a paper on an educational plan now in effect on the Great Northern. Through the action of the railroad section on that road a plan calling for educational courses was presented to the management and adopted. Meetings are held every two weeks at the present time, at which different higher officers describe the problems with which their departments are confronted. Lessons are presented to the students for their solution two weeks in advance of the classes. Special courses will be inaugurated to cover practically all branches of railroading. Chief of interest among the special courses will be one designed to train the engineer as an executive. The educational bureau handling the plan consists of the executive heads of the various departments of the railroad and three members of the railroad section of the A. A. E. There are three standing committees, one each on program, service and progress, which committees lay out the plans and schedules for the lessons and prospective work, check up the progress in classes and in the work and note the resulting effect on the operation of the road.

J. T. W. Jennings, in presenting the report on the revision of salaries schedules, stated that no changes had been made in amounts of compensation as given in the 1920 schedule. Several changes had been made, however, in the duties of certain classes of engineers, the intention being to bring the salary question more on the basis of service rendered rather than on the question of title.

The evening meeting was presided over by C. E. Drayer, general secretary of the Association, in the absence of W. H. Finley, president of the Chicago & Northwestern, who was unable to attend on account of serious illness.

W. W. K. Sparrow, assistant to the president of the Chicago, Milwaukee & St. Paul, spoke on the "Public Versus the Railroads," reviewing the history of railway development, the land grants, abuses in early days, the enormous risk taken by those who pushed the roads into undeveloped territory, etc. Regulation without regard to the effect on the regulated led to restricted development which was not realized by the public until America's entrance into the war, and resulted eventually in federal management. Following a review of the circumstances that resulted in the drafting and passage of the Transportation Act, he explained the principal provisions and related the difficulties which have followed as a consequence of reduced earnings and inability to lower expenses in proportion.

He said the Transportation Act is now on trial and if it is not a success he saw nothing left save government ownership and operation which would stifle all initiative, and kill ambition. On this point, he felt that he was particularly qualified to speak because of his own experience on the state-owned railways of South Africa. After working 10 years he gave up the position which he had attained because he could see nothing ahead of him and he had heard that in the United States there was no limit to promotion based on merit and hard work.

Annual Exhibit of the N. R. A. A. at the Coliseum

This Year's Show Featured by Large Attendance and
Record Number of New Exhibitors

THE ANNUAL EXHIBITION of the National Railway Appliances Association which opened at 8 o'clock yesterday morning at the Coliseum was confidently expected to be a "record breaker" by C. W. Kelly, secretary of the organization. From the start of the preparations, interest in the show has been running so high that officers of the Association found it necessary to provide more space for the exhibitors than for several years. To meet this need the Coliseum Ballroom was secured, which has floor space sufficient to accommodate 82 booths, all of which were occupied. In spite of these additional facilities the space has proved no more than adequate to take care of the 60 new exhibiting members of the Association, coupled with the demand of many of the regular exhibitors for more space than was available for them last year. When the show opened it was found that every booth in the Coliseum, Annex and Ballroom was occupied. Although there is no convention of the Signal section of the American Railroad Association, the signal companies are exhibiting as usual, for many signalmen are expected to attend the show.

The unusual interest in the exhibition not only has made additional space necessary but has occasioned a number of special features. The practice adopted several years ago of having the main entrance to the show through the Annex has been discontinued, the Ballroom entrance being substituted instead. The decorating scheme of oatmeal and brown, new this year, is featured by the arrangement of a false ceiling, false sides walling off the balcony, and elaborate festoons covering the balcony railing. The ceiling acts as a canopy for the entire exhibiting space and sets off effectively the old-bronze and white signs and partitions of the booths. The same general decorating effect is carried out in the Annex and Ballroom. A special scheme of lattice work, hung with colored lights, has been worked out for all leads to the stairs and an additional space has been arranged between the main Coliseum and Ballroom by extending the balcony, which has been fitted up in the form of a pagoda, built of lattice frames and also hung with colored lights and smilax.

Public stenographers are in attendance on the balcony, and separate registration booths have been provided for members of the American Railway Bridge and Building Association, the Roadmasters' and Maintenance of Way Association, the Scalemen's Association and the Signalmen's Association. The balcony has been found to supply a third need through its adequate reception room facilities which visitors to the exhibition are finding desirable as meeting places.

Following the precedent established last year, all furniture, electric fixtures and decorative effects have been handled direct by the Association, instead of permitting this work to be done by outside agencies as was customary formerly. The uniformity in the style, color and type of the furniture and individual features provided for the booths of the exhibitors adds an exceptionally pleasing touch to the decorative scheme. An 8-piece orchestra giving concerts morning, afternoon and evening on the balcony lends refinement to the exhibition.

A preliminary survey made with the idea of determining the approximate attendance to be expected at this year's show disclosed the fact that the demand for tickets

by railroad men would be unequalled. Approximately 10,000 invitations were sent out to members of engineering societies, to colleges, to railroad men, and to members of the N. R. A. A. In addition, officers of the Association have provided 125,000 passes, exceeding the average number issued in former years by 50,000. The plan of distribution is practically the same as that which was followed last year. It is intended to confine the attendance at the show to those who are really interested in the exhibit, or who are in any way connected with the railway or railway supply business.

In the same way the experience at the last convention made it seem desirable to open the Coliseum each day during the present exhibition at 8 a. m., closing at 6:30 p. m., with the exception of the second day of the Convention, Tuesday, March 15, when the exhibition will close at 11 p. m. According to Secretary Kelly, the arrangement was found to be very successful last year, in giving both the men connected with the exhibit and visitors to the show an ample opportunity to get together and renew old friendships.

New records were made for opening day attendance. Up to 4 o'clock yesterday afternoon Secretary Kelly reported that 1,291 members of the National Railway Appliances Association had enrolled, while the figures for total attendance stood at 3,184.

The officers and members of the board of directors of the National Railway Appliances Association for the past year were: President, J. B. Strong, Ramapo Iron Works, Hillburn, N. Y.; vice-president, G. C. Isbester, American Chain Company, Chicago; secretary-treasurer, C. W. Kelly, Kelly-Derby Company, Chicago; honorary director, P. C. Jacobs, H. W. Johns-Manville Company, Chicago. Directors, A. A. Taylor, Fairbanks, Morse & Co., Chicago; T. W. Aishton, National Malleable Castings Company, Chicago; E. A. Johnson, Duff Manufacturing Company, Pittsburgh, Pa.; L. W. Shugg, General Electric Company, Schenectady, N. Y.; W. J. Gillingham, Hall Switch & Signal Company, Garwood, N. J. and A. J. Filkins, Paul Dickinson, Inc., Chicago.

LIST OF EXHIBITORS

The following is a list of firms presenting exhibits, with the devices on display and the names of the representatives present at their booths:

Ackerman-Johnson Company, Chicago.—Expansion bolts; expansive screw anchors; etc. Represented by C. N. Ackerman, W. A. Stein and J. L. Johnson. Space 246.

Adams & Westlake Company, Chicago.—Signal lamps; lanterns; long time burners; burner wicks; switch locks; car window sash locks; etc. Represented by A. S. Anderson, C. B. Carson, W. J. Pierson, J. F. Stender, H. G. Turney and G. L. Walters. Spaces 87, 88, 106 and 107.

Adams Motor & Manufacturing Company, Chicago.—Gasoline operated railway motor speeders. Represented by W. E. Adams, B. A. Harris and L. Gerhardt. Spaces 218-218½.

A. G. A. Railway Light & Signal Company, Elizabeth, N. J.—Railway grade crossing signals; flashing signal lights; oxy-acetylene welding and cutting equipment; traffic signals. Represented by J. K. Howard, H. A. Berggren and L. M. Merrill. Spaces 39-40.

Air Reduction Sales Company, New York City.—Oxygen and acetylene cylinders; welding and cutting apparatus. Represented by A. W. Brown, R. T. Peabody, L. A. Tucker and H. H. Melville. Space 167.

American Abrasive Metals Company, Chicago.—Car steps; thresholds and door plates for street and steam passenger coaches; floor plates in engine and boiler rooms; freight corridors; cover



C. W. Kelly, Secretary-Treasurer
L. W. Shugg, Director
A. J. Filkins, Director

J. B. Strong, President
P. C. Jacobs, Honorary Director
E. A. Johnson, Director

G. C. Isbester, Vice-President
T. W. Aishton, Director
A. A. Taylor, Director

plates for trenches; expansion joint; coal-hole and man-hole covers and frames; hot air or heater gratings; pull box covers; door saddles for elevator, fire and other doors; vent and drainage gratings; elevator floors and floor landings. Represented by Charles A. Barker. Space 166.

American Association of Engineers, Chicago.—Represented by E. L. Brandt, C. E. Drayer, F. C. Armstrong, R. C. Bailey, W. S. Cleveland, C. B. Smith, E. Willoughby, C. R. Thomas, E. B. Miller and M. C. Small. Space 165.

American Car and Foundry Company, New York City.—Electric rivet heaters. Represented by A. G. Wood and C. P. Dickerman.

American Hoist & Derrick Company, St. Paul, Minn.—Ditcher. Represented by W. L. Manson, W. B. Maurer, J. L. Hickey and Miss Helen M. Hoeller. Space 88½.

American Chain Company, Reading Specialties Division, New York City.—Replacers; rail binders; derail; guard rail clamps. Represented by J. J. O'Connell, G. C. Isbester and A. P. Van Schaick. Spaces 81 and 84.

American Kron Scale Company, New York City.—Automatic springless dial scales. Represented by C. F. Larson and W. W. Camp. Space 125.

American Malleable Castings Association, Cleveland, Ohio.—Malleable cast iron parts for track equipment and rolling stock. Represented by F. J. Lanahan. Spaces 181, 182 and 183.

American Manganese Steel Company, Chicago Heights, Ill.—Manganese steel castings; crane wheels; conveyor chains; sprockets; car replacers; track work; centrifugal manganese pumps; etc. Represented by W. G. Nichols, W. S. McKee, M. B. Myers, E. C. Bauer, H. A. Hunt and Earl A. Lerner. Spaces 280 and 295.

American Radiator Company, Chicago.—Heating outfits for waystations and interlocking towers. Represented by Grover J. Meyer. Spaces 256 and 269.

American Steel & Wire Company, Chicago.—Railroad fences; steel fence posts; steel fence gates; rail bonds; arc welding machine; wire rope; electrical wires; signal wire; telephone and telegraph wire; locomotive switching ropes. Represented by L. P. Shanahan, B. H. Ryder, J. W. Collins, M. E. Evans, A. W. Froude, W. Mackley, C. S. Knight, J. W. Meaker, O. T. Allen, B. S. Pease and V. R. Sladek. Spaces 51½, 52, 70½ and 71.

American Valve & Meter Company, Cincinnati, Ohio.—Automatic water columns; float valve; switch stands; interlocking switch locks; track appliances. Represented by J. T. McGarry, D. J. Higgins, D. DePinal and F. C. Anderson. Spaces 130, 131 and 132.

American Vulcanized Fibre Company, Wilmington, Delaware.—Fibre; insulation for rail joints; switch rods; steel tie and bridges. Represented by H. C. Hackett, E. W. Patterson and John Barron. Space 126.

Anchor Company, Chicago.—Rail anchors. Represented by O. Metcalf and Geo. H. Chadwell. Space 192½.

Armco Culvert & Flume Manufacturers' Association, Chicago.—Ingot iron corrugated culverts; ingot iron sheets. Represented by T. W. Jenkins, A. J. Bohle and J. E. Buckingham. Spaces 99 and 100.

Austin Company, Cleveland, Ohio.—Model of railroad round house. Represented by O. D. Conover and G. A. Bryant. Spaces 158 and 158½.

Austin Machinery Corporation, Chicago.—Earth moving, concrete mixing and material handling machinery. Represented by H. A. Hooker. Space 300.

Balkwill Manganese Crossing Company, Cleveland, Ohio.—Cast manganese crossings. Represented by S. Balkwill. Spaces 259, 260, 272 and 273.

Barrett Company, Chicago.—Models showing systems of roofing; flashing and waterproofing; protective coatings for roof maintenance; protective iron coatings; wood preservative; prepared roofings; tarvia for paving. Represented by G. R. McVay, W. S. Babcock, F. W. Freeman and G. L. Wilson. Spaces 107½ and 108.

Barrett Cravens Company, Chicago.—Power ox; industrial tractor; lift truck; portable crane; barrel trucks. Represented by T. W. Noble and E. J. Heimer. Spaces 190 and 191.

Bassick Manufacturing Company, Chicago.—High pressure lubricating system; oil. Represented by Carl I. Overton, J. Henly Frier, Jr., Paul D. Wilson, Marion H. Heustis, Wm. H. Roesch and Frank A. Hiter. Space 314.

Benjamin Electric Manufacturing Company, Chicago.—Lighting appliances and fixtures; water tight electrical equipment. Represented by L. E. Snell and C. G. Carlson. Spaces 152 and 153.

Bethlehem Steel Company, Bethlehem, Pa.—Switch stands; one piece guard rail; etc. Represented by R. W. Gillispie, Neil E. Salsich, R. E. Belknap, E. E. Goodwillie, J. F. Hennessy, E. H. Gumbart, J. S. Clark, G. H. Riddle and J. H. Budd. Spaces 199 and 216.

Blaw-Knox Company, Pittsburgh, Pa.—Buckets; sectional steel buildings; forms for concrete construction. Represented by L. R. Grannis and R. B. Randall. Spaces 137-138.

Boss Nut Company, Chicago.—Lock nuts; bolts; rivets. Represented by J. W. Fogg, A. W. MacLean, J. P. Crowley, C. Beaumont, E. T. McAuliffe and J. A. MacLean. Spaces 1 and 2.

L. S. Brach Manufacturing Company, Newark, N. J.—Lighting arresters and signal specialties. Represented by Godfrey Gort. Space 169.

Brown Hoisting Machinery Company, Cleveland, Ohio.—Locomotive cranes; car dumpers; buckets; boat unloaders. Represented by Geo. F. Climo, E. C. Pierce, F. D. Johnson and Bob White. Spaces 231-4.

Bucyrus Company, South Milwaukee, Wis.—Spreader plows; steam shovels; dragline excavators; railway wrecking cranes; unloading plows; etc. Represented by E. G. Lewis and M. L. Woodhull. Spaces 307, 308 and 309.

Bryant Zinc Company, Chicago.—Crossing signals; signal accessories; testing instruments. Represented by D. C. Bryant, A. Muller, S. Miskelly, J. Hensell and T. H. Cole. Spaces 154 and 155.

Buda Company, Harvey, Ill.—Ball bearing jack; journal jack; ratchet jack; barding drill; track drill; switch rods; crossing gate; switch stand; water cooled motor car with generator; replacers; steam tube lighting plant; headlight. Represented by R. B. Fisher, Wm. P. Hunt, Jr., M. A. Evans, J. R. Artrmaier, G. F. Gells, Geo. E. Bryan, A. L. Bliss, S. F. Franks, Geo. Hoover, L. R. Griffin, J. E. Murray, V. Y. Bell and H. C. Beebe. Spaces 61, 62, 63, 64, 65 and 66.

A. M. Byers Company, Pittsburgh, Pa.—Wrought iron pipe; wrought iron signal pipe. Represented by E. A. Small, Jr. and S. K. Turner. Space 253.

Carbic Manufacturing Company, Duluth, Minn.—Portable acetylene lights; motor car lights; oxy-acetylene welding and cutting equipment. Represented by D. C. Duncan, A. D. Guthrie and C. H. Bolinder. Space 15.

Carter Bloxonten Flooring Company, Chicago.—Flooring. Represented by C. J. Carter, M. G. Truman, R. G. Stowell and F. L. Bronez. Space 225.

Challenge Company, Batavia, Ill.—Model railroad tank, tower and fixtures. Represented by Frank Snow, E. W. Johnson, J. A. Anderson and R. L. Lewis. Space 109.

Chicago Bridge & Iron Works, Chicago.—Tank models; pictures and diagrams. Represented by M. J. Trees, H. C. Brown, H. T. Horton, K. I. Small, Ralph Green, C. H. Scheman, C. M. Ladd, Lewis McDonald, C. S. Smith, H. B. Murphy and J. L. Zeller. Spaces 109½ and 110.

Chicago Flag & Decorating Company.—Signal flags; United States and foreign nation flags; signal flag bunting. Represented by George L. Glendon. Space 189.

Chicago Malleable Castings Company, West Pullman, Ill.—Rail anchor tie plate; tie plate key. Represented by J. S. Llewellyn, Warren Osborn, W. L. Beudway, G. B. Greene, Geo. W. Stevens and Alan Rogers. Space 142.

Chicago Pneumatic Tool Company, Chicago.—Riveting and chipping hammers; air drills; pneumatic grinders; portable electric drills and grinders; fuel oil engines. Represented by A. E. Goodhue, C. W. Cross, H. G. Barbee, J. L. Canby, T. J. Hudson, Jr., A. C. Andresen. Spaces 134 and 135.

Chicago Railway Signal & Supply Company, Chicago.—Block signals; relays; switch boxes; crossing bells; signal forgings; etc. Represented by E. W. Vogel, A. C. Dunne, R. F. Frehse, Wm. McClintock, C. R. Ahrens, Carl Suhr, W. E. Ferguson and D. J. McClintock. Spaces 77 and 78.

Central Electric Company, Chicago.—Lighting fixtures; receptacles and plugs for power and lighting equipment. Represented by A. L. McNeil, R. M. Baker, E. H. McNeil, J. M. Lorenze and L. R. Mann. Space 17.

Clark Car Company, Pittsburgh, Pa.—Extension side dump cars. Represented by R. L. Mason and H. G. Doran. Space 135.

Cleveland Railway Supply Company, Cleveland, Ohio.—Guard rail; switch stand; flangeway guard; foot guards; malleable tie plates; malleable iron rail braces and universal cranes. Represented by Frank A. Peck, George W. Pope and Q. J. Winsor. Space 205.

Copper Clad Steel Company, Rankin, Pa.—Weatherproof wire; barb wire; strand; nails; ground rods. Represented by Geo. F. Bain, W. S. Krenz and J. P. Mumford. Space 213.

Creepeck Company, Inc., Hoboken, N. J.—Anticreepers. Represented by P. E. Browne and John T. Reagan. Space 285.

Crerar Adams & Co., Chicago.—50 ton self-lowering jack; 75 ton self-lowering jack; journal jack; bonding drills; track drills. Represented by J. A. Martin, G. D. Bassett, W. I. Clock and Russell Wallace. Space 28.

Chipman Chemical Engineering Company, Inc., New York City.—Chemical weed killer and equipment for application of chemical. Represented by R. N. Chipman, E. D. Jackson, R. B. Davis and I. P. Brookfield. Space 90½.

L. & R. Culvert Company, Chicago.—Sectional cast iron culverts. Represented by T. F. Lundergan, Wm. Robertson, R. F. Repasz. Spaces 242 and 243.

Detroit Graphite Company, Chicago.—Railway paints for bridges, buildings, tanks, equipment, signals, etc. Represented

by R. C. Ashenden, O. N. Edgar, A. B. Edge, J. R. Hintz, H. I. Miller, L. D. Mitchell, J. F. Neimann, F. L. Warner, W. D. Waugh, Walter West and T. R. Wyles. Space 108½.

Detroit Steel Products Company, Detroit, Mich.—Continuous sash; sidewall sash for railroad buildings of all types. Represented by R. S. Bishop. Space 262.

Diamond State Fibre Company, Bridgeport, Pa.—Railway insulation; hard vulcanized fibre; waterproof insulation for track circuits. Represented by G. Swallow, Theo. Herkert and J. B. Rittenhouse. Space 254 and 267.

Paul Dickinson, Inc., Chicago.—Smoke jacks; chimneys for small buildings and roof ventilators; models of engine house with smoke jacks and ventilators. Represented by A. J. Filkins, D. B. Wright and H. Knutson. Space 98.

Dilworth, Porter & Co., Inc., Pittsburgh, Pa.—Represented by W. F. Schleiter, Joseph Dilworth and A. Morrison. Space 27.

Joseph Dixon Crucible Company, Jersey City, N. J.—Silica-graphite paint and other graphite products adapted for railroad equipment. Represented by N. C. Cameron and J. E. Simpson. Space 51.

Duff Manufacturing Company, Pittsburgh, Pa.—Car jacks; locomotive jacks; track jacks. Represented by E. A. Johnson, C. N. Thulin and Earle Thulin. Space 89½.

George E. Gibson, Chicago.—Nut locks. Represented by George E. Gibson. Space 274.

Edison Storage Battery Company, Orange, N. J.—Storage batteries for railway car lighting and signaling. Represented by D.

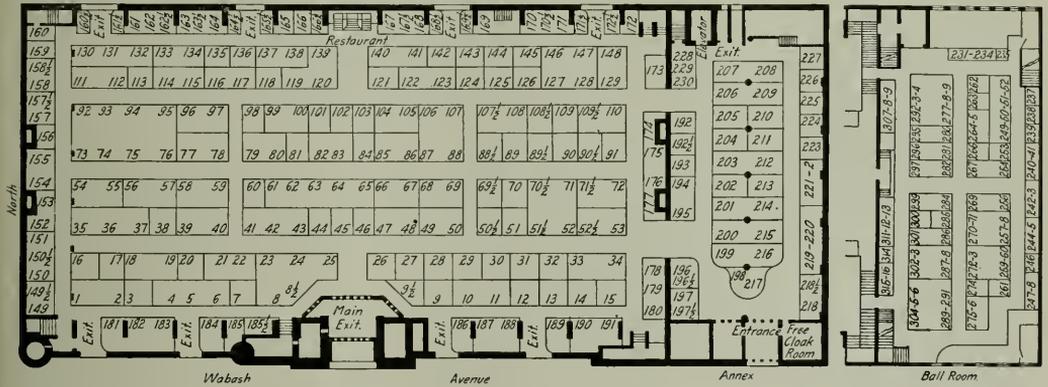
equipped); motor car for heavy service; inspection car; locomotive water crane; water crane valve; oil engine; track scale; electric motors; centrifugal pumps; etc. Represented by J. V. Akers, W. F. Anderson, J. M. Barron, F. M. Condit, E. J. Coverdale, F. P. Drinker, J. C. Flanagan, J. T. Frame, P. H. Gilleland, E. C. Golladay, H. L. Hilleary, G. Howard, J. L. Jones, K. Jurgensen, S. G. Eaton, Roger F. Lane, E. Lang, D. K. Lee, F. J. Lee, G. W. Lewis, L. H. Matthews, C. W. Pank, E. E. Pendray, Stephen Smith, F. C. Snyder, B. S. Spaulding, A. A. Taylor, H. E. Vogel, C. H. Wilson and M. O. Southworth. Spaces 92, 93, 94, 95, 73, 74, 75 and 76.

Fairmont Gas Engine & Railway Motor Car Company, Fairmont, Minn.—Handcar equipment; power deck for converting handcars and pushcars into motor cars; section car; inspection car; handcar equipment; roller bearings; ball bearings; pressed steel car wheels. Represented by H. E. Wade, W. F. Kasper, H. M. Starrett, J. P. Dunning, W. D. Brooks. Spaces 41, 42 and 43.

Federal Electric Company, Chicago.—Sirens; lanterns; fuses. Represented by O. S. Burke, F. T. Baird, P. L. Reymond, H. W. Neal, F. E. Deal, H. L. Duncombe and C. H. Murrin. Space 171½.

Federal Signal Company, Albany, N. Y.—Signals; relays; switch boxes; automatic and interlocking signaling devices. Represented by Paul Renshaw, M. R. Briney, Carl Henze and W. H. Reichard. Spaces 47 and 48.

H. K. Ferguson Company, Cleveland, Ohio.—Erecting aisle; construction section of round house. Represented by H. K. Fer-



Floor Plan of the Coliseum, Annex and Ballroom

C. Wilson, W. F. Bauer, A. S. Knox and A. M. Anderson. Space 20.

Thomas A. Edison, Inc., Bloomfield, N. J.—Primary cells; devices for electrically lighting signals with primary cells; adapters for fitting oil signal and switch lamps to take incandescent bulbs; color and position light signals lighted by primary cells; signal lamp aligning and bulb focusing devices. Represented by L. W. McChesney, R. E. Trout, A. J. Loughren, F. S. Stallknecht, L. S. Dunham, E. W. Brown, P. A. Garrity, B. F. Hines, E. W. Newcomb and R. J. Frost. Spaces 18-19.

Electric Storage Battery Company, Philadelphia, Pa.—Storage batteries for railway signal and car lighting service; three position light signal in operation controlled by mechanical rectifier and storage battery from A. C. current. Represented by J. Lester Woodbridge, F. M. Ethers, H. E. Hunt, J. A. Fitts, W. Dunne, H. M. Beck, T. Milton, G. H. Atkin and H. B. Crantford. Space 60.

Elliot Frog and Switch Company, East St. Louis, Ill.—Manganese insert frog; split switch; switch stand; rails for the above. Represented by H. Elliot, W. H. Elliot, Dickson Fairback, Wm. J. Fairback, H. J. Elliot, A. F. Hess and A. F. Huber. Spaces 281 and 296.

Ellwell-Parker Electric Company, Cleveland, Ohio.—Storage battery electric trucks with 18-inch lifting magnet; truck; paper handling truck; tractor. Represented by Joseph M. Brown. Spaces 257, 258, 270 and 271.

Equipment Corporation of America, Chicago.—Hoisting engines. Represented by Messrs. Capron, Sullivan and Rennolds. Space 227.

Eymon Crossing Company, Marion, Ohio.—Continuous rail crossing. Represented by Byron E. Wilson, James H. Eymon and A. C. Queen. Space 169½.

Fairbanks, Morse & Co., Chicago.—Motor car (magneto

guson, E. M. Haas, O. C. F. Randolph and L. H. Butler. Spaces 163, 163½ and 164.

Friction Car Stop Company, Cleveland, Ohio.—Car stops or bumpers. Represented by J. U. Duffy and B. W. Siftlet. Space 165½.

Frog, Switch & Manufacturing Company, Carlisle, Pa.—Manganese frogs. Represented by L. E. Weidman and A. Gordon Jones. Spaces 207, 208, 302 and 303.

General Automatic Scale Company, St. Louis, Mo.—Automatic weight indicator. Represented by Geo. H. Tontrup, W. F. Siegmund, H. C. Schaper, H. L. Price, E. D. Gordon, H. W. Nolker, Nic LeGrande and C. W. Rhodes. Space 204.

General Electric Company, Schenectady, N. Y.—Turbine generator locomotive headlight; automatic arc welding head; complete line enameled resistor units; diagrammatic layout of automatic substitution for signal service. Represented by J. Roberts, H. W. Stewart, C. C. Bailey, H. M. Jacobs, L. W. Shugg, F. P. Jones, C. B. Keyes, C. Derticos, W. M. B. Bradley and G. F. Bunn. Spaces 35, 36 and 37.

General Railway Signal Company, Rochester, N. Y.—Relays; switch circuit controllers; indicating relays; clockwork time contractor. Represented by F. W. Moffett, F. L. Dodgson, L. Thomas, C. M. Dearnorff, J. R. Willis, H. W. Lucia, W. H. Workman and J. A. Geneser. Spaces 49 and 50.

Gilbert & Barker Manufacturing Company, Springfield, Mass.—Portable outfits; first floor outfits; bench outfits; first and second floor pumps and tanks. Represented by O. W. Howard and J. E. Ham. Space 70.

Gosso Company, Chicago.—Beds. Represented by A. E. Gosso, L. Jensen, T. B. Harned, Jr., and A. R. Brunker. Space 168½.

Graver Corporation, Chicago.—Water softeners; pressure filters. Represented by W. R. Toppa and J. J. Felsecker. Spaces 96 and 97.

- Gould Storage Battery Company, Chicago.—Storage batteries; generators for locomotive headlights. Represented by G. R. Berger, Mr. Pipkin, R. N. Chamberlain and R. Shead. Spaces 157-157½.
- W. & L. E. Gurley, Troy, N. Y.—Transits; levels; plane table outfits; current meters; water stage registers; leveling rods. Represented by C. H. Smart and C. F. Kingsley. Space 69½.
- Hatfield Rail Joint Manufacturing Company, Macon, Ga.—Rail joints; rail joint fastenings. Represented by Walter T. Johnson and Roswell A. Merritt. Space 166½.
- Hayes Track Appliance Company, Richmond, Ind.—Derails. Represented by R. H. Gausepohl, S. P. Hayes, S. W. Hayes, P. I. Harris, H. H. Jenkins, O. M. Kendall, H. J. Mayer and F. C. Stowell. Spaces 140 and 141.
- Henion & Hubbell, Inc., Chicago.—Pumps and hydraulic machinery. Represented by Henry M. Henion, Frank P. Perkins and Frank S. Salchenberger. Spaces 244-245.
- Hazard Manufacturing Company, Chicago.—Rubber insulated wire; wire rope. Represented by C. P. Brodthun, T. A. Keeffe, L. W. Allen, William S. Hart, H. B. Pfisterer and Geo P. Cady. Spaces 21-22.
- Headley Good Roads Company, Philadelphia, Pa.—Crossings and platform materials. Represented by W. T. Headley, E. J. Hunt, Jas. P. Hennessy and Francis X. Kern. Spaces 315 and 316.
- Howlett Construction Company, Moline, Ill.—Electric automatic hoist for coaling stations. Represented by W. E. Howlett, S. M. Howlett and J. F. Greene. Spaces 284 and 299.
- Hubbard & Co., Pittsburgh, Pa.—Track tools and shovels. Represented by O. W. Youngquist, W. H. Remmel, J. V. Smith, S. F. Remmel and J. S. White. Space 143.
- Hall Switch & Signal Company, Garwood, N. J.—Signal appliances. Represented by W. T. Gillingham, O. S. Field and D. R. Day. Spaces 85-86.
- Imperial Belting Company, Chicago.—Conveyor and elevator belting; transmission belting. Represented by A. G. Pickett, B. C. Hooper, D. L. Jennings, W. D. Otter, E. H. Willard and E. A. Woodworth. Spaces 282 and 297.
- Ingersoll-Rand Company, New York City.—Tie tamping outfits; concrete picks; asphalt cutting tools; rail drills; bonding drills; nut tightening machines; grinders; wood borers; riveting hammers; drills, etc. Represented by W. H. Armstrong, J. N. Thorp, C. W. Melcher and J. P. Gillies. Spaces 206-209.
- Johns-Manville, Inc., New York City.—Asbestos built-up and prepared roofings; asbestos shingles; corrugated asbestos roofing; waterproofing; industrial flooring; pipe coverings; packings; high temperature cements; smoke jacks; steam traps; insulating cements; transit asbestos wood; hair felt; fibre conduit and electrical materials. Represented by J. E. Meek, J. C. Younglove, G. A. Nicol, F. J. Horne, H. Flannagan, R. A. Hamaker, H. L. Leach, C. E. Murphy, H. G. Newman, H. B. Sewell, J. H. Trent and W. J. Stewart. Spaces 174-177.
- O. F. Jordan Company, East Chicago, Ind.—Spreader; bank sloper and ditcher. Represented by A. L. Greenbaum, S. B. Morian, Jos. A. Adley, Ray Cosgrove, Alfred Jones and A. W. Banton. Spaces 56 and 57.
- Kalamazoo Railway Supply Company, Kalamazoo, Mich.—Railway motor car; motor section car; inspection car; four-cylinder railway motor car chassis; power car with trailer; two-cylinder opposed air cooled section motor car; inspection car enclosed; drills; pressed steel wheels. Represented by John McKinnon, Frank E. McAllister, D. A. Stewart, W. N. Sidman, Jos. Brown, John Ross Bates, H. R. Miller, W. E. Winterle and F. L. Mason. Spaces 23, 24, 25, 8 and 8½.
- Paul J. Kalman Company, Inc., Chicago.—Reinforcing steel and concrete accessories. Space 7.
- Kaustine Company, Buffalo, N. Y.—Waterless toilets. Represented by D. A. Evans, Chas. F. Smale, Frank Fridlund, Harry C. Clark and Robert C. Higgins. Space 29.
- Kelly-Derby Company, Inc., Chicago.—Kaustine waterless toilets; pulsometer steam pumps; two, four and six-wheel steel warehouse trucks; waterproofing compound; steam specialties. Represented by Chas. F. Smale, Frank Fridlund, Harry C. Clark and Robert C. Higgins. Space 30.
- Kerite Insulated Wire & Cable Company, Inc., Chicago.—Insulated wire and cable. Represented by Azel Ames, P. W. Miller, J. W. Young, J. A. Renton, B. L. Winchell, Jr., E. L. Adams, C. A. Rech, W. H. Fenley and J. A. Hamilton. Spaces 68 and 69.
- Kueffel & Esser Company, Chicago.—Drawing instruments; surveying instruments; measuring tapes; slide rules. Represented by E. W. Kraft, J. J. Carlisle and A. Mossner. Space 90.
- Keystone Grinder & Manufacturing Company, Pittsburgh, Pa.—Railroad tool grinders and attachments. Represented by S. S. Newman and L. J. Cooney. Space 193.
- Kilbourne & Jacobs Manufacturing Company, Columbus, Ohio.—Automatic air dump cars. Represented by J. S. Mossgrove and J. N. Markel. Space 45.
- Lackawanna Steel Company, Lackawanna, N. Y.—Deseamed rails; joint plates; angle bars; steel sheet piling. Represented by H. H. Barbour, Wm. Breeden, F. E. Abbott, M. E. Gregg, Jay L. Hench and E. B. Thomas. Spaces 33 and 34.
- Lakewood Engineering Company, Cleveland, Ohio.—Tractor; trailer; clam shell bucket. Represented by O. W. Stiles, M. L. Weiner, C. R. Dodge, J. A. Doran, C. G. Salisbury, A. M. Kirchner and R. M. Jones. Space 14.
- Layne & Bowler Company, Memphis, Tenn.—Turbine pumps; well screen and strainer. Represented by T. R. Smyth. Space 211.
- Lehon Company, Chicago.—Roofing and shingles; waterproof papers; insulating papers. Represented by Tom Lehon, G. C. Estes, H. M. Voss, H. H. Granade, John E. Eipper and Edw. Leonard. Space 91.
- Leich Electric Company, Genoa, Ill.—Rectifiers for trickle charging storage batteries; telephones; spark plugs; telephone ringing converters. Represented by A. J. Kohn and A. C. Reid. Space 266.
- Robert M. Lucas, Chicago.—Flexible corrosion-proof cements. Represented by Edwin Parr, E. M. Stringer and O. Victor McGrew. Space 238.
- Lufkin Rule Company, Saginaw, Mich.—Measuring tapes; wood and steel rules; tools for shop equipment. Represented by Robert M. Benjamin, Lewis Barnard and Theodore P. Young. Space 121.
- Lundie Engineering Corporation, New York City.—Tie plate. Represented by L. B. Armstrong, S. W. Boyce, E. Brandeis, John Lundie and W. Brooke Moore. Space 145.
- M. W. Supply Company, Philadelphia, Pa.—Switch heater; guard rail clamps; tie plate; guard rail fastener; rail bender. Represented by David L. Vaughan. Space 101.
- Macleod Company, Cincinnati, Ohio.—Rivet forges; oil burners and thawing outfits; carbide lights; sand blast equipment. Represented by Walter Macleod, James Shields and Aug. Schmidt. Spaces 207 and 208.
- MacRae's Blue Book Company, Chicago.—MacRae's Blue Book. Represented by Albert MacRae, Thos. H. MacRae, L. R. Rollins, Lloyd Simonson, C. Hill, J. A. Walsh, F. R. Rice and R. S. Jaquith. Space 9½.
- Maintenance Equipment Company, Chicago.—Rail laying machine; switchpoint straightener; derail; tie spacer; derrick truck car; steel fence posts; power puller; air tools; power ballast screen; rail brace. Represented by H. C. Holloway, W. W. Glosser, J. A. Roche and R. V. Dawney. Spaces 194-195.
- Massey Concrete Products Corporation, Chicago.—Signal cellar; bridge warning pole; crossing slabs; railroad culvert pipe; battery boxes; signal foundation; lighting standard; telephone booth. Represented by J. S. Hobson, F. V. Shannon, Chas. Gilman, B. F. Landers, P. Kircher, G. H. Redding, D. B. Hanna, W. L. McDaniel, E. C. Alexander and E. M. Hatheway. Spaces 54 and 55.
- McGraw-Hill Company, Inc., New York City.—Engineering News Record; Electric Railway Journal, etc. Represented by Wm. Buxman, Fred G. Hudson, A. A. E. Tratman, W. W. DeBerard, J. H. Rudd and H. H. French. Space 185½.
- Mercury Manufacturing Company, Chicago.—Electric tractors; freight house trailers; shop trailers. Represented by L. R. Millar, A. D. Shanks, L. F. Meissner Jr., and Wm. I. Lott. Spaces 116 and 117.
- Metal & Thermit Corporation, New York City.—Rail frogs. Represented by H. S. Mann, C. D. Young, T. B. Skelton and W. H. Moore. Spaces 201 and 214.
- Metal Safety Railway Tie Company, Salt Lake City, Utah.—Metal safety tie. Represented by J. E. Langford, Jr., N. P. Hansen and J. B. Finks. Spaces 240 and 241.
- Midvale Steel & Ordnance Company, and Cambria Steel Company, Philadelphia, Pa.—Car forgings; concrete reinforcing bars; drill steels; wire fence; rails; boiler tubes; rail braces, etc. Represented by J. C. C. Holding, R. V. Sage, G. A. Richardson, G. E. Thackray and F. W. Sager. Spaces 71½-72.
- Miller Train Control Corporation, Danville, Ill.—Standard brake valve. Represented by W. B. Murray, Eugene Murray, Earle Murray, P. E. Herren and H. B. Miller. Space 197.
- Monroe Calculating Machine Company, New York City.—Calculating machine. Represented by W. F. Barklage, R. N. Peck, B. W. Burns, W. E. Hill, H. F. Doty, W. G. Ryan and M. F. Lorton. Space 9.
- Mudge & Co., Chicago.—Railway motor cars. Represented by Burton Mudge, Robert D. Sinclair, Karl J. Eklund, Arthur L. Pearson, George W. Bender, Clyde P. Benning, Jean K. Vanatta and John M. Mulholland. Space 127.
- National Boiler Washing Company, Chicago.—Locomotive terminal facilities. Represented by Spencer Otis, Frederick A. Gale, J. S. Maurer, Thos. G. Dalton, C. C. Lance, F. W. Gale and F. S. Wickman. Space 12.
- National Carbon Company, Cleveland, Ohio.—Signal batteries; dry cells; carbon brushes; carbon products. Represented by J. M. Spangler, C. S. Pfisterer, W. R. Pfisterer, A. E. Pratt, W. A. Sisler, D. H. Green and P. G. Pendorf. Spaces 150, 150½ and 151.
- National Highway Crossing Company, Burlington, Iowa.—Steel

highway railroad crossing. Represented by M. A. Wooldridge. Spaces 247-248.

National Lead Company, New York City.—White lead; red lead; babbitt metal; solder. Represented by A. H. Sabin, F. M. Hartley, Jr., L. T. Wilson and Charles Haas. Space 115.

National Lock Washer Company, Newark, N. J.—Nut locks. Represented by F. B. Archibald, A. T. Thompson, R. L. Cairncross, R. B. Cardozo and Howard Horn. Space 192.

The National Malleable Castings Company, Cleveland, Ohio.—Wrecking hook; rail braces; tie plates; bridge washers; spools. Represented by J. A. Slater, J. A. Faltz, T. W. Ashton, R. T. Hatch, C. H. Krakau, Geo. Rasmussen and L. S. Wright. Space 102.

National Surface Company, Chicago.—Cattle guards; rail saws; tie tongs. Represented by C. C. Zimmerman, H. L. Van Auken and C. F. Hately. Space 210.

National Water Main Cleaning Company, New York City.—Cleaning machine. Represented by Burt B. Hodgman. Space 172.

Geo. P. Nichols & Brother, Chicago.—Electric turntable tractor; transfer table. Represented by Geo. P. Nichols, S. F. Nichols and N. Fries. Space 173.

Northwestern Motor Company, Eau Claire, Wis.—Motor cars; engines. Represented by F. W. Anderson. Space 196.

Ogle Construction Company, Chicago.—Balanced bucket coating stations. Represented by R. A. Ogle, C. F. Bledsoe, M. W. Powell and J. G. Forster. Space 31.

Ohio Brass Company, Mansfield, Ohio.—Signal bonds; propulsion bonds; third rail insulators; high tension porcelain insulators; trolley guard; carrying frame. Represented by W. H. Bloss, W. P. Bovard, E. W. Rowland, Frank V. Cook, F. E. Johnson, R. J. Deneen and M. W. Manz. Space 136.

Okonite Company, Passaic, N. J.—Signal wires and cables. Represented by J. D. Underhill and J. W. Hackett. Space 16.

O'Malley-Bear Valve Company, Chicago.—Gate valves. Represented by Edward O'Malley, Thomas O'Malley, J. E. Brown, J. N. Gallagher, J. M. Pigott, W. H. Morris, F. H. Hitesman, W. J. Murphy and G. Bishop. Spaces 114-115.

Otley Paint Manufacturing Company, Chicago.—Paint. Represented by James J. Otley, W. A. Otley, W. H. Kessler and M. G. Lindsay. Space 161½.

Oxwell Railroad Service Company, Chicago.—Equipment for reclaiming track materials and tools. Represented by G. M. Crownover, F. C. Hasse, L. C. Ryan, W. H. Kofmehl, Wm. Leighton, H. W. Schulze, A. N. Lucas, R. Rivett and W. A. Hogan. Spaces 10 and 11.

P. & M. Company, Chicago.—Rail anti-creeper; bond wire protectors. Represented by Fred N. Baylies, S. M. Clancey, John J. Gallagher, D. T. Hallberg, P. H. Hamilton, Geo. E. Johnson, J. E. Mahoney, Philip W. Moore, Geo. E. Olson, Fred A. Poor, Fred A. Preston, W. H. Reaves, J. N. Reisz, John Ritchie and L. S. Walker. Spaces 122-123.

Page Steel and Wire Company, New York City.—Ingot iron welding rods and electrodes; iron bars and welded tubing; fencing. Represented by W. T. Kyle, C. A. McCune, W. H. Bleecker and E. J. Flood. Spaces 81, 82, 83 and 84.

Pittsburgh-Des Moines Steel Company, Chicago.—Represented by Max Whitacre, W. H. Jackson, W. W. Hendrix, M. P. Cogswell, I. A. Bickelhaupt, E. J. Mershon, J. E. O'Leary, H. W. Ford, W. A. DaLee, C. L. Todd, A. C. Pearsall, G. A. Smith, Herbert Miller, O. D. DeHart, Geo. H. Grase, W. R. Workman and S. E. Andrews. Spaces 52½ and 53.

Pocket List of Railroad Officials, New York City.—Pocket List of Railroad Officials. Represented by J. Alexander Brown, Harold A. Brown and Charles L. Dinsmore. Space 26.

Positive Rail Anchor Company, Marion, Ind.—Guard rail plates and braces; rail anchors; tie plates; rail braces. Represented by L. C. Ferguson, E. A. LeBeau and A. H. Told. Spaces 178, 179 and 180.

Protective Signal Manufacturing Company, Denver, Colo.—Space 3.

Pyrene Manufacturing Company, New York City.—Fire extinguishers; fire alarms; chemical engines; fire appliances and safety devices. Represented by G. P. Rogers, J. P. Maloney and J. D. Cole. Space 186.

Q. & C. Company, New York City.—Derails; clamps; snow melters; braces; steps; insulated joints. Represented by R. J. McComb and E. R. Packer. Spaces 119, 120 and 139.

Rail Joint Company, Chicago.—Rail joints. Represented by V. C. Armstrong, J. C. Barr, B. C. Braine, E. A. Condit, Jr., Alex. Chapman, C. A. Disbrow, Milton Markley, J. A. Greer, C. B. Griffin, H. C. Hickey, Charles Jenkinson, G. H. Larson, J. N. Meade, R. W. Payne, J. G. Runyon, Thomas Ryan, R. R. Seward, E. F. Schermerhorn, McLeod Thomson, W. P. Thomson, F. C. Webb, G. T. Willard, Ben. Wolhaupter and D. P. Wolhaupter. Spaces 79-80.

Railroad Herald, Atlanta, Ga.—Railroad Herald. Represented by E. C. Laird. Space 310.

Railroad Supply Company, Chicago.—Tie plates; derailleurs; crossing signals; highway crossing bells; signal accessories. Rep-

resented by E. H. Bell, H. M. Buck, Paul W. Kohnen, A. H. Smith, H. G. Van Nostrand, E. P. Gowing, Geo. W. Nibbe, T. W. Nicholson, M. J. Fox, F. M. Hill, Geo. J. Schmitt, Jr., R. E. Bell, Geo. T. Cook, Geo. M. Kenyon, F. C. Webb and Royal D. Hawley. Spaces 104 and 105.

Railway Review, Chicago.—The Railway Review. Represented by W. M. Camp, Willard A. Smith and A. E. Hooven. Space 44.

Ramapo Iron Works, Hillburn, New York.—Manganese reinforced switch; switch stands; flange frog; guard rail clamps; tie plate clamp; switch riser plates; adjustable rail brace. Represented by Thomas E. Akers, J. Edgar Davidson, R. J. Davidson, Jr., W. C. Kidd, William Wait Snow and James B. Strong. Spaces 277, 278, 279, 292, 293 and 294.

Rawls Machine and Manufacturing Company, Chicago.—Track-mower. Represented by S. E. Rawls, Elwyn B. Orr and Russell King. Space 210.

Reade Manufacturing Company, Jersey City, N. J.—Weed exterminator. Represented by R. H. Bogle, A. W. Barnard and C. H. Reade. Space 156.

Refinite Company, Omaha, Neb.—Soda water tinsley; water softener; pressure filter. Represented by W. W. Fintner, T. G. Windes and P. L. Markel. Space 184.

Richards-Wilcox Manufacturing Company, Aurora, Ill.—Hardware for engine house doors, freight house doors and sliding doors; trolleys; hoists, etc. Represented by A. J. Eggleston, J. H. Wise and T. G. Perry. Spaces 170, 170½ and 171.

Roadmasters' and Maintenance of Way Association, Sterling, Ill.—Literature. Space, ball room balcony.

Roberts and Schaefer Company, Chicago.—Electric coating station hoist; traction hoist; "RandS" gravity sand drying plants; cinder handling plants. Represented by Clyde P. Ross, G. E. Tebbetts, H. S. Shimizu and E. E. Barrett. Space 89.

Geo. J. Roberts Company, Dayton, Ohio.—Water driven engine; water pumps. Represented by John C. Jamieson. Space 160½.

Roos Foundries, Inc., Chicago.—Guard rail clamps; rail bend-ers; engine and car replacers; bumping posts; replacer clamps; portable derail. Represented by R. D. Gallagher. Space 239.

Safe Lock Switch Machine Company, Lexington, Ky.—Switch machine. Represented by J. F. Leonard and C. F. Jones. Space 159.

Sellers Manufacturing Company, Chicago.—Anchor bottoms; wrought iron tie plates. Represented by J. M. Sellers, R. A. Van Houten, G. M. Hogan, R. J. Platt and T. D. Crowley. Space 124.

Signal Accessories Corporation, Utica, N. Y.—Track contractor; switch adjusters; rail braces; signal and dwarf blades; number plates; pipe carrier supports and hook bolts; foundation extensions; bootleg terminals and anchors; screw locks; signal tape; terminals; lightning arresters; lamp blocks; sacolene blade cleaner. Represented by Wm. F. Bossert and A. J. Crowley. Space 118.

Sherwin-Williams Company, Cleveland, Ohio.—Metal protective paints; target and semaphore finishes; mill white. Represented by P. L. Maury, H. E. Billou, W. F. Gallinger and R. V. Goodremont. Space 13.

Simmons-Boardman Publishing Company, Chicago.—Railway publications, Railway Age; Railway Maintenance Engineer; Railway Signal Engineer; Railway Mechanical Engineer; Railway Electrical Engineer; Maintenance of Way Cyclopedias; Boiler Maker; Marine Engineering. Represented by L. B. Sherman, Henry Lee, C. R. Mills, F. H. Thompson, R. H. Smith, F. C. Koch, R. F. Duysters, C. A. Beardsley, R. E. Jarvis, J. M. Rutherford, B. J. Wilson, E. A. Lundy, Samuel O. Dunn, Roy V. Wright, E. T. Howson, W. S. Lacher, K. E. Kellenberger, Milburn Moore, C. B. Peck, Luther M. Sandwick and D. A. Steel. Space 46.

Simonds Manufacturing Company, Chicago.—Metal cutting machine; cold cutoff machine; metal cutting saws; hack saws; files; tool bits. Represented by Geo. R. Bird, R. H. Myers and H. D. Weed. Spaces 200 and 215.

T. W. Snow Construction Company, Chicago.—Water and coal handling devices. Represented by T. W. Snow, Barton S. Snow, O. T. Snow and W. A. Lathrop. Space 50½.

Southern Hardware and Supply Company, St. Louis, Mo.—Car stopper. Represented by W. D. Achuff and Lorraine Boswell. Spaces 161, 162 and 162½.

St. Louis Frog and Switch Company, St. Louis, Mo.—Flange frogs; manganese steel types of construction. Represented by R. E. Einstein and E. C. Argust. Spaces 286 and 301.

Standard Asphalt and Refining Company, Chicago.—Water-proofing; pipe dip; pipe coating; refrigerator car seal; battery seal; roofing asphalt; the dip; tie plate coating; concrete primer; saturated burlap, fabric and felt. Represented by E. W. Krueger, G. A. Thornton, L. E. Mass, O. H. Beyer, G. Houston, A. L. Sterner and W. F. Bliss. Space 185.

Steel Sales Corporation, Chicago.—Steel rods, bars, wire and sheets; copper and brass; monel metal; copperweld copper clad wire. Represented by W. S. Krenz, J. P. Mumford, Walter

Horn, Geo. Sullivan, H. B. Dickinson and Frank Elliott. Space 202.

Stuebing Truck Company, Cincinnati, Ohio.—Lift truck systems; steel bound platforms; dollies for terminals; conveying systems. Represented by A. O. Kraemer. Space 223.

Templeton, Kenly & Co., Ltd., Chicago.—Track and ballast jacks; bridge and car jacks; wrecking jacks. Represented by L. E. Allen, H. B. Burlow, Bob Evans, J. H. Hummel, Arthur C. Lewis, S. A. Nelson, J. J. O'Fallon, A. W. Preikschat, T. L. Simpson, W. B. Templeton and G. W. Whiteside. Space 32.

Toledo Scale Company, Toledo, Ohio.—Automatic scales. Represented by H. O. Hem, C. H. Hoggood and T. M. Bates. Spaces 4, 5 and 6.

Track Specialties Company, Inc., New York City.—Guard rail clamp; guard rail brace; rail joint; derailleurs; rail bender; "U" spike; rail braces and brace plates; anchor plate. Represented by W. B. Lee. Spaces 275-276.

Train Control Appliance Company, El Paso, Texas.—Automatic stop. Represented by M. B. Bulla. Space 164½.

Torchweld Equipment Company, Chicago.—Welding apparatus; cutting apparatus; preheating apparatus; lead burning apparatus; apparatus for signal departments; welding materials. Represented by W. A. Slack, H. R. Fenstermaker and A. F. Dillon. Spaces 149 and 149½.

Truscon Steel Company, Youngstown, Ohio.—Reinforcing steel; steel sash; metal lath; standard steel buildings; highway reinforcing products; pressed steel; inserts. Represented by A. E. Brown, W. E. Lambert, S. C. Stout and G. F. Sparks. Spaces 221 and 222.

Turner, Day & Woolworth Handle Company, Louisville, Ky.—Hickory handles; track jacks, etc. Represented by T. R. Clendinen. Space 237.

Union Switch & Signal Company, Swissvale, Pa.—Relays; switch boxes; rail joint; phase meter. Represented by Messrs. J. S. Hobson, W. W. Talbert, George Marloff, S. E. Gillespie, J. L. Loucks, Roy Clayburn, W. H. Cadwallider and H. R. Sheene. Spaces 66 and 67.

U. S. Wind Engine & Pump Company, Batavia, Ill.—Stand pipes; water station; wood tank; steel substructure; tank fixtures; railroad pump; tank hoops; switch stands; semaphore. Represented by L. E. Wolcott, J. P. Prindle, Clifford E. Ward, Fred Pearson and Theodore Daniels. Spaces 111 and 112.

Verona Tool Works, Chicago.—Track tools; nut locks. Represented by Wm. F. Hart, E. Woodings, John B. Seymour, P. L. Laughlin, F. B. Nimmo and John S. Wincrantz. Spaces 129 and 145.

Volkhardt Company, Stapleton, S. I., New York City.—Water service supplies. Represented by W. Volkhardt. Space 160.

Wailles Dove-Hermiston Corporation, Cleveland, Ohio.—Protective coatings for bridges, tanks, cars, power plants, bunkers, buildings and signal towers. Represented by Irving Noonan, J. A. Graves, L. A. Demnstaedt and John A. Tilden. Spaces 311, 312 and 313.

Waterbury Battery Company, New York City.—Primary batteries. Represented by E. E. Hudson, G. A. Nelson, S. J. Hough and G. S. Gaunt. Space 38.

Wayne Oil Tank & Pump Company, Fort Wayne, Ind.—Oil storage equipment; oil filtration equipment; oil burning equipment. Represented by Fred H. McCulloch, S. D. Rickard and Carver Wood. Space 144.

Werner Machine Company, West Allis, Wis.—Spike shaper for reclaiming bent spikes. Represented by A. M. Fons, A. W. Tabert, J. M. McDermott and J. A. Goetz. Space 260.

West Disinfecting Company, Chicago.—Insector machines and tablets; insecticides; sprays; disinfectants. Represented by H. E. Daniels, W. L. Larry and E. C. Daniels. Space 263.

Western Electric Company, Chicago.—Electrical supplies. Represented by G. H. Porter. Spaces 58 and 59.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.—Portable arc welding equipment; welding samples; electric motors; control equipment; locomotive headlight sets. Represented by G. H. Jaspart. Spaces 249, 250, 251 and 252.

Wm. Wharton Jr. & Co., Inc., Easton, Pa.—Switches and frogs; guard rail clamps; castings. Represented by Geo. R. Lyman, H. F. McDermott, S. G. Llewellyn and Walter Allen. Spaces 289, 290, 291, 304, 305 and 306.

Woods Brothers Construction Company, Lincoln, Neb.—Retards; concrete piles. Represented by C. W. Sturtevant. Space 235.

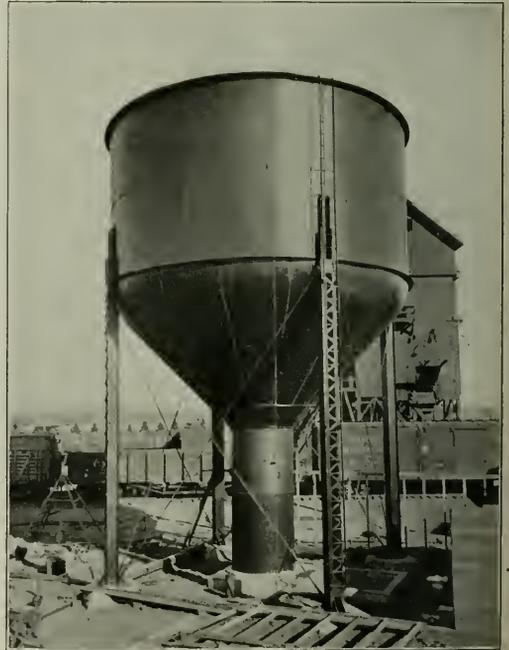
Woolery Machine Company, Minneapolis, Minn.—Railway motor car engines. Represented by H. E. Woolery and D. A. Woolery. Space 226.

Wyoming Shovel Works, Wyoming, Pa.—Shovels and picks. Represented by H. T. Potter, G. E. Geer, Lou Braden, E. L. Ruby and Stanley H. Smith. Space 103.

Yale & Towne Manufacturing Company, Stamford, Conn.—Chain blocks; electric hoists; I-beam trolleys; electric industrial trucks; padlocks; night latches; cabinet locks; door closers. Represented by W. C. Bigelow, H. R. Butler, C. B. Veit, Geo. C. Fishleigh and W. A. Boyce. Spaces 264 and 265.

A Conical Bottom Water Softener

A WATER SOFTENING PLANT has been completed recently by the Refinite Company, Omaha, Neb., for the Chicago, Milwaukee & St. Paul at Yankton, S. D., which contains a number of interesting features, one of which, the construction of the bottom, is a new departure in water softening design. As will be seen in the illustration, the bottom is similar to that of the conical-spherical water tanks, sloping sharply to the center and terminating in a cylindrical leg of small diameter. The idea in this construction is to facilitate the removal of the precipitates resulting from the softening process. Aside from this feature and that of passing all piping through the body of the tank, the plant conforms to the standard Booth design for railroad service, in



C. M. & St. P. Water Softening Plant, Yankton, S. D.

which the raw water is first discharged over a water wheel located above the tank, after which it passes through a measuring weir into a cylindrical reaction tank, in which the chemical is discharged and the resulting mixture agitated by revolving paddles, emerging from the open bottom as softened water. The water then rises in the settling tank to the storage space in the top of the tank preparatory to passing directly to the locomotives, the precipitates settling out in the bottom, from the leg of which they are removed at will through a sludge valve.

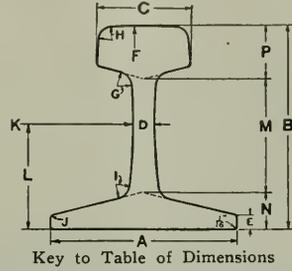
It will be seen that the plant is a combination softener and storage tank, the tank at Yankton being 28 ft. 8 in. in diameter and 41 ft. high, from ground to top, which, at the rated capacity of 10,000 gal. per hour, provides for a total capacity of 100,000 gal. and a storage capacity of 50,000 gal. The system is automatic, all chemicals being prepared in a ground tank of several hours' capacity and being fed automatically into the softener in

proportion to the flow of the raw water. The plant as completed has a housing built around the posts supporting the tank which provides storage space for chemicals, and it is estimated that with the water running about 42 grains hard the plant will remove about 22 tons of scale-forming salts from the water each month.

in the files of that company. These records show that 24 of the sections shown in this chart are what may be termed "live" sections at the present time, i. e., those

A New Rail Section Chart

THE CHART APPEARING BELOW gives the complete dimensions for 39 rail sections and include the principal steam rail sections that are being rolled for steam railroad use in this country at the present time. This chart was prepared under the direction of C. W. Gennet, Jr., manager of the Rail Inspection department of Robert W. Hunt & Company, Chicago, from records



Key to Table of Dimensions

FEB. 1, 1921.

SECTION	WT.	A	B	C	D	E	F	G	H	I	J	K	L	N	M	P	SLOPE OF HEAD	SPLICE BAR ANGLES	% HEAD	% WEB	% BASE
R.E.	130	6	6 1/8	2 6/8	4 1/8	3 0/8	14	8 1/8	6 1/8	12 1/8	1 1/8	14	3 3/8	1 1/4	3 4/4	5 4/4	1 To 16	4 To 1	36.4	23.8	39.6
R.E.	120	5 1/2	6 1/8	2 1/8	4 1/8	3 0/8	14	8 1/8	6 1/8	10 1/8	1 1/8	14	3 1/2	1 1/4	3 1/4	5 1/4	1 To 16	4 To 1	37.1	22.7	40.2
R.E.	110	5 1/2	6 1/8	2 1/8	4 1/8	3 0/8	14	8 1/8	6 1/8	10 1/8	1 1/8	14	3 1/2	1 1/4	3 1/4	5 1/4	1 To 16	4 To 1	37.4	23.0	39.6
R.E.	100	5 1/2	6 1/8	2 1/8	4 1/8	3 0/8	14	8 1/8	6 1/8	10 1/8	1 1/8	14	3 1/2	1 1/4	3 1/4	5 1/4	1 To 16	4 To 1	38.2	22.6	39.2
R.E.	90	5 1/2	6 1/8	2 1/8	4 1/8	3 0/8	14	8 1/8	6 1/8	10 1/8	1 1/8	14	3 1/2	1 1/4	3 1/4	5 1/4	1 To 16	4 To 1	36.2	24.0	39.8
A.R.A.-A.	100	5 1/2	6 1/8	2 1/8	4 1/8	3 0/8	14	8 1/8	6 1/8	10 1/8	1 1/8	14	2 15/16	1 1/4	3 1/4	5 1/4	1 To 16	4 To 1	36.9	23.4	39.7
A.R.A.-A.	90	5 1/2	6 1/8	2 1/8	4 1/8	3 0/8	14	8 1/8	6 1/8	10 1/8	1 1/8	14	2 9/16	1 1/4	3 1/4	5 1/4	1 To 16	4 To 1	36.2	24.0	39.8
A.R.A.-A.	80	4 1/2	5 1/8	2 1/8	3 3/8	2 3/8	14	7 1/8	5 1/8	9 1/8	1 1/8	14	2 15/16	1 1/4	2 4/4	4 1/4	1 To 16	4 To 1	38.8	21.0	40.2
ARA-B.	100	5 1/2	6 1/8	2 1/8	4 1/8	3 0/8	12	8 1/8	6 1/8	10 1/8	1 1/8	12	2 15/16	1 1/4	2 4/4	4 1/4	3°	13°	40.2	19.2	40.6
ARA-B.	90	4 1/2	5 1/8	2 1/8	3 3/8	2 3/8	12	7 1/8	5 1/8	9 1/8	1 1/8	12	2 11/16	1 1/4	2 4/4	3 3/4	3°	13°	40.1	19.2	40.7
ARA-B.	80	4 1/2	5 1/8	2 1/8	3 3/8	2 3/8	12	7 1/8	5 1/8	9 1/8	1 1/8	12	2 15/16	1 1/4	2 4/4	3 3/4	3°	13°	38.8	19.5	41.7
A.S.C.E.	100	5 1/2	5 1/2	2 1/8	3 1/8	1 9/8	12	4 1/8	5 1/8	4 1/8	1 1/8	12	2 15/16	1 1/4	2 4/4	3 3/4	NONE	13°	42.0	21.0	37.0
A.S.C.E.	90	5 1/2	5 1/2	2 1/8	3 1/8	1 9/8	12	4 1/8	5 1/8	4 1/8	1 1/8	12	2 15/16	1 1/4	2 4/4	3 3/4	NONE	13°	42.0	21.0	37.0
A.S.C.E.	85	5 1/2	5 1/2	2 1/8	3 1/8	1 9/8	12	4 1/8	5 1/8	4 1/8	1 1/8	12	2 15/16	1 1/4	2 4/4	3 3/4	NONE	13°	42.0	21.0	37.0
A.S.C.E.	80	5	5	2 1/8	3 1/8	1 9/8	12	4 1/8	5 1/8	4 1/8	1 1/8	12	2 3/16	1 1/4	2 4/4	3 3/4	NONE	13°	42.0	21.0	37.0
A.S.C.E.	75	4 1/2	4 1/2	2 1/8	3 1/8	1 9/8	12	4 1/8	5 1/8	4 1/8	1 1/8	12	2 15/16	1 1/4	2 4/4	3 3/4	NONE	13°	42.0	21.0	37.0
P.S.	130	5 1/2	6 1/8	3	4 1/8	3 4/8	12	8 1/8	7 1/8	12 1/8	1 1/8	16	3 1/2	1 1/4	3 1/4	2	NONE	16° AT TOP 16° AT BASE			
P.S.	125	5 1/2	6 1/8	3	4 1/8	3 4/8	12	8 1/8	7 1/8	12 1/8	1 1/8	16	3 1/2	1 1/4	3 1/4	2	NONE	16° AT TOP 16° AT BASE	38.4	22.4	39.2
P.S.	100	5	5 1/2	2 1/8	3 1/8	3 4/8	10	7 1/8	7 1/8	10 1/8	1 1/8	10	2 11/16	1 1/4	2 4/4	2 1/4	2 1/2 AT TOP	15° AT TOP 15° AT BASE	40.4	19.1	40.5
P.S.	85	4 1/2	5 1/8	2 1/8	3 1/8	3 4/8	10	7 1/8	7 1/8	10 1/8	1 1/8	10	2 15/16	1 1/4	2 4/4	2 1/4	NONE	15° AT TOP 13° AT BASE	42.3	18.5	39.2
L.V.	136	6 1/2	7	2 1/8	4 1/8	3 4/8	10	8 1/8	7 1/8	12 1/8	1 1/8	14	1 1/2	1 1/4	3 1/4	2	4°	4 To 1	35.4	23.7	40.9
L.V.	110	5 1/2	6 1/8	2 1/8	4 1/8	3 4/8	10	7 1/8	7 1/8	10 1/8	1 1/8	14	2 15/16	1 1/4	3 1/4	2	4°	4 To 1			
DUDLEY REN'F.	105	5 1/2	6 1/8	3	4 1/8	3 4/8	14	8 1/8	7 1/8	1 1/8	1 1/8	14	3 1/2	1 1/4	3 1/4	2	1 To 16	4 To 1	40.2	26.2	33.6
DUDLEY	100	5 1/2	6 1/8	3	4 1/8	3 4/8	14	8 1/8	7 1/8	1 1/8	1 1/8	14	3 1/2	1 1/4	3 1/4	2	1 To 16	4 To 1	41.2	24.7	34.1
DUDLEY REN'F.	90	5	5 1/2	2 1/8	3 1/8	3 4/8	14	7 1/8	7 1/8	1 1/8	1 1/8	14	3	1 1/4	3 1/4	2	1 To 16	4 To 1	37.9	25.7	36.4
DUDLEY	85	5	5 1/2	2 1/8	3 1/8	3 4/8	14	7 1/8	7 1/8	1 1/8	1 1/8	14	2 3/4	1 1/4	3 1/4	2	1 To 16	4 To 1	45.5	20.8	33.7
D.L.&W.	105	5 1/2	6 1/8	3	4 1/8	3 4/8	10	8 1/8	7 1/8	10 1/8	1 1/8	8	2 3/4	1 1/4	3 1/4	2	4°	13°	39.2	23.2	37.6
D.L.&W.	101	5 1/2	6 1/8	3	4 1/8	3 4/8	10	8 1/8	7 1/8	10 1/8	1 1/8	8	2 3/4	1 1/4	3 1/4	2	4°	13°	40.6	20.2	39.2
Co of N.J.	135	6	6 3/8	3 1/8	4 1/8	3 5/8	12	9 1/8	8 1/8	12 1/8	1 1/8	14	3 1/2	1 1/4	3 1/4	2	4°	14°			
C.&N.W.	100	5 1/2	6 1/8	2 1/8	4 1/8	3 0/8	12	8 1/8	6 1/8	10 1/8	1 1/8	12	2 15/16	1 1/4	2 4/4	3 3/4	2 1/2 AT TOP	13°	36.1	19.7	44.2
C.&N.W.	90	5 1/2	6 1/8	2 1/8	4 1/8	3 0/8	12	8 1/8	6 1/8	10 1/8	1 1/8	12	2 15/16	1 1/4	2 4/4	3 3/4	2 1/2 AT TOP	13°	36.1	19.7	44.2
GN-1918	90	5	5 1/2	2 1/8	3 1/8	3 4/8	14	7 1/8	7 1/8	10 1/8	1 1/8	14	2 3/4	1 1/4	3 1/4	2	5°	13°	35.7	22.7	41.6
GN-1920	90	5	5 1/2	2 1/8	3 1/8	3 4/8	14	7 1/8	7 1/8	10 1/8	1 1/8	14	2 3/4	1 1/4	3 1/4	2	1 To 16	13°	36.6	21.8	41.6
A.T.&S.F.	90	5 1/2	6 1/8	2 1/8	4 1/8	3 0/8	14	8 1/8	6 1/8	10 1/8	1 1/8	14	2 3/4	1 1/4	3 1/4	2	1 To 16	4 To 1	36.1	24.0	39.9
A.T.&S.F.	85	4 1/2	5 1/8	2 1/8	3 3/8	2 3/8	14	7 1/8	5 1/8	9 1/8	1 1/8	14	2 3/4	1 1/4	3 1/4	2	1 To 16	4 To 1	37.0	22.7	40.2
C.P.K.	85	5	5 1/2	2 1/8	3 1/8	3 4/8	8	7 1/8	7 1/8	10 1/8	1 1/8	8	2 1/2	1 1/4	2 4/4	2	7 To 1 AT TOP	4 To 1	36.4	22.5	41.1
D.&R.G.	90	5 1/2	6 1/8	2 1/8	4 1/8	3 0/8	14	8 1/8	6 1/8	10 1/8	1 1/8	14	2 3/4	1 1/4	3 1/4	2	4°	14°			
C.N.R.	80	5	5 1/2	2 1/8	3 1/8	3 4/8	8	7 1/8	7 1/8	10 1/8	1 1/8	8	2 1/2	1 1/4	2 4/4	2	2 1/2 AT TOP	13°	39.2	21.3	39.5
HARRIMAN	75	4 1/2	4 1/2	2 1/8	3 1/8	1 9/8	14	7 1/8	7 1/8	10 1/8	1 1/8	14	2 1/2	1 1/4	2 4/4	2	1 To 16	4 To 1	38.5	21.7	39.8

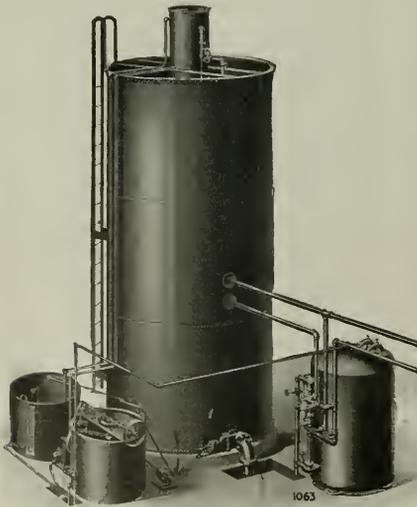
Table of Rail Section Dimensions

that are being rolled in considerable quantities. These 24 sections are as follows: RE, 130 and 100-lb.; ARA-A, 90 and 100-lb.; ARA-B, 90-lb.; ASCE (all weights); PS, 130-lb.; PS, 85-lb.; LV, 136-lb.; Dudley, 105-lb.; D. L. & W., 105-lb.; C. R. R. of N. J., 135-lb.; C. & N. W., 100 and 90-lb.; G. N., 1920, 90-lb.; A. T. & S. F., 90 and 85-lb.; C. P. R., 85-lb.; D. & R. G., 90-lb., and Harriman.

One section of particular interest at the present time is the RE 130-lb. section, of which 12,000 tons has been ordered by the Baltimore & Ohio, the first road to adopt this section. Another is the PS 130-lb. section of the Pennsylvania System, of which 82,500 tons were laid in 1920, this being 87 per cent of the entire tonnage of new rails laid last year on the lines of that system. Other important sections include the RE 100-lb. used by the Union Pacific, the Dudley 105-lb. rail used on the New York Central Lines and the Lehigh Valley 135-lb. section. The newest rail shown on this chart is the G. N. (Great Northern) 90-lb. section. A study of this chart will impress the reader with the fact that the railroads of this country are still a long way from actual standardization of rail sections.

A Softening Plant for Small Water Stations

ON MOST RAILROADS there are a number of small water stations where the condition of the water is such as to make its improvement for boiler use highly desirable and in consequence, where railroads, aware of the potential possibilities in softening processes, would likely provide for their establishment if suitable systems could be obtained at a price low enough to warrant the expenditure. In view of this the Graver Com-



Graver Softening Plant for Small Stations

pany, Chicago, has recently developed and standardized in its shop a small softener, which is designed to meet these requirements.

Except for the arrangement of chemical mixing and regulating tanks, which in this case are usually carried on the top of the settling tank, this plant is similar in de-

sign to the manufacturer's type "K" plant, consisting of a sheet steel softener with or without a pressure filter, in which raw water is discharged into the top of a down-take pipe, receives its supply of chemical, proceeds to the bottom of the downtake and thereafter rise in the settling tank and passes to the filter.

Like the large type "K" plant, the softener is equipped with devices for starting and stopping its operation automatically and also regulating the supply of chemicals automatically, and is designed for mixing the chemicals by electric power, although where electricity is not accessible the design can be modified to accommodate a water wheel, as it can also be designed to permit placing the chemical tanks on the ground floor.

The settling tank of the softener is 10 ft. 6 in. in diameter and 38 ft. high, thus permitting all tanks to be shipped in the assembled condition and necessitating only the work of placing the equipment on suitable foundations and of making the pipe and sewer connections preparatory to its operation.

A New Development in Rail Anchors

TWO DEVICES HAVE BEEN PLACED on the market recently which present a new treatment of the rail creeping problem. They are the "Trak-Ankor" and the Trasco "U" spike, products of the Track Specialties Company, New York City. The first is a narrow



An Installation of "Trak-Ankors"

flat steel bar punched with spike holes, while the second is a $\frac{3}{8}$ -in. square rod pointed at each end and bent in U shape. Both devices are designed for the same purpose, that of holding together the ties located in the vicinity of the rail joints of the track, the theory being that by so doing rail-creeping and its evils can be prevented at a very low cost.

The theory is based upon the observation that in track not already equipped between joints with anti-creeping devices, the rails are prevented from shifting over the cross ties only at the joints, the slotted spike holes in the rail joints effectively holding the rail to the ties at these points, but only with the result that the joint ties, not sufficiently resistant by themselves, are carried along

with the rail, and in addition, owing to the fact that no two rail-joints of the track come on the same cross-ties, they are subjected to a slewing movement which gives rise to tightening of the gage. This being the case, it is claimed that the creeping can be prevented by dis-



A Trasco "U" Spike

tributing the thrust of the rail at the joints to several ties instead of the two joint ties.

With the "Trak-Ankers" this is accomplished by spiking the plates to the ties as shown in the illustration, a four or six-hole plate being used, depending upon the intensity of the creeping, and the plates being arranged to connect those ties with the joint ties which lie back of the joint. The "U" spikes are arranged according to the same plan but, being long enough only to connect two adjacent ties, are applied in series.

A Practical Method of Handling Spray Painting Equipment

RAILWAY OFFICERS HAVING CHARGE of work involving the painting of bridges and other structures along the right of way may find a very helpful suggestion for the handling of spray painting equipment in the description of the method employed by the maintenance department of one railroad, the nature of the equipment



Portably Arranged Spray Painting Equipment

used and the method of handling it being evident from the illustration showing a bridge in the process of being repainted. The entire outfit consists simply of a two-man spraying outfit, a gasoline engine air compressing set, and a push car, the air compressor set, in this case, being attached to the car and the paint tank arranged so that it be lifted from it and placed where most convenient for the two painters. In the picture it will be noticed that the paint tank has been placed on the ties near the center of the bridge, permitting a man to work on each side of the bridge. This arrangement of handling painting work adjacent to the track is both one which affords convenience in painting and in meeting calls at different points along the line. Aside from the air compressing set there is plenty of room on the car for a 7 or 13 gal. paint tank,

the hose, and such extra equipment as ladders and safety brackets. The equipment illustrated is made by the DeVilbiss Company, Toledo, Ohio.

A New Combination Headlight and Handlight for Motor Cars

KNOWING THAT IT IS FREQUENTLY necessary to operate motor cars at times when an effective and convenient form of lighting is greatly desired from the standpoints of safety and general usefulness, the Carbic Manufacturing Company, Duluth, Minn., has recently developed a lamp under the name of Carbic Model M, which is designed specially for this use. As the name would imply, the lamp is of the acetylene type, the gas in this case being generated within the lamp from calcium carbide prepared in briquet form. As will be seen in the illustration, it consists essentially of a water tank, a gas bell with reflector, and a cake-holding assembly. The process of setting up the lamp consists of inserting one or two Carbic cakes, as the briquets are called, into the cake holder, inserting this assembly, which includes a splash ar-



The Carbic Model M Assembled

rester, into the gas holder, fastening, and thereafter inserting the gas holder into the tank and clamping it, the tank having previously been partly filled with water. When thus set up the lamp is 15 1/4 in. high over all, 6 1/2 in. wide and weighs, empty, 6 1/2 lbs. When charged with 12 Carbic cakes and filled with water it weighs about 12 lb. and has a continuous burning capacity of 8 hr. at a cost of approximately 1 2/3 cents. Clamps on the side of the water tank provide a convenient means of securing the lamp in the stand, the latter being bolted to the car, and a handle which forms a part of the gas holder provides the means of carrying the outfit about as a hand lamp. Located above and attached to the gas holder is also an operating valve for regulating or shutting off the light. The water



Parts of Carbic Model M Lamp

tank of the lamp is made of heavy galvanized metal. The reflector, also of sheet metal, has an aluminum interior of such shape and polish as to project the light, it is said, over a hundred feet ahead and to provide sufficient illumination sidewise to permit a clear observation of a large portion of the right of way. A swing joint placed near the reflector permits its adjustment to any vertical angle. The Carbic cakes for the lamp are furnished in 40 and 75 lb. drums, containing 54 and 110 cakes, respectively,

and the outfit is so designed that the unconsumed portions of a charge need not be discarded, but instead may be used again without wastage.

A New Inspection Car for Officers

RAILWAY OFFICERS ACCUSTOMED to making extended inspection trips over their lines by motor car realize the importance of reliability in engine performance, high speed consistent with safety, cleanliness and comfort in the accommodations and such shelter as will make the continuation of important trips independent of minor changes in weather. The Kalamazoo Railway Supply Company, Kalamazoo, Mich., has recently developed a car designed to fulfill these requirements. This car provides comfortable seating quarters for 11 men. It is carried on springs, runs equally well in either direction, and is completely enclosed by a steel cab equipped with continuous side steps, three doors on each side, speedometer



Kalamazoo Motor Inspection Car

and electric headlights, markers, interior lights and siren. The upper section of the cab is open on all sides to afford an unobstructed vision in all directions and may be fitted with glass or weather curtains. The engine is a four-cylinder, water-cooled type, equipped with electric starter and is capable of running 40 miles per hour. By reason of the steel underframe of the car, its weight and the long wheel base, it is said that this speed can be maintained safely.

Culvert Pipe With Reinforced Ends

THE CANTON CULVERT & SILO COMPANY, Canton, Ohio, has recently devised a reinforced end for its "Imperial" riveted corrugated iron culverts, which is said to have greatly increased the serviceability of such pipe in service where the ends are frequently subjected to rough treatment without adding to its cost. A condition of this kind is commonly encountered at the approaches to highway crossings, particularly in the case of the smaller culverts where the fill does not exceed a depth of one or two feet. At such points it is the tendency of drivers of wagons or trucks often to make a short turn in approaching or leaving the grade with the result that some part of the vehicle drops over the edge of the embankment and strikes the culvert, tending to bend it. Obviously the culvert ends can be reinforced to good purpose at such places.

The nature of the Canton reinforcement is shown in the

illustration. It consists simply of bending back the metal of the pipe $2\frac{1}{2}$ -in. on each end, after which it is rolled back into a $\frac{3}{4}$ -in. head. Aside from affording great strength to the ends, this type of reinforcement is pleasing in appearance, presents nothing to make handling of the culvert less convenient, and embodies the further advan-

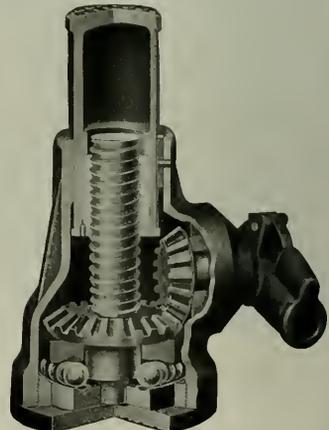


The Imperial Culvert Showing Reinforced End

tage of being made of the same corrosion-resisting material as that in the culvert. This reinforcement, when requested, is placed on all culvert pipe 24 in. in diameter and under.

An Improved Jack for Bridges

THERE IS NOW ON THE MARKET an improved lifting jack which is designed for use in bridge shimming and similar work. A cross section of this jack is shown in the illustration. As will be seen, the jack is a ball bearing, ratchet jack of the screw-head type. It is built compactly and embodies several new features in con-



Sectional View Duff Jack

struction. Aside from its unusual lifting capacity (35 tons) special features are the small head, positive stop and keyed standard.

The small head facilitates the use of the jack in confined spaces and gives an added insurance that the jack will be placed squarely under the load, thus avoiding the danger present, when, through carelessness, the jack is so placed that the load becomes eccentric. The positive stop, formed by the collar on the nut in the standard

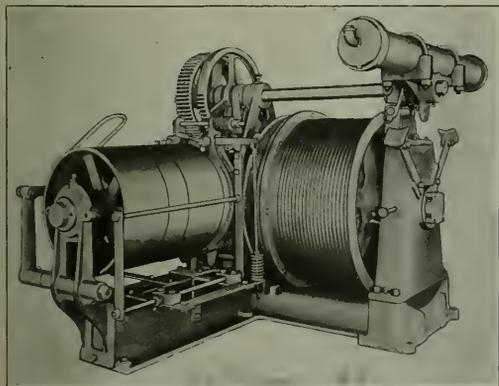
extending beyond the outside of the standard, does away with the danger of raising the jack so far that the standard is pushed out of the base and the load allowed to drop. The key in the standard (in the illustration appearing at the top of the jack on the right hand side between the standard and the base of the jack) prevents any tendency of the jack to twist when heavily loaded.

In this jack the steel screw is of high carbon crucible steel and the nut in which it revolves of hard bronze. It is said that this combination affords, aside from great strength, an unusually low coefficient of friction. The ball bearings used are large diameter alloy steel and they roll in a large diameter race. All gears are of steel with machine-cut teeth case-hardened and heat-treated, and are protected from springing or dislocation by the method of attaching the bonnet and bottom plate.

These jacks are made in two sizes, having heights, when closed, of 9 and 11 in., respectively, raises of $3\frac{1}{4}$ and $5\frac{1}{4}$ in., and they weigh 50 and 55 lb. The head and diameter of the base are the same for both jacks, being $3\frac{3}{8}$ and $6\frac{1}{4}$ in. The jacks are manufactured by The Duff Manufacturing Company, Pittsburgh, Pa.

An Automatic Hoist for Coaling Stations Improved

THE ACCOMPANYING ILLUSTRATION shows an automatic hoist manufactured and recently improved by the Howlett Construction Company, Moline, Ill., for use in locomotive coaling stations. This machine is a belt drive type, self contained on the one base, and is designed to execute automatically the hoisting, reversing and lowering movements involved in operating a skip bucket be-



Howlett Automatic Coaling Station Hoist

tween the coal pit below the receiving track of the coaling station and the top of the tower.

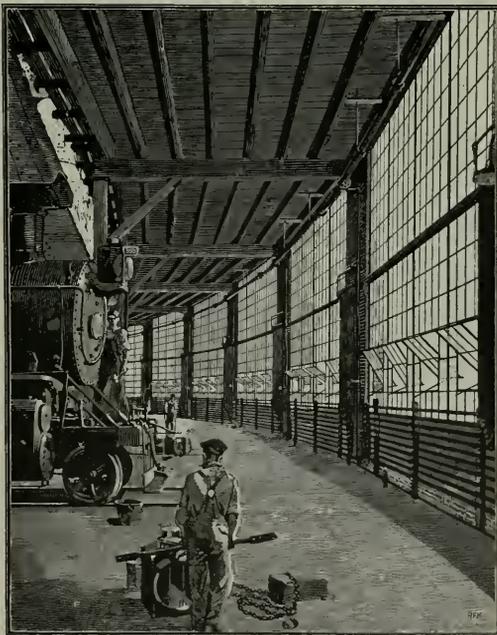
The new features in the hoist as improved are several, chief among which is the combining of the hoist and automatic reversing mechanism in the one machine. The iron cylinder, or barrel, together with the connecting shaft and gears, as shown mounted on the top of the hoist, constitute the major part of this reversing mechanism. In the barrel is a dense liquid and a cast iron ball free to move from one end to the other as the barrel is tilted up or down, this feature of the machine being called into play when the bucket has reached the end of its travel up or down and been halted by an automatic

stop. The stop, aside from shifting the belt to the free pulley and applying the brake to the hoist, raises the end of the barrel then containing the ball, whereupon the ball sinks to the lower end until its added weight becomes sufficient to throw the machine into the reverse gear, the period required for the ball to pass through the liquid allowing time for dumping or loading of the bucket as the case may be, and this time, it is said, being adjustable from 1 to 30 seconds by varying the amount of liquid in the barrels. Another new feature of the machine lies in a safety stop, designed to stop the machine immediately upon the breaking of the belt. The device consists in a ball carried across the back of the pulley and operates in such a case by actuating an emergency brake. The fact that all the gears which carry the load are protected from dust is said to be further improvement of the hoist.

Fenestra Window Sash

THE DRAWING APPEARING BELOW shows the application of Fenestra window sash, a product of the De-the Howlett Construction Company, Moline, Ill., for round house just completed for the Pere Marquette at Plymouth, Mich. This illustration conveys an idea of what can be accomplished in the way of providing better lighting and ventilation in railway building, such as round houses and shops.

In this particular case each back wall of the house is



An Artist's Conception of the Pere Marquette Round House at Plymouth, Mich.

fitted with windows 15 ft. high and 25 ft. wide, each window comprising 240 panes of 15-in. square wired glass framed in steel and arranged into an upper and lower bay, separated, as shown in the illustration, by a horizontal steel mullion. Ventilation as well as lighting have been

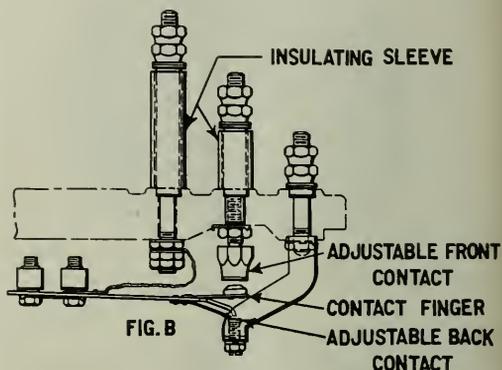
provided in the windows by pivoting four six-pane sections of glass in each lower bay on a horizontal axis. Further lighting and ventilation in the building are provided by monitor windows on each side of a lantern roof extending around the center of the house. These windows are also of Fenestra sash, 6 ft. 6 in. high on the back side of the lantern roof and 8 ft. on the front side, and similarly to the wall windows, occupy almost the entire space between posts.

The predominance of windows over blank walls is obviously a radical departure from the former practice in round house and shop construction. The windows themselves are well reinforced against wind and vibration and, consisting of wired glass in steel sash, are entirely applicable to fireproof construction. The recently constructed New York Central freight house at Weehawken, N. J., the Pennsylvania engine house at Columbus, Ohio, and the Los Angeles and Salt Lake shops at Salt Lake City, Utah, are other buildings thus equipped.

Two New Railway Signal Relays

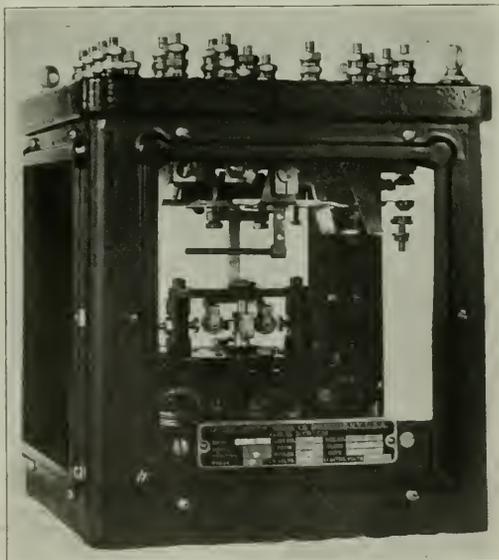
THE GENERAL RAILWAY SIGNAL COMPANY, Rochester, N. Y., has placed on the market two new types of relay, i. e., a universal d. c. relay and a universal a. c. relay. The d. c. relay is so mounted as to be used as a wall or shelf type without change. A spring mount-

The a. c. relay is constructed with all four sides of glass to facilitate inspection. The top is of heavy porcelain, carrying the complete contact equipment and is detachable after disconnecting the lead wires to the stator. The contact movement is operated by contacting rollers instead of links. The rotor and stator are assembled as a unit which may be easily removed. The rotor shaft is



Arrangement of Contact Equipment

mounted vertically on jewel bearings, which construction is claimed to prevent sidewise movement, so that the rotor clearance cannot be changed by adjustment. The rotor chamber is effectively sealed to exclude foreign matter which might obstruct proper movement of the rotor. The relay is furnished as direct-connected or pinion-sector connected; the first is recommended for the average track



The New A. C. Signal Relay

ing can be provided which may be easily attached to reduce the effects of severe vibration when used on elevated structures or trestles. The contact posts are mounted in rows on a porcelain base, step fashion as shown in the illustration, each row being higher than the one in front of it, thus allowing all terminals to be readily accessible. Insulating sleeves around the higher posts prevent the shorting of circuits attached to adjacent posts when nuts are dropped accidentally between them. The principal parts of the relay are the same for all classes, both neutral and polar.



The New D. C. Signal Relay

circuits and the pinion-sector type for long track circuits having unfavorable ballast conditions.

Lightning protection is considered in the construction of the relay, as all metal parts except those carrying cur-

rent are grounded to the relay frame on which is provided a terminal post to be connected to the ground. Two eye bolts are located at diagonally opposite corners of the top; to which a strap may be attached, providing a convenient handle for carrying the relay.

By employing the proper winding the relay may be used for line or track circuits; the relay may be furnished so as to be adapted for either single rail or double rail track circuits by changing connections between five-track phase terminal posts. The two-position relay may be converted into a three-position relay by merely adding counterweights and readjusting the contacts.

A Recent Development in Oil Engine Design

ONE OF THE VERY PROMINENT features of railroad operation in recent years—quite as prominent, in fact, as the transition from the small steam boiler to the gasoline engine as a pumping unit—is the trend toward the substitution of kerosene (and in some cases the heavier oils) for gasoline as a fuel for the internal combustion engines employed for power purposes by the roads. This transition, necessitating, of course, the remodeling of old engines or their replacement by types better adapted for the heavier fuels, has naturally brought about many changes in machinery and methods, and has led the roads to give close attention to the new developments along these lines calculated to secure greater economy in the use of fuel or to improve conditions generally.

One development which has recently occurred and which is of interest in this respect is the change which the Chicago Pneumatic Tool Company, New York, has made in the design of its Giant Semi-Diesel fuel oil engine. This engine, as the name implies, is a type in which ignition of the explosive mixture is effected by the natural

consists of restricting the combustion to the cylinder head instead of permitting it to occur in the cylinder proper, as was done heretofore. This change is said to be an improvement over the former design in that it reduces the deposition of carbon on the cylinder walls and insures more perfect combustion.

A Five-Gallon Fire Extinguisher

IT IS RECOGNIZED BY FIRE PREVENTION authorities that one of the most effective features of any fire extinguisher is an ability to direct a stream of water or other extinguishing material on the origin of the fire, and that with a minimum of delay. To this end a portable pump tank has been devised which depends for its effectiveness on the force of an accurately applied stream of water rather than on the use of chemicals. This device consists of a five-gallon cylindrical tank equipped with a double action force pump and a hose, and is designed for use either in unheated buildings or around outside property.

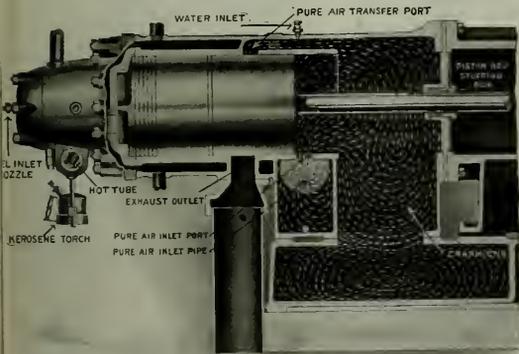


The Accurate Five-Gallon Pump Tank

The outfit uses plain water unless the likelihood of freezing exists, the water in such cases being mixed with a quantity of Accurate Freeze Proof; a proper proportion of this material, it is said, will protect water from freezing at temperatures as low as 40 deg. below zero. The tank is easy to carry, simple to operate, and is capable of discharging a steady stream a distance of 40 ft., the force of such a stream usually being sufficient to beat back the flames and permit the soaking of the burning material. When empty the tank can be refilled from a well or faucet the same as an ordinary pail.

On railroads this outfit is particularly adapted for use in freight rooms, warehouses, cabooses, around docks, etc., in such service affording an obvious advantage over water pails in its greater capacity and in that it permits a more effective use of the water. The tank, having a closed top, also prevents the accumulation of dirt and reduces the evaporation of the contents.

These outfits carry the label of the Underwriters' Laboratories and are recognized by the fire insurance rating bureaus throughout the country. They are products of the Pyrene Manufacturing Company, Chicago.



Giant Oil Engine With Improved Head

heat in the cylinder resulting from the high degree to which the mixture is compressed by the piston; the operation of the engine prior to the ignition consisting of compressing air in the cylinder head, and just at the instant of complete compression, of injecting fuel oil into the cylinder head by an atomizer and converting it into vapor by discharging it against a hot plate, this plate prior to the starting of the engine being heated by torch, after which the heat is maintained by the successive combustions in the cylinder. The change made in this design

Recent Test of Minwax Waterproofing

ENGINEERS COGNIZANT OF THE importance of elasticity and imperviousness in waterproofing coatings used in connection with bridge decks and subways, the construction of foundation walls, depressed pits, tunnels, and similar work where water under pressure is commonly encountered and contraction and expansion in the masonry as well as the liability of cracking by settlement must be considered, will be interested in the results of a recent test of Minwax waterproofing made by the engineer of tests of the Pittsburgh Testing Laboratory.

The specimens for the test were obtained from a waterproofing blanket consisting of two piles of Minwax saturated cotton fabric and three swabbings of Minwax waterproofing asphalt, the blanket weighing 1.495 lb. per sq. ft. The tabular results of the tensile strength and elasticity tests are as follows, the specimens for the test being 1 in.

wide, the distance between the jaws of the machine, 1 in., and all tensile strength valves being measured at failure.

Specimen Number	Thickness in Inches	Tensile Strength in Pounds per Inch Wide	Strength (Elasticity) in Inches per Inch Wide
Series H, Average of 5 tests.....	0.275	102.4	0.24
Series B, Average of 5 tests.....	0.284	90.4	0.30

In the above test, the specimens of Series A were cut with the fibers parallel to one edge of the blanket and those of Series B perpendicular to the same edge, thus providing a means of determining the difference between the strength of specimens stressed along the woof and those stressed along the warp. The report states that no difference was distinguishable.

Tests to determine the resistance of the blanket to hydrostatic pressure were made on a hydraulic gage testing machine having an area of opening of 1.25 sq. in. No rubber diaphragm was used, as the material remained proof against water up to the bursting pressure, the average value of this bursting pressures of five specimens being 374 lb. per sq. in. with two of the specimens failing at the edge and the others through the center.

Built Up Sections for Block Paved Crossings

THE HISTORY OF PAVING, like a great many other industrial operations, has been one of constant effort, as manifested in changes in product or method, to improve the service or to enlarge the field of use. One of the recent developments of particular interest to railroads is that which has occurred in the paving of railroad crossings. The conditions encountered in many cases have invited much improvement, particularly where crossings are carried only on ballast, the paving problems at such points frequently combining both those of maintaining pavement, which is subject to the impact and vibration set up by passing trains and street traffic, and of re-



Paving a Railroad Crossing With Kreolite Crossings

moving and replacing the paving frequently to repair the track or tamp the roadbed.

To meet this problem the Jennison-Wright Company, Toledo, Ohio, is offering a form of construction for paving at crossings which employs a built-up section called the Kreolite Crossing. This crossing consists of a solid panel of wood block built according to dimensions or

while in place to fit the spaces between the intersecting tracks and permit of its being removed and replaced bodily. The process of construction consists in building a timber box in each diamond or square of the crossing, the box consisting of plank resting on the ties, ballast, and the bases of the rails, and of timber sides. This box is then paved with wood blocks, each block being nailed to the floor. All the timber as well as the blocks are creosoted and a wing is belted to the floor at the center to provide the means of removing the section. The accompanying illustration of a Michigan Central crossing at Dorr street, Toledo, shows the nature and method of the construction. Such crossings have been in service over a year and are said to have given very commendable service, providing both a crossing capable of withstanding severe wear and affording ready access to the track and roadbed.

A Power Ballast Screen

THE MAINTENANCE EQUIPMENT Co. of Chicago has recently added to its railroad supplies a power screen adapted to the screening of ballast. This machine is an interesting development in railroad appliances for the reason that it presents the possibility of supplanting the cumbersome and expensive method of screening ballast by forking and, correspondingly, of performing more readily the extensive ballasting operations of this kind which many of the roads endeavor to carry on. The machine consists essentially of a cylindrical revol-



Power Ballast Screen in Operation

ving screen, feed trough, dirt conveyor and engine all compactly arranged on a structural steel frame mounted on wheels for traveling on a railroad track. In operation, the machine is moved ahead of the ballasting, the ballast to be cleaned meanwhile being thrown into the feed trough, wherein a conveying belt carries it up the incline and discharges it into the upper end of the revolving screen, the coarse material, which remains in the screen, thence falling naturally to the lower end and discharging directly in the center of the track, while the dirt, which passes through the screen, drops upon the wide canvas belt conveyor, on which it is carried and discharged to the side of the track, where it is available for bank widening or it can be hauled away.

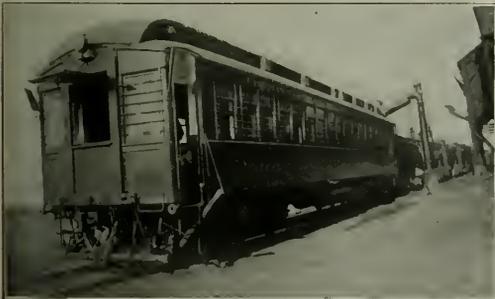
The power is furnished by a 15 h.p., 4-cylinder water-cooled gasoline engine, this engine being adapted to run-

ning at various speeds and arranged not only to furnish the power necessary to accomplish the screening process, but also that for propelling the machine backward or forward along the track. It accommodates an operator's platform on one side and embodies the novel feature of carrying a set of cross wheels by means of which the machine can be lifted off its track wheels and wheeled to the side of the track, the operation requiring about a minute. With respect to the performance of this equipment, it is said that the machine will handle any quality of ballast, has easily screened average material for a depth of 10 in. at the rate of 60 running feet of track per hour, and is capable of accomplishing such work at one-third the cost of hand processes.

Recent Development in the Killing of Weeds With Chemicals

COINCIDENT WITH THE INCREASED use of chemicals by the railroads for weed killing purposes and the quite general adoption by them of the practice of contracting for the equipment and supervision maintained by the manufacturers of the chemicals as against that of using equipment of their own, the Chipman Chemical Engineering Company, New York, has brought out an interesting development in weed-killing equipment by introducing a Pullman car type of sprinkling unit as a substitute for the original flat car arrangement. The selection of this arrangement along with a few changes made in the sprinkling apparatus were induced by efforts directed by the company to improve its service generally, and particularly with respect to operating speed, total daily performance and comfort for the operating crew. As shown in the illustration, an old Pullman car has simply been remodeled to accommodate the sprinkling system, to provide living quarters for the operating crew, the car when in use being attached to the head of the train of tank cars which carry the supply of chemicals.

It is said that with this equipment the weed killer can be applied effectively while the train is traveling at speeds



Sprinkling Unit for Weed Killing Purposes

as high as 20 to 30 miles per hour, and that, owing to the smooth riding of the coach, as compared to the flat car, and the comfortable living quarters provided the operating crew, the means is afforded of covering a mileage limited only by the speed of the train, traffic conditions, and the requirements of the 16 hour law. With the design of the sprinkling head enabling the operator to distribute the chemical over the width and length of the track according to the need for it, and with the presence in the car of mechanical devices permitting accurate

determinations to be made of the consumption of chemical over each mile, provision is supplied for the economical as well as the effective use of the chemical, supervision being furnished when desired. The design of the equipment is also said to be of value in affording the



Interior View of Car Showing Operating End

means of practically eliminating trouble in sections visited by stock, the system enabling the operator to avoid spraying cattle passes or unfenced portions of track, or of applying a stock repellent in addition to the weed killer. The cost of weed killing by the use of this equipment is said to range from \$50 to \$75 at present prices.

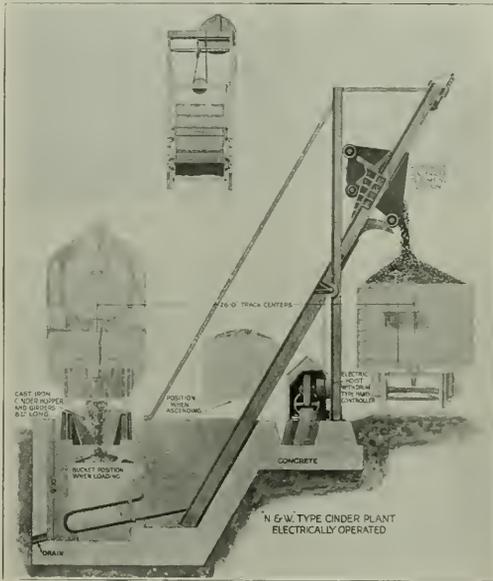
"RandS" Coaling Station and Cinder Plant

THE ROBERTS & SCHAEFER COMPANY, Chicago, is now introducing two new appliances in coal handling equipment in the railway field. One of these is a portable combination locomotive coaling and cinder loading plant, which is designed also to accommodate a program of ground coal storage. The plant, as the illustration shows, consists essentially of an elevated coal pocket surmounted by an electric trolley hoist system and supported over a standard gage track on a track of its own. The latter track is 21 ft. between rails and can be extended to any length desired. No coal hopper is provided below the coal receiving track. Instead, the coal is lifted directly out of cars by a clam shell bucket, hoisted, and then dumped into the coal pocket or carried beyond it and deposited alongside on the ground, from which it can be readily be picked up and dumped into the coal pocket or reloaded into cars for shipment to other points. By a like process and with the same equipment, cinders which have been dumped into depressed pits along the coaling track can be elevated, transferred by trolley to a point above the coal receiving track, and there deposited in the emptied coal cars or into cars spotted specially for their removal.

It is evident that under suitable conditions this system will permit the operations of coaling, handling cinders, locomotives, and even the handling of a storage project for several points to be carried on by the same equipment. Furthermore, the facility with which coal can be handled from the ground may also be utilized to advantage in avoiding the expense of large coal pockets. In this plant the coal pocket has a capacity of 50 tons, a capacity which in some places would make unnecessary the operation of the machinery during the night. It is equipped on one side with the standard coaling gate and

chute and is said to provide for the coaling of locomotives in as short a period as 45 seconds.

The entire plant is of structural steel, is electrically operated and propelled from a weather-proof cab by one man, and is large enough to provide for an engine consumption of 250 to 300 tons per 10 hours. With respect to the ground storage it is estimated that 1,100 tons of coal may be stored in each 10 ft. interval of the plants travel. The machinery comprises the Shepard electric double drum hoist and the double line Blaw-Knox "Speedster" or the Lakewood one cu. yd. bucket, which



New Type RandS Cinder Plant

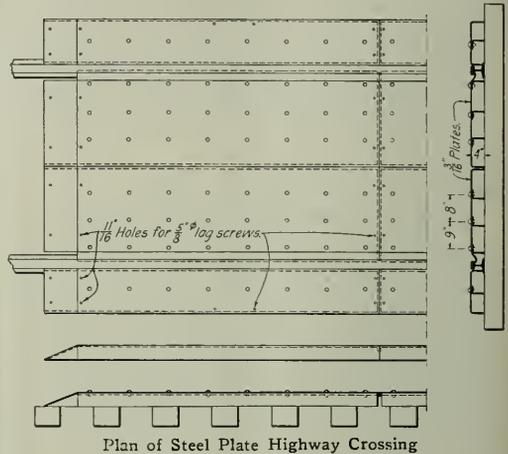
permits the hoisting of approximately 30 tons per hour. Although it is intended that the machinery should be operated by power obtained from electric transmission lines, the plant is so designed that a gas engine generator set can be installed below the coal pocket. Aside from features already brought out in connection with this plant, the plant requires but one receiving and one coaling track, and it can be moved at will to a different location to accommodate a change in terminal arrangements.

A Steel Plate Highway Crossing

BECAUSE OF THE UNUSUAL ACTIVITY in the development of crossings constructed of other materials than planks, considerable interest is attached to the use of a crossing made of structural steel, of which two are now in use, one on the Chicago & North Western at Milwaukee avenue and Union street, Chicago, and the other at a crossing of the Chicago, Burlington & Quincy in the city of Burlington, Iowa. This is shown in the photograph, where it is seen that the steel construction forms one-half of the street crossing, the other half being of concrete.

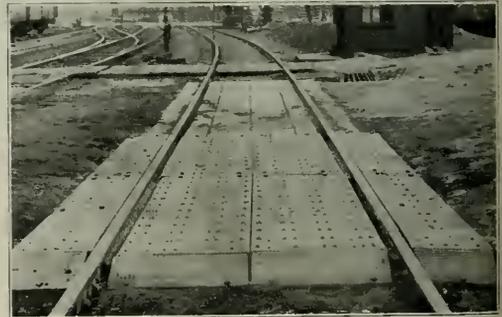
The construction of this crossing, which is being manufactured by the National Highway Crossing Company of Burlington, Iowa, is readily understood from the drawing. The roadway surface is formed by a deck plate of

3/16 in. material, with a diamond pattern non-slip upper face. The plate is supported at the level of the rails of the top of rail by steel ribs placed parallel to the rails and resting on the ties or on shims placed on the ties. These are spaced eight inches center to center and are formed of 3/16-in. bent steel plates riveted to the deck plate except at the center line of the tracks, where the deck is divided



into halves. Here the edges of the deck plate for the two halves are turned down to form flanges and a strip of fiber insulation placed between them.

Adjacent to the rails the deck plates are bent down to form flangeways and thus secure an anchorage under the ball of the rail. Further anchorage is provided by lag screws driven into the ties through holes near each end of the deck plates. These deck plates are built in units 7 ft. 11 in. long with ramps at the outer ends to deflect dragging parts of rolling stock. The crossing units out-



Steel Plate Crossing on C. B. & Q. Ry.

side of the rail are made 13½ in. wide of similar construction.

The advantages claimed for this type of construction by the manufacturers are as follows: Low maintenance because of resistance to wearing; neat construction with a well-formed flangeway adjacent to the rail; better protection for the ties which are covered against accumulations of mud, gravel, snow and sleet, yet afforded thorough ventilation and freedom from any influence from freezing and thawing.

EDITORIAL

Railway Age

EDITORIAL

DAILY EDITION

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The rapid growth of the Association in the last two years has introduced no small problem for the Committee on

Problem of Committee Personnel

Personnel of Committees to provide for participation in the work by as large a proportion of the membership as possible. With only 23 regular committees and an association membership nearing 2,000, there are obviously not enough places on the committees as now organized to accommodate all who may wish to serve. Just how to overcome this difficulty is a problem for which various solutions have been suggested. One plan has been to increase the size of the committees and provide for greater independence of action by sub-committees. Another proposal is that made by President Safford in his address yesterday morning whereby members of the Association would be made "corresponding members" of certain committees, the idea being primarily to recruit the assistance of those members located in the more distant parts of the continent who are precluded from attendance at committee meetings. The idea of rotation in membership of committees is subject to the criticism that many of the members are peculiarly valuable to the committees on which they serve, because their long service has given them an intimate knowledge of the past work of the committees

and the problems which they have previously encountered. With committee memberships at a definite premium, one thing is certain—there is no room for dead wood. Such a thing as vested rights to committee membership solely on the ground of seniority or long tenure of service is not to be thought of. The new members of the Association must have an opportunity to serve.

Engineers are little concerned with orators or oratory. They seem to pride themselves on their ability to resist the wiles of honeyed speech or spirit-swaying declamations. Theirs is a vocation that deals in cold facts which call for quiet discussion around a conference table rather than eloquence from the rostrum. But is this not sometimes carried too far? Some A. R. E. A. members seem to forget that the annual convention is no longer a conference of a small group of engineers with kindred interests. Rather it approaches the proportions of a congress. In other words, the conversational tone of voice which suffices for speech before a small gathering simply will not "get by" before crowds the size of those attending the sessions in the Florentine room. Speak up!

It is unfortunate that the line is so clearly drawn between the engineering and the motive power departments.

The Track and the Locomotive

The track and the bridges are so intimately related to locomotive and car design that they should all be considered in a large way as a single problem, instead of being almost entirely separated. Why, for instance, should the mechanical department consider the design of the locomotive almost purely from the standpoint of operation and cost of maintenance of the locomotive, when a larger expenditure for its first cost and facilities for maintenance will be offset many times by decreased damage to the track and bridges? Is the engineer officer advising the mechanical department of the vital necessity for reducing the dynamic augment to a minimum by showing clearly the extent of the damage which is now being done because of excessive dynamic augment?

One feature of this year's convention is to be noted in the large number of new committee chairmen—ten in all—

New Committee Chairmen

only one of whom owes his appointment to the organization of a new committee, that of shops and locomotive terminals. This is a much greater change in committee heads than has been observed in any recent year. At the convention in 1920 only four regular committees had new chairmen; in 1919 there were six new chairmen; while of the six new chairmen in 1918 two headed newly formed committees. Whatever the motives responsible for the greater

change in committee chairmen this year it is believed that this is a trend in the right direction. Evidence of high grade leadership should be recognized and utilized to the fullest possible measure. At the same time a certain degree of rotation in chairmanship will serve to stimulate interest and effort on the part of the rank and file. This does not mean that it is at all desirable to place any arbitrary limits on the tenure of office of committee chairmen. The really important matter is to insure that each committee is under the direction of a leader who is qualified by experience, ability and temperament to accomplish the best results.

The fact that the American Railway Engineering Association received over 500 new members during the past year, a larger number than in any previous year, is an indication of the inherent strength of the Association in the trying times through which we are now passing. While this large increase was attained as the result of a systematic campaign for members, the fact that the members were secured testifies strongly to the high esteem in which railway engineers hold the Association. The American Railway Engineering Association is unique among technical organizations in the way in which it conducts its work, and in the solidarity of its work. The result of its 23 years of activity are condensed in the Manual of Recommended Practice, aggregating approximately 1,000 pages. With the Association now comprising nearly 2,000 members, its influence is increasing accordingly.

Attention has been called repeatedly to the exceedingly poor ventilation in the convention room. This condition was exhibited strikingly yesterday, when every available chair was filled throughout almost the entire day. The air was so foul that a number of members were constrained to leave the room. The effect of this condition was also strikingly evidenced by the unusually limited discussion. Owing to the oppressive conditions in the room a number of the reports were not received with the interest that their contents justified. Thus the report of the Track Committee, which contained a number of conclusions which were the occasion of spirited discussion and controversy within the committee, were received without comment by the Association, considerably to the surprise of the members of the committee. The convention room has many admirable advantages, prominent among which is its lack of outside exposure to the noise of the city. However, this condition makes even more necessary the installation of adequate ventilation, for it is not possible to secure relief by opening windows.

Record Convention Attendance

THE ATTENDANCE AT THE CONVENTION of the American Railway Engineering Association yesterday was the largest in history and the discussion of committee reports was characterized by great earnestness. These facts indicate that the engineering and maintenance officers of the railways realize that present conditions demand the most profound study and the hardest kind of work if efficiency and economy of operation are ever to be restored. The present is an opportune time to emphasize the fact that the greatest efficiency and economy in operation cannot be obtained by the adoption of tem-

porary drastic expedients to meet emergencies, but only by thorough study and planning and by intensive efforts over a period of long years to carry out the plans made. The largest economies ever effected have been the result of vast capital expenditures made to reduce grades, strengthen tracks, lengthen passing tracks and enlarge yards to enable the railways to operate more powerful locomotives and larger trains and thus handle traffic in larger units and at lower labor costs per ton and per passenger carried. There is a natural tendency in periods of stress such as the present to cease working on plans which will require millions of investment and years of time to carry out and concentrate attention and effort on meeting immediate conditions, but in the long run the best results are obtained by steadily continuing the effort to carry out well-conceived plans, and to subordinate their execution to the use of immediate expedients only to such an extent as is absolutely necessary. A very large and important part of the scientific planning for future railway development and future increases in efficiency is entrusted to the higher engineering officers, and it is gratifying to find that even in an acute period such as the present they are disposed to take active part in the study and discussion of the fundamental problems. One of the main causes of the troubles of the railways today is that since this country entered the war in 1917 the making and carrying out of far-reaching plans of improvement has been seriously interfered with. If important increases in the efficiency and economy of operation are to be resumed, the making and carrying out of far-reaching plans of improvement must be resumed, and it is essential to the making of such plans that all the problems involved shall first be carefully studied and thoroughly discussed.

Today's Program

The program for today's sessions of the American Railway Engineering Association is as follows:

Committee No. IX.	Signs, Fences and Crossings.....	Bulletin 232
Committee No. III.	Ties	Bulletin 232
Committee No. XV.	Iron and Steel Structures.....	Bulletin 232
Committee No. XI11.	Water Service.....	Bulletin 232
Committee No. XXII.	Economics of Railway Labor.....	Bulletin 231
Committee No. XXI.	Economics of Railway Operation	Bulletin 234
Committee No. XVI.	Economics of Railway Location	Bulletin 233
Committee No. XXIII.	Shops and Locomotive Terminals	Bulletin 233
Committee No. VI.	Buildings	Bulletin 235
Annual dinner at 6:30 p. m.		

Changes in Engineering Organization on the New York Central Lines West

Newspaper reports concerning reductions in the official personnel of the New York Central have excited considerable interest among those attending the convention, but unfortunately these items were so incomplete as to give little real information concerning the actual changes. Inquiry has shown that these changes as regards the New York Central Lines West, in so far as they affect the higher officers of the engineering department are not nearly so drastic as might have been assumed from the newspaper accounts. These changes were as follows: R. O. Rote, assistant chief engineer, will take over the duties of H. B. Reinsagen, engineer maintenance of way, whose position has been abolished. Mr. Reinsagen has been

appointed principal assistant engineer, succeeding A. M. Currier, and Mr. Currier has been made engineer grade separation, succeeding C. F. Mayer, who has been assigned to other duties.

Car Loadings Increase

WASHINGTON, D. C., March 15, 1921.

Evidences of increased traffic on the railways are afforded by the weekly car loading statement of the Car Service Division of the Interstate Commerce Commission, showing that the number of cars loaded with revenue freight for the week ending March 5 was 712,822, an increase of 54,000 as compared with the preceding week. This is the first week this year to show any considerable increase in car loading and the loadings for this week are larger than for the corresponding week during the business depression of 1919. The loading of grain and grain products, of merchandise and of miscellaneous freight was greater than for any previous week this year.

Purdue Luncheon Today

Purdue University men will lunch today at the University Club, corner Michigan and Monroe, at 12:45 p. m. All Purdue men are urged to report at the University Club at that time.

More Winslow Bill Payments

WASHINGTON, D. C., March 15, 1921.

The Interstate Commerce Commission has issued a certificate for partial payments on account of the guarantee to the Trans-Mississippi Terminal Railroad for \$110,000, the Chicago, Rock Island & Pacific for \$6,000,000, the Chicago Great Western for \$500,000, the Chicago, Indianapolis & Louisville \$400,000, the Chicago & Northwestern \$12,000,000, and Gulf, Mobile & Northern \$50,000. The commission has also issued a certificate in final settlement for its deficit during federal control to the Western Allegheny amounting to \$114,000. The returns to the Interstate Commerce Commission by 43 Class I railroads show a net operating deficit of \$3,120,000.

Correction of an Error

In the story in the Daily of yesterday entitled "The Railroad Labor Board Subpoenas Railroad Officers" the statement was made that a subpoena was issued for W. T. Tyler, vice-president of the Northern Pacific. This was a mistake. The subpoena was issued for Thomas DeWitt Cuyler, chairman of the Association of Railway Executives. The other persons subpoenaed were W. W. Atterbury, vice-president of the Pennsylvania Railroad; C. R. Gray, president of the Union Pacific, and Robert S. Binkerd, assistant to the chairman of the Association of Railway Executives.

B. & L. E. Supervisors at Coliseum

The Bessemer & Lake Erie arranged for all of its track supervisors to spend Monday at the Coliseum. The party left Pittsburgh Sunday morning, traveling by daylight to Chicago over the B. & O. and studying the standards of track maintenance of that road.

The Bridge and Building

Executive Committee Meeting

The Executive Committee of the American Railway Bridge and Building Association and interested members will meet in the Congress hotel at 4:30 this afternoon to plan for the next convention, which will be held in New York in October.

The A. W. P. A. Dinner

Over 50 members and friends of the American Wood Preservers' Association gathered at dinner at the Hotel Sherman last evening to discuss problems of interest to the wood preserving industry and to witness the presentation of the moving picture films which were taken on the recent trip of the members of that association to the Pacific coast to attend the convention at San Francisco in January.

New Division Engineer on S. A. L.

W. D. Simpson has been appointed division engineer of the Florida division of the Seaboard Air Line at Tampa, Fla., succeeding B. Land, Jr., resigned.

The Annual Dinner

W. A. Wallace, chairman of the sub-committee of the Arrangements Committee in charge of the annual dinner of the American Railway Engineering Association, urges those members planning to attend the dinner this evening to get their tickets promptly, for the reason that the Congress hotel management must be notified at noon. Tickets will be on sale in the lobby outside the convention hall. This dinner will be held in the Gold room at 6:30 p. m. The speakers will include John F. Wallace, consulting engineer, New York City, and formerly chief engineer and general manager of the Illinois Central and chief engineer of the Panama Canal; Dr. David Kinley, president of the University of Illinois, and the Honorable William Renwick Kiddell, Justice of the Supreme Court of Ontario, Can.

Requisites of Train Control

The Joint Committee on Automatic Train Control has issued its circular No. 2 on the functions and requisites of train control systems so far as these have been developed to date.

Signal Business Picking Up

The Missouri Pacific has reopened bids for the necessary material to construct a mechanical interlocking plant where its line crosses the St. Louis-San Francisco at Aurora, Mo. Bids were originally asked for a 40-lever frame mechanical machine at this point, but due to track changes made on the Frisco it was necessary to reopen the bid. Power signals will be used on the Frisco in connection with its automatic signal system.

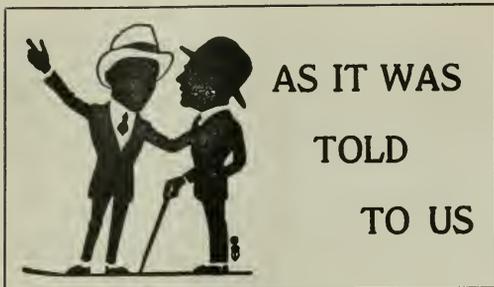
Burlington Officers Meet

The Permanent Way committee of the Chicago, Burlington & Quincy and the Roadmasters' committee of the same railroad held meetings at the general offices of the Burlington in the city yesterday and Monday to discuss problems of the maintenance of way department.

Senate Fails to Confirm Appointment of J. J. Esch

WASHINGTON, D. C., March 15, 1921.

The Senate failed yesterday to confirm the appointment of J. J. Esch as a member of the Interstate Commerce Commission because of the insistence of Senator LaFollette on his right to file a minority report to the action of the Committee on Interstate Commerce Commission, recommending the confirmation. This action on the part of Senator LaFollette will delay the confirmation of Mr. Esch until the extra session of Congress which is called for April 11. The appointment of M. W. Potter as a member of the commission was confirmed on Saturday, as announced in yesterday morning's daily.



One of the familiar faces which is missing from the convention this year is that of A. R. Fugina, signal engineer of the Louisville & Nashville, who is detained at home recovering from a severe illness.

S. A. Jordan, engineer maintenance of way of the Baltimore & Ohio, Lines West, finds that there are some bright spots in railroading even when things look duller for because of that he has been able to attend the convention for the first time in two or three years.

Among the prominent railway supply men who are attending the exhibit of the National Railway Appliances Association for the first time is W. B. Lashar, president of the American Chain Company, Bridgeport, Conn. Mr. Lashar came to Chicago purposely to attend this exhibit.

The fact that Cuba possesses attractions as a winter resort for railway as well as railway supply men is shown by the fact that W. H. Hoyt, chief engineer of the Duluth, Missabe & Northern, is stopping over at the convention on his way home from a six weeks' trip to that island and Florida.

Herbert Deeming, formerly of the firm of Deeming and Endsley, who has been in the shipping business in New York City for over a year, has returned to Chicago and the railway supply business. Seen at the Coliseum yesterday, he expressed considerable pleasure at his return to the railway game.

The friends of M. J. Trees, vice-president of the Chicago Bridge & Iron Works, have watched with considerable envy the frequent business trips which Mr. Trees has made to Cuba during the past year. He has found it necessary to make no less than four such trips during 1920 and one trip since January 1.

Ralph T. Hatch, for the past 14 years connected with the National Malleable Castings Company, will join the forces of the American Chain Company when he will become general manager sales of the Reading Steel Casting Company, a subsidiary of the American Chain Company, with headquarters at Reading, Pa.

Edwin Gagel, chief engineer of the New York, New Haven & Hartford, was an interested attendant at the convention yesterday. This is the first time Mr. Gagel has attended a convention. Mr. Gagel is a new member of the Association, having joined during the past year. He is one of about 15 officers of the New Haven Railroad who are present.

H. T. Porter, chief engineer of the Bessemer & Lake Erie and an active worker on the Track Committee, was

present at the convention yesterday and participated in the presentation of the report of that committee. It was necessary for Mr. Porter to leave last evening for Washington to participate in negotiations incident to the settlement of claims rising out of federal control.

Colonel H. S. Crocker, acting secretary of the American Society of Civil Engineers, was an interested visitor at the convention yesterday morning. Colonel Crocker has been serving in this position for over a year pending the selection of a permanent secretary. He has recently asked to be relieved of these duties in order that he may resume his private practice. Colonel Crocker stopped only for the day while enroute to Denver to reopen his office.

E. B. Katte, chief engineer electric traction, New York Central, and a member of the Board of Directors of the A. R. E. A., is also chairman of the professional section on Railroads of the American Society of Mechanical Engineers. The spring meeting of the A. S. M. E. will be held in Chicago, May 23-26, and the Railway Section is arranging for a revision of the problems connected with the design and maintenance of large freight locomotives.

E. R. Lewis, editor of the Maintenance of Way Cyclopedias, and now office engineer of the Michigan Central, at Detroit, Mich., was a first day attendant at the convention. Mr. Lewis, on the completion of the cyclopedia, left for a trip to Panama and other points south, but we understand that he spent his entire vacation in Cuba, stating for his reason that he sprained his ankle and could go no further. It is not at all surprising that an American citizen would let his foot slip when in Cuba.

F. A. Poor, president of the P. & M. Company, returned on February 12 from a month's trip to England. He is a director in the P. & M. Company of England, Ltd., which handles the products of this company abroad. Mr. Poor reported that railway conditions abroad so far as he had opportunity to observe them are very bad. The railways of India, Australia and South America buy a large part of their equipment and supplies in England. The railway conditions in these countries, as indicated by the inquiries for equipment and supplies in London, are beginning to improve but still are very unsatisfactory. Sentiment abroad is that business conditions will not get good until the whole general financial condition has been cleared up and that it cannot be cleared up until a definite determination of reparation to be paid by Germany and the other central allies has been reached. Mr. Poor found that the competition of European manufacturers for railway equipment and supply business is becoming more energetic. This is especially true of the manufacturers of Germany and Belgium. The low rate of exchange and the prevailing low wages of labor, especially in Germany, are enabling Belgium and German manufacturers to produce iron and steel articles cheaper than they can be produced in the United States and other countries. He found that the prevailing wage in the iron and steel industry in Germany is about 300 marks a week which at the present rate of exchange is equivalent to about \$6 a week in American money. British manufacturers are not getting on their feet as rapidly as those of Germany because the iron and steel industry in Great Britain is so highly unionized that it has been impossible thus far for the manufacturers to get their costs down to a basis where they can meet the competition of the Germans.



The A. R. E. A. in Session Tuesday Afternoon

American Railway Engineering Association Proceedings

Record Crowd at the Opening Session in the Florentine
Room Yesterday Morning

ANY DOUBT AS TO the success of the twenty-second annual convention of the A. R. E. A. was definitely dispelled by the capacity of the crowd which was present at the opening session yesterday morning to hear the address of President H. R. Safford, assistant to the president of the Chicago, Burlington & Quincy. As the minutes of last year's meeting have been printed and distributed, their reading was dispensed with and the con-

vention passed immediately to the president's address. Following this the reports of the secretary and treasurer were presented, after which the Association began the consideration of the reports of committees.

Reports were presented by the committees on Signals and Interlocking, Ballast, Electricity, Stresses in Railroad Track, Track, and Rail. Reports on Standardization and Uniform General Contract Forms come up today.

Address of President Safford

THIS ANNUAL MEETING MARKS the close of the twenty-second year of the life of the American Railway Engineering Association—practically a generation as human life is measured. In some ways, it would seem that we have just passed through a period which will mark a very definite generation in the history of railroads. This thought is suggested when we recall that at the end of the Association's twenty-first year we find the railroad industry, of which we are a part, at the threshold of a new era.

Many things point to this belief. The new Transportation act expresses a desire on the part of the public for private control with protective regulation, with expressed support of efficient and honest management and an earnest desire to restore confidence in the enterprise and credit to the structure.

The termination of federal control and the restoration of the properties to their owners coincident with the passage of the new Transportation Act seem to mark the close of a period when there was a noticeable and increasing tendency toward excessive and burdensome regulation, an increasing failure upon the part of the public fully to understand and appreciate the rail transportation structure and especially a failure to realize the interdependence and joint responsibility resting upon both the railroad and the user to create, support and maintain what the public most desires, namely, good transportation. A great change and I believe for the bet-

ter has taken place. New powers and responsibilities are assumed by lawfully created public bodies. A different attitude is observed on the part of the shipper and the traveller and new conditions also surround the details of operation affecting theories of development and expansion of existing properties and the promotion of new projects, which are vastly different from 21 years ago.

This Association in devoting its entire attention to railway construction, operation and maintenance will find its efforts and results measured by the same standards applied to the various phases of railway service and we must feel the same sense of responsibility in trying to perfect the studies of the service which are entrusted to us that is felt by the executive and financial heads if we are to do our part in making the business successful and of permanent existence as a private enterprise. Probably no industry felt as severely the impact and the continued stresses of the war. It seemed sometimes as if the structure would not survive the eccentric and unexpected strains for which it was not designed, but it has done so, and from the test will be developed new formulæ giving truer results in future study and the structure should be much more scientifically designed than ever before.

We are now passing through the severe and trying period of readjustment from the war strain and greater therefore is the need for intensive study of economic

problems and renewed efforts to direct controlling influences to a stabilization of the situation so that the industry may thrive and prosper as intended by the new legislation.

MEMBERSHIP INCREASES

A review of our own activities as an association for the past year seems quite in order and I turn first to the matter of membership. It has always been the policy to place a high premium upon quality of membership with the very definite goal of securing the highest degree of efficiency and the most finished product in the Manual. On the other hand the restrictions have not been pronounced in so far as departmental representation is concerned and encouragement has always been given to applications from officers in the transportation as well as from the construction and maintenance departments; this because the Association has endeavored to co-ordinate transportation, construction and maintenance of way in matters which jointly interested these several branches. I believe that this idea has done much to keep interest in the Association and accounts for the par excellence of its work.

The encouragement which has always been given by railway executives has made it attractive for members to join and work. We have probably inclined in the past too much toward the policy of allowing the individual to seek us and have made too little effort to interest the outsiders, and while it is possible always to go too far in adding members for numbers only, on the other hand we must not sit idly by and fail to keep apace with the natural growth in general railway organization and should not hesitate to show fully and aggressively to all interested in the business the benefit to come from membership.

There are a great many officers who are not, but should be, members and if the practical advantages are indicated to them they might become members. We have always disliked the idea of a spectacular and exciting campaign for membership, but last year a dignified but earnest effort was made to interest men, with the result that from January 27, 1920, to March 1, 1921, there were 514 additions to the membership.

There were also deaths of some members which are recorded with deep regret, men who gave a great deal of earnest effort to the work and whose counsel is missed:

O. W. Albee	J. W. Wilkinson
Sir James B. Ball	Paul L. Wolfel
W. A. Cattell	R. C. Sattley
P. S. Hildreth	E. S. Draper
A. S. Markley	W. H. Moore
John G. Shillinger	A. T. Tomlinson
T. H. Hickey	L. J. Putnam
William Travers	G. W. Vaughan
T. H. Sears	E. V. Smith

FINANCIAL

The report of the secretary and treasurer shows a very satisfactory situation for the year and reflects great credit upon these officers as well as the Board Committee in charge of Finance. In the face of continual increase in costs of printing especially, and perhaps to a less extent in other things, we have been able to carry on without any increase in dues and without drawing upon our reserves. It is hoped this may continue, although until prices become more nearly normal, it may not be expected that our assets will increase as rapidly as in past years.

It has been the policy not to try to build up a large investment, but to invest the surplus in such a manner as to be in position to meet any emergency which may re-

quire temporary assistance in meeting unusual demands. Our invested funds are assisting in meeting annual expenses from interest bearing securities. The time may come when some use may be made of these funds in their application to research work and this possibility should be kept in mind, as I believe that should be the ultimate desire.

It is proper here to allude to the several kinds of assistance from outside agencies in promoting research work. The splendid results which have come from these special lines of study speak for themselves and this assistance is appreciated. I refer particularly to the work of the Committee on Stresses in Track and the Committee on Rail. I would especially commend to the members the published result of the last two years from these committees. It is not a waste of time to read them and give this committee all the support possible by way of suggestion.

COMMITTEE PERSONNEL

The increasing membership offers new problems in arranging the personnel of committees to obtain broad representation and effective work. It obviously is impracticable to put all the members on committees all the time, but the desirable thing is to encourage all members to have some committee service. There are always differences in the degree of support which members will give to committee work and committees should always be composed of good workers.

During the past year the Committee of the Board on Personnel has made extraordinary efforts to work out the problem and has made progress in getting changes in personnel, but they need assistance from you as individuals both as to offers of service and suggestion of preferential service. My own idea is that members should desire to obtain a varied committee service and occasionally shift from committee to committee to broaden their experience and to prevent autocracy in committee policy. A varied committee service is a splendid opportunity for the young man to grow in his profession beyond the confines or limited activities of his own particular branch of the service.

Committees can be too large and fail to function well on that account, but they can be too small as well, and can be composed of too limited a representation geographically and can be so greatly spread as to fail to obtain good attendance. Committee organization is a very important matter, probably the most important of all, because that is the means by which our work is done.

I would urgently recommend the establishment of joint conference between the Committee of the Board on Personnel and the various committee chairmen, both at the beginning and end of the year, to perfect the committee organization. This seems to be the most effective way of developing the fitness of members for committee service and to co-ordinate the work of the several committees whose work is related.

To afford opportunities to a larger number of members to have a share in committee work, it has been proposed to establish what might be termed "Corresponding Members" of committees. Many members of the Association are so situated geographically, or for other reasons, as to make attendance at committee meetings impracticable. Such members could nevertheless contribute materially to the value of committee work by correspondence. The Board Committee on Personnel is giving the suggestion further thought.

COMMITTEE SERVICE

Here is an important phase of our work, two features of which I would specially mention: (1) Co-ordinat-

ing the work of different committees whose subjects are inter-related, and (2) character of Reports.

The first seems to become increasingly important as the subjects expand and one of the real difficult duties of the Board Committee on Outline of Work is to assign the subjects requiring co-ordination.

I believe one of the most effective means to assign this work is through a joint conference of the committee chairmen and the Board Committee on Outline of Work. This would systematize the work and obtain the benefits from conference in expression of views and will result in a clearer understanding as to what is wanted, and minimize duplication of effort.

The matter of character of reports is one which has caused concern to the Board on account of the rapidly increasing size of Committee Reports due to the natural expansion of the subjects and the increasing costs of reproduction. The thought I try to convey is to consider the material collected during the research period and see if there cannot be a curtailment of volume without sacrificing the value of the report.

I believe too we have come to the point of doing more experimental work by sub-committee organization and less dependence be placed upon personal viewpoint in majority expression without actual supporting data from organized demonstration or test. In this connection I want to suggest that we avoid too great a speed in trying to conclude research for the purpose of definite recommendation sometimes at a sacrifice of thoroughness. This is not said in criticism of past practice but to call attention to the increasing complication of the many questions before committee.

UNIVERSITY CO-OPERATION

During the year the Association was asked to send to the University of Illinois and Purdue University committees to look over their facilities and methods with the ultimate idea that we might give such assistance as we could in the further development of their courses. In accordance with that request such committees visited the universities and reported favorably upon their work and methods.

These invitations permit the opportunity I have anticipated for some time to offer the recommendation that the Association should make systematic effort to establish and extend contact with technical schools. This is desirable not only for the purposes which have brought about the relations with those with whom we have had co-operation in committee work, such as impact tests and stresses in track, but for the larger matters of university work in which we are interested as employers of engineers.

OFFER OF ASSISTANCE TO THE INTERSTATE COMMERCE COMMISSION IN ACCOUNTING MATTERS

Realizing the increasing need and importance of correlating engineering and accounting to the fullest degree in filling the requirements of the Interstate Commerce Commission, the Board of Direction has tendered to the commission the services of the Association in any manner or matter that may be within its power, which offer has

been most cordially and appreciatively received. The development of the federal valuation work has more prominently shown the interdependence of these departments in perfecting accounting accuracy and the securing of proper cost data for the engineer and operating man.

In particular the enforcement of Order No. 3 has advanced and emphasized this need and I am hopeful out of this offer of assistance may come some new and constructive service for our Association committees. Our work heretofore has been confined almost to a study of forms, but matters of joint interest to both departments are confronting us, not in trying to re-form the basic principle of accounting, but to make them of greater value to both the Railroad and the Government which under the new powers granted by Congress call for new data and measures.

The Interstate Commerce Commission has just asked us, by letter, to co-operate in the development of methods for charging depreciation and its application to existing accounting rules. I believe all concerned feel that in accounting classification we have drifted into a class of detail which has bedimmed the light and caused us to lose the greater and broader view and that out of the co-operative study contemplated by our offer we can all be benefited in simplifying but making more useful the records of such great importance. I would urge that the offer we have made be aggressively followed up.

CO-ORDINATION WITH OTHER COMMITTEES

Through the activities of the American Railway Association for whom we perform the work of the Engineering division a contact has been established with the Mechanical division and with the Purchases and Stores division. The work of correlating the study of roadway and track structure with motive power and equipment is of increasing interest and importance. The tendency of the past for these two

departments to work more and more independently has not been the ideal manner of procedure. Increasing wheel loads and the need for maximum clearances requires careful consideration of the demands upon track, roadway and structures. Likewise certain track and roadway details require consideration from the standpoint of equipment clearances.

Transportation conditions, changed as they are by new regulations as to hours of service, working conditions, the penalty from idle power, all call for new values to be ascribed to speeds, gradients, train loads, terminal delays, etc.—requiring greater co-ordination between the engineering, mechanical and operating divisions. This co-ordination is made easier by reason of the present organization of the American Railway Association and should be encouraged.

RELATIONS WITH OTHER ENGINEERING BODIES

During the year the Association became a member of Engineering Council, a federated body composed of the four founder societies and several other technical bodies, the purpose being to co-operate in matters affecting the welfare and progress of the profession and of interest to



H. R. Safford
President

all engineers. The board felt that such affiliation was desirable and proper. In the interim, however, a body of different origin and character has been proposed to take the place of Engineering Council and has been organized. The majority of the members of Engineering Council have voted to become members of the new body and by such action the greater elements of support were taken away from Engineering Council, rendering it inoperative.

The American Railway Engineering Association was invited to become a charter member, but having agreed to support the Council your Board felt it inexpedient to do so because it felt it could not commit your Association to the financial burden at this time and because it felt the plan of organization to be objectionable and by such action also urged that the Engineering Council be continued. The opportunity to become a charter member was of limited duration but the way is still open for the Association to become a member and which action should be by a referendum vote if it appears desirable and financially possible to consider such connection.

NEW PROBLEMS CONFRONTING THE ASSOCIATION

I have briefly referred to new conditions surrounding the construction, maintenance and operation of railways as a result of the many changes of the past two or three years. It is not necessary to discuss causes, but the practical effects—and their influence upon our work.

The Association has already sensed the need of giving relatively more attention to economics and committee assignments for two or three years past embody prominent references thereto. This necessity has increased by reason of the existing wage schedules and working conditions—whereby different values are given to the various operations of railway service.

These changes affect all activities and call for new formulae—new values and new ideals. They include: Greater costs of equipment with greater loss from idleness, higher values for speed against tonnage performance, where overtime is excessive, increased per diem needing higher average daily car movement, the application of the shorter working day and the adverse and wasteful effect upon that class of work requiring the transportation of employees. These things all must be related to transportation economics and developed cooperatively.

I want to take this opportunity to express upon behalf of the Board the splendid work and loyal support which you have given in the conduct of the year's work. The year has been a difficult one in many ways. The change from federal control to private control meant a great deal of confusion in the reorganization of the railway service, particularly disturbing the work of the engineering department, and your Association work has been done under hardships, but you have done well and I commend that service to my successor with a feeling of deep personal gratitude.

Report of the Secretary

FINANCIAL STATEMENT

The detailed financial statement for the calendar year 1920 shows:

Receipts from all sources	\$37,631.37
Disbursements	38,386.55
Excess of Disbursements over Receipts	\$ 753.18
Investments and Cash Assets, January 1, 1921	\$42,989.22

Ten numbers of the Bulletin and the annual volume of Proceedings were issued during the year. The Proceedings for 1920 contain 1,500 pages, exceeding the volume

of the preceding year by more than 500 pages of printed matter.

THE REVISED MANUAL

The republication of the Manual has been deferred until this year in order to include in the revision the important changes and additions submitted by the several committees for action at this convention. The Manual will be issued as promptly as practicable after the annual meeting.

The revised manual will contain the net results of the Association's work for the past 22 years. It is estimated the new volume will contain approximately one thousand pages.

MEMBERSHIP

The campaign for increasing the membership has resulted in the largest addition to the membership roll within a like period in the history of the Association. Since the inauguration of the campaign—January 27, 1920—521 applications have been received. A portion of this increase was included in the report made last year. The credit for this gratifying condition is due primarily to the earnest efforts of L. A. Downs, chairman of the Special Committee on Increase of Membership; and, secondly, to the hearty co-operation of the individual members of the several roads.

The following is a report on the present membership of the Association:

Membership at last annual meeting	1,638
Deceased members	18
Resignations and dropped	33
	— 51
Additions during the year	364
Net gain	313
Total membership March 1, 1921	1,951

Your Association has continued to actively cooperate with other technical bodies in the study of problems of mutual interest. The extent and scope of such cooperation has been clearly and comprehensively set forth in the address of the president.

Respectfully submitted,

E. H. FRITCH, Secretary.

FINANCIAL STATEMENT FOR CALENDAR YEAR ENDING DECEMBER 31, 1920

Balance on hand January 1, 1920	\$43,744.40
---------------------------------------	-------------

RECEIPTS

Membership Account	
Entrance Fees	\$ 4,070.00
Dues	8,168.75
Subscription to Bulletins	8,168.75
Binding Proceedings and Manual	781.45
Badges	41.00
Sale of Publications	
Proceedings	2,695.60
Bulletins	1,127.88
Manual	360.95
Specifications	323.00
Leaflets	14.15
General Index	24.75
Advertising	
Publications	2,883.10
Interest Account	
Investments	1,677.50
Bank Balance	97.38
Annual Meeting	
Sales of Dinner Tickets	1,136.00
Miscellaneous	102.31
American Railway Association	
Rail Committee	5,958.80

Total

\$37,631.37

DISBURSEMENTS

Salaries	\$ 6,373.75
Proceedings	6,621.24
Bulletins	10,176.06
Manual	23.80
Stationery and Printing	1,344.56
Rents, Light, etc.	850.00
Telegrams and Telephone	27.41
Equipment	89.10
Supplies	126.19
Expressage	579.11
Postage	941.72
Exchange	84.00
Committee Expenses	57.97
Officers' Expenses	48.60
Annual Meeting Expenses	1,726.23
Refunds Dues Account Duplicate Pay- ments, etc.	44.00
Audit	150.00
Engineering Council	1,099.77
Contribution to Joint Committee on Rein- forced Concrete	100.00
Rail Committee	7,681.95
Miscellaneous	241.09
Total	\$38,386.55
Excess of Disbursements over Receipts.....	\$ 755.18

Balance on hand, December 31, 1920.....	\$42,989.22
Consisting of:	
Bonds	\$40,565.65
Cash in S. T. & S. Bank	1,752.97
Cash on Hand	645.60
Petty Cash	25.00
	\$42,989.22

STRESSES IN TRACK FUND

Balance on Hand January 1, 1920.....	\$ 1,036.29
Received from Interest During 1920.....	28.36
	\$ 1,064.65

DISBURSEMENTS

Transportation	\$ 8.20
Hotel and Meals	2.40
Supplies	99.20
	\$ 109.80

Balance on hand in Standard Trust and Savings Bank, December 31, 1920.....\$ 954.85

Respectfully submitted,
BOARD OF DIRECTION.

REPORT OF THE TREASURER

Balance on hand January 1, 1920	\$43,744.40
Receipts during 1920	\$37,631.37
Paid out on audited vouchers, 1920.....	38,386.55

Excess of disbursements over receipts

Balance on hand December 31, 1920.....\$42,989.22

Consisting of:	
Bonds	\$40,565.65
Cash in S. T. & S. Bank.....	1,752.97
Cash on hand	645.60
Petty Cash	25.00
	\$42,989.22

STRESSES IN TRACK FUND

Balance on hand January 1, 1920	\$ 1,036.29
Received from interest during 1920	28.36

Total

Balance on hand December 31, 1920.....\$ 954.85

The Securities listed above are in a safety deposit box of the Merchants' Loan & Trust Safe Deposit Company, Chicago.

Respectfully submitted,
GEO. H. BREMNER,
Treasurer.

Report of Committee on Ballast

In choice of ballast, gravel, where available, should receive careful consideration when it is properly screened, crushed and washed. Consensus of opinion is strongly against ballasting by contract in normal times and especially so on operated track. New and more complete specifications for stone ballast and washed gravel are submitted for inclusion in the Manual. Specifications have been made sufficiently flexible to meet conditions of available supplies for individual roads, while at the same time furnishing accurate comparisons with desired product. Requirements are well within limits of tolerance. Plans are submitted for tamping tools, etc.



H. L. Ripley
Chairman

H. L. Ripley, who is completing his second years as chairman, has been a member of the committee for five years. He is the second valuation engineer to direct the work of this important committee, having succeeded H. E. Hale, group engineer of the President's Conference Committee on Valuation in 1919. As valuation engineer of the New York, New Haven & Hartford he has had occasion to study many of the problems under consideration by the committee from the standpoint of their influence on the cost of a railway proper. His effective direction of the work of the committee is indicated by the fact that its report was completed early.

THE COMMITTEE RECOMMENDED that the revision and rearrangement of the subject-matter in the Manual as made in accordance with Appendix A be approved and the revised matter be substituted for the present recommendations in the Manual.

The committee recommended that the instructions to govern ballasting on an operated line, presented as a report of progress last year (*Railway Age*, March 18, page 917), be approved and printed in the Manual as recommended practice.

The committee recommended that Specifications for Stone Ballast Material, as presented in tentative form last year (*Railway Age*, March 18, page 918), be ap-

proved and printed in the Manual as recommended practice.

The committee recommended that Specifications for Washed Gravel Ballast, as outlined in Appendix D, be adopted and printed in the Manual as recommended practice.

The committee recommended that the standard ballast tamping bar, tamping pick, and ballast fork, as outlined in Appendix E, be printed in the Manual as recommended practice.

Committee: H. L. Ripley (N. Y. N. H. & H.), chairman; F. J. Stimson (Penna.), vice-chairman; C. W. Baldrige (A. T. & S. F.), O. F. Barnes (Erie), J. S. Bassett, W. J. Bergen

(N. Y. C. & St. L.), F. W. Bettle (T. & P.), Theo. Bloecher, Jr. (B. & O.), H. E. Boardman (N. Y. C.), C. J. Coon (N. Y. C.), T. W. Fatherson (C. G. W.), H. E. Hale, Paul Hamilton (C. C. C. & St. L.), G. H. Harris (M. C.), A. G. Holt (C. M. & St. P.), F. A. Jones (M. P.), J. S. McBride (C. & E. I.), S. B. Rice (R. F. & P.), D. L. Sommerville (N. Y. C.), Paul Sterling (N. Y. N. H. & H.), W. W. Thrower (I. C.), R. C. White (M. P.), W. D. Williams (C. N.).

Appendix A—Revision of Manual

DEFINITIONS

GENERAL

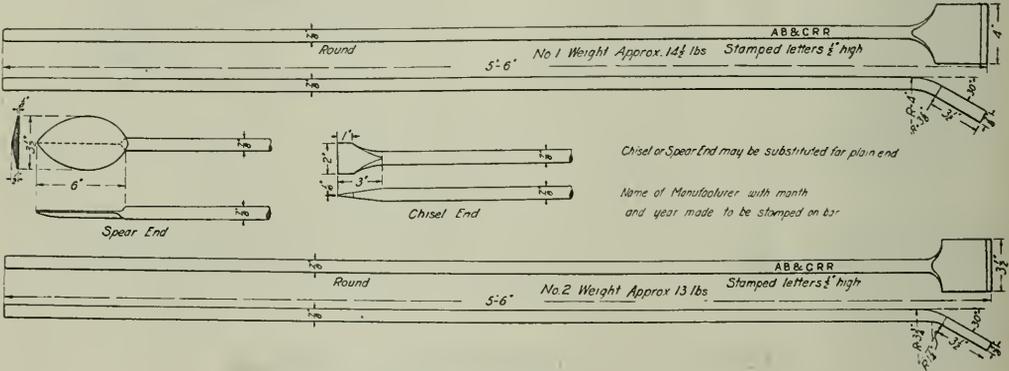
Ballast.—Selected material placed on the roadbed for the purpose of holding the track in line and surface.
Sub-Ballast.—Any material of a character superior to that in the adjacent cuts, which is spread on the finished sub-grade of the railroad and below the top-ballast, to provide better

Gumbo.—A term commonly used for a peculiarly tenacious clay, containing no sand.
Sand.—Any hard, granular, comminuted rock which will pass through a No. 10 screen and be retained on a No. 50 screen.
Slag.—The waste product, in a more or less vitrified form, of furnaces for the reduction of ore; usually the product of a blast furnace.
Stone.—Stone broken by artificial means into small fragments of specified sizes.

COMPARATIVE MERIT OF MATERIAL FOR BALLAST

The following sets forth the relative order of effectiveness of various kinds of ballast:

- (1) Stone
 - (a) Trap rock.
 - (b) Limestone.
 - (c) Sandstone.
- (2) Washed Gravel



Recommended Plan for Standardized Tamping Bars

drainage, prevent upheaval by frost, and better distribute the load over the roadbed.
Top-Ballast.—Any material of a superior character spread over a sub-ballast to support the track structure, distribute the load to the sub-ballast, and provide good initial drainage.
Foul-Ballast.—Ballast which has lost its porosity through the filling up of the voids by cinders, coal dust, dirt or other foreign matter.
Dust.—Fine particles of sand, clay, loam, or other earthy matter which will pass through a No. 50 screen.
Shoulder.—That portion of the ballast between the end of the tie and the toe of the ballast slope.
Crib.—That portion of the ballast between two adjacent ties.
Depth.—The distance from the bottom of the tie to the top of the sub-grade.

KIND

Chats.—Tailings from mills in which zinc, lead, silver, and other ores are separated from the rocks in which they occur.
Chert.—An impure flint or hornstone occurring in natural deposits.
Cinders.—The residue from the coal used in locomotives and other furnaces.
Clay (Burnt).—A clay or gumbo which has been burned into material for ballast.
Granite (Disintegrated).—A natural deposit of granite formation, which on removal from its bed by blasting or otherwise, breaks into particles of size suitable for ballast.
Gravel.

- (a) Pit Run.—Worn fragments of rock and sand occurring in natural deposits.
- (b) Screened.—Worn fragments of rock, occurring in natural deposits, that will pass through a 2 1/2-inch ring and be retained upon a No. 10 screen.
- (c) Washed Gravel.—A gravel from which foreign matter has been washed and the relative proportions of gravel and sand have been determined.

- (3) Broken slag (not granulated)
 - (a) Precious metal slag.
 - (b) Open-hearth slag.
 - (c) Blast furnace slag.
- (4) Screened Gravel
- (5) Pit Run Gravel
 - (a) River or stream gravel.
 - (b) Hill gravel (not cementing).
 - (c) Hill gravel (cementing).
- (6) Chats
 - (a) Chats from zinc ore, which is coarse.
 - (b) Chats from lead ore, which is fine.
- (7) Burnt Clay or Gumbo
- (8) Cinders
 - (a) Hard coal cinders.
 - (b) Volcanic cinders.
 - (c) Soft coal cinders.

Natural ballast materials vary greatly in quality, and the choice must often be determined by availability and expediency under the particular existing circumstances. Financial conditions may control the choice or there may be only one suitable material readily available. Crushed stone is a manufactured article and, the process being under control, it is practicable to make the product conform to specifications. In the choice of ballast where gravel is available, it should receive careful consideration, as it has given excellent results, especially when properly screened, crushed and washed.

PROPER DEPTH OF BALLAST

(a) On a roadbed material such as clay, loam, etc., subject to deformation by the application of live load, the proper depth of ballast under the tie to produce approximately uniform pressure on the roadbed would be not less than the spacing center to center of the ties. For

Class A track, see ballast sections, adopted March, 1918.

(b) On material that approximates the character of good sub-ballast (which will not be deformed by the application of live load), the minimum depth of ballast under the bottom of the tie should be 12 in.

(c) These depths are required, under the conditions named, to support the track structure; to provide good initial drainage; to provide against upheaval by frost; to serve as a cushion for the track.

(d) A combination of a good sub-ballast 18 to 14 in. and top-ballast 6 to 10 in., making a total of approximately 24 in. under the tie in the aggregate, will produce nearly the same result as though the superior material was used for the full depth.

(e) Until sufficient tests are made under normal traffic conditions, the proper depth of ballast under the tie must rest on opinion, based on experience and supported by such tests as are available, notably the test made by Director Schubert of the German Railways and the "Altoona Test" made by the Pennsylvania Railroad.

(f) Proper drainage of the sub-grade is essential to success with any kind of ballast.

CHARACTERISTICS OF STONE BALLAST

(1) Stone ballast should be sufficiently durable not to disintegrate in the climate where used, hard enough to prevent pulverizing unduly under the action of tools or traffic, and should break with an angular fracture when crushed.

(2) It should be broken into pieces of such size that they will in any position pass through a 2½-in. ring and will not pass through a ¾-in. ring.

(3) It should be free from dirt, dust or rubbish.

(e) Toughness, maximum.

(f) Cementing value, minimum.

(g) Compression test, maximum.

The above physical tests are made uniformly and free of charge by the Department of Agriculture, U. S. Government, Washington, D. C. Much valuable information in regard to tests already made and tabulated can also be obtained from this department.

SPECIFICATIONS FOR PIT RUN GRAVEL BALLAST

For Class A Railways: Bank gravel, which contains more than 2 per cent dust or 40 per cent sand, should be washed or screened.

For Class B Railways: Bank gravel, which contains more than 3 per cent dust or 60 per cent sand, should be screened or washed. Screened gravel should not contain less than 25 per cent nor more than 50 per cent sand.

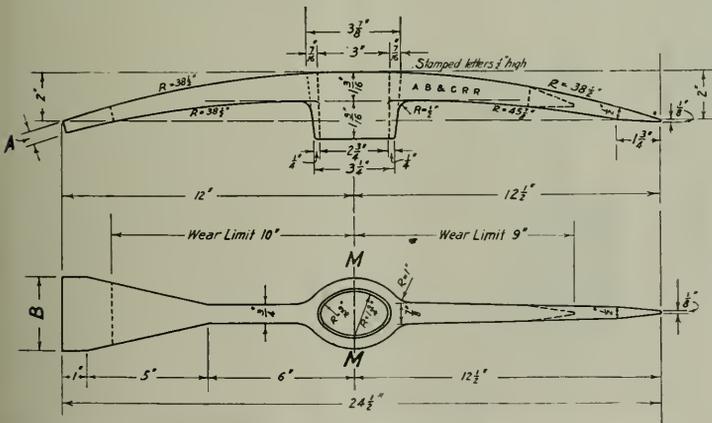
For Class C Railways: Any material which makes better track than the natural roadbed may be used economically.

METHOD OF TESTING QUALITY OF PIT RUN GRAVEL FOR BALLAST

(1) The size of the sample to be tested should be approximately 1 cubic foot.

(2) Five average samples of about one cubic foot each should be selected from various parts of the pit which is to be tested. The five samples should then be thoroughly mixed and about one cubic foot of the mixture selected for testing.

(3) To separate the gravel from the sand and dust, use a No. 10 screen, 10 meshes to the inch, made of No. 24 wire, B. & S. gage. To separate the sand from



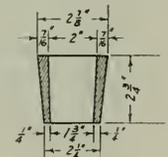
Name of Manufacturer with month and year made to be stamped on pick

Recommended Plan for Standardized Tamping Picks

Attention is called to the physical test of stone for ballast given below, which is recommended as a guide in connection with the specifications, or where a quick test must be substituted for a more complete examination.

Other things being equal, the maximum or minimum results, as indicated, will govern in selecting stone for ballast:

- (a) Weight per cubic foot, maximum.
- (b) Water absorption in pounds per cubic foot, minimum.
- (c) Per cent of wear, minimum.
- (d) Hardness, maximum.



SECTION M-M

SIZE	A	B	WEIGHT
1	2 1/2"	3"	7 1/2 lb
2	2 3/8"	3"	7 3/8 lb
3	2 1/2"	2 1/2"	7 3/8 lb



the dust, use a No. 50 screen, 50 meshes to the inch, made of No. 31 wire, B. & S. gage.

(4) Measure the percentage of gravel, sand and dust taken from the sample by volume, giving the percentage of each ingredient compared to the volume of the sum of the ingredients, as follows:

$$\text{Per cent of sand} = \frac{S}{G + S + D}$$

Where S = Volume of sand
 G = Volume of gravel
 D = Volume of dust

(5) When sample is shipped for test it should be marked carefully and securely with the name and location of the pit from which it was taken.

CINDER BALLAST

The use of cinder as ballast is recommended for branch lines with light traffic; on sidings and yard tracks near the point of production; as sub-ballast in wet, spongy places, on new work where embankments are settling, and at places where the track heaves from frost. It is recommended that provision be made for wetting down cinders immediately after being drawn. A sub-ballast blanket of cinders not less than 12 in. thick is effective in most cases in preventing mud and similar material working up into the top-ballast.

SPECIFICATIONS FOR BURNT CLAY BALLAST

1. **Kind of Material.** Good ballast clay is heavy and plastic, free from sand, gypsum or other impurities. It must not crumble when exposed to air or when brought in contact with heat.

2. **Location.** The pit should be located on level or moderately sloping ground, not subject to overflow. A water supply is desirable and it should be borne in mind that the sulphurous and carbonaceous gases liberated during the

5. **Size.** Burnt clay ballast should be crushed or broken, if necessary, so that the largest piece will pass through a 4-inch ring.

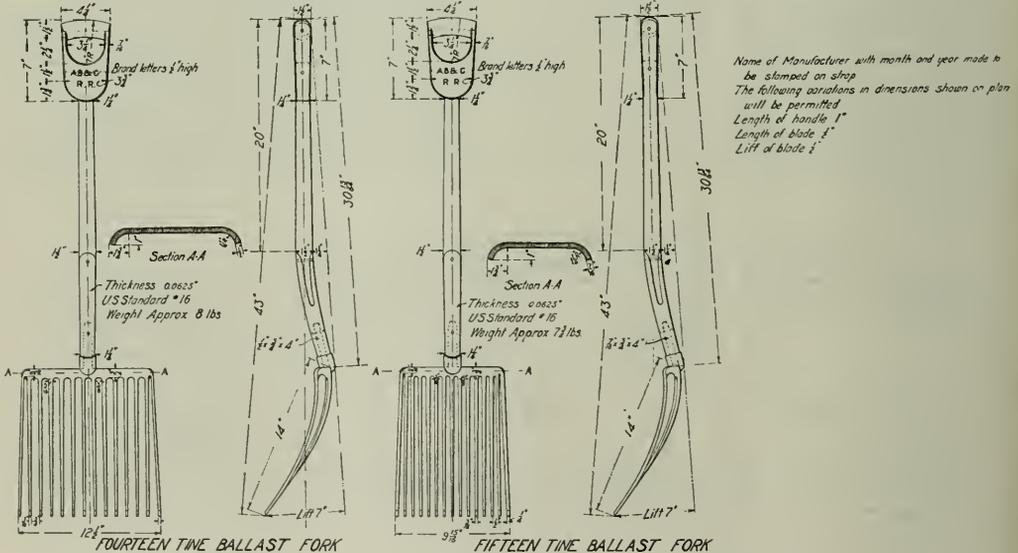
6. **Density.** The finished product should absorb not to exceed 15 per cent of moisture by weight.

CLEANING FOUL BALLAST

Under usual conditions no ballast, except stone or hard slag, should be cleaned. Ballast should be cleaned when foul enough to prevent proper drainage. Clean with ballast forks or screens. Clean shoulder down to sub-grade. Clean crib to bottom of ties. Clean space between tracks to depth of 6 in. or more below the bottom of ties. Clean the berme to bottom of ballast, preferably not less than 12 in. below bottom of tie. Clean cross ditches between ties approximately every rail length, or 33 ft. Cross ditches should not be under rail joints. Return ballast when cleaned and apply sufficient new ballast to produce the standard section.

Tests, fully described in the report of the Committee on Ballast for 1914, indicate stone ballast can be cleaned by use of screens for approximately one-half cost of cleaning stone ballast with forks.

Stone ballast should be cleaned in terminals, at intervals of 1 to 3 years, under heavy traffic at intervals of 3



Recommended Plans for Standardized Ballast Forks

burning period, damage the surrounding vegetation and make habitation in the near vicinity very disagreeable.

3. **Test.** The location site should be thoroughly tested to determine quality of clay, depth and uniform consistency of deposit, and small quantities should be burned in test kilns to show the quality of ballast to be secured.

4. **Burning.** Fuel should be fresh, clean slack, and arrangements should be made to secure constant supply. One ton of slack coal is generally sufficient for the perfect burning of four cubic yards of acceptable ballast. From one to one and one-half-inch layer of slack is alternated with from ten to twelve-inch layer of clay, a new layer of slack and clay being applied to the fire every five or six days. Fires once started must be kept burning steadily and uniformly. To insure thorough and proper burning of the clay, the top and face of the fire should be frequently raked down, to avoid clinker or black spots, caused by too much or too little air. When fully burnt a proper ballast clay becomes red in color, when the clay contains iron; when under-burnt, the clay will show a yellow color.

to 5 years, under light traffic lines at intervals of 5 to 8 years. Per cent of new stone ballast to be applied, 15 to 25 per cent.

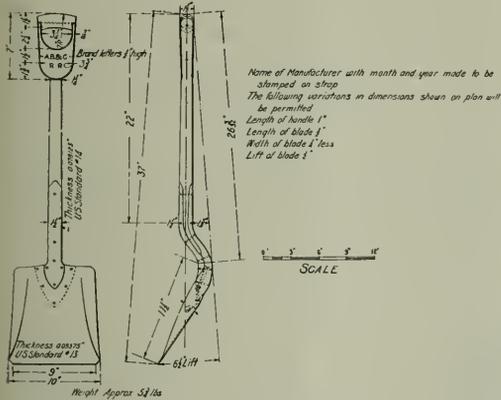
USE AND LIMITATION OF MECHANICAL TOOLS

Mechanical devices used to save labor and expense and to expedite the work fall naturally into sequence from the pit, quarry or ballast pile to the finished track. Cars for transporting ballast should be chosen carefully with regard to the work to be done—whether it is to be on track already laid or for an additional parallel track. If for raising track, hopper cars should be used with the ballast plow or tie drag. If for parallel track, side dumps are to be preferred, especially when air operated. Convertible cars where the sides swing out and up, when used with the side plow and unloading engine-drum and

cable, are fairly satisfactory when dump cars are not available, which is usually the case when stone ballast is furnished from a private quarry. Anchoring the train and pulling the plow through the train by cable from the locomotive is a poor substitute for the unloading engine. It does beat unloading by hand.

The spreader car, especially when air-operated, is effective and should be in general use. With this car ballast for new second track work previously dumped alongside the running track from side dump cars or unloaded by side plows, can be spread out to a grade two inches below the bottom of tie and to the outside shoulder at a speed of eight miles per hour. When not in use on ballast work the spreader can be used on a grading dump and in wet clay or rock, will do the work of fifty men and remain idle most of the time at that.

The mechanical tamper has passed the stage where its usefulness under favorable circumstances needs further



Suggested Type of Ballast Shovel

defense. Around terminals and yards where there is a large amount of frog and switch work, so far as this committee knows there is no disposition to question the expediency of its use based on its merits alone, entirely apart from any question of scarcity of labor.

The consensus of opinion is strongly against ballasting by contract in normal times and especially so on operated track. Advocates of ballasting by contract do so largely as an emergency measure because of the greater flexibility of a contractor's organization in changing the rates of pay and so securing labor in times of stress.

Concrete slabs placed under the ballast on soft roadbed where traffic is heavy, and at times under other exceptional circumstances, indicate that a considerable degree of success may be expected from their use, and at reasonable expense.

Appendix D—Specification for Washed Gravel Ballast

1. Gravel for ballast shall be so prepared that dust, loam and dirt are removed, that all aggregates that will not in any position pass through a 2 1/2-in. ring are rejected; and that the sand contained in the ballast shall not, in volume, exceed 20 per cent nor be less than 15 per cent of the material as loaded for use.

Test No. 1. Dust, Dirt or Loam

2. A sample of the prepared ballast containing 1/8 cu. ft. shall be placed in a watertight receptacle having a capacity of not less than 1 cu. ft. Into this receptacle shall then be placed two quarts of clear water, after which the receptacle shall be agitated until the gravel is thoroughly washed. The water shall be drained off immediately and placed in a glass jar and allowed to settle. If the sediment deposited in the

bottom of the jar is more than 1/2 of 1 per cent of the volume of sample the output of the plant shall be rejected until the fault has been corrected.

Test No. 2. Large Aggregate

3. A sample weighing not less than 150 lb. shall be placed in or on a screen having round holes 2 3/4 in. in diameter. If a thorough agitation of the screen fails to pass through the screen 98 per cent of the material, as determined by weight, the output from the plant shall be rejected until the fault has been corrected.

Test No. 3. Sand

4. One cubic foot of the prepared ballast shall be thoroughly dried, placed in a screen having ten meshes to the inch and the screen agitated till all particles which will pass have passed the screen. If the material which passes through the screen exceeds 20 per cent or is less than 15 per cent in volume of the original sample the output shall be rejected until the fault has been corrected.

5. In case inspection develops the fact that the material which has been or is being loaded is not in accordance with these specifications, the inspector shall notify the manufacturer to stop further loading until the fault has been corrected, and to dispose of all defective material that had been loaded in cars, which shall be done at the expense of the contractor.

6. When ballast is being paid for by the ton, and it is impracticable to weigh each car, the weight per yard shall be obtained by weighing at frequent intervals not less than five cars loaded with ballast, the contents of which have been carefully measured. The weight per yard obtained by such a test shall be used in figuring the weight per car until another test is made.

7. When ballast is paid for by the yard, the amount shall be determined by weighing each car, where practicable, and applying the weight per yard as determined by frequent tests. When impracticable to weigh each car, the contents of each car will be carefully estimated by comparison with cars, the contents of which have been actually measured.

Appendix E—Standardization of Ballast Tools

The sub-committee submitted specifications and plans for tamping bars, tamping picks and ballast forks, which were recommended for insertion in the Manual.

The committee also submitted a plan for a standard ballast shovel which it requested be considered as a progress report.

SPECIFICATIONS FOR BALLAST TOOLS

Scope

1. These specifications cover tamping bars, ballast forks and tamping picks.

Material

2. These tools, other than straps, shall be high-grade tool steel made by the open-hearth or crucible process.

3. Straps for forks shall be of soft open-hearth steel or wrought-iron.

4. Handles shall be smooth and well seasoned, of the best grade straight grained ash or hickory, bent to shape.

Chemical Properties

5. The steel shall conform to the following chemical composition:

	Tamping Bars and Picks Per Cent	Forks Per Cent
Carbon	0.55 to 0.75	0.90 to 1.05
Manganese	0.40 to 0.60	Not more than 0.50
Phosphorus	Not more than 0.04	Not more than 0.04
Sulphur	Not more than 0.04	Not more than 0.04

Design

6. The dimensions of tools shall conform to the plans which are made a part of these specifications.

Physical Properties

7. All tools shall be free from defects and finished in a workmanlike manner.

8. Tools must be properly tempered to provide the maximum toughness and strength to perform the service for which they are intended.

9. Tamping bars, picks and tines, head and tongue of ballast forks shall be of one piece, no welding being permissible.

10. Tools shall be marked as shown on the plans.

Inspection

11. Inspection of tools shall ordinarily be made at the place of manufacture. The manufacturer shall notify

..... of the Railroad Company at least days in advance when tools will be ready for shipment. However, when so directed, in regard to a particular shipment, the manufacturer shall make shipment on his own inspection, subject to requirements of Paragraph 15.

12. The manufacturer shall allow the railroad company's inspectors such access to the work as may be necessary to satisfy them that the provisions of these specifications are carried out.

13. The manufacturer shall furnish, without charge, all necessary facilities and assistance for making thorough inspection and tests at the works.

Rejection

14. Individual tools, defective in any respect, and lots of tools not meeting above requirements, shall be rejected.

15. All tools shipped on manufacturer's inspection, as provided in Paragraph 11, which on arrival at destination are found defective and all tools which develop flaws and defects in the usual and necessary service, shall be rejected and replaced at the entire expense of the manufacturer or seller.

Discussion

H. L. Ripley (Chairman): The work of the ballast committee for the past year has been largely in the nature of a review of the tentative report presented a year ago. It has been reviewed and corrected by the members of the committee.

C. W. Baldrige (A. T. & S. F.): The instructions to govern ballasting on an operated line were presented to the Association last year as information, with the statement that they would be presented this year for adoption for inclusion in the Manual. Some few changes have been made since that time by the committee. These instructions are intended as a guide to anyone who may care to look up something in regard to recommended practice on ballasting or reballasting of track.

Chairman Ripley: *I move the adoption of Appendix B, to be printed in the Manual as recommended practice.*

(*Motion carried.*)

Chairman Ripley: The next matter covered by the committee is Appendix C, on specifications for stone ballast material. In offering these, the committee realizes fully that it is not possible to write precise specifications for stone for ballast as can be done with specifications for steel, for instance, because the original material is not capable of the same treatment and one is compelled to use the raw material available. *I move the adoption of Appendix C for inclusion in the Manual.*

(After some discussion relating to details of wording the motion was carried.)

Chairman Ripley: Appendix D refers to a matter not directly referred to the committee, Specification for Washed Gravel Ballast. It seemed so closely allied to the subject that was specifically given to the committee for consideration and was a matter which some members of the committee themselves found they were very much interested in at this time that the committee has drafted this set of specifications, which does not do violence to the other set just read, and should go into the Manual.

J. E. Willoughby (A. C. L.): In connection with the first item of the specification I notice it is proposed that the sand for the washed gravel ballast shall not exceed 20 per cent. I believe it is the more general custom where washed gravel ballast is used that the sand may exceed 20 per cent. On the Atlantic Coast Line we use it up to 25 per cent and 33 per cent. We have a good deal of rain and do not have any trouble from the amount of sand causing the retention of the water. The soils on which the ballast is placed, however, are usually sandy soils. In our practice we remove all sand and remix the sand and gravel and the sand is that ordinarily found in our sand pits and will pass through a $\frac{3}{8}$ -in. screen.

Chairman Ripley: Under the conditions found on the line of the Atlantic Coast Line that is perfectly permissi-

ble. This is recommended, not as a standard, but recommended practice to carry us under normal average conditions. The committee would not oppose making that 25 per cent if it seems good to the membership. The committee, however, is pretty thoroughly in accord, if not unanimous, in suggesting the percentages named here, and would be, frankly, more likely to reduce the 15 per cent than to add to the 20 per cent, based on the experience of two members of the committee who have used washed gravel very extensively and lately have had experience with it.

The Chairman: Did the committee take into consideration the fact that oftentimes a different specification might be required for washed gravel sand proportion, in the case of bank washed gravel, as compared with river-bed washed gravel, the difference being largely due to the fact that in the river bed material the larger particles are quite smooth and round, while with certain classes of bank gravel that are washed the aggregate is rough.

Chairman Ripley: Yes, that matter was considered by the committee. We put down a trial section of that track with ball-bearing gravel, as it is called, containing seven per cent sand, and it held its line, held its grade and there was no difficulty experienced. I have no objection to lowering the minimum 5 per cent or raising the maximum 5 per cent. I believe, however, as a guide under normal conditions the percentages named are better than would be the case if a change was made either lowering or raising the limit of tolerance. *I move Appendix D be adopted and included in the Manual as recommended practice.*

(*Motion carried.*)

Chairman Ripley: Appendix E, Standardization ballast tools. This matter has been before the convention for two years, and the report will be made by the chairman of the sub-committee, Mr. McBride.

(J. C. McBride (C. & E. I.) submitted Appendix E.)

Chairman Ripley: *I move the adoption of Appendix E, excepting ballast shovel specifications, be placed in the Manual as recommended practice.*

The Chairman: May I ask the committee whether in the designs of these tools there are any radical changes that will induce any manufacturing difficulties?

Chairman Ripley: I think we can say positively, no; although the manufacturers have not responded to our request for criticism; but these tools were the composite result of a questionnaire sent out by different carriers, and pretty well responded to.

(*The motion to adopt Appendix E was carried.*)

Chairman Ripley: The other matter is the revision of the Manual. We request permission to suggest to the committee editing the Manual that the matter be rearranged and worded as stated in Appendix A.

Mr. Willoughby: I take it that it was one of the duties of the committee to ascertain if the existing specifications on which no change is made fulfil what is now good practice, regardless of whether the convention have heretofore adopted the definition. In Appendix A there is a definition for sub-ballast: "Any material of a character superior to that in the adjacent cuts." Now, the material in the adjacent cuts is sometimes very good ballasting material. Sometimes it may be gravel, it is possibly stone and it is frequently sand, all of which may be good ballast, not only in sub-ballast, but in ballast. The purpose of the sub-ballast is to cover the roadbed. The sub-ballast material ought to be material which is better than the material underneath the roadbed.

Chairman Ripley: Mr. Willoughby, taking the condition that you have stated, isn't it an open question, whether it is ballast or not, or whether you would handle it as ballast? If you went through a cut with material of that

nature you would not take it out only to a certain depth. If the adjacent fill was made with that material, you would make it up to a certain depth. I wonder whether under such conditions material handled out of that cut below a final ballast would be considered and handled as ballast at all?

Mr. Willoughby: There is a condition in certain parts of the country, for instance, Florida, where the state is overlaid generally with a layer of sand that is sometimes 20 ft. or more in depth. In the cutting you will pass through sand, and sand would be in the adjacent cut. Sand will make good sub-ballast, but not good ballast, on account of its lightness in blowing away. Now, the cut may be sand itself and you would not be entitled under that classification to call the sand which you placed on the roadbed sub-ballast.

Chairman Ripley: I think your point is well taken. I wonder if that definition should not be made to read: "Any material of a superior character which is spread on the finished sub-grade of the roadbed and below the top-ballast, to provide better drainage, prevent upheaval by frost, and better distribute the load over the roadbed. Is that satisfactory to you, Mr. Willoughby?"

Mr. Willoughby: That is satisfactory to me.

H. Austill (M. & O.): In Appendix A, does the definition of screened gravel represent gravel in the pit that may be screened?

Chairman Ripley: The basic idea was to get a certain product, and that product is one that has no stone in it that is larger than $2\frac{1}{4}$ in. in diameter, and has nothing smaller in it than will be held on a No. 10 screen.

Mr. Campbell: I would suggest that that be made to read: "Worn fragments of rock occurring in natural deposits that have been passed through a $2\frac{1}{2}$ -in. ring and been retained on a No. 10 screen."

Mr. Ambrose: How would it be if you were to simply treat it as a noun and cut off the letters "ed" and leave it stand as it is? *I move that the "ed" be deleted.*

The Chairman: The motion is that the caption should read "screen gravel" instead of "screened gravel."

(Motion carried.)

J. M. R. Fairbairn (C. P. R.): In the figures we are passing on for the Manual, is there any special reason why in these diagrams the crown of the sub-grade has been left off? It seems to me it would be better to show the crown of the sub-grade as it is shown to the committee on roadway.

Chairman Ripley: I know of no reason why the bottom should not be made to conform, but it would require special action by the Association to do so.

Mr. Fairbairn: *I move that the sub-grade be shown with a crown in these diagrams similar to that used by the Roadway committee report.*

Mr. Frink: The committee on roadway this year is presenting some diagrams of roadway sections with the sub-grade crowned. It is my recollection our Manual now contains diagrams with the sub-grade at the level and therefore this presentation of the committee on roadway is a change in the Manual.

(Motion carried.)

(The committee was dismissed with the thanks of the Association.)

Report of the Committee on Electricity

The electrification of the Norfolk & Western is described in the report on water power. All phases of the work, including operating conditions, operating cost, classes of equipment, purchase of power, conservation of fuel and saving of wages are discussed. It is concluded that a saving of at least 12½ per cent of the total annual expense will be obtained by a system of electrification as compared with steam operation under similar condition. Specifications for wires and cables, underground conduit construction and tungsten lamp standards are presented for adoption in the Manual. Marked economies can be effected by the use of a restricted number of different lamps.



Edwin B. Katte
Chairman

Edwin B. Katte has been associated with the work of the Committee on Electricity since 1911, and for the last four years he has been the chairman. No man has had a better training for the leadership of this important committee than Mr. Katte. Being associated with the electrification of the New York Central's Manhattan terminal since its very inception and occupying the position of chief engineer of electric traction, he has had an extended first hand contact with steam railway electrification from the viewpoint of both construction and operation. This experience is of great value to the committee when the subject of electrification is receiving so much attention.

IN APPENDIX A OF THE REPORT the committee reported on the subject of electrolysis and its effect on reinforced concrete; in Appendix B, water power for electric railway operation; in Appendix C, railroad specifications for electric wires and cables.

In Appendix D the committee reported on the subject of electrical interference, and in Appendix E, railroad specifications for underground conduit construction for power cables for approval and printing in the Manual as recommended practice; also definitions of additional electrical terms for printing in the Manual.

Conclusions

1. The committee recommended for inclusion in the Manual the additional electrical definitions enumerated in Appendix E.

2. The committee recommended that the report on electrolysis and insulation, being Appendix A, be accepted as information and published in the Proceedings.

3. The committee recommended that the report on water power, being Appendix B, be accepted as information and published in the Proceedings.

4. The committee recommended that the railroad specifications for wires and cables, being Appendix C, be approved and printed in the Manual as recommended practice.

5. The committee recommended that the report on electrical interference, being Appendix D, be accepted as information, published in the Proceedings.

6. The committee recommended that the railroad specifications for underground conduit construction for

power cables, being Appendix E, be approved and printed in the Manual as recommended practice.

7. The committee recommended that the report on the National Electrical Safety Code, being Appendix F, be accepted as information, published in the Proceedings and that the committee be authorized to continue its cooperation with the United States Bureau of Standards.

8. The committee recommended that the railroad specifications for incandescent lamps, being Appendix G, be approved and printed in the Manual as recommended practice.

Committee: Edwin B. Katte (N. Y. C.), chairman; D. J. Brumley (I. C.), vice-chairman; H. M. Bassett (N. Y. C.), R. D. Coombs (Cons. Engr.), Walt Dennis (Wabash), A. H. Hogeland (G. N.), C. E. Lindsay, W. L. Morse (N. Y. C.), R. S. Parsons (Erie), M. Schreiber (P. S. R. of N. J.), W. M. Vandersluis, R. Beeuwkes (C. M. & St. P.), J. C. Davidson (N. & W.), R. H. Ford (C. R. I. & P.), G. W. Kittredge (N. Y. C.), H. K. Lowry (C. R. I. & P.), A. E. Owens (C. R. R. of N. J.), J. R. Savage (L. I.), E. B. Temple (P. R. R.), S. Withington (N. Y. N. H. & H.).

Appendix B—Water Power

The report on water power consists of a description of the Norfolk & Western's electrification, covering in the first part such subjects as operating features, types of locomotives, power house problems, etc. This project has been described on varying occasions in the *Railway Age*, the latest article being on page 101 of the January 7, 1921, issue. The last half of the report deals with the questions of purchasing power, operating costs, etc.

PURCHASING POWER

The question has been frequently asked why the company installed a steam-driven plant for power generation when hydro-electric power was available. At the time when plans for electrification were being perfected, this subject was studied in detail and the decision to generate by steam was arrived at after careful consideration. There were two main factors involved; first, the question of cost; second, continuity of supply. In 1913 and 1914, power station coal could be placed in the railway company's bunkers at less than one dollar per ton, and on this basis power could be produced more cheaply than it could be purchased. With the present high prices of this coal, the comparison is on an entirely different basis. As to continuity of power, hydro-electric concerns in the vicinity are affected materially by shortage of water at certain seasons of the year, and at the time electric operation was decided upon, very little steam reserve power was available. It was felt that it would be unwise for the railway to rely upon an outside source of power which was liable to interruption from shortage of water or other causes. Through the emergency connection with the Appalachian Power Company, the railway has frequently had to supply power to enable the hydro-electric company to maintain its service.

In 1916, a reciprocal agreement was effected between the railway company and the Appalachian Power Company whereby, in emergency, either company would supply the other with power. Under the terms of this agreement, the power company installed at its own cost in its plant at Switchback, a frequency changer with connections to the railway company's substation at Maybeury. The amount of power which can be transferred is, of course, limited by the capacity of the frequency changer, which is 10,000 kilowatts. All power exchanged is metered at the power company's side of the apparatus and consequently the railway stands all loss of transmission and conversion. As a partial compensation, the power company paid for power supplied 33 per cent more than

the railway company paid for power received. Payments originally were based on a flat rate per kilowatt hour.

Due to the great advance in cost of coal, a supplementary agreement was put into effect in 1918, whereby a sliding scale adjustment was applied to the price charged the power company to cover increase in cost of coal. No change was made in the price for hydro-electric power received from the power company, but provision was made that in the event of steam generated power being received from the power company from their steam reserve plants, the railway company would pay for this steam power on the same basis as the power company pays the railways. No adjustments have yet been made to cover increased cost of labor and material.

Under present conditions, the advantages of these emergency connections are slight insofar as the railway company is concerned. The amount of power available at any time is insufficient for traction purposes without keeping the railway company's Bluestone plant in complete operation. At times, it has been possible to use the power company's supply and shut down one machine. There is, however, a distinct advantage due to the fact that the operation of the frequency changer can be handled so as to improve the system power factor of the railway. The use of the frequency changer as a condenser increases the power factor by 10 to 15 per cent.

OPERATION COSTS

As the electric service now maintained is on an entirely different basis from the former steam service, it is impossible to give a direct comparison of cost. It has therefore been considered advisable to give the following comparison between steam and electric freight locomotive operation, using the records and figures compiled for use in the company's annual report. In this comparison, all costs entering into operation as well as interest and depreciation have been taken into account and while the figures are necessarily approximate it is believed they are sufficiently close to be representative:

COMPARATIVE COST PER MILLION TRACTIVE-MILES

Items	Steam	Electric
Interest and depreciation	\$ 4.36	\$12.16
Repairs	7.64	6.40
Fuel of elec. power at loc.	13.00	6.19
Lubricants and waste	.16	.05
Supplies	.16	.16
Engine house expenses	2.18	.56
Water	.51	.00
Wages	1.89	.70
Total per million tractive-miles	\$29.90	\$26.20
Per cent saving		12.5 per cent

Attention is called to the unit of comparison, "Tractive-Miles," which is the product of the maximum tractive power in pounds and total miles run. This affords a direct comparison.

In explanation of the table given above, it will be noted that the interest and depreciation figure for electric locomotives is much higher than that given for steam. This is because all of the electric cost has been charged against the number of engines in the service, i. e., each engine carries its share of power house transmission, distribution, etc. The actual electrification installation costs have been increased in this table over 100 per cent to adjust the values to those prevailing in 1919.

The cost of electric locomotive repairs has been reduced below the actual figures in order to eliminate charges which have been due to the development of a new design. In other words, the electric locomotives now in service have been experimental, and could they be replaced today by new equipment it is entirely reasonable to expect the figures shown for repairs would be representative. In this connection it is pointed out that the power house, substations and transmission lines gen-

erally are designed for considerably larger service than is now given.

CONSERVATION OF FUEL AND SAVING IN WAGES

An important question today in connection with the general movement towards conservation of fuel is how much actual fuel can be saved by electric operation, and in this connection the Norfolk & Western has found that with the modern Mallet, compound superheating steam locomotive, equipped with all improvements excepting feed-water heater, about 5.4 lb. of fuel are required per drawbar hp. hour, taking into account road conditions and allowing for standby losses. It should be noted that these figures assume the engine to be in thoroughly good operating condition. With electric operation, about 3.3 lb. of fuel are required per drawbar hp. hour in the present electric service, which gives a direct saving in the fuel bill of about 40 per cent. This amounts to a total saving for the present "Elkhorn Grade" electrification of about 60,000 tons of fuel coal per year. Applying the same ratio of saving to the entire Norfolk & Western system, it is estimated that with complete electric operation the net saving in amount of fuel used would be nearly one million tons per year.

In the case of crew wages, it will be noted that on the "tractive-mile" basis the saving in crew wages is over 60 per cent. A comparison on another basis can be made by comparing the round trip times. The average round trip time for an electric crew between Bluefield and the coalfield is somewhat under seven hours, whereas the best average time under steam conditions formerly was somewhat over 12 hours. Therefore, to make a direct comparison, the seven crew hours in electric operation should be compared with 14 hours in steam operation, taking into account punitive overtime. This in itself would show a saving of 50 per cent in the crew cost, but as there is of course a certain amount of overtime made by electric crews, the net saving is between 35 and 40 per cent.

One important point is that with the present facilities and volume of traffic, it is problematical whether the tonnage could be moved at all with steam. The only possible way to do so would be to increase the number of engines per train so that a schedule speed could be maintained equal to the present electric speeds. This would require probably four Mallet steam engines per train as compared with the two electrics on the heaviest grades, which would increase the operation costs much beyond those shown in the table, and if the percentage of engine failures were at all unusual, the service would be unreliable.

MILEAGE OF ELECTRIC LOCOMOTIVES, ETC.

The total electric locomotive mileage made for the six months ending June, 1920, was 224,974, or an average of 34,162 per month. The average number of locomotives in service per day is about eight, which establishes an average figure of 135 miles per locomotive per day. The company's records show that the kilowatt hours at the power house per locomotive mile are about 160, while the watt hours per trailing 1,000 ton-miles are about 165.

THE APPLICATION OF THE ELECTRIFICATION OF THE NORFOLK & WESTERN TO OTHER RAILWAYS

In a general way the following statements can be made regarding the utilization of electrical energy for the operation of other railways similarly situated:

(1) That 44,000-volts, single-phase, 25-cycle transmission of electric power with 11,000 volts, single phase on the trolley wire are practical and reliable voltages for electric train service for heavy grades and heavy tonnage.

(2) The average daily gross tonnage of freight east-bound over the electrified grade on the Norfolk & Western for 1918 was 47,500 tons as compared with 32,000 tons in 1912, an increase of over 50 per cent. The ultimate capacity based on the present installation is stated as 80 per cent over that of 1912.

(3) That such a system of electrification will probably effect a saving of at least 12½ per cent of the total annual expense as compared with steam operation on a railway with similar characteristics.

(4) That the introduction of electric locomotives with electric brakes (regenerative braking) has made possible higher speeds on heavy grades, with greater safety and reliability under all climatic conditions.

Appendix E—Underground Conduit Construction

The committee suggested three new electrical definitions as follows:

Duct or Conduit: A unit length of pipe suitable for use in the construction of runways for electric wires or cables.

Manholes: An opening in a splicing chamber through which a man may enter.

Mandrel: A tool used for aligning and cleaning ducts.

STONE CONDUITS

One of the large utility companies in the middle west has used for several years "stone conduit," and is now using stone conduit of their own manufacture, with very satisfactory results.

The specifications describe the processes of manufacture and method of installation of stone conduit.

1. **Materials.** Stone conduit shall be made of limestone screenings which will pass through a screen of ½-in. mesh and approved make of Portland cement in the proportion of 4¾ to 1 properly moistened with water and shall be formed by tamping in cylindrical moulds.

2. **Dimensions.** Conduit shall be made in lengths of 5 ft. with ⅝-in. walls and ¾ to 4½-in. round bore.

3. **Workmanship.** (a) Conduit shall be symmetrical throughout, straight, true, smooth, free from cracks, air holes, uneven surfaces or other imperfections which will injuriously affect it. The ends shall be perpendicular to the bore.

(b) Conduit shall be cured for not less than eight weeks after removal from the mould. For the first six weeks it shall be kept wet by sprinkling and then allowed to dry in the air for at least two weeks.

4. **Joints.** (a) Conduit when thoroughly cured shall be turned, for a distance of ¼ of an inch on each end, sufficient to secure an exact diameter concentric with the bore, but which shall not reduce the thickness of the wall given in Section 2 by more than one-sixteenth of an inch.

(b) With each conduit there shall be supplied a suitable metal sleeve which will fit tightly over the ends of adjacent conduits to hold them in place and to secure perfect alignment.

5. **Short Lengths.** Pieces of conduit less than the standard 5 ft. length will be accepted, not to exceed 10 per cent. of the total ordered, provided the ends are cut square, dressed and turned for metal sleeves, but no conduit will be accepted less than 2½ ft. long.

6. **Inspection.** (a) The railroad may inspect the conduit at any time during the process of manufacture and shall be furnished free of cost the necessary tools and appliances for making such tests as are necessary to determine if the requirements of these specifications have been met.

(b) Conduit offered for inspection shall be factory run from which no conduit of a superior quality has been removed.

(c) The railroad shall be given advance notice of completion of conduit to permit it to arrange for inspection.

7. **Tests.** Conduits shall permit the passage from end to end of a mandrel 3 ft. long and ⅝-in. less than the nominal diameter of the bore.

(b) Samples of 5 ft. lengths of conduit shall be selected at random and after immersion for 24 hours in air shall show an increase in weight of not more than 9/10 of one per cent.

(c) The presence of cracks shall be determined by sounding each piece with a steel hammer or its approved equivalent. Pieces which fail to give a clear metallic ring shall be considered defective.

(d) Conduit which fails to meet all of the requirements of these specifications shall be rejected.

8. Installation. (a) Conduit line shall be encased in concrete four inches thick on top, three inches on the side and a minimum thickness of four inches for the full width of the trench, except where ledge rock is encountered; in which case the concrete foundation may be omitted and the bottom of the trench leveled with cement mortar. Conduits shall be laid with a minimum separation of one inch both horizontally and vertically and the joints shall be staggered so that the joints of adjacent sections will be separated by at least three inches.

(b) In ending conduits only full lengths shall be used in the lower tier at the entrance to splicing chambers. Short lengths where necessary shall be inserted further out in the section.

(c) Where work is suspended leaving incomplected sections the open ends of the conduits shall be plugged with tapered wood, or other approved plug conforming accurately to the shape of the bore and so formed that it cannot be forced entirely within the opening.

(d) During construction work a mandrel three feet long and 1/8-in. less than the nominal bore shall be drawn through the conduits as they are laid.

(e) In other respects the methods of laying stone conduits shall correspond to the American Railway Engineering Association specifications for fiber conduits.

Appendix G—Standards

Many railroads carry in stock a long list of lamps of various kinds, which involves not only a large amount of storage space and storehouse expense, but likelihood of errors in the proper placing of lamps. The accompany-

purposes are not included in the report. More than 80 per cent of the lamps manufactured are rated at 110, 115 and 120 volts; and the intermediate voltages are being eliminated as rapidly as possible. With regard to train lighting circuits, the voltage is standardized at 32 and 64 volts. It should not be a difficult matter to so adjust the train circuits as to obtain an average of these potentials and eliminate all lamps of other voltages. Train lighting circuits of the 60-volt range are rapidly disappearing. With regard to the cab lighting, 33 volts appears to have been recommended by the American Railway Association as standard. The voltage has been standard at 34 volts, but the above recommendation of the A. R. A. will undoubtedly involve a change to 33 volts.

All lamps in the list can be obtained equally readily with clear bulbs, or with frosted or enameled bulbs. For "C" lamps of 100 watts or above, the bulbs, instead of being frosted, should be "bowl enameled." The "C" lamps are filled with an inert gas, such as nitrogen or argon, while in the "B" lamps the filament operates in a high vacuum. The diameter of the lamp bulb is measured in eighths of an inch, the shape is indicated by the following letters: S—straight side; G—round (globular), and P. S.—pear shape.

It is realized that the list is not complete, and that probably most railroads will have local requirements which are not met by the list. It is the thought, however, that if the demand can be concentrated on this comparatively small number of sizes and styles of lamps, deliveries will be facilitated, the labor of handling reduced, and manufacturing economies will before long be reflected in prices.

Discussion

E. B. Katte (Chairman): The first sub-committee report is that on electrolysis and insulation, presented as Appendix A.

(Chairman Katte briefly abstracted Appendix A.)

Chairman Katte: In the absence of G. W. Kittredge, chairman of the sub-committee on Water Power, the report will be presented by W. L. Morse, vice-chairman.

(Mr. Morse abstracted the report.)

Chairman Katte: In Appendix C is given Specifications for Insulated Wires and Cables. I have not had an opportunity to talk with Mr. Elliott. I think perhaps I might have made clear the intent of these specifications a little more fully. They were not written to supersede the signal specifications, and there is nothing in this specification which supersedes or takes the place of any of the signal specifications. We hope in the course of a few years, or maybe months, we will have one specification that is applicable to all the various users of electric insulated wire. There will undoubtedly be clauses added to this specification from time to time, in which will be included the special kind of insulation required by the signal department or any of the other departments. The committee which made the tests in connection with the Results of Analysis was made up of representatives of four or five railroads, the U. S. Navy, the U. S. War Department and four or five manufacturers, and after years of research they have finally agreed on a procedure which is fairly accurate. I move that the railroad specifications for electric wires and cables be approved and printed in the Manual for recommended practice.

(Motion carried.)

Chairman Katte: The next subject is "Underground Conduit Construction, Appendix E," and I will ask Mr. Brumley, chairman of the sub-committee, to present that matter.

(Mr. Brumley then abstracted Appendix E.)

Chairman Katte: The committee recommends for in-

Tungsten Lamp Standards—1920

Size in Watts	I'oltages		ILLUMINATION		Remarks
	110, 115, 120, 125	10	Type and Size of Bulb	Base Type	
15	"	"	S. 17	Med. Screw	B
25	"	"	S. 17	"	B
50	"	"	S. 19	"	B
75	"	"	P. S. 16	"	C
100	"	"	P. S. 22	"	C
150	"	"	P. S. 25	"	C
200	"	"	P. S. 30	"	C
250	"	"	G. 30	"	C
300	"	"	P. S. 35	Mogul	C
500	"	"	G. 40	"	C
500	"	"	P. S. 40	"	C
750	"	"	P. S. 52	"	C
1000	"	"	P. S. 52	"	C
25	220, 230, 240, 250	"	S. 19	Med. Screw	B
50	"	"	S. 19	"	B
100	"	"	P. S. 30	"	B
200	"	"	P. S. 30	"	C
300	"	"	P. S. 35	Mogul	C
500	"	"	P. S. 40	"	C
1000	"	"	P. S. 52	"	C
MILL TYPE					
25	110, 115, 120, 125	"	S. 19	Med. Screw	B
50	"	"	S. 19	"	B
CAR AXLE LIGHTING					
15	32-64	(*) S. 17	G. 18 1/2	"	B
25	"	(*) S. 17	G. 18 1/2	"	B
50	"	(*) S. 19	G. 30	"	B
25	"	"	P. S. 20	"	C
50	"	"	P. S. 20	"	C
75	"	"	P. S. 22	"	C
100	"	"	P. S. 25	"	C
MOTOR AND TRAILER CAR AND LOCOMOTIVE LIGHTING AND HEADLIGHTS					
15	33	S. 17	Med. Screw	B	Cab Lighting.
23	110, 115, 120, 125, 130	S. 17	"	B	Series.
36	"	S. 19	"	B	"
56	"	S. 21	"	B	"
64	"	S. 24 1/2	"	B	"
100	32	G. 25	"	C	Headlight.
250	32	G. 30	"	C	"

Used for flood lighting. Concentrated filament for focusing.

do

Will be standardized to replace the type B lamp at a future time. "White" bulb may also be used.

ing list has been compiled from data obtained both from railroads and manufacturers, in an effort to obtain a list which should be as short as is consistent with efficiency of operation, taking into account both the illumination efficiency and the life of the lamps. Lamps for signal

clusion in the Manual the additional electrical definitions, "Duct or conduit, Manhole and Mandrel." *I present that as a motion.*

(Motion carried.)

Chairman Katte: I inadvertently passed Appendix D, on electrical interference. The committee recommends that the report be accepted for information, published in the proceedings and the subject continued.

(Motion carried.)

Chairman Katte: *I would move that the railroad speci-*

fications for incandescent lamps in Appendix G be approved and printed in the Manual.

(Motion carried.)

Chairman Katte: The committee now recommends that the railroad specification for underground conduit construction for power cables, Appendix E, be approved and printed in the Manual. *I so move.*

(Motion carried.)

(The committee was dismissed with the thanks of the Association.)

Report on Signals and Interlocking

An investigation of means whereby temporary protection may be provided for track workers or for dangerous track conditions in automatic signal territory is a matter occupying the attention of this committee. Arrangements may be made whereby protection of a temporary or of a permanent nature may be provided. Temporary protection is afforded by signalmen disconnecting signal circuits while permanent arrangements may be made by introducing knife switches or circuit controllers in the circuits. The committee also reported on automatic train control and on the proper time interval for the release of electrical and mechanical devices.



W. J. Eck
Chairman

W. J. Eck is completing his first year as chairman of the committee, although he had been vice-chairman for the four years previous, prior to which time he has served as a member since 1911. He entered the signal department of the Chicago & North Western in 1902 and was assistant engineer from November of that year until July, 1907, when he went to the Southern as signal and electrical superintendent, in which capacity he is now engaged. Mr. Eck has taken an active part in the development of signal and electrical standards and practices, being one of the pioneers in the introduction of alternating current signals in this country.

THE COMMITTEE SUBMITTED a number of revisions for the Manual in Appendix A. The recommendations cover the reprinting of certain parts and the elimination and substitution of other matter in connection with requisites of switch indicators, signal symbols, drawings and specifications, etc.

In Appendix B the committee submitted extracts as information from the report of the Automatic Train Control Committee of the United States Railroad Administration to the director general on November 29, 1919.

In Appendix C the committee submitted the results of its study on the subject of methods for the display of signals for the protection of track workers. Its recommendations are given under the heading of Conclusions.

In Appendix D the committee submitted the results of its study on the proper time interval for releases applied to signal or switch apparatus. Its recommendations are given under the heading of Conclusions.

Conclusions

The committee recommended that the following action be taken on the reports submitted:

1. That the changes in the Manual in Appendix A be approved and the revised matter be substituted for the present recommendations in the Manual.

2. That the matter shown in Appendix B be accepted as information.

3. That the following be approved and published in the Manual on the subject of methods for display of signals for protection of track workers:

(1) If temporary protection by signal is desired for track workers or for dangerous track conditions it should be provided by disconnecting the signal circuits so that the proper indication will be displayed. Disconnections should be made by signal forces.

(2) If permanent arrangements are desired for protection, by signal, of track workers or for dangerous track conditions, this may be provided by:

(a) Opening track relay through knife switch.

(b) Opening circuit wires through circuit controllers.

(c) Shunting track by circuit controller or knife switch.

(3) Information may be provided by means of indicators to advise track workers of the approach of trains.

Note.—On an emergency a shunt wire with clips to attach to bond wires may be used, provided prompt action is taken thereafter to arrange for proper disconnection as prescribed.

4. That the following be approved and published in the Manual on the subject of time releases applied to signal or switch apparatus:

For average conditions the proper time interval for the release of electrical and mechanical devices applied to signal and switch apparatus should be the time required for a train running 30 mi. per hr. to travel from a point 1,000 ft. before reaching the distant signal to a point 10 ft. beyond the home signal.

In interpreting and applying this recommendation, it should be distinctly understood that it is only a guide and that the particular local conditions must, in the final analysis, govern the determination of this time interval.

Appendix C—Display of Signals for Protection of Track Workers

It is not recommended that temporary protection by signal shall be provided by means of short circuiting track circuits because of the unreliability of such protection. Even when substantial connections are provided, they are so easily torn loose that no absolute protection is afforded.

If temporary protection by signal for track workers or against some emergency trouble is desired, it should be provided by having the signal forces disconnect the

signal circuits so that the signal will display the desired indication. After the necessity for protection has ceased, the circuits should again be connected by signal forces.

Where it is desired to install permanent arrangements for providing protection for other than purely train operations, any of the following methods, which are now in use on several railroads, seem to take care of the situation:

- (a) Open track relay connections at the relay.
- (b) Open track relay connection by knife switch.
- (c) Open signal circuit wires by knife switch or provide convenient way to cut wires with pliers.
- (d) Shunt track by circuit controller operated by switch stand.
- (e) Double shunt and break track circuit by knife switch.
- (f) Shunt track circuit by circuit controller operated by hand.
- (g) Control line circuits by staff instruments operated by track or other maintenance of way forces.
- (h) Special indicators to give information of the approach of trains.

Appendix D—Time Releases Applied to Signal or Switch Apparatus

In considering this question, the important and determining factor is that of "Safety." All electric locking devices are applied to promote safety in operation and in considering any device for nullifying such features, safe operation must still remain the principal consideration.

It is obvious that with a given train, the proper time interval for the release of electric locking devices should be the time required for such a train to travel from the point of clear vision of the distant signal (or sighting distance) to a point just in advance of the track circuit controlling the derails or switches.

There is difficulty in formulating any one rule that will govern all the various classes of traffic operating over any one interlocking plant. As either the speed or weight or both of trains increases, the longer should be the sighting distance and the longer the distant signal block. The question then really resolves itself into determining the speed of traffic upon which the recommended rule should be based.

The committee does not recommend that this should be based upon the speed of the slowest train operating over the plant, for the reason that this train can stop in a lesser distance than other traffic.

For average conditions, it is recommended that a speed of 30 mi. per hr. and a sighting distance of 1,000 ft. be assumed.

Upon these assumptions the rule will take the following form:

"For average conditions the proper time interval for the release of electrical and mechanical devices applied to signal and switch apparatus should be the time required for a train running 30 mi. per hr. to travel from a point 1,000 ft. before reaching the distant signal to a point 10 ft. beyond the home signal."

In interpreting and applying this recommendation, it should be distinctly understood that it is only a guide and that the particular local conditions must, in the final analysis, nearly always govern the determination of this time interval.

Committee: W. J. Eck (Southern), chairman; W. M. Vandersluis (I. C.), vice-chairman; Azel Ames (Cons. Sig. Engr.), H. S. Balliet (N. Y. C.), A. M. Burt (N. P.), C. E. Denney (N. Y. C. & St. L.), F. L. Dodgson (G. R. S. Co.), W. H. Elliott (N. Y. C.), G. E. Ellis (A. R.), J. G. M. Leisenring (I. T. S.), H. K. Lowry (C. R. I. & P.), J. C. Mock (M. C.), F. P. Patenall (B. & O.), J. A. Peabody (C. & N. W.), A. H. Ridd (Penna.), A. G. Shaver (Cons. Sig. Eng.), T. S. Stevens

(A. T. & S. F.), B. Wheelwright (G. T.), E. E. Worthing (Sou. Pac. Atl. Sys.).

Discussion

W. J. Eck (chairman): The Committee on Signals and Interlocking is reporting on the revision of the Manual, on automatic train control, on methods of displaying signals for the protection of track workers, and on time releases applied to signal or switch apparatus. As to the revision of the Manual, *I move that the changes in the Manual, Appendix A, be approved and the revised matter be substituted for the present recommendation in the Manual.*

(Motion carried.)

Chairman Eck: In outlining the method of automatic train control, the committee submits certain data as Appendix B. *I move that the matter shown be received as information.*

(Motion carried.)

Chairman Eck: The committee submits a report for the display of signals for the protection of track workers, and recommends that the conclusions be approved and published in the Manual. *I make a motion that the same be adopted.*

(Motion carried.)

Chairman Eck: Under time releases, as applied to signal or switch apparatus, *I move that the conclusion be approved and published in the Manual.*

The Chairman: Is the last paragraph under Appendix D to be incorporated in the Manual?

Chairman Eck: Yes.

The Chairman: Do I understand that the entire text of Appendix D is to be incorporated in the Manual?

Chairman Eck: No, sir. I moved that the conclusion be approved.

G. A. Mountain (Kan. Ry. Com.): What regulates the speed of 30 miles?

Chairman Eck: It was taken as an average figure. For average conditions a rule or section of this sort must be carefully considered, as we bring out in the last paragraph.

(Motion carried.)

(The committee was dismissed with the thanks of the Association.)



Permanency and Harmony of Design Are Well Illustrated in the Lackawanna Tower at Montclair, N. J.

Report of the Committee on Rail

The rail record forms have been revised and renumbered to divide them into groups relating to inspection and shipment, rail failures and rail wear. The relation of shattered steel in fissured rails to the mill end of the rail was discussed by M. H. Wickhorst, who concluded that this shattering developed in the cooling and seems to be shrinkage checks. Dr. P. H. Dudley presented data to show that the broad head of the 100-lb. and 105-lb. rail sections provides ample area to carry the wheel loads of present-day traffic without impairment of its initial ductility with rails made from sound, homogeneous metal. Elimination of brittleness would reduce failures.



G. J. Ray
Chairman

G. J. Ray has been a member of the committee for five years and chairman for three years. He has also been active in other work in the Association, having served as chairman of the Track committee for several years and as a member of the Board of Direction from 1914 to 1917. He has been chief engineer of the Delaware, Lackawanna & Western for 12 years, during which time he has led in the development of an unusually permanent form of track construction employing treated ties, screw spikes and heavy ties plates and fastenings. He has long been a student of the rail problem and has had an important part in measures for improvement.

THE COMMITTEE GAVE CONSIDERABLE attention to the rail record forms in the Manual, and in Appendix A presented forms recommended for inclusion in the Manual to replace the present forms.

During the year special reports were presented by the Rail committee as follows:

No. 89. Fail Failure Statistics for 1918 Classified by Railroads, by M. H. Wickhorst.

No. 90. The Relation of Shattered Steel in Fissured Rails to the Mill End of the Rail, by M. H. Wickhorst.

No. 91. Fail Failure Statistics for 1919, by M. H. Wickhorst.

No. 92. Residual Ductility Tests in the Bearing Surface from Failed Rails in Service, by Dr. P. H. Dudley.

Report No. 90 is a continuation of the research work to discover the cause of interior rail shattering so a remedy can be provided. Previous reports by the Rail committee have announced the discovery of a shattered condition in the interior of the heads of rails that had failed from transverse fissures; that is, the interior steel contained numerous small cracks, some of which developed in service and some of these in turn finally breaking the rail. It has already been shown that in the body of the rail the shattering remains about one-half inch away from the exterior surface and this investigation shows that the shattered interior also terminates about one-half inch short of the end of the rail as hot-sawed at the mill. This indicates that the shattering was not in the hot rail bar as rolled, but developed in the cooling of the rail; that is, the small cracks are probably shrinkage checks.

Dr. Dudley's paper describes the results of drop tests of 65 rails which had failed in service. They were cut into short lengths and tested in the drop test with the head in tension, to determine their ductility. Most of the rails were lacking in ductility, but some showed good ductility. Failures of the coalescent type occurred mostly in the A rails, while failures of the intergranular type were more numerous in the B and C rails.

Conclusion

The committee submitted the following resolution for adoption by the Association:

That the rail record forms submitted with this report (Appendix A) be adopted by the Association and included in the Manual to replace the present forms.

Committee: G. J. Ray (D. L. & W.), chairman; H. B. MacFarland (A. T. & S. F.), vice-chairman; E. E. Adams (U. P.), A. S. Baldwin (I. C.), W. C. Barnes (U. P.), W. C. Cushing (P. R. R.), G. M. Davidson (C. & N. W.), Dr. P. H. Dudley

(N. Y. C.), J. M. R. Fairbairn (C. P. R.), L. C. Fritch (C. R. I. & P.), J. H. Gibboey (N. & W.), A. W. Gibbs (P. R. R.), C. R. Harding (S. P.), John D. Isaacs (S. P.), H. D. Knecht (M. P.), Howard G. Kelley (G. T.), R. Montfort (L. & N.), A. W. Newton (C. B. & Q.), J. R. Onderdonk (B. & O.), F. S. Stevens (P. & R.), F. M. Waring (P. R. R.), M. H. Wickhorst, J. B. Young (P. & R.).

The Relation of Shattered Steel in Fissured Rails

Rails that have failed in track due to interior transverse fissures contain "shattered" steel in the interior of the rail head, as disclosed by deep etching with strong hydrochloric acid of sections of the rail head, particularly horizontal longitudinal sections through the middle of the head. Etchings have shown the cracks to be deeply imbedded in the rail head, occurring not less than about one-half inch from an external surface. This suggested that the cracks are shrinkage cracks formed during or after the cooling after the rail bar has been fully formed. If so, then the end of the rail produced in the sawing of the hot bar also should be free from the cracks for about one-half inch or so from the end as hot sawed.

About 25 fissured rails were examined, and as a part of the investigation of the rails, longitudinal sections through the interior of the head, six inches long, were cut from each end of the rail and from near its middle. Most of the samples showed a defective condition in the interior of the head and about half the rails showed a condition of badly shattered steel, displaying numerous etching cracks. The samples which showed numerous etching cracks were suitable for observations as to whether the zone of shattered steel terminates before reaching the end of the rail and measurements were therefore made on these rails, of the distance from the end of the rail to the nearest crack displayed in the etched section. The numbers of the rails on which the measurements were made and the mill and service data concerning the rails were compiled. The results of the measurements showed that the shattered steel terminated from 0.33 to 0.62 inch from the end of the rail, with an average distance of 0.49 inch in the 19 rail ends measured. At any other place on the etched surface, including the end of the slab cut six inches from the mill end of the rail, a line drawn at right angles across the surface from side to side would be apt to cut through a crack or come close to it. This fact and the angular nature of the small cracks indicate that the shattering was not present in the hot bar as it left the finishing rolls, but developed in the cooling; that is, the cracks seem to be shrinkage checks. On the other hand, it has been sug-

gested that the freedom of the end of the rail from cracks is due to the densifying effects of the hot saw, and not to the relief of the end from strains.

Residual Ductility Tests

For several years the New York Central Lines have conducted numerous drop tests on rails removed from service after having developed interior transverse fissures. These tests were conducted principally under an improvised drop testing machine, so constructed that the full residual ductility could not be developed. During July, 1920, a standard drop testing machine was used, so that each individual piece could be tested to destruction, and the full residual ductility developed. Rails were gathered from widely scattered locations, and represent failures in melts rolled in different years, as well as different months of the same year.

The tests were all made with the head in tension, supports 3-ft. centers, and the 2,000-lb. tup falling through a height of 15 ft. The object in testing all pieces of the old rails with head in tension was to determine the amount of residual ductility in the cold rolled bearing surface, and also to classify the type of head fracture as each piece was broken under successive drops.

Of the 305 pieces tested, 137 broke on the first blow without displaying ductility. One hundred and fifty-eight, or 52 per cent of the total tested, developed at least five per cent in two consecutive inches; the residual ductility on the various test pieces ranging all the way from 5 to 19 per cent, the latter amount being obtained in one inch of one test piece. This is a remarkable showing in view of the service records of these rails under severe traffic, speed and weather conditions, and substantiates the fact that the broad head of the 100 and 105-lb. rail sections provides ample area to carry the wheel loads of present-day traffic, without impairment of its initial ductility, when the rails are made from sound, homogeneous metal, both physically and chemically.

It should be noted that of the 137 test pieces failing under the first blow of the tup, 57 disclosed cores, or fissures of either the coalescent or intergranular type. Over half of the remaining 80 pieces were portions of high and low rails from curves. These contained the accumulated deformation and abrasive effect from the impingement of thousands of wheels, of which a great many were cast iron wheels with the M. C. B. contour. The chamfer of the cast iron wheels on the low rails does more than simply abrade the bearing surface. The action seems to exhaust the ductility in a faster ratio than the ordinary rolling abrasion. The metal in the low rails wears hollow, and in portions of the bearing surface the metal is frayed and ragged. It could hardly be expected under the 30,000 foot-pounds of the drop that this frayed metal would show as much ductility as on rails where only rolling abrasion has occurred.

It was exceedingly important to find the high residual ductility in such a large number of the test pieces from these rails after 5 years, or more, of service. The statement has often been made and inferred that the ductility is practically nil in all rail heads after relatively lighter traffic conditions and shorter lengths of service than was obtained on this lot of rails. This supposition will need revision from a study of the tests included in this report, for the evidence presented shows that a large amount of ductility still remains in many of the pieces of the old rails, with the full ductility due to the chemical composition, after a number of years' service.

Discussion

(In the absence of both the chairman and the vice-chairman the report was presented by J. M. R. Fairbairn [C. P. R.])

Chairman Fairbairn: Our chairman has written a letter in presentation of this report which I think it is in order to read, as I think it is the unanimous feeling of the committee on this subject. Mr. Ray says:

So far as the committee is aware no rail has been rolled under the new specification. This is not at all surprising considering the attitude of the manufacturers. On September 14, 1920, the rail committee met with the rail committee of the manufacturers. All phases of the specifications were freely discussed. The manufacturers, as represented by their rail committee, have stated that they will not agree to roll rail of any weight under a contract requiring full compliance with all features of the 1920 specifications. They have stated that they will roll rail up to 110 lb. per yd. under the 1920 specifications slightly modified so as to eliminate a few of the so-called objectionable paragraphs on manufacture or mill practice. This modified specification will take an extra price estimated at approximately \$13.00 per ton for a base price of \$57.00, or something in excess of \$9.00 on a base price of \$47.00. The manufacturers' committee have further stated that they will not meet the 1920 specifications at all for rail 111 lb. per yd. and over. The big extra demanded by the manufacturers has practically killed the new specification. Naturally, no railroad management will pay so large an extra for a standard specification until it has been proven beyond a doubt that rail manufactured under such specifications is sufficiently superior to warrant the extra price.

The rail committee is at present somewhat confused as to what to do under the prevailing conditions. Those reasonably well satisfied with the quality of rail now being received are opposed to changing the specifications if by so doing the price of rail will be increased. They are also opposed to two standard specifications, one for a higher quality of rail to require an extra price. Naturally they do not wish to be placed in the position of purchasing an inferior brand of rail. With the present attitude of the rail manufacturers there is little that can be done by the rail committee to improve the 1915 specifications without creating extra expense on the part of the purchaser.

It is a fact that many of the mills are rolling rail under modified specifications and the rail manufacturers freely admit that they are willing to roll rail for individual roads under specifications containing many of the objectionable features of the 1920 specifications. Some such specifications take a slight extra, in other cases no extra is charged. The rail committee has sought a reason from the manufacturers for their willingness to roll rail without extra charge under private specifications when they are not willing to have the special features of the private specifications included in the A. R. E. A. specifications. In answer the manufacturers give what appears to be a more or less reasonable explanation. Where the manufacturers and the individual road agree on a special specification, consideration is given to all features of the specification and the method of inspection together with the judgment and fairness of the inspector, or those responsible for the inspection. Where both the physical and chemical properties of the finished rail are limited as in the A. R. E. A. 1920 specifications, a strict compliance with the specifications as to chemistry might be the cause of discarding more or less perfectly good rail, but where the railroad officials are inclined to be fair and reasonable, some of the manufacturers are willing to try out the specifications, although such specifications may vary materially from the standard. They are not willing to take chances with inspectors at large and claim that the general use of such a specification as the A. R. E. A. 1920 would cost the manufacturers a

material amount of money, and in their opinion such refinement is not needed with the greater portion of the tonnage used throughout the country.

There is undoubtedly some merit to the manufacturer's contention that the purchaser should not specify the method of manufacture and also place a limit on both the chemical and physical requirements of the finished rail. On the other hand, the consumer is anxious to have sufficient control over the mill practice and to place such limits on the physical and chemical properties of the finished rail as to insure the elimination of both the dangerous and poor wearing rail.

The rail committee will endeavor to reach a conclusion during the coming year. First: Should the Association adopt two specifications, one to be the best possible without running into extra price; the other to be the 1920 specification, possibly revised, but requiring an extra price? Second: Should we have one specification without extra cost over the manufacturer's base price, the Association to be given a list of specific refinements in the order of their importance (considering the probable cost) so that roads requiring a higher grade of rail will have the benefit of the Association's judgment on the most valuable of such refinements?

Chairman Fairbairn: I think Mr. Ray has so thoroughly covered the ground in presenting the report, there is really nothing further to be said on the subject, except to proceed with the report itself. I will ask Mr. Newton, chairman of the sub-committee, to present the part of the report referring to Revision of the Manual.

A. W. Newton (C. B. & Q.): After a meeting of the committee the conclusion was reached that we should revise the forms in the Manual covering the production of rail and the records of rail failures and rail wear in track.

In order to ascertain the feeling of the railroads respecting the use of these forms, a circular letter was sent out and replies were received from 49 different roads, which showed that on the roads reporting only two of the forms are generally used. One was the failed rail report as it is commonly known, and the other is the summarization of those reports that is submitted annually to the rail committee.

Of the other, I think, 15 forms, out of 49 roads it appeared that about only 4 or 5 of the roads were using this or that or the other form. Only one or two roads made any attempt to use the number of the forms as provided.

One thing that the committee wishes brought to the attention of the convention is that probably much more valuable information would be available if all the roads interested would take a more active part in the compilation of data on this subject, not only the manufacture of rails, but of the results obtained from rails in the past. The changes made were such as would make it possible to give a little more detail in some respects and make it possible to apply the specifications of 1920 to record the results of any rail production under those specifications.

Chairman Fairbairn: *I move that the Association adopt these forms for inclusion in the Manual to replace the present form.*

C. E. Lindsay (N. Y. C.): In the report to be used by the section foreman the committee shows the gage side in plan or elevation, but do not provide for showing it in the section.

The Chairman: The committee states that that suggestion will be incorporated in the drawing.

C. W. Baldrige (A. T. & S. F.): In checking over the rail failure reports in the form Report of Rail Failure in Main Track I found that the term "Rail Section" gave the section foreman more trouble than most of the

other matters in it, and I prepared a form for our own road, some two or three years ago, in which we propose to overcome this by a little note to the foreman saying—"Show once on this line all letters and figures appearing in raised form on the rail."

Mr. Newton: That subject was considered, and I think it has been tried by other roads than your road. We tried it once, and when the report came in it happened that there were four sets of numbers on the rail that failed, and he started at one end and went clear to the other end, and we got all the figures. The committee in giving study to that, felt that the roadmaster who has to prepare these reports should certainly be conversant enough with the subject to have proper reports made by the section foreman.

Mr. Baldrige: I realize that a good many foremen, if you simply leave it to them to show the brand without any instructions, or the heat number without any instructions, would repeat it, but by putting the note—"show *once* all letters and figures appearing in raised form in the rail" I think he would get a pretty accurate brand.

I have this to say in regard to the checking up of these reports by the roadmasters—fully 50 per cent of these reports come in without the roadmaster seeing them. The clerk checks them up.

A. L. Davis (I. C.): On the Illinois Central we tried the same plan about two years ago, cutting out a lot of questions and substituting one line across the top of the form. We found it does not work out at all, but that by having the separate questions, as the committee has recommended, we get better results.

E. A. Frink (S. A. L.): It is obvious that this form is the most important form we have for our rail data, because upon it is based all the information we get as to the actual failure of the rail in the track. There is one class of failures which is unfortunately becoming more prevalent in our track and that is transverse fissures. I find that many of our section foremen (and I presume other roads have had the same experience) have not been educated to distinguish a transverse fissure, at any rate, not in all cases. I think this form would be improved if a note was inserted where rail failures are classified, bringing out the fact that a transverse fissure before it penetrates to the edge of the rail is always white, and after it reaches the outside air is almost invariably black or dark in color. If you bring that out more strongly a foreman will be more apt to report these breaks correctly.

J. L. Campbell (E. P. & S. W.): I believe a good plan in this connection would be if a railroad company would provide the foreman with a photograph of a typical transverse fissure, and that will give him a physical illustration of what it looks like. It is not difficult to photograph this particular form of failure so that it shows clearly, and that can be transferred to the blue print, where it can be shown clearly.

Chairman Fairbairn: On the Canadian Pacific we have inserted in our maintenance of way rule book a few pages on the subject of rail failures. They are really instructions to section foremen and roadmasters as to the use of these forms. They illustrate and elucidate what is required for each of these numbers. We give further, an illustration by photographs of what a transverse fissure is, and we try to educate the foreman to such an extent that he can intelligently fill in these forms, and I believe if that system of advising the trackmen was generally practiced the form as it now exists is in about as good shape as it can be put.

(The motion was put to vote and carried.)

Chairman Fairbairn: The next subject is a report on rail failures, comprising present statistics and conclusions

as to causes and including suggestions for improvements in rail steel.

Mr. Wickhorst will present that part of the report.

M. H. Wickhorst: I am asked to talk on the subjects, rail failures and investigations. I might just dispose of one of these, the subject of investigations, hurriedly, by calling your attention to the work, particularly along the line of transverse fissures—the work of the last few years, and which has been continued during the last year, has shown that fissures occur in steel that has been shattered interiorly, that is, the interior of the head contains numerous small cracks which are apparently in the rail at the time it is put into the track. At any rate there is a potential condition and a fissure is a development of some of the small cracks originally in the rail.

The paper on The Relation of Shattered Steel in Fissured Rails to the Mill End of the Rail, shows this, but I may say, first, that this shattered condition does not extend to the surface, either at the top or the side, but remains about a half inch away, and this particular investigation shows that that shattered condition does not extend clear to the end of the rail as it was not sawed. It terminates about a half inch away from the end, in other words, it is a purely interior condition.

Doctor Dudley has also presented the results of some of his work—tests of a great many rails that have failed from fissures, and tests particularly by means of drop testing, and we have some very interesting information. One is these fissures of the type that are called the coalescent type, that is, where there is a horizontal fissure extending lengthwise of the rail and horizontal, perhaps $\frac{1}{2}$ to $\frac{3}{4}$ in. That type of fissure occurs largely in the A-rail. Its point of origin or point of growth is from a streak in the interior, apparently in most cases a streak of slag, or some other non-metallic inclusions.

The type of transverse fissure—pure and simple transverse fissure—that has no longitudinal element to it, occurs mostly in the D and C rail. This zone includes perhaps 25 to 40 per cent of the ingots, which takes most of the fissures of that type. It is very interesting to know how that is caused, but we have not worked that out.

A study of rail failure records indicates that it is probable that a further reduction of perhaps 80 per cent can be made, and we have that to look to as a goal for the next eight or ten years perhaps.

Some years ago, when the thin base sections were used largely, there were a large number of failures of the base, but that type of break has been largely overcome by thickening of the base. I would suggest to those roads that are still using these thin bases, where the rails are in heavy service, would profit by adopting some sections with the heavy base.

The specifications should be so designed that the ductility of the metal in the rail can be retained. The mill practice, the methods of manufacture, should be such as to eliminate such matters as segregation in the ingot, inclusion of slag. That means good ingot practice.

The inspector has a very important part. The specifications generally permit the inspector to test the head with either base in tension or with the head in tension. Early work of the rail committee showed that the results when the rail is tested with the head in tension correlate pretty well with the interior condition of the ingot. Segregation of carbon and phosphorus or possibly large amounts of over-inclusion will show up in the analysis of the rail, or in etching tests. This same condition can be shown pretty well by testing the rail with the head in tension. With the base in tension, however, the correlation is not so good.

Tensile tests of rails made from special ingots showed much better than the ordinary type of ingot. But when they made break tests, and these tests were made with the head down, the ordinary type of ingot was quite as good or possibly even a little bit better.

C. W. Gennett, Jr. (C. W. Hunt & Co.): As one who is continually brought into very close contact with the rolling of steel rails, and frequently with their later use, I feel that some observations of the past year's work may be opportune. Production was low, one mill rolling no rails at all, four others contributing only a small tonnage, and the remaining eight of the United States and Canada rolling at a rate much reduced from normal. Such operations do not, in my judgment, speak for the best of quality, for slow operation generally means intermittent rolling, and may easily result in bad quality. As a rule, the best results may be expected when the mills are rolling steadily, with the various details running smoothly and with clocklike precision.

Perhaps the most curious fact apparent at the mills is their loathness to adopt any special means aiming towards the casting of sounder ingots. It is practically agreed that the segregated and physically unsound steel occurring in the top part of the ingots is the direct cause of virtually half of the troubles occurring with rails in service, for split, crushed, flowed and mashed heads are mostly confined to "A" or top rails from ingots. A number of "A" rails constitute, roughly, 15 per cent of all that are rolled and, while they all bear a mark of suspicion, still their price is the same as for the less doubtful rails.

Several mills have recently widened the distance between the supports in the cold straightening presses and as much as 60 in., instead of 42 in., is now being used. Needless to say, the results are favorable and it is to be hoped that the practice will be adopted at all the mills and the punishment of the rails in the damaging process of straightening thus reduced.

A continued source of difficulty at most mills is the inability to make every heat of open hearth steel analyze within the limits of the chemical composition specified for the particular order being worked. Frequently whole heats in the form of ingots or blooms have to be temporarily set aside to be later reheated and rolled on orders which their composition fits. Such cases invariably give rise to an increased number of flawed rails and the practice is manifestly unsatisfactory. Carbon is one of the chief causes of this trouble, and it would be extremely desirable to agree on a common standard to cover the carbon content of all rail steel.

It is difficult to say what specifications for rails are the most commonly used. Definite figures would probably show that the Manufacturers' Standard had been used on the largest tonnage, and following them would come the A. R. E. A. of 1915, often with modifications making it virtually that of the A. S. T. M. and, finally, several others of the individual railroads. Practically all of these specifications contain the clause governing ductility, which requires that the drop test pieces show at least five per cent elongation in two inches or six per cent in one inch.

The question of interior defects showing at the drop test is important. The rejections at one mill, due to interior defects, were approximately 10 times those at another. Such a diversity of results, of course, indicates a diversity of practice, and naturally raises again not only the question of making sound ingots, but also the desirability of treating each ingot as a unit and testing it accordingly, as was repeatedly done in war times with shell steel and is easily accomplished at the Canadian mills on rails for that country.

I venture the statement that good steel cast into sound ingots, of proper composition, followed by careful treatment in the soaking pits and rolling mills, may be expected to result in rails of such quality as to safely with-

stand, when laid on a roadbed of good ballast and ties, the heavy wheel loads of traffic for years to come.

(The committee was dismissed with the thanks of the Association.)

Report of the Committee on Track

Designs for 5/8 and 9/16-in. cut track spikes are presented. Specifications for switches, frogs, crossings and guard rails with data for laying out frogs are offered. New requisites for switch stands, including connecting rods, are presented. A number of typical plans for turnouts, crossovers, frogs and guard rails were submitted. A theoretical study of gages and flangeways for curved crossings was printed as information. The committee is working on plans and specifications for switch stands, switch lamps and switch locks and also on tie plates, deraillers and anti-creepers. Little track work was done by contract, except on a cost-plus plan, last year.



W. P. Wiltsee
Chairman

W. P. Wiltsee has been chairman of the Track committee for three years and a member of the committee for two years more. He has also been active in the work of the Roadmasters' and Maintenance of Way Association, of which organization he is now president. In directing the work of the committee he has been particularly successful in enlisting the co-operation of the Manganese Track Society in the development of standard plans for special track work and in harmonizing conflicting opinions regarding these standards. Mr. Wiltsee is principal assistant engineer of the Norfolk & Western, in which capacity he has a wide range of duties.

IN APPENDIX A THE COMMITTEE presented a large number of proposed changes in the Manual.

In Appendix B the committee reported on typical plans of turnouts, crossovers, slip switches, double crossovers and railroad crossings, and detail plans for such work, including necessary fixtures, etc., and its recommendations are given under the conclusions. In Appendices C, D, E and F the committee submitted progress reports on gages and flangeways for curved crossings; plans and specifications for switch stands, switch lamps and switch locks; plans and specifications for tie plates, deraillers and anti-creepers; specifications and piece work schedules for contracting track maintenance work.

The committee also reported progress on: Subject 3, "Reduction of taper of tread of wheel to 1 in 38, and on canting the rail inward"; on Subject 4 (a), "Report on tests of tie plates subject to brine drippings, and (b) on the effect of brine drippings on track appliances;" on Subject 5, "Plans and specifications for track tools," and on Subject 6, "Report on limit of wear on frogs, including rules for determining when frogs are sufficiently worn to warrant removal."

Conclusions

1. The committee recommended the changes in the Manual as submitted in Appendix A be approved and the revised matter be substituted for the present subject matter in the Manual.

2. In Appendix B the committee submitted detail plans as per instructions, recommending certain of them for adoption and others to be received as information. These plans are the result of the study and co-operation of your committee and the Frog and Switch Manufacturers of the Manganese Track Society. Appendix B also covers a progress report on uncompleted work, and the committee recommended reassignment of the subject.

2a. In Appendix C a theoretical study was submitted on the subject of gages and flangeways for curved crossings, which the committee recommended be accepted as information, also that the subject be reassigned.

3. The committee reported progress and recommended that subjects Nos. 3, 4, 5 and 6 be reassigned. It also recommended that the progress reports in Appendices

D, E and F be accepted as information, and the subjects reassigned.

Committee: W. P. Wiltsee (N. & W.), chairman; J. V. Neubert (N. Y. C.), vice-chairman; L. B. Allen (C. & O.), V. Angerer (Wm. Wharton, Jr., & Co.), W. G. Arn (I. C.), J. D. Baker (P. R. R.), R. A. Baldwin (C. N. R.), G. H. Bremner (I. C. C.), H. G. Clark (C. R. I. & P.), E. A. Hadley (M. P.), G. W. Hegel (C. I.), E. T. Howson (Railway Age), T. T. Irving (G. T.), J. B. Jenkins (B. & O.), H. A. Lloyd (Erie), J. de N. Macomb (A. T. & S. F.), F. H. McGuigan, Jr. (V. S. R. A.), F. L. Nicholson (N. S.); R. M. Pearce (P. & L. E.), H. T. Porter (B. & L. E.), J. H. Reinholdt (M. & St. L.), G. J. Slibeck (Pettibone, Mulliken Co.), J. B. Strong (Ramapo Iron Works), J. R. Watt (L. & N.).

Appendix A—Revision of Manual

The committee recommended that the following changes in the Manual be made:

CUT TRACK SPIKE

The committee recommended that the design of the cut track spike shown on page 22 of the 1918 supplement to the Manual be withdrawn, and the designs for 5/8-in. and 9/16-in. cut track spikes submitted be substituted therefor, as the present design in the Manual does not correctly show the slope of the underside of the head of the spike to agree with the slope of the top of the rail base. The design of 5/8-in. cut track spike is the same as that submitted last year and as published in Vol. 21, Bulletin 221, except the width at the toe end has been changed to 5/8 in. instead of 1/2 in., and the curve under the head has been changed for greater strength and better contact of the jaw of a claw bar.

Reports as to the practicability of this design for manufacture in automatic machines have been received from various steel companies and samples have been submitted to this committee.

It was recommended that pages 168 to 186, inclusive, in the Manual be omitted commencing with the article "Crossovers," and the following substituted:

Specifications for Switches, Frogs, Etc.

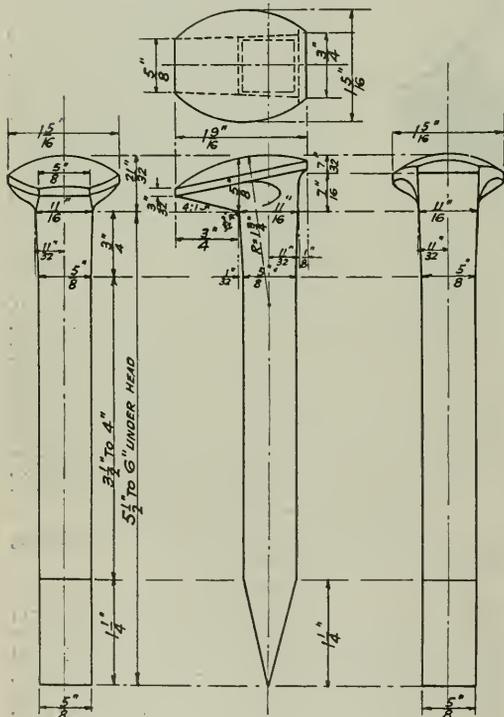
I. GENERAL INSTRUCTIONS

1. The purchaser will furnish the manufacturer specifications and drawings, giving rail sections, splice drilling, angles,

alignment and general dimensions, and such special details as may be required.

2. Unless otherwise specified the construction, design and details shall conform to the plans adopted by the American Railway Engineering Association as recommended practice. For track structures for which no such plans have been adopted, the manufacturer shall, on request, submit for approval detail drawings.

3. The detailed drawings shall be on sheets 22 in. wide between outside border lines, with inside border lines $\frac{1}{2}$ in. from the top and bottom. The standard length of the sheet shall be 30 in. between outside border lines with inside border lines $\frac{1}{2}$ in. from the right-hand edge and $1\frac{1}{2}$ in. from the left-hand edge. When longer sheets are necessary they shall be in multiples of 6 in. and folded back to the standard length. Drawings shall be confined to one subject. The title shall be placed in the lower right-hand corner. The scale of the general drawings shall be $1\frac{1}{2}$ in. equals one foot, where practicable. Details not less than 3 in. equals one foot wherever



New Design of $\frac{5}{8}$ -in. Cut Track Spike

practicable. Dimensions and distances under 2 ft. should be shown in inches; 2 ft. and over in feet and inches. Cross-sections shall be section lined for the material to be indicated in accordance with standard sections as shown in the A. R. E. A. Manual. Manganese steel section to be indicated by heavy single lines.

4. The drawings shall be part of the specifications. Anything that is not shown on the drawings, but which is mentioned in the specifications, or vice versa, or anything not expressly set forth in either, but which is reasonably implied, shall be furnished, the same as if specifically shown and mentioned in both. Should anything be omitted from the drawings or specifications that is necessary for a clear understanding of the work, or should any error appear in either the drawings or specifications affecting the work, the manufacturer shall notify the purchaser and shall not proceed with the work until instructed to do so.

II. MATERIAL

5. Rail. The rail used shall be first quality open-hearth steel of the section called for, manufactured according to A.

R. E. A. specifications or to rail manufacturers' standard specifications, unless otherwise specified.

6. Gray Iron Castings. Gray iron castings shall be of a good commercial grade of medium gray iron.

7. Steel Castings. Steel castings shall be of good commercial grade manufactured in accordance with standard specifications of the American Society for Testing Materials for steel castings class "B"; except that steel castings exposed to wheel wear shall have a hardness approximately that of rail steel.

8. Cast Manganese Steel. The cast manganese steel shall conform to the standard specifications of the Manganese Track Society.

9. Malleable Iron Castings. Malleable iron castings shall be of a good commercial grade, properly annealed.

10. Rolled or Forged Steel. Rolled or forged steel parts shall be of a medium grade of commercial mild steel. Parts exposed to wheel wear shall be equal in hardness to rail steel.

11. Fillers. Fillers shall be of rolled or forged steel, wrought iron or of good quality gray cast iron as called for on plans and as specified.

12. Heel Risers. Heel risers shall be as called for on plans and provide wearing surface equal in hardness to rail steel.

13. Foot Guards. Metal foot guards as shown on plans shall be of rolled steel or malleable iron. Wooden foot guards shall be good quality hard wood. Filler blocks when acting as foot guards may be of gray iron.

14. Bolts. Bolts, other than where heat treated bolts are called for on plans or specified, shall be of mild carbon steel and shall have a tensile strength of not less than 50,000 lb. per sq. in. and an elongation of not less than 15 per cent in 8 in. Heat treated or high tensile bolts shall be of carbon or alloy steel and conform to the following minimum requirements:

Tensile strength	100,000 lb.
Yield point	70,000 lb.
Elongation in 2 in.	.15 per cent.
Reduction of area	.40 per cent.

Full-size bolts shall bend cold without cracking through 180 deg. around a pin of the same diameter as the bolt. The yield point, elongation, and reduction of area may be determined from a finished bolt or from a test piece $\frac{1}{2}$ in. by 2 in. turned from a finished bolt. Nuts may be Bessemer or open-hearth carbon steel not treated and shall be of sufficient thickness to develop the full strength of the bolt.

15. Rivets. Rivets shall be made of steel manufactured in accordance with the standard specifications of the American Society for Testing Materials for rivet steel for ship or structural work.

16. Reinforcing Bars. Reinforcing bars shall be of wrought iron or mild open-hearth steel.

17. Plates. Switch plates, special frog tie plates, and bearing plates shall be of mild open-hearth steel.

18. Switch Clips. Switch clips shall be of mild open-hearth steel, except special designs, which may be of cast steel or malleable iron.

19. Switch Rods. Switch rods shall be of mild rolled steel or wrought iron.

20. Stops and Hold-Downs. Stops and hold-downs shall be of mild rolled steel or wrought iron.

21. Anti-Creeping Device. Anti-creeping devices shall be of mild rolled steel or wrought iron.

22. Braces. Braces shall be of mild rolled steel, malleable iron or cast steel.

23. Washers. Washers shall be of mild rolled steel, malleable iron or cast steel.

24. Nut Locks. Nut locks shall be of good strong spring steel.

25. Switch Heel Blocks. Switch heel blocks shall be of gray iron, cast or forged steel as specified.

26. Springs. The steel in springs shall conform to the standard specifications of the American Society for Testing Materials for carbon steel bars for railway springs. Springs when forced down solid and held in the compressed position for thirty seconds, upon release, must not vary from their original free length.

27. Spring Housings. Spring housings shall be of gray cast iron, malleable iron or cast steel.

28. Forged Crossing Knees. Forged crossing knees shall be of mild rolled open-hearth steel or wrought iron.

29. Special Splice Bars. Special splice bars shall be of mild rolled steel or cast steel.

III. WORKMANSHIP

30. Workmanship. Workmanship shall be first-class and in accordance with best current practice. The assembly of the several parts shall be such that uniformity of detail and finish will result.

31. **Alinement and Surface.** The alinement and surface of all finished work shall be even and true and conform to the angles specified.

32. **Length.** Length of frogs and crossing arms shall not vary more than 1/4 in. from lengths specified. Switch-point rails and guard rails shall not vary more than 1/2 in. from length specified. Rail ends shall be cut square to the axis of the rail, unless otherwise required.

33. **Flangeways.** The width of flangeways shall not be less than nor more than 1/16 in. greater than the width specified, when measured on the level of gage line 3/4 in. below tread surface. Flangeways shall not be less than 1 1/4 in. deep measured from top of the tread surface, unless otherwise specified.

34. **Bending.** Bends shall be made accurately in arcs of circles and without injury to the material. It is desired that rails be bent cold. If heating of the rails is resorted to it must be done in a manner so as not to injure the metal.

35. **Planing.** All planing must be true and all abutting surfaces must fit accurately.

36. **Grinding.** Running surfaces of the manganese steel parts shall be ground to practically as good a surface as that of the rolled rail. Manganese steel portions fitting into rails or other parts shall be ground to a good fit.

37. **Drilling and Punching.** All holes in carbon steel rails must be drilled. In other parts all holes for turned pins or bolts and for tight fit of rough bolts must be drilled. Drilling to be done accurately, on bevel where necessary. Punching will be permitted only in wrought iron or mild steel parts for rivets, loose rough bolts and spikes, except when such holes come so close together or close to the edge of the piece that the metal between holes or between hole and edge is less in width than the thickness of the material, in which case holes must be drilled.

38. **Fit of Bolts.** Main or body bolts in frogs and crossings shall have a tight fit in straight true holes. Heads and nuts shall have a square bearing. Other bolts not requiring a tight fit, unless otherwise specified shall have a clearance of not more than 1/16 in. in drilled or punched holes and not more than 1/8 in. in cored holes. Threads must be U. S. Standard, accurately cut within tolerance of best practice for cut threads. Nuts must have a tight fit.

39. **Rivets.** Rivets shall be of full diameter called for on plans and rivet holes shall not be more than 1/16 in. greater in diameter. When not otherwise called for by plans or specifications, rivets shall have standard button or cone heads of uniform size for the same size rivet. The heads shall be concentric with the holes. Countersunk rivets shall be flush with the surface and fill the countersink.

40. **Fit of Fillers, Braces and Reinforcing Bars.** Fillers, except as otherwise called for or permitted by plans and specifications, shall fit closely into the fishing space of the rail and into the fillets of the web for not less than 1/2 in. below the head and above the base flange. When the raised brand of the rail interferes with fit of filler the brand shall be removed. Fillers shall be grooved or cut to clear rivet heads and bolt heads. Switch braces shall fit the fishing space of the rail when the brace is tight against the shoulder of the switch plate. Reinforcing bars shall fill the height of the fishing space of the rail.

41. **Plates and Bars.** All plates must be flat and true to surface. Bars must be straight and of the full size called for.

42. **Painting.** No paint, tar or other covering shall be used unless specified, and, in any case, shall not be applied before final inspection.

43. **Welding.** No welding shall be permitted on rails or on surfaces of other parts exposed to wheel wear. Welding in other portions may be permitted if in the judgment of the inspector the strength of the piece is not impaired.

44. **Marking.** The finished articles shall be plainly stamped with 3/4-in. figures and letters for identification. The manufacturer's name or initials, section and weight of rail and month and year of manufacture must be stamped on a rail portion of the structure not exposed to wheel wear and where marking can be plainly seen, or may be stamped on a separate rust-proof plate, riveted to the web of the rail, in which case smaller letters may be used. Frogs must be marked with the frog number. All loose parts or fixtures shall be similarly stamped with suitable size letters and figures, the stamping also to show the numbers of the parts appearing on the plan and detail number, where established. On cast parts all or part of the lettering may be cast on the piece. All heat-treated bolts shall be marked on the head with letter or symbol indicating the manufacturer.

IV. INSPECTION

45. Material and workmanship shall be at all times subject to inspection by a duly authorized representative of the pur-

chaser. The inspector shall have all reasonable facilities afforded to him by the manufacturer to examine the work during its progress, as well as the finished product, to satisfy himself that the work is manufactured and finished in accordance with these specifications.

46. All inspection shall be made at the place of manufacture. Tests of material may be made at the expense of the manufacturer if the amount of any particular kind of material is 50 tons or more. If less than 50 tons, the manufacturer shall certify that it is furnished in accordance with this specification; however, if the purchaser desires that a test be made he shall bear the expense of same, unless the material fails to meet the specifications, in which case the manufacturer shall stand the expense of such test. For the rails used in the work the manufacturer, when requested, shall supply the purchaser with a certificate of inspection from the rail manufacturer.

47. The acceptance of any material by an inspector shall not prevent subsequent rejection if found defective after delivery, and such defective material shall be replaced by the manufacturer at his own expense.

Requisites for Switch Stands, Including Connecting Rods

The committee recommended that article "Requisites for Switch Stands" on page 168 be withdrawn, and the following substituted:

1. Provision shall be made for spiking or bolting switch stands to two head blocks.

2. Classification of switch stands according to heights. (Height of switch stands is measured from top of tie to bottom of taper of lamp tip):

A. High Switch Stands: Height greater than 14 ft.; standard height, 18 ft.

B. Intermediate Switch Stands: Height greater than 2 ft.; to and including 14 ft. Standard heights: (a) First intermediate, 7 ft. 9 in.; (b) second intermediate, 6 ft.; (c) third intermediate, 4 ft.

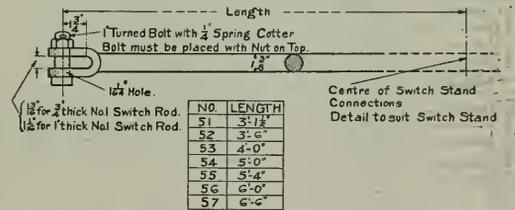
C. Low Switch Stands: Height greater than 1 ft.; to and including, 2 ft.

D. Extra Low Switch Stands: Height, 1 ft. or less.

3. The operating lever of extra low and low switch stands shall work parallel with the track.

4. The switch stand shall be so arranged that it can easily be inspected.

5. There shall be no lost motion in the bearings. The connections between the various points of the switch stand



Switch Stand Connecting Rods

shall be such as to insure against movement of switch points without corresponding movement of the operating lever.

6. The connection between the connecting rod and the switch stand shall be by a turned bearing of not less than 1 1/2 in. diameter, and shall be so arranged that the separation cannot occur under operating conditions.

7. Provision shall be made for adjusting the throw of either or both switch points without moving the switch stand.

8. The throwing apparatus shall be so arranged that it will lock or latch in either extreme position without the use of the switch lock.

9. Lengths and details of connecting rods shall conform to plan No. 251, dated November 17th, 1920.

10. The target and lamp tip when used on a switch stand shall revolve through 90 deg. with the movement of the switch points, and indicate their position.

11. Shapes and sizes of targets shall conform to plan.....

12. Lamp tips shall conform to plan.....

On account of the variety in the detail of switch stands now on the market and the fact that many of the features are patented the committee recommended that it would

not be desirable to prepare plans nor complete specifications for switch stands, and in lieu thereof recommended the above. The requisites of switch stands have been drawn sufficiently broad to include the more efficient and complete switch stands now commercially available.

Appendix B—Typical Plans of Turnouts, Crossovers, Slip Switches, Double Crossovers and Railroad Crossings

The committee recommended the following plans for adoption:

- Plan 901—Layout No. 6 Turnout and Crossover.
Plan 902—Layout No. 7 Turnout and Crossover.
Plan 903—Layout No. 8 Turnout and Crossover with Rigid Frogs.
Plan 904—Layout No. 8 Turnout and Crossover with Spring Frogs.
Plan 905—Layout No. 10 Turnout and Crossover.
Plan 906—Layout No. 11 Turnout and Crossover.
Plan 907—Layout No. 16 Turnout and Crossover.
Plan 908—Layout No. 20 Turnout and Crossover.
Plan 190—Diagram Preferred Names for Split Switches with Uniform Risers.
Plan 191—Diagram Preferred Names for Split Switches with Graduated Risers.
Plan 390—Diagram Preferred Names for Bolted Rigid Frogs.
Plan 490—Diagram Preferred Names for Spring Rail Frogs.
Plan 590—Diagram Preferred Names for Guard Rails.
Plan 690—Diagram Preferred Names for Rail Bound Manganese Steel Frogs.
Plan 691—Diagram Preferred Names for Solid Manganese Steel Frogs.

The plans of turnouts and crossovers, Nos. 901 to 908, inclusive, are the result of study of several railroads. At-

Plan 502—Details of guard rail fixtures: Under notes, the second item, correct to read "For 16-ft. 6-in. guard rails and for congested traffic, with 11-ft. guard rails, use two clamps, applied in position C-2"; and note under alternate should be revised to read "For 16-ft. 6-in. guard rails and for congested traffic, with 11-ft. guard rails, use two adjustable guard rail braces applied in position B-2."

The committee also recommended that the following plans be accepted as information:

- Plan 309—No. 4 and No. 5 Bolted Rigid Frogs.
Plan 608—No. 4 and No. 5 Rail Bound Manganese Steel Frogs.
Plan 656—No. 4 and No. 5 Solid Manganese Steel Frogs.

The following plans for railroad crossings, dated November, 1920, were submitted as information and for criticism:

- Bolted Rail Crossings:
Plan 701—Angle 50 to 90 deg., Three Rail Crossings.
Plan 702—Angle 50 to 90 deg., Two Rail Crossings.
Plan 703—Angle 35 to 50 deg. minus, Three Rail Crossings.
Plan 704—Angle 35 to 50 deg. minus, Two Rail Crossings.
Plan 705—Angle 25 to 35 deg. minus, Two Rail Crossings with easers.
Plan 706—Angle 25 to 35 deg. minus, Two Rail Crossings without easers.
Manganese Steel Insert Crossings:
Plan 751—Designs and dimensions of manganese steel inserts for angles 45 deg. to 14 deg. 15 min., Details A.
Plan 752—Designs and dimensions of manganese steel inserts for angles 45 deg. to 14 deg. 15 min., Details B.
Plan 753—Designs and dimensions of manganese steel inserts for angles 14 deg. 15 min. to 8 deg. 10 min.
Plan 754—Typical crossings, angles 35 deg. to 45 deg., Details A, with continuous easers.

GAGES & FLANGEWAYS FOR CROSSINGS.

Table with columns for NAME OF RR OR MANUFR., TANG, 1°, 2°, 3°, 4°, 5°, 6°, 7°, 8°, 9°, 10°, 11°, 12°, 13°, 14°, 15°, 16°, 17°, 18°, 19°, 20°, 25°, MAX. Rows include B&O R.R., ERIE R.R., GRAND TRUNK, I.C.R.R., DT&I R.R., CB&Q.R.R., FRISCO, ROCK ISLAND, C&E I.R.R., MORDEN, ELLIOT, ST LOUIS FROG & SW, BETHLEHEM, CF&C CO., PETTIBONE MULLIKEN, AJAX, RAMAPO, FROG, SW & MFC CO., A.R.E. P. 11, and I.R.S. MANUAL.

tention is called to using short ties in the crossovers to eliminate the heavy expense of longer ties, which are used as alternates. These plans were published as information in supplement to Bulletin 221, and in Vol. 21 of the Proceedings. As the changes from previous publication are of a minor nature only, principally in modifying some of the tie lengths, they were not reprinted.

The following changes were recommended on the plans adopted at the March convention, 1920:

Plan 501—Details of guard rails: Make the following changes in gage line diagram to show dimension line between gage line of frog point and guard line of guard rail, stating this distance must be maintained 4 ft. 6 3/4 in. instead of showing this distance as 4 ft. 5 in. between guard line of wing rail and guard line of guard rail.

- Plan 757—Typical crossings, angles 25 deg. to 35 deg., Details A, without easers.
Plan 762—Typical crossings, angles 35 deg. to 45 deg., Details B, with continuous easers.

Appendix C—Gages and Flangeways for Curved Crossings

The committee submitted a theoretical study of the subject as information, and for criticism and comparison with results obtained in practice. An analysis of the results lead to the following conclusions:

- (1) Practically all locomotives will operate on curves of 6 deg. or less laid to standard gage of 4 ft. 8 1/2 in. and standard width of flangeway of 1 3/4 in.
(2) Locomotives with not more than two pairs of flanged drivers will operate over all curves within the limits of the table on standard gage of 4 ft. 8 1/2 in. and 1 3/4 in. flangeway.

(3) The operation of locomotives with trucks is limited by the swing or lateral motion of the trucks and such locomotives will not take a sharper curve than the maximum swing, provided for thereon, permits.

(4) For locomotives with three or more pairs of flanged drivers "Free Gage" should preferably be used and practical width of flangeway made equal to F.G.—4 ft. 6¾ in. Exact figures call for slightly wider flangeway in numerous cases, but the usual side play of the axles will compensate for the difference. Minimum gage would call for a distance of less than 4 ft. 6¾ in. between gage line and opposite guard line, and should not be used through curved crossings. A practical minimum gage may be made equal to F. G.—½ (FG—MG) and flangeways made this practical minimum gage G—4 ft. 6¾ in.

(5) Gage and flangeway thus determined for the locomotive giving the greatest values will satisfactorily admit the operation of locomotives and trucks calling for lesser values.

In specifications for locomotive the degree of the sharp-est curve over which it is to operate is usually given and necessary provision is then made in side play, setting of wheels, lateral motion of trucks and sometimes special provision for floating axles are added if further required for the type under consideration.

Gages and flangeways for curved crossings should similarly be specified for the type of locomotive that is to be operated over the crossing and that requires the widest gage and flangeway, according to wheel base, number of flanged drivers and maximum degree of curve for which it is arranged. If such details are not available, but the types of locomotives operating over the crossing are known, the greatest value of gage and flangeway for such types and given curve may be used.

Where no definite information is available the rule for gage as per 1915 Manual with the flangeway made = G—4 ft. 6¾ in. will admit most of the general types of locomotives with less than 10 drivers up to a 20-deg. curve, except where swing of trucks is insufficient. In locations where the operation is restricted to certain types of locomotives, the rule may give a wider gage than would be necessary.

Discussion

W. P. Wiltsee (Chairman): Nine subjects were assigned to the track committee this year. They have reported on six subjects. The matter relating to the revision of the Manual is shown in Appendix A. *I move the adoption of this spike, both the 5/8 and the 9/16 spike, for printing in the Manual as recommended practice.*

A. W. Newton (C. B. & Q.): What has prompted such a change from the type that is used by all the railroads at this time, and being manufactured at all the mills? The explanation refers to the design of the head of the spike only, and I wondered why there was such a change in the general design, whether it was for economical distribution of metal or what.

Chairman Wiltsee: The proposed spike increases the metal in the neck of the spike more particularly than any other place. Otherwise it is practically the same as the spike adopted by the Association in 1918.

(*Mr. Wiltsee's motion was carried.*)

Chairman Wiltsee: The next item is specifications for switches, frogs, crossings and guard rails. *I move that these specifications be adopted as recommended practice and substituted for those now in the Manual.*

(*Motion carried.*)

Chairman Wiltsee: Considerable detail is given to show how the committee designed its frogs and switches. These take the place of the designs that are now in the Manual, and agree with the plans that we have already prepared. *I move their adoption as recommended practice and for printing in the Manual.*

(*Motion carried.*)

Chairman Wiltsee: The tables of turnout leads are simply a revision of those tables now in the Manual to agree with the different frog lengths that have been approved by the Association. *Therefore, I move their adoption.*

(*Motion carried.*)

(Typical plans of turn-outs, cross-overs and slip switches, and the plans showing diagrams of preferred names of parts were presented in turn for adoption and accepted.)

Chairman Wiltsee: In regard to Plan 501, as long as the standard frog has a flangeway of 1¾ in., this does not mean anything different, but provides in case of necessity for widening the flangeway, the committee thinks that the gage that should be maintained is from the back of the guard rail to the frog point.

(Mr. Wiltsee then read the matter relating to Plan 502.)

Chairman Wiltsee: These plans were not reprinted, as they were adopted last year, and the committee wish to make these two changes and *I therefore move their adoption.*

J. W. Ambrose (Tor. Term.): I will ask the committee how they arrive at the distance 4 ft. 6¾ in.; in other words, how do they justify the flangeway of 1¾ in.?

Chairman Wiltsee: The flangeway of 1¾ in. was adopted years ago as the flangeway required.

(*Motion carried.*)

C. W. F. Felt (A. T. & S. F.): I move that Plans 331 to 335 with the clamp frog be published in the Manual.

J. L. Campbell (E. P. & S. W.): I wish to compliment the committee on track on the very excellent designs of frogs which it has submitted from time to time to this Association and in which the design of the clamp frog is included. Speaking from an experience of 15 years with the clamp frog, I wish to say that I consider the design for the clamp frog submitted by this committee second to no design I have ever seen. I do not believe that it is the purpose of this Association to limit unnecessarily the recommended practice of the Association, and that if there is a choice between good articles, that the members of the Association ought to have the freedom of that choice. This committee is not recommending to the Association that you use this frog in preference to that frog, but rather that if you desire this type of frog it will be good practice for you to construct it according to this design.

(*Motion to adopt Plans 331 to 335 carried.*)

Chairman Wiltsee: The next matter is Gages and Flangeways for Curved Crossings, which will be presented by V. Angerer, chairman of the special committee.

V. Angerer: During the preparation of the plans for crossings, the question arose as to the proper gage and width of flangeways in curved crossings. Some roads have made investigations of their own on this subject, and the committee gathered information as to the number. The tabulation thereof was sufficient to show the great diversity in practice in the width of gages and flanges on curved crossings. The committee then decided to make a study as to how the different factors which affect the gage and width of flanges would work out theoretically. The factors, which are the determining points, are the wheel base, the number of flanged wheels, semi-rigid connection and diameter of the wheels. From these the committee has worked out some formulas and tables.

The swing given in these tabulations is the swing that would be necessary to allow the locomotive to take the

curve with the driver arrangement which it has, but is really in itself excessive in some cases. It is not practicable to give that much swing on the locomotive.

There are some factors which cannot be determined theoretically. One is the flexibility in the tender of the locomotive and its parts and also with regard to the flexibility of the tracks or the crossings, which, as we build them now, are not very flexible.

T. E. Rust (W. C. F. & N.): If I am not very much mistaken this Association adopted standard flangeways for both straight and curved track in 1917.

Chairman Wiltsee: I would like to know if this question is ever taken into consideration. Apparently it has been some years preceding. The question of curved crossings is certainly bad practice. Who would put in a curved crossing that could possibly be avoided? I have recommended to my Board a great many crossings of railroads, but I do not think I have ever passed one crossing on a curve. I do not think it is good practice.

W. M. Camp (Railway Review): Mr. Chairman, it is true that no one puts in curved crossings, but there are other arrangements that introduce similar conditions, for instance, a frog on a curve, a frog on the outside of a curve or on the inside of a curve introduces conditions which are essentially similar that you would have in a flangeway on a curved crossing.

C. J. Coon (N. Y. C.): In the Grand Central terminal we use a 4-ft. 9-in. gage. We have turnouts as high as 18 deg. constantly under regular traffic. The flangeway of the frogs is $1\frac{7}{8}$ in. The distance the guard rail is set from the wing rail of the frog is 4 ft. $4\frac{7}{8}$ in., and we have never had any derailment which was attributed to this gage or to the setting of these guard rails at these distances.

We operate multiple-unit electric equipment over 42-deg. 40-min. curves, with a 4-ft. 9-in. gage, and a flangeway in the frog of 2 in., without derailment.

The Chairman: The supplement to the Manual in 1918 provides for a flange $1\frac{3}{4}$ in. wide, or with provision for an increase of $1/16$ of an inch for every 2 deg. of curvature, and on that recommendation that is the practice now, reflected by the Manual.

Is there any further discussion of this, which, as I stated before, is merely received for information this year. If not, we will pass to the next subject.

Chairman Wiltsee: The next portion of the report is Appendix D. Mr. Macomb will present the report.

(J. de N. Macomb (A. T. & S. F.) read Appendix D, and also abstracted portion of Appendix D relating to switch stands.)

Chairman Wiltsee: *It is the recommendation of the Committee that this matter be adopted as recommended practice, and printed in the report. I therefore so move you.*

(Motion carried.)

Chairman Wiltsee: Plans and specifications for tie plates, derailleurs and anti-creepers in Appendix E is simply a progress report, and no conclusions have been reached. H. T. Porter, chairman of the sub-committee, will present the report.

(H. T. Porter (B. & L. E.) presented the report.)

The Chairman: This report, gentlemen, is offered as information, with the request for constructive criticism during the coming year.

Chairman Wiltsee: The next sub-division is Study and Report on Specifications and Piece Work Schedules for Contracting Track Maintenance Work. This part of the report will be presented by E. T. Howson.

E. T. Howson (Railway Age): Owing to the abnormal conditions with which we are all familiar which have prevailed during the past year in getting work done by contract or by any other means, it was very difficult for your committee to find any clean-cut examples of contract work. The standard track work system which had been in effect for several years on the B. & O. and for a shorter time on the Pennsylvania, prior to federal control, and which were abandoned during that control, have not yet been re-established. Therefore, the committee was unable to get any up-to-date information on which to base any report.

While a good many roads resorted to the cost-plus form of contract in one form or another last year, the committee did not consider that was the kind of contract the Board of Direction had in mind in assigning this subject, in most cases the cost-plus form of contract being little more than paying the contractor a percentage on the cost of his work for recruiting the force. Therefore the committee can only report progress.

(The committee was excused with the thanks of the Association.)



Simplicity Is the Keynote of the Lackawanna at Pocono Summit, Pa.

Report of Committee on Stresses in Track

The work of the committee has resulted in the collection of a large amount of data relative to the stresses developed in curved and tangent track which will require considerable time for analysis and presentation in a final report. In securing this data field tests were made by methods similar to those employed in the preparation of last year's report. Work of a preliminary nature was performed to find the effect of flat spots on wheels upon the stress in the rail. The principal purpose of this year's tests was to find the effect of curvature upon the stresses in the rail caused by different types of locomotives as compared with the stresses developed in straight track.



A. N. Talbot
Chairman

A. N. Talbot has been chairman of the committee since its creation seven years ago. He has also been active in other professional societies, having been president of the American Society of Civil Engineers in 1918. As professor of civil engineering at the University of Illinois he is brought into intimate daily contact with intricate problems of engineering research. His long experience in directing field investigations in the laboratory and field eminently fits him to guide the extensive and complicated investigations which constitute the basis for the work of the committee, while his connection with the university forms a valuable alliance for the committee.

IN CONTINUATION OF THE PROGRAM of the committee, field tests on railroad track were carried on during the summer season. The tests were conducted on the tracks of the Illinois Central in Illinois, the Delaware, Lackawanna & Western in New Jersey, and the Atchison, Topeka & Santa Fe in New Mexico and Iowa. The tests were made on tangent track and on curved track, several different curvatures being used. A principal purpose of the tests was to find the effect of curvature of track upon the stresses in the rail (including lateral bending stresses) caused by locomotives of different type run at different speeds, as compared with the stresses developed in straight track. Several types of locomotives were used—Pacific, Mountain, Santa Fe, Mikado, Ten-Wheeler, etc. Work of a preliminary nature was also done to find the effect of the flat spots of wheels upon the stress in the rail. All the tests were carried on in much the same way as were the tests described in the reports of the committee already presented to the Association. A large amount of data has been accumulated, and it will require several months to reduce these data and a further time to study the results. Preliminary work on the data indicates that the tests will give important information on stresses developed in curved track. The committee is also continuing work on other phases of the subject assigned to it.

Committee: A. N. Talbot (U. of Ill.), chairman; W. M. Dawley (Erie), vice-chairman; A. S. Baldwin (I. C.), G. H. Brenner (I. C. C.), John Brunner (Ill. Steel Co.), W. J. Burton (M. P.), Chas. S. Churchill (N. & W.), W. C. Cushing (Penna.), Dr. P. H. Dudley (N. Y. C.), H. E. Hale, Robt. W. Hunt, J. B. Jenkins (B. & O.), Geo. W. Kittredge

(N. Y. C.), Paul M. LaBach (C. R. I. & P.), C. G. E. Larsson (Am. Br. Co.), G. J. Ray (D. L. & W.), Albert Reichmann (Am. Br. Co.), H. R. Safford (C. B. & Q.), Earl Stimson (B. & O.), F. E. Turneaure (Univ. of Wis.), J. E. Willoughby (A. C. L.).

Discussion

Prof. A. N. Talbot (Chairman): Since the report was written considerable progress has been made in reducing the data on curves. Attention may be called to the large bending stress in the inner rail over the third or fourth driver, according to the type of locomotive. The bending stress decreases in this inner rail with an increase of speed. For the outer rail there is considerable lateral bending over the front truck and first driver, and over the last driver and trailer, and this bending increases with increase of speed.

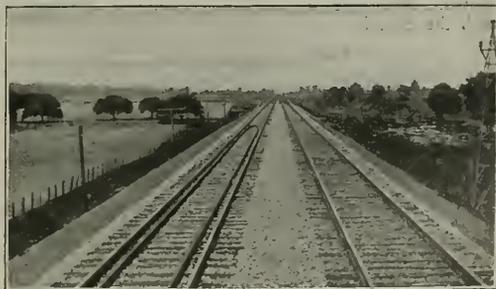
Measurements were made of the lateral bending of the rail section on itself (tilting) and also of the bending developed in the rail in a 6-ft. length, as would be produced as the engine passed at low speed. High stresses were found in the rail under wheels having flat spots. Tests in the laboratory are being carried on to learn how the splice bar and rails act at a joint and how the stresses are transmitted from rail to bar, as well as the amount of stress developed. It may be said that we have still a large amount of work to do before the results of data already secured will be ready for presentation, or even for discussion.

(The committee was dismissed with the thanks of the Association.)

(Adjourned.)



Crooked River Arch on the Oregon Trunk Line



A Typical Section of Track as Found on the Lehigh Valley

National Railway Appliances Association Meeting

G. C. Isbester Elected President; Members Well Satisfied With This Year's Exhibit

THE NATIONAL RAILWAY APPLIANCES ASSOCIATION held its annual meeting in the restaurant of the Coliseum at 11 o'clock yesterday morning.

In reviewing the work of the year President J. B. Strong stated that "last year the space applications from old exhibitors exceeded that available by 20 per cent. This year, in adding the ballroom, we had 5,500 sq. ft., or about 17 per cent additional space to offer and were therefore able to take better care of our space applications though we still have applications for more space than available. At our last annual meeting the directors were asked to consider having a ladies' rest room for the next exhibit, and I am pleased to state we have now provided it in the southeast corner of the ballroom. We have also provided a lounging space and music in the gallery adjacent to the ballroom at the south end of the main building, which we trust is being found of convenience and interest to our visitors.

"The oak and wicker furniture provided this year is comfortable and of a unique design and a great improvement over that heretofore offered. It is all new, made especially for this exhibit at a considerable outlay in investment by the contractor, and has been furnished to our exhibitors at a reasonable rental.

"The added facilities and equipment have been provided without increasing our membership dues and with but a small increase in our space rental rates. It is too early to state just how our income and expenses will balance, but present estimates indicate a close balance with only a small deficit.

"I wish to take this opportunity of thanking the members of the board of directors, and especially our secretary-treasurer, Mr. Kelly, for their hearty co-operation throughout the past year by their attendance and interest in all meetings called, which has enabled this exhibit to be so successfully opened to railroad men."

REPORT OF SECRETARY-TREASURER

Secretary-Treasurer C. W. Kelly reported that the exhibit will probably create a deficit of between \$1,800 and \$2,000. Last year our attendance on Monday was 2,084; this year at the same hour it was 3,566.

OTHER BUSINESS

By a unanimous vote the transactions of the Board of Directors for the past year were approved.

A vote of thanks was extended to the retiring officers for the completeness of the furniture equipment of the booths. There was a general expression of satisfaction with the exhibit.

ELECTION OF OFFICERS

The Nominating Committee, composed of P. C. Jacobs, Johns-Manville, Inc., chairman; L. B. Sherman, *Railway Age*; A. Anderson, Adams & Westlake Co.; E. E. Hudson, Waterbury Battery Co., and G. R. Lyman, William Wharton, Jr., Company, recommended the following officers for the coming year, and two directors to serve for three years, which recommendations were adopted:

President—George C. Isbester, American Chain Company, Chicago.

Vice-President—Thomas W. Aishton, National Malleable Castings Company, Chicago.

Directors for a three-year term—A. A. Taylor, Fair-

banks, Morse & Co., Chicago, and G. E. Geer, western manager, Wyoming Shovel Company, Chicago.

G. C. Isbester, who was elected president, is the district sales manager of the American Chain Company, Chicago. Mr. Isbester was connected with the mechanical department of the Great Northern at St. Paul, Minn., from 1897 to 1899, leaving the Great Northern at this time to go with the Sargent Steel Company, with headquarters at Chicago. He remained with this company until about 1902, when he went with the Q & C Company, with headquarters at Chicago, afterwards becoming vice-president of that company. In 1912 he went with the Rail Joint Company as district sales manager. During the war Mr. Isbester served in the United States Naval Reserve Forces as lieutenant commander, having been on active duty from April, 1917, until he was placed on the inactive list in May, 1919. He was recalled to active duty on July 28, 1919, to be sworn in as commander in the supply corps. He was selected for promotion from lieutenant commander to commander by the Board of Selection, and after receiving his promotion he was again detached from active duty. Commander Isbester also served with the Illinois Naval Militia for ten years. On his return from the navy Mr. Isbester again resumed his duties with the Rail Joint Company as district sales manager, which position he resigned on August 1, 1919, to enter the service of the American Chain Company, Inc., with headquarters at Chicago.

American Railway Engineering Association Registration

THE REGISTRATION of members and guests of the American Railway Engineering Association yesterday totalled 593, as compared with a similar registration for the first day a year ago of 534. The crowded condition of the convention room yesterday reflected this large attendance.

Abbott, F. E., Insp. Engr., Lackawanna Steel Co., Buffalo, N. Y.
Adams, L. L., Roadmaster, L. & N., Etowah, Tenn.
Adamson, J. H., Asst. Engr., B. & O., Meyersdale Pa.
Albaugh, R. B., Div. Engr., St. L. S. W., Tyler, Texas.
Allan, A. G., Asst. Engr. Mo. Pac., St. Louis, Mo.
Allen, L. B., Supt. M. W., C. & O., Huntington, W. Va.
Ambrose, J. R. W., Chief Engr., Toronto Term., Toronto, Ont., Canada.

Amory, G. F., Asst. Engr., C. T. H. & S. E., Chicago.
Amoss, F. X., Can. Gov. Rys., Corinth, Ont., Can.
Anderson, Arthur, Instrumentman, N. Y. C., Chicago.
Anderson, Irving, Div. Engr., A. T. & S. F., Marcelline, Mo.
Andrews, Lamont, Ch. Engr., S. A. & A. P., San Antonio, Tex.

Angerer, Victor, Vice-Pres., Wm. Wharton, Jr., & Co., Easton, Pa.

Angier, F. J., Supt. Tim. Pres., B. & O., Baltimore.
Armour, Robert, Masonry Engr., Grand Trunk, Montreal, Can.

Armstrong H. J. Asso. Prof. C. E., Armour Inst., Chicago.
Armstrong, J. E., Asst. Engr., Canadian Pac., Montreal, Que.
Arn, W. G., Asst. Engr. M. W. I. C., Chicago.

Atwill, A. Lee, Asst. Engr., Chicago & Western Indiana, Chicago.

Atwood, Col. Wm. G., Woods Bros. Const. Co., St. Louis, Mo.
Auryansen, F., Bridge Eng., Long Island, Jamaica, N. Y.
Austill, H., Bridge Engineer, M. & O., St. Louis, Mo.
Aylsworth, R. G., Asst. Engr., C. B. & Q., Denver, Colo.
Babcock, J. B. (III), Asst. Prof. Ry. Eng., M. I. T., Cambridge, Mass.

- Backes, W. J., Engr., N. Y. N. H. & H., New Haven, Conn.
 Badger, O. C., Asst. Engr., A. T. & S. F., Chicago.
 Baker, W. E., Asst. Engr., L. & N., Ravenna, Ky.
 Baldridge, C. W., Asst. Engr., A. T. & S. F., Chicago.
 Baldwin, A. S. (Past-President), Vice-President, I. C., Chicago.
 Baldwin, Hadley (Director), Asst. Ch. Engr., C. C. C. & St. L., Cincinnati, Ohio.
 Baldwin, L. W., Vice-President, I. C., Chicago.
 Baldwin, R. A., Dist. Engr., C. N. R., Toronto, Can.
 Ballard, E. E., Office Engr., M. K. & T., St. Louis, Mo.
 Baluss, F. C., Engr. B. and B., D. M. & N., Duluth Minn.
 Bardwell, R. C., Engr. Water Service, M. P., St. Louis, Mo.
 Barrett, W. C., Trainmaster, Lehigh Valley Sayre, Pa.
 Barry, H. B., Prin. Asst. Eng., St. L.-S. F., St. Louis, Mo.
 Batchellor, F. D., Div. Engr. B. & O., Garrett, Ind.
 Bates, Onward, Con. Engr., Chicago.
 Beach, D. P., Div. Eng., Penn. System, Indianapolis, Ind.
 Beach, Dr. S. C., Health Officer, I. C., Chicago.
 Beahan, Willard, First Asst. Engr., N. Y. C., Cleveland, O.
 Bell, Gilbert J., Engr. West. Dist., A. T. & S. F., Topeka, Kan.
 Bertram, H. A., Div. Eng., C. & O., Peru, Ind.
 Betts, E., Asst. Cons. Engr., Sou. Pac., New York City.
 Beugler, Edwin J., Vice-Pres., Foundation Co., New York City.
 Beyc, John C., Oak Park, Ill.
 Bissell, F. E., 729 Garfield Bldg., Cleveland, Ohio.
 Black, G. F., Eng. M. of Way, Maine Cen., Portland, Me.
 Blackie, G. F., Asst. Ch. Engr., N. C. & St. L., Nashville, Tenn.
 Blackman Chas. H., Prin. Assist. Engr., L. & N., Louisville, Ky.
 Blaiklock, M. S., Engr. M. of W., Grand Trunk, Montreal, Can.
 Blake, H. S., Asst. Engr., Norfolk Southern, Norfolk, Va.
 Blum, Bernard, Engr. M. W., N. P., St. Paul, Minn.
 Boardman, H. E., Engr. Asst. to Gen. Val. Coun., N. Y. C., New York City.
 Bohnstengel, W., Asst. Engr. Tests, A. T. & S. F., Topeka, Kan.
 Bond, F. L. C., Chief Engineer, G. T., Montreal, Can.
 Bond, T. S., Asst. Engr., I. & G. N., Palestine, Texas.
 Borchert, W. C., Dist. Engr., M. K. & T., Smithville, Tex.
 Bowser, E. H., Supt., Timber Dept., I. C., Memphis, Tenn.
 Boyd, G. E., Div. Engr., D. L. & W., Buffalo, N. Y.
 Brameld, W. H., Engr. Asst. to Gen. Mgr., Erie, New York City.
 Breckinridge, W. L., Asst. Chief Engr., C. B. & Q., Chicago.
 Bremner, Geo. H. (Treasurer), Dist. Engr., Bureau of Valuation, Interstate Commerce Commission, Chicago.
 Brewer, V. A., Asst. Engr., C. & N. W., Chicago.
 Brown, A. V., Engr. M. W., Lake Shore Electric, Sandusky, Ohio.
 Brown, H. C., Jr., Chicago.
 Brown, J. M., Corp. Engr., Maint. and Const., C. R. I. & P., Chicago.
 Brumley, D. J., Chief Engr., Chicago Ter. Imp., I. C., Chicago.
 Brunner, John, Asst. Insp. Engr., Ill. Steel Co., Chicago.
 Buck, C. M., Div. Engr., A. T. & S. F. Topeka, Kans.
 Buchler, Walter, Cons. Engr., The Barrett Company, New York City.
 Burns, J. F., Asst. Engr., M. W., L. & N., Louisville, Ky.
 Burpee, G. W., Man. Engr., Westinghouse, Church, Kerr Co., New York City.
 Burpee, Moses, Ch. Engr., B. & A., Houlton, Me.
 Burrell, Chas. F., Eng. M. of Way, K. & I. T., Louisville, Ky.
 Burt, A. M., Asst. to Vice-Pres. N. P., St. Paul, Minn.
 Burt, J. W., Div. Engr., C. C. C. & St. L., Indianapolis, Ind.
 Camp, Wm. M., Editor, Railway Review, Chicago.
 Campbell, J. E. (Second Vice-President), Ch. Engr., E. P. & S. W., El Paso, Texas.
 Carothers, J. B., Asst. to G. M., B. & O., Lines West, Cincinnati, Ohio.
 Carpenter, H. R., Asst. Ch. Engr. Con., M. P., St. Louis, Mo.
 Cassil, H. A., Eng. M. of Way, P. M., Detroit, Mich.
 Chamberlain, O. P., President, C. & I. W., Chicago.
 Chevalier, C. R., Roadmaster, Portland Term., Portland, Me.
 Chinn, Armstrong, Instrumentman, Engr. Dept., C. B. & Q., Chicago.
 Christian, W. A., Sp. Engr., M. & St. L., Chicago.
 Christiansen, Eli, Asst. Engr. of Bldgs., C. R. I. & P., Chicago.
 Church, S. R., Man. Tar and Oil Div., The Barrett Co., New York City.
 Churchill, Chas. S. (Past-President), Vice-President, Norfolk & Western, Roanoke, Va.
 Clapper, Leland, Engr. B. & B., D. & I. R., Two Harbors, Minn.
 Clark, W. A., Chief Engr., D. & I. R., Duluth, Minn.
 Clarke, A. C., Dist. Engr., B. & O., Pittsburgh, Pa.
 Clarke, R. N., Asst. Engr., Mo. Pac., Kansas City, Mo.
 Clements, M. F., Bridge Engr., Nor. Pac., St. Paul, Minn.
 Coburn, Maurice, Engr. M. W., Pennsylvania System, Indianapolis, Ind.
 Cochran, Charles W., Major, U. S. A., Mil. Dept., U. of Ala., University, Ala.
 Condon, T. L., Con. Engr., Chicago.
 Conner, J. K., Chief Engr., L. E. & W., Indianapolis, Ind.
 Conner, E. H., C. E., Mo. V. Br. & I., Leavenworth, Kan.
 Cook, R. A., Val. Engr., C. & A., Chicago.
 Cook, R. L., Office Engr., Central of Georgia, Savannah, Ga.
 Coon, C. J., Engr. Gr. Cen. Terminal, N. Y. C., New York City.
 Cox, J. B., Con. Engr., Chicago.
 Craine, Arthur, Div. Engr., C. B. & Q., St. Joseph, Mo.
 Craine, Lawrence, Asst. Engr., Val. M. P., St. Louis, Mo.
 Cramer, F. H., Asst. Br. Engr., C. B. & Q., Chicago.
 Crane, E. B., Chicago.
 Cummins, R. R., Roadmaster, Cen. of Ga., Macon, Ga.
 Cunningham, A. O., Chief Engr., Wabash, St. Louis, Mo.
 Cunningham, C. C., Div. Engr., C. R. I. & P., Herington Kan.
 Curd, W. C., Con. Engr., Chicago.
 Cushing, W. C. (Past-President), Engr. of Standards, Pennsylvania System, Philadelphia, Pa.
 Cutler, A. S., Asst. Prof. Ry. Engr., Univ. of Minn., Minneapolis.
 Dakin, A. H., Jr., Asst. Engr., C. of N. J., New York City.
 Dale, L. E., Supv. Penna. Sys., Philadelphia, Pa.
 Daley, C. A., Div. Engr., Erie, Salamanca, N. Y.
 Dalstrom, O. F., Engr. of Bridges, C. & N. W., Chicago.
 Dare, C. E., Res. Engr., R. F. & P., Alexandria, Va.
 Darrow, F. T., Asst. Ch. Engr., C. B. & Q., Lincoln, Neb.
 Davidson, Geo. M., Chemist & Engr. Tests, C. & N. W., Davis, A. L., Prin. Asst. Engr., I. C., Chicago.
 Davis, Garrett, Asst. Engr., C. R. I. & P., Chicago.
 Davidson, J. C., Engr. Elec. Tr., N. & W., Bluefield, W. Va.
 Davidson, J. H., Water Engr., M. K. & T., Dallas, Tex.
 Deckert, J. E., Ch. Draftsman, Val. Dept., C. B. & Q., Chicago.
 DeGeer, B. W., Engr. W. S., Gt. Nor., St. Paul, Minn.
 DeLamere, C. T., Engr. Const., C. P., Montreal, Canada.
 Dennis, Walt, Div. Engr., Wabash, Moberly, Mo.
 Dodgson, F. L., Con. Engr., Gen. Ry. Sig. Co., Rochester, N. Y.
 Donahey, J. A., Cleveland, Ohio.
 Dorley, A. F., Dist. Engr. M. W., E. Lines, M. P., St. Louis, Mo.
 Dorrance, W. T., Design. Engr., N. Y. N. H. & H., New Haven, Conn.
 Douglas, H. T., Jr., Chief Engr., C. & A., Chicago.
 Downs, J. L., Roadmaster, I. C., Champaign, Ill.
 Downs, L. A. (First Vice-President), Vice-President and General Manager, Cen. of Ga., Savannah, Ga.
 Duffy, C. M., Asst. Sig. Engr., C. R. I. & P., Des Moines, Iowa.
 Dufour, F. O., Structural Engr., Stone & Webster Engr. Corp., Boston.
 Durham, E. M., Jr., Mgr. Dept. & S., Div. of Liq. Claims, U. S. R. A., Washington, D. C.
 Dyke, R. L., Div. Engr., Erie, Elmira, N. Y.
 Earle, Thos., V. P., Bethlehem Steel Br. Corp., South Bethlehem, Pa.
 Eck, W. J., Sig. and Elec. Supt. Sou., Washington, D. C.
 Edgerton, H. H., Engr. of Surveys, C. G. W., Chicago.
 Ellis, G. E. Secy., Auto. Train Control Com., Chicago.
 Ellsworth, F. H., Div. Engr., N. Y., N. H. & H., New Haven, Conn.
 Emmons, S. E., Asst. Engr., Ann Arbor, Owosso, Mich.
 Entwisle, E. D., Ch. Engr., I. & S. C., Johnstown, Pa.
 Ericson, G. G., Asst. to Chief Engr., Penna., Pittsburgh, Pa.
 Evans, John, Div. Engr., M. C., Detroit, Mich.
 Evans, W. T., Asst. Engr., C. & A., Chicago.
 Fair, J. M., Asst. Supr., Penna., Philadelphia, Pa.
 Fairbairn, J. M. R. (Director), Ch. Engr., Can. Pac., Montreal, Canada.
 Farlow, G. B., M. of W., B. & O., Cincinnati, Ohio.
 Farnsworth, M. H. Asst. Engr., Chicago Union Sta. Co., Chicago.
 Farrin, J. A., Asst. Engr., I. C., Chicago.
 Fechtig, F. H., Pur. Agt., A. C. L., Wilmington, N. C.
 Felt, C. W. F., Ch. Engr., Santa Fe, Chicago.
 Fenstermaker, D. C., Dist. Engr., C. M. & St. P., Chicago.
 Fifield, H. F., Div. Engr., N. Y. N. H. & H., Taunton, Mass.
 Fickes, C. R., Regional Engr., U. S. R. A., Chicago.
 Filippi, Hugo, Asst. Engr., Chicago Term. Imp., I. C., Chicago.
 Fisher, S. B., Engr. Dept., M. K. & T., Parsons, Kan.
 Ford, C. F., Supr. of T. & T. Dept., C. R. I. & P., Chicago.
 Fowler, W. E., Ch. Engr., Montour Railroad, Corapolis, Pa.

- Frink, E. A. (Director), Principal Asst. Engr., S. A. L., Norfolk, Va.
- Fritch, E. H. (Secretary), Chicago.
- Gagel, Edward, Ch. Engr., N. Y. N. H. & H., New Haven, Conn.
- Galbreath, A. W., Val. Engr., M. K. & T., Parsons, Kan.
- Gennet, C. W., Jr., Engr., R. W. Hunt & Co., Chicago.
- Gersbach, Otto, Chief Engr., Ind. Harbor Belt, Gibson, Ind.
- Gilreast, F. W., Engr. Maint., L. & N. E., South Bethlehem, Pa.
- Godlove, Geo. W., Office Engr., A. T. & S. F., Marceline, Mo.
- Going, A. S., Engr. Const., Grand Trunk, Montreal, Can.
- Goldstraw, Walter, Asst. Arch., Grand Trunk, Montreal, Can.
- Goodrich, C. M., Des. Engr., Canadian Br. Co., Walkerville, Ont.
- Goos, J. H., Insp. Engr., G. N., St. Paul, Minn.
- Grandy, A. L., Chief Engr., Pere Marquette, Detroit, Mich.
- Grear, S. F., Ch. Draftsman, Br. Dept., I. C., Chicago.
- Grime, E. M., Supv. B. & B., Nor. Pac., Fargo, N. D.
- Haas, E. M., Mgr. R. R. Dept., The H. K. Ferguson Co., Cleveland, Ohio.
- Hadwen, T. L. D., Engr. of Masonry Const., C. M. & St. P., Chicago.
- Haislip, L. E., Div. Engr., Baltimore and Ohio, Parkersburg, W. Va.
- Hale, H. E., Group Engr., Pres. Conference Com., New York City.
- Hall, F. D., Elec. Engr., B. & M., Somerville, Mass.
- Halpin, V. C., Asst. Engr., Mo. Pac., Little Rock, Ark.
- Hamilton, G. F., Dist. Engr., C. B. & Q., Alliance, Nebr.
- Hamilton, Paul, Engr. Tr. & Roadway, Big Four, Cincinnati, Ohio.
- Hammond, R. J., Office Engr., B. & M., Boston, Mass.
- Hand, G. F., Gen. Asst. Engr., N. Y. N. H. & H., New Haven, Conn.
- Hanger, Kenneth, Div. Engr., M. K. & T., Parsons, Kan.
- Hannaford, A. R., Asst. Engr., Grand Trunk, Hamilton, Ont., Can.
- Hansen, Oscar, Asst. Engr. B. & B., Cen. of Georgia, Savannah, Ga.
- Harrington, C. J., Roadmaster, I. C., Memphis, Tenn.
- Harris, G. H., Engr. M. Way, M. C., Detroit, Mich.
- Harris, G. W., Asst. Ch. Engr., A. T. & S. F., Chicago.
- Harris, P. H., Asst. Engr., T. & S. F., Port Arthur, Texas.
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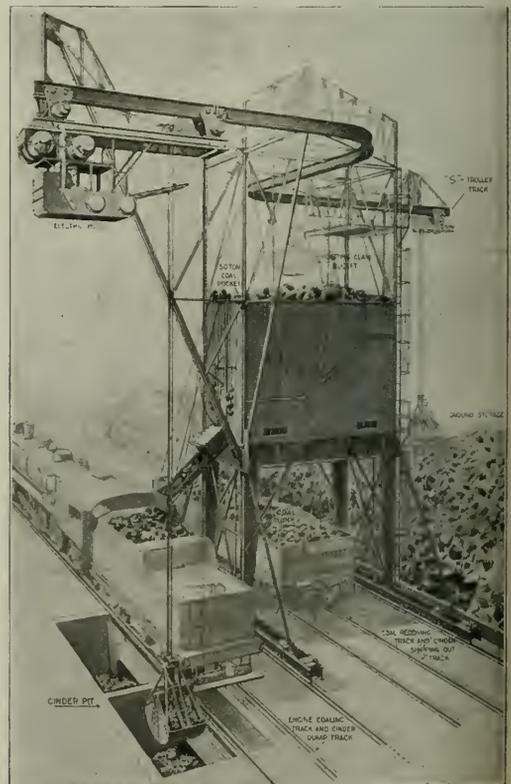
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Tilley, C. M., Inspector, Southern, Slidell, La.
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Turner, G. S., Harry Vissering & Co., Chicago.
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An Innovation in Coal Handling Equipment

ON PAGE 607 of yesterday's Daily there appeared an article describing a new type of mechanical coal and cinder handling plant developed by the Roberts & Schaefer Company, Chicago. In this plant the coal or



RandS Coaling Station and Cinder Plant

cinders are handled by a clam shell bucket operated from a trolley moving on a runway supported by a structural steel frame, the idea being to afford a wide range of use for the equipment, which may be applied equally well for coaling locomotives direct from cars, for storing coal or for reclaiming it or for handling cinders. Through an error the cut provided to illustrate this article was interchanged with another, so that the wrong cut was shown. For this reason we are here presenting the correct cut of the equipment.

A Correction

Owing to an error arising from the transposition of lines in the printshop the article describing the installation of Fenestra window sash in a Pere Marquette round house at Plymouth, Mich., which appeared on page 603 of the *Daily Railway Age* of March 15, failed to credit this work to the Detroit Steel Products Company, Detroit, Mich., manufacturers of the sash. While it was evident to a reader that an error had been made, the correct name of the maker was not so evident.

Stresses in Track Meeting

There will be a meeting of the Committee on Stresses in Track in room 1102 in the Congress Hotel at 9 o'clock this morning.

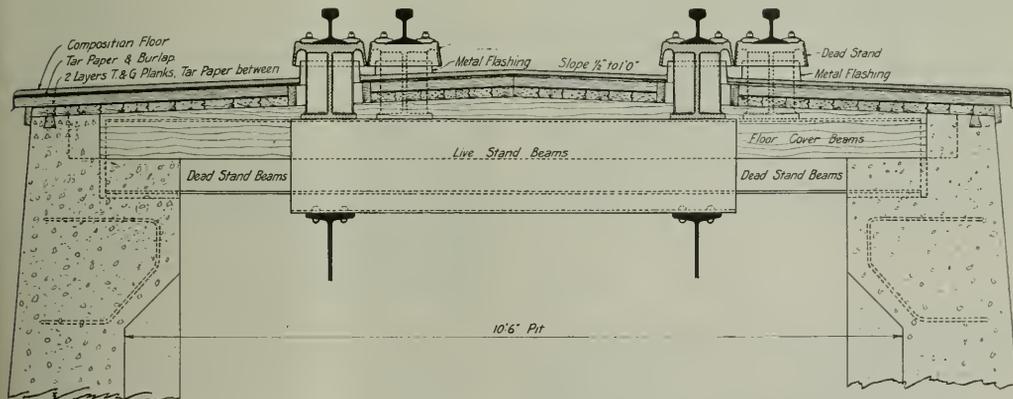
A Weather Proof Track Scale Floor

FAIRBANKS, MORSE & Co., Chicago, has recently adopted a type of floor construction for its track scales which was developed by the Canadian Pacific recently. This design is a modified form of the earlier Fairbanks, Morse construction. It is of particular interest to railroads operating through regions similar to those

per, and covered with three layers of tar paper and burlap painted with asphalt mastic. This floor slopes away from the center on a slope of $\frac{1}{2}$ in. to 1 ft. and is carried on timber joists which span the pit. This independent condition of the floor joists is said to simplify the work of shaping the joists over the earlier method of carrying both the joists and the dead rail chairs on the same 1 beams. The live rail and dead rail chairs in this construction, instead of being different design, as in the earlier type of floor, are alike. Each rail chair extends 5 in. about the track floor and has an umbrella top of such a size as to project a sufficient distance out from and down over the galvanized flashing provided around the floor openings as to avoid contact and prevent the entrance of water into the pit at these points. It is evident that with this form of floor construction there is little opportunity for any water to pass through the deck and enter the scale pit from above.

Safety Railings for Motor Cars

AMONG THE DEVICES WHICH have recently been developed with special reference to the interest of safety, and whose range of application has been broadened, is a combined railing and end screen which Mudge & Co., Chicago, designed originally for use on motor cars of their construction, but which are now made to apply on any standard make of railroad section motor car or for push cars. In this construction two end frames supporting screens and connected at the top by a cross bar constitute the entire equipment, the frame work of which is made from heavy tubing bent to shape, connected by pipe fittings, and securely braced and bolted to the car body, while the screen is made of heavy woven wire held in place by iron strips bolted to the railings. The construction is substantial, adds but little weight to the car, and includes nothing capable of obstructing the free passage of the air, the screen purposely having a large mesh.



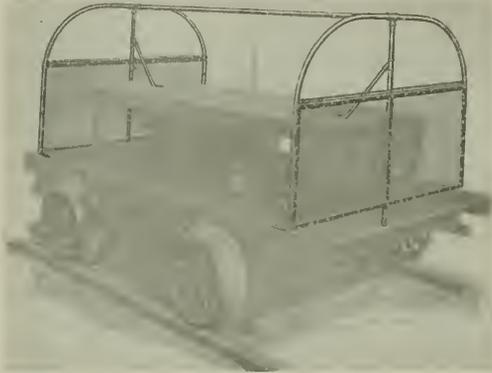
Cross Sectional Plan of Weatherproof Track Scale Floor

of northern United States and of Canada, where the trouble resulting from the leakage of water into scale pits is not only one of corrosion but of interference with the free and accurate movement of the scale parts by ice formed when melted snow drips through the floor and strikes the cold scale iron.

The floor as improved consists of a covering made up of two thickness of $1\frac{1}{4}$ -in. tongue and groove planks extending crosswise to each other, separated by tar pa-

The screen prevents small tools from falling off the car and upon the track with resulting derailment, while it is also a guard against men being thrown off the cars or jumping off accidentally ahead of the car while in motion, and, in the case of push cars, of preventing passengers from riding with their feet suspended from the car. Aside from its function as a safety device it is said to be of value also in providing greater comfort for the men, in that men in a sitting posture can rest their backs against

the cross bar and that men, when standing (particularly the end men) are afforded a more substantial hold than that obtained by holding on each other or attempting to maintain a balance alone. Other points urged in favor of this device are that it affords an additional bracing to the car which tends to prolong its life; also that it makes for easier handling of the car by presenting a shoulder brace



Safety Railings on Motor Car

to the men lifting, that it makes the covering of the car with tarpaulin a more simple matter, and, finally, that it enables the men in starting the car to maintain practically an upright position while pushing.

An Improved Locomotive Type Crane

THE LOCOMOTIVE CRANE COMPANY, Champaign, Ill., has recently made several improvements in its Model A Little Giant Crane. This crane is a ground machine, mounted on flat-faced wheels, 36 in. in diameter and 14 in. wide. On these wheels the crane is capable of traveling under its own power about 2 miles per hour and of turning in a 100-ft. circle. Both wheel gage and base are 10 ft., the boom 30 ft., the capacity of the clam-



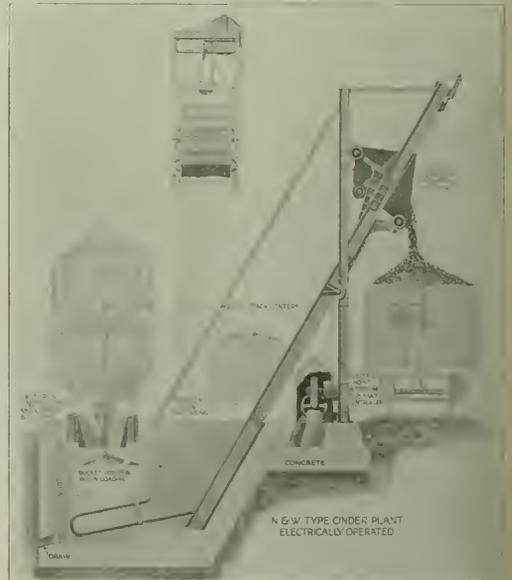
Model A Little Giant Crane Handling Coal

shell bucket $\frac{3}{4}$ yd., and the approximate weight of the crane exclusive of the counter weight, $12\frac{1}{2}$ tons. The crane is said to be capable of lifting 8,000 lb. with the radius of the boom at 10 ft., 6,000 lb. with the radius at 15 ft., 5,000 lb. with the radius at 20 ft., and 4,000 lb. with the radius at 25 ft. The most important feature of

the new model is the double cylinder, throttle reversing swinging engine, which is self contained, and is bolted to the frame in such a way as to permit its removal without dismantling. This engine is said to operate smoothly and to facilitate adequate rapidity in the crane's movements. Other features mentioned about the crane are the use of gears made of high grade steel and the absence of frictions, slip rings, and similar articles commonly used to overcome shock and strain on the swinging mechanism in the lack of flexibility in the steam engine's operation or proper gear reductions. It is also stated that the boom-hoisting mechanism is fitted with an adjustable cone maple block friction which is controlled from the operator's stand, and that the counter weight is made of heavy plate, cut to size for bolting to the frame.

A Practical Electric Cinder Conveyor

COINCIDENT WITH ITS PORTABLE combination locomotive coaling and cinder handling plant, described in the columns of the *Daily Railway Age* of yesterday, the Roberts & Schaefer Company, Chicago, is introducing a new type of cinder plant for the use of railroads. This



New Type RandS Cinder Plant

plant is the product of several years of experimenting on the Norfolk & Western and the Nashville, Chattanooga & St. Louis, where installations of the plant as perfected are said to be operating very successfully.

In this plant, as shown in the illustration, ashes are dumped directly from the locomotive ash pans into a train bucket or cinder car located in the depressed pit below the track, this car, when filled, being hoisted up a structural steel incline to a point above an adjacent railway track and there automatically emptied of its contents. The distance required between the two tracks is 26 ft. The plant is operated electrically by means of a direct-connected hoist, by reason of which it is not subject to trouble from freezing in cold weather, and it involves no

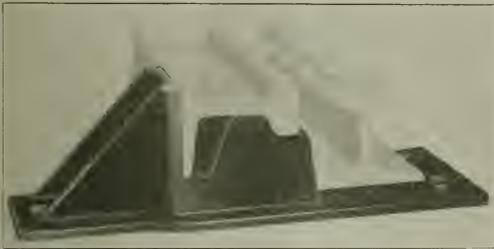
hand labor other than that required in operating the hoist. A heavy cast iron cinder hopper 8 ft. long is bolted to the track girders between the pit walls, providing the means of deflecting into the cinder car all ashes dropping from the ash pans. The cinder car itself has a capacity of 80 cu. ft. and travels at a speed of 150 ft. per min.

At many points a single installation of this type of plant is sufficient for all cinder handling requirements but where the conditions require it combinations of several such plants in various arrangements can readily be installed.

A Girder Type Guard Rail

A NUMBER OF RAILROADS are now testing out a girder type of guard rail manufactured by the Positive Rail Anchor Company, Marion, Ind. This device consists of a section of stock rail bent through its depth and bolted in the sidewise position to the supporting guard rail braces and plates, each rail brace and plate being a one-piece malleable iron unit.

It is claimed for this type of guard rail that it is impos-



Sectional View of Girder Type Guard Rail

sible for it to overturn under traffic inasmuch as the plates to which the rail is bolted are held in place by the weight of the traffic and that the "I" beam or strongest section of the rail is utilized to resist the thrust instead of the unsupported head, as is the case with the ordinary rail guard rail. As an additional point in favor of this type of guard rail, it is stated that an old rail, either of



Installation of Girder Type Guard Rail

the same or of lighter section than the running rail, can be used for the guard rail, or when a road is adopting a heavier weight of rail, the old guard rail can be utilized, its preparation requiring only straightening, followed by bending through the "I" section. The fact that the rail when on its side presents a larger surface to abrasion than when upright, and that the head of the old rail, having been subject to cold rolling under traffic, is harder than a new rail are also presented in support of this device.

It is further claimed that the wide space obtaining under this type of guard rail, when installed, is a protection against clogging from snow and ice, this feature, together with the absence of parts likely to stretch or spread, and the absence of bolt connections with the running rail by means of which it might be pulled out of line by creeping movements, all contributing to reduce maintenance costs to a negligible point. Further points advanced in support of the guard rail are that the running rail can be removed without changing or disturbing the guard rail, that it can be assembled in the shop and shipped out as a one-piece guard rail, yet permitting broken parts to be replaced without scrapping the entire rail, and that a road need not alter its standards in order to employ the device inasmuch as plates may be made to fit these standards.

Recent Developments in Movable Bridge Machinery

THE PERFECTING OF THE AUTOMOBILE and marine type of high-speed gasoline engines has led to their use in operating movable bridges. Owing to their compactness and reliability, these units are particularly adapted to serve as an auxiliary to an electric installation. The Deering bridge of the Chicago & North Western over the Chicago river (built in 1916) was the first bridge on which this type of engine was installed as the auxiliary drive and since then it has practically superseded the heavy stationary type of slow-speed engines in units ranging from 18



Fig. 1. Norwood-Nocnan Installation on Illinois Central

to 95 hp. Figure 1 shows a four-cylinder 60-hp. 900-r.p.m. auxiliary gas engine installed on the Illinois Central's bascule bridge over the south branch of the Chicago river, the longest bridge of its kind built so far. On the Baltimore & Ohio's bridge at South Chicago a six-cylinder 95-hp. 1,500-r.p.m. engine is provided to drive a dynamo that supplies current for an auxiliary electric motor located on the moving span.

Figure 2 shows a 22½-hp. gas engine with clutch and reversing gears all mounted on a single base to be used as the motive power on a swing bridge where electrical current is not available. It is unique in that it is a complete unit in itself, including gasoline tank and radiator. The engine is started with a crank, larger units being started with an electric motor. The gasoline tank holds 10 gal. of fuel and the radiator is large enough to permit of the engine being run for 30 min. under full load. The spark and gas levers are mounted on a stand located on

the operating floor near the brake and clutch levers. To open the bridge the operator releases the disc friction clutch, adjusts the spark and gas levers and cranks the engine. He then returns to the operating floor and throws the jaw clutch to "open." The end lift clutch on the next shaft reduction from the engine unit is then engaged and when the ends have been lowered this clutch is released

curves can be inserted in the conveyor track where necessary.

A further advantage claimed for the Godfrey system lies in its ability to dump the coal at more than one point, and, inasmuch as the conveyor bucket, when once over the coal pocket, is lowered before emptying, to deposit the coal without fall or chuting, thus by permitting uniform mixing of lumps and dust and reducing breakage to a low point, insuring the maintenance of the coal in the best condition for locomotive use.

The silo coal pocket and wooden pocket coaling stations shown in the illustrations are served equally well by the Godfrey conveyor. In either case it is possible to prolong the conveyor structure to serve more bins or to give open storage in connection with the hopper. The merit in the latter method lies in the possibility of providing a good-sized storage with a medium-sized conveyor

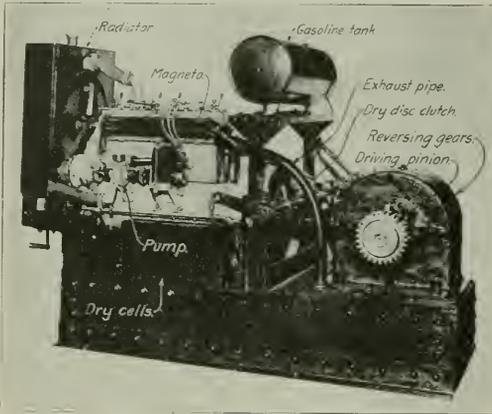


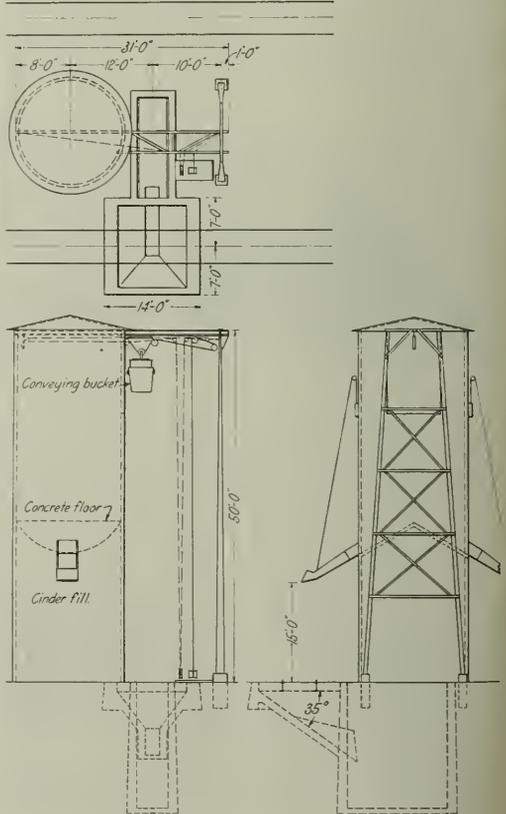
Fig. 2. A 22½ H. P. Norwood-Noonan Engine

and the swing clutch is engaged and the bridge opened. To close the bridge the cycle is reversed. This unit is to be installed on a draw span over the St. Joe river near Shatolet, Idaho, for the Oregon-Washington Railroad & Navigation Company and was designed and built by the Norwood-Noonan Company of Chicago.

A New Type of Coal Handling Equipment

AS A RESULT OF EXPERIMENTS and investigations conducted during the last 18 months the Godfrey Conveyor Company, Elkhart, Ind., has introduced a type of coal handling equipment for locomotive coaling service, which comprises one or more coal pockets with locomotive coaling chutes erected alongside the coaling track and arranged to accommodate the operation of a special coal-handling bucket, this bucket being filled in a pit below the track, then hoisted to a point above the coal pocket, after which it is shifted along an overhead rail to the proper dumping position, lowered and then emptied. This system is adapted for use where the amount of coal to be handled ranges from 10 tons to 4 or 5 cars per day. It is stated that the Godfrey system requires the labor of but one or two men for a period of one to three hours in unloading a car of coal, and is reported that in many instances coal is being unloaded into hoppers at a labor and power cost of 5 or 6 cents per ton by means of these systems.

The system is obviously one which allows a large flexibility in arrangement and design, permitting the hopper to be built large enough to store several cars, as at points where a reserve supply should be provided during periods of free coal movement to warrant the presence of an adequate supply during periods of shortage, also readily adapting itself to the serving of any type of hopper. Furthermore, the conveyor can be installed to run parallel to the siding, or at right angles or other angles to it, and



Godfrey Coaling System—Silo Coal Pocket Plan

and a small hopper at points where the daily consumption is low and coal shipment irregular. In the construction of these systems the Godfrey Company recommends a pit large enough only to catch the drop from one coal car hopper, inasmuch as the time and labor consumed at small stations in pinching the car is a small item. It also calls attention to the advisability of reducing the pitch of the hopper floor to a minimum as a means of reducing first cost, although the size and angle of the track hopper is optional.

EDITORIAL

Railway Age

EDITORIAL

DAILY EDITION

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It is becoming more evident every day that railroading is becoming more scientific. Evidences of this are reflected in the report of the Committee on Economics of Railway Operation, which included progress reports on such important subjects as "Methods for Increasing the Traffic Capacity of a Railway," "The Effect of Speed of Trains on Cost of Operation" and "The Determination of the Traffic Capacity of Single and Multiple Track Railways."

In the early days of railway development in this country only a limited amount of attention was given to the consideration of operating economies. However, as the regulation of railway earnings has become increasingly strict, it has been necessary for them to reduce operating expenses in every manner possible. This has made necessary the more thorough study of many problems. At the present time, when the capacity of the railroads is so greatly taxed with each upward surge of traffic and when intensive improvement work is largely out of the question, studies of means of increasing the capacity of existing facilities are becoming of increased importance. Although organized only a couple of years ago, the committee has undertaken an ambitious program and has already made gratifying progress. It is to be hoped that

the American Railway Engineering Association will lead in the recognition of the value of the application of trained men to the analytical discussion of railway problems by the creation of other committees as occasion warrants. While continuing the consideration of those problems of a more particularly engineering nature, the Association can also contribute to the promotion of efficient railway operation by the consideration of these larger problems.

Engineering colleges generally have made considerable progress in recent years by broadening out their courses

Human Element in Engineering

to include instruction in management and other matters concerning the human element and its relation to production. This is as it should be, and it is to be hoped that still greater progress will be made in this direction. The human machine is the most complicated piece of mechanism imaginable and it must be intelligently and scientifically supervised if the best results are to be obtained. Engineering societies generally have realized the importance of this and their programs in recent years have been giving more and more attention to matters relating to the handling of men in industry. It is of great importance that this be appreciated by railroad engineers because of the scattered forces on the railroads and the difficulty of providing adequate supervision.

In the article on "Humanizing Engineering Education," which appears in this issue, Professor A. A. Potter has pointed out clearly that the proportion of students graduating in engineering courses is far too small and that the educational system is at fault. The fact that only a small percentage graduate is only too well known, but it has usually been considered as an index to the standards of the school. Professor Potter now raises the question whether it is at all indicative of the standards of the institution or of the ability of the student. He believes that it is not and states that it is purely a matter of holding the student through stimulating his interest by introducing more engineering matter early in the curriculum. He further advocates, and for that matter is actually practicing at Purdue University, the study of the characteristics of men in order that the interest of the student may be continually sustained and his knowledge broadened. There is much to this. The students who drop out or change their course of study are by no means failures in their after work in life. In fact, a large proportion do achieve a success comparable with that of the graduate engineer. It has been chiefly a case in the past of following certain interests, modified more or less by natural though perhaps undefinable instincts. The successful business man of today has some understanding of engineering matters. On the other side, the successful engineer has, through either interest or necessity, acquired a knowledge of people, of business and of other matters. Thus, if we

Why Not Broaden the Engineer at the Start

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can intelligently combine and sustain the interests and instincts of the students at the start of their education we will have laid the foundation for not only a larger number of graduates, but for a better and broader class of men. And the engineering profession will have been benefited thereby.

Because a man is a master workman is no reason why he will be successful in directing a gang or a force of men.

Training of Foremen

It takes years of practice to make a good craftsman, even in handling simple machines or materials. And yet because a man may be a good workman and appear to have a certain potential ability as a leader, he is often promoted and placed in charge of men with little, if any, instruction in handling them. What is the result? Sometimes he makes good, sometimes he just scrapes through, and often he fails and has to be set back. With an intensive course of instruction in the handling of men more of these foremen will make good in a decided fashion and at a very much smaller expense to the railroad—an expense which often is not apparent because it is reflected in friction, decreased production and lost motion. A great industrial organization has found it profitable to provide special courses of instruction in handling men for all of its foremen, old and new. Is there not a suggestion here by which the railroads can increase their efficiency?

One of the basic maintenance of way materials which is now undergoing a marked transition is the cross tie. The hardwood tie of a couple of decades ago has largely given way to that of the softer woods. Used originally as cut in the timber, they are now being treated with preservatives in increasing quantities. More attention is also being given each year to experimentation with substitute ties of steel, concrete and other materials. The Committee on Ties is performing a valuable service in presenting a report on the progress of these developments from year to year. Thus the report presented yesterday contains recommendations for methods of installing and keeping records on test sections to determine data as to the service life of cross ties of various materials and treatments. The annual presentation of information concerning the results which are developing currently in the experimental installations of substitute ties also constitutes a valuable record of importance which will be more fully appreciated as the cost of wooden ties continues to increase to the point where those of other materials are more practicable commercially.

Rendering a Valuable Service

No committee has a larger or more important field for investigation ahead of it than that on Economics of Railway Labor. The labor problem is now of paramount interest in all branches of railway service. Nowhere, however, are greater opportunities afforded for the promotion of efficiency, with a corresponding reduction in expenses, than in the consideration of maintenance of way labor. So many conditions have developed which have tended to drive the more efficient men from this work that the efficiency of the rank and file has deteriorated to a low level. In its report, the committee calls attention to one of the most serious defects in the handling of maintenance of way labor—the inefficient manner of hiring men for employment. Prior to federal control, the practice

prevailed of leaving the selection of men to labor agents, who most generally derived their compensation from boarding and commissary concessions. In spite of the evident viciousness of this system, the committee points out that this practice is again coming into vogue, following the return of the roads to private control. With the selection of men left to persons not directly in railway employment, and with no attempt to pick out the more capable or experienced, little improvement can be expected. The committee can perform no more important service than to develop a system by means of which some consideration can be given to the qualification of a man in hiring him for maintenance of way work.

Practice in making decisions as to old bridges covers a wide range of variation from an extremely empirical study based almost entirely on judgment and experience to a most exacting mathematical analysis. In view of the fund of information now available and the possibility of checking up stresses in indeterminate members with the extensometer, there is no excuse at the present time for relying on "educated guesswork" unless lack of time or a competent staff is an admissible alibi. This being the case, the real question at hand, as brought out in this discussion, relates to the method under which the true mathematical analysis applied under the rules adopted yesterday shall be applied.

Opinions were agreed on one point, the decision must be made by an officer who is thoroughly competent and, what is equally important, whose opinion will carry weight with the management. Since bridge engineering is so highly technical, requiring closer application than a chief engineer can give it, it would seem clear that this responsibility should rest primarily with the bridge engineer or one who is a bridge engineer by training if not by title. But on all but the smallest of roads, the bridge engineer can not himself make the detailed inspections and all computations required to carry out the complete investigation. He must delegate part of the work to others and herein lies a difficulty. In some cases the inspection and the mathematical analysis are completely segregated—the man who does the figuring rarely sees the structure. But while there are serious objections to this plan, it is sometimes difficult to work out any other feasible arrangement. On the larger roads it is a problem also to say to what degree the bridge engineer shall have a personal part in the investigation.

These are problems of personnel and organization in the bridge engineer's office that are equally as important as the discussion of the rules presented at the session yesterday. Of particular moment is the need for impressing the management with the fact that this is highly exacting work requiring a thoroughly competent staff.

The Classification of Old Bridges

JUDGING FROM THE COMMENTS made in the course of discussion of the report on Iron and Steel Structures, the subject covered in this year's work—namely that on Rules and Unit Stresses for Rating Existing Bridges—is one of the most important ever taken up by the steel bridge committee. A further evidence of this is to be seen in the character of the discussion as reported elsewhere in this issue. In spite of some of the adverse criticism it must be conceded that the rules prepared by the committee are an excellent work that will go far to place the investigation of old bridges on a generally systematic basis. The discussion was of value in bringing out some pertinent truths on the methods under which such rules should or should not be applied.

Opinions were agreed on one point, the decision must be made by an officer who is thoroughly competent and, what is equally important, whose opinion will carry weight with the management. Since bridge engineering is so highly technical, requiring closer application than a chief engineer can give it, it would seem clear that this responsibility should rest primarily with the bridge engineer or one who is a bridge engineer by training if not by title. But on all but the smallest of roads, the bridge engineer can not himself make the detailed inspections and all computations required to carry out the complete investigation. He must delegate part of the work to others and herein lies a difficulty. In some cases the inspection and the mathematical analysis are completely segregated—the man who does the figuring rarely sees the structure. But while there are serious objections to this plan, it is sometimes difficult to work out any other feasible arrangement. On the larger roads it is a problem also to say to what degree the bridge engineer shall have a personal part in the investigation.

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The Railways and the Universities

A VERY LARGE PART OF THE TROUBLES of the world are due to ignorance. Most of the present troubles of the railroads of the United States undoubtedly are due to ignorance. Part of this ignorance is that of many railway officers concerning fundamental engineering and economic principles which must be applied to secure the greatest efficiency and economy of operation. Part of it is ignorance of railway employees, who do not understand the advantages they would gain from more efficient and economical operation and the disadvantages they suffer from every form of inefficiency and waste. Part of it is ignorance of the public and public men regarding the public policies in regulating the railways which must be followed if they are to be adequately developed and enabled to give good service at the lowest practical cost.

President Kinley of the University of Illinois in his address at the dinner last night discussed the subject of co-operation between the universities and the American Railway Engineering Association. There can be no doubt whatever that closer co-operation between the railways and educational institutions would, in the long run, reduce this ignorance and be of great benefit both to the railways and the public. The universities need in their work the practical point of view and knowledge of the working railway officer. If the university professors had more understanding of practical railway problems their pupils would go into active life better equipped to deal intelligently with railway problems, whether those of railway management or railway regulation. On the other hand, if there were more of the thorough scientific study of railway engineering, operating and economic problems which can be best done in the universities, and if railway managements were more disposed to use the results of such studies, the art of railroad transportation would be more rapidly advanced. The railroads could well afford to give more co-operation and support to university work along the lines of engineering economics and business administration. The greatest progress in every line of industrial endeavor depends upon a well-balanced combination of scientific investigation and practical administrative effort. In no other industry is this more needed than in the great railroad industry.

Humanizing Engineering Education*

IN CONNECTION with the question of engineering education, which is a most important one to the country and this Association, it is always believed that the best results are produced as far as instruction is concerned by the teaching of men and not subjects. That means we should pay greater attention to the testing and sorting of students before they are assigned to any particular course of study and that their progress must be carefully watched.

We should give more attention to the teaching of students, how to study and improve their personal efficiency, and that we should rate them not only on their academic performance, but certain personal traits. Every effort should be exerted to develop not only their memory, their knowledge of technique, but also to develop certain traits of personality such as initiative, judgment, leadership and other qualities which are so essential for success in engineering and industry.

The conditions which existed when most of you gentlemen were at school and which existed when I was at college was that the young high school graduate, as he

entered the university to study engineering, became immediately discouraged, because he found that instead of becoming acquainted with engineering problems he was made to devote all of his time during the first two or three years to certain abstract subjects. He could not see any connection between the subjects he was studying and the engineering profession for which he was preparing. Little attention was paid to the effect of failure, or the cause of failure, on the part of college students; in fact, I know in some cases university professors boasted of the fact that they had a high mortality among the students. In many cases certain institutions claim high standards because they start with 100 freshmen and graduate 25 or 30 seniors—that was taken as a criterion of high quality. If a factory superintendent would lose 25 per cent of his castings continuously day after day he would not hold his job very long.

We have not recognized the fact that failure on the part of the student to carry a certain subject may not be due entirely to his indifference, but may be due to poor teaching, and also to the fact that the student is not interested in the subjects which he is studying. In order to correct this a great many of the engineering schools at the present time are introducing in the larger courses certain subjects which are very closely related to engineering. At Purdue we are giving to every freshman a course in engineering problems, at the same time trying to acquaint him with certain problems of particular interest to his community, such as roads, water supply, sewage disposal, etc.

Another thing that I am personally interested in is to stimulate the college student in doing good work by giving recognition to his efforts and rewarding them. We are all familiar with the effect of publicity upon athletics. We all know the effect upon athletics by having space given to athletic events in the dailies, by having the pictures of the contestants appear in the paper. We know what a large stimulus that type of publicity gives. It would seem that if a student is relegated to the brain squad the results of his studies should be given some publicity. If a student excels in surveying or mathematics, or any other subject, we make it a point to send a little story about it to his home paper as well as to the college paper, and we find that that type of publicity is of great advantage in keeping the student interested in his work.

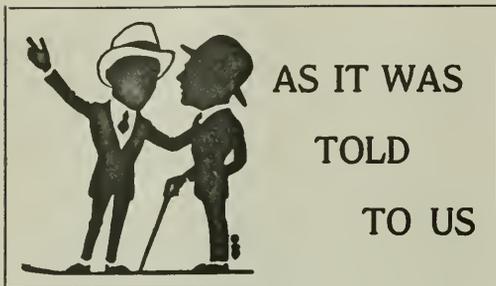
Another thing you may be interested in is that we are making a very careful study of the students' characteristics, and some of the qualities that pertain to the student's personality. We are also having the students graded on initiative and judgment, and other qualities, not only by his teachers, but by his chums, classmates and people in his home town, and we are using that information, to some extent, in advising the student concerning the selection of the course of studies.

Today's Program

The program for the American Railway Engineering Association sessions today is as follows:

Committee VI.	Buildings	Bulletin 235
Committee VIII.	Masonry	Bulletin 233
Committee I.	Roadway	Bulletin 234
Committee XVII.	Wood Preservation	Bulletin 233
Committee VII.	Wooden Bridges and Trestles	Bulletin 233
Committee XIV.	Yards and Terminals	Bulletin 235
Committee XII.	Rules and Organization	Bulletin 234
Committee XI.	Records and Accounts	Bulletin 235
Committee XIX.	Conservation of Natural Resources	Bulletin 235
	New Business	
	Election and Installation of Officers	
	Adjournment.	

*At the invitation of President Safford, Prof. A. A. Potter was given the privilege of the floor for a few minutes yesterday morning. This is an abstract of his talk.



H. B. MacFarland, a member of the Rail Committee and formerly engineer of tests of the Atchison, Topeka & Santa Fe, has just returned from a visit to England where he supervised the application of the Lewis draft appliance to a British locomotive.

* * *

A. L. Grandy, assistant general manager of the Pere Marquette, with headquarters at Detroit, Mich., has been appointed chief engineer and the position of assistant general manager has been abolished. J. Tuttle, chief engineer, has been appointed assistant chief engineer.

* * *

W. K. Hatt, who was professor of Purdue University at the time H. R. Safford and L. A. Downs were students, said that he always knew they would amount to something when they left Purdue because they had a habit of running things while they were there.

* * *

Among those attending the convention this year for the first time is B. W. DeGeer, recently appointed engineer water service of the Great Northern. He is enjoying the convention keenly and expresses the opinion that the individuals who have had the opportunity to be present, likewise the railroads which they represent, cannot but greatly benefit from their experience here if in no other way than through the greater zeal with which they will return to their work at a time when this encouragement is greatly needed.

* * *

After an absence of several years John B. Seymour is again present at the exhibit at the Coliseum, although in a new connection. Mr. Seymour was formerly manager of the Western territory for the National Lock Washer Company, resigning this position in 1917 to enter the officers' training camp at Ft. Sheridan, following which he was commissioned and spent considerable time in active service overseas. Mr. Seymour has recently returned to the railway supply industry as manager of sales of the Western territory of the Verona Tool Works, with office at Chicago.

* * *

P. G. Lang, Jr., assistant bridge engineer of the Baltimore & Ohio at Pittsburgh, Pa., who is in attendance at the convention, was in direct charge of the design and construction of a new bridge over the Allegheny river at Pittsburgh, the last stage of which was completed yesterday with the opening of traffic over the eastbound track. This structure received considerable notice some time ago in connection with the completion of some exceedingly intricate erection operations involving the shifting and jacking of spans during a temporary interruption to traffic. With the completion of these changes on December 20 traffic was opened over the new structure on the west-

bound track. The work has now been completed on the east approach to this bridge so that traffic will be opened on the eastbound track, effective yesterday.

* * *

Frank Rhea, trade commissioner, United States Department of Commerce, is the member of the A. R. E. A. who is perhaps the farthest away from the convention at this time. Mr. Rhea is at present in Peking, China, having left the United States last fall. Mr. Rhea spent some time in London and while there happened to meet another member of the Association, A. G. Shaver, who was in Europe studying the railroad situation at that time. In a letter recently received from Mr. Rhea, he states that he arrived at Shanghai on January 14 after a 42 day trip from London with only a two day stop at Singapore and less than one day stops at Gibraltar, Malta, Port Said, Aden, Colombo, Penang and Hongkong. As the ship usually arrived in these ports in the morning and left in the evening or night, Mr. Rhea stated that this did not give him much time to see these places, but that not much time was required for such places as Aden.

* * *

Of the members of the American Railway Engineering Association who arrived Monday none has a more interesting railway career than S. B. Rice, engineer maintenance of way of the Richmond, Fredericksburg & Potomac, and a member of the Ballast Committee of the Association. Mr. Rice entered railway service in November, 1865, as a carpenter on the construction of the Jamestown river bridge of the Richmond & Petersburg Railroad at Richmond. He entered the service of the R., F. & P. in June, 1866, since which time he has been continuously in the service of this railroad with the exception of a few months in 1867 and 1868. Mr. Rice thus has a record of over a half century of continuous service with one railroad. He was made a foreman of carpenters in 1873 and was promoted to master carpenter on the death of his father in 1880. He was made roadmaster of the Richmond, Fredericksburg & Potomac and the Washington Southern in 1900 and was promoted to engineer maintenance of way in 1910.

At the time Mr. Rice entered the service of this road certain portions were still laid with "U" rails weighing about 46 lbs. per yard. Some old strap rail was also in use on sidings. In reviewing his experiences in his early days Mr. Rice states that "railroading at that time on the R. F. & P. was more a pleasure than labor. The responsibility was so light that you hardly felt it. If we were putting in any new work such as bridges, culverts, or laying rail, all we had to do was to let scheduled trains pass, then go to work, knowing that we had the track until the next scheduled train, never putting out a flag. If there was to be an extra at any time, we would have been notified the previous day by what was known as a "red letter." If there was to be an extra train, one of these red letters would be thrown off by the engineer, the train stopping at the man it was addressed to and the men would take out the order, sign on the back of the envelope and return to the conductor to be turned over to the superintendent. Another practice in those days was that engineers at night were required to throw off at section houses a cast disc about $\frac{3}{4}$ in. thick and 4 in. in diameter, this to show the number of the train that had passed. This was after we had commenced to number trains. Section masters, carpenters, and all maintenance of way employees were required to find this disc before putting a car on the track or fouling the line. Sometime they would lose considerable time before finding same. The discs were bundled up and returned to the master mechanic at Richmond for further use."



D. L. & W. Station at Morristown, N. J.

Railway Engineering Association Proceedings

An Account of Wednesday Sessions Including Presentation of Ten Committee Reports With Discussions

THE SECOND DAY'S SESSION of the convention of the American Railway Engineering Association was called to order promptly at 10 o'clock yesterday morning by President Safford. The larger attendance at the convention was reflected in the fact that the room was completely filled throughout both the morning and afternoon sessions. Owing to inability to complete the entire program the reports of the committees on Standardiza-

tion and Uniform General Contract Forms were held over from the Tuesday morning session and were presented early Wednesday morning. These reports were followed by those scheduled for presentation on Wednesday and included: Signs, Fences and Crossings; Ties; Iron and Steel Structures; Water Service; Economics of Railway Labor; Economics of Railway Operation; Economics of Railway Location, and Shops and Locomotive Terminals.

Report on Iron and Steel Structures

This committee follows the policy of publishing certain criticisms of the specifications which it submits for approval with a view to eliciting more intelligent discussion on the floor of the convention. This practice has been carried out this year with respect to the Rules and Unit Stresses for Rating Existing Bridges. The Principles for Detailed Design of Flashing, Drainage, Reinforcement and Protection for Waterproofing Purposes cover the perfection of details which have been shown by experience to favor good workmanship and reduce the possibility of the chance fault that will cause a leakage at any point in the system.



O. E. Selby
Chairman

O. E. Selby, chairman of the committee, has served in this capacity for the last four years, previous to which he was vice-chairman for five years. He has been a member of this committee for a total of ten years. Although Mr. Selby's present title is that of principal assistant engineer of the Cleveland, Cincinnati, Chicago & St. Louis, he carries the duties of bridge engineer and for a long time carried that title on that railway. As the head of the committee dealing with one of the most scientific subjects, it is to be expected that he is a man given to scientific study and investigation not only as to bridge work but to other railway matters as well.

IN APPENDIX A ARE GIVEN the Rules and Unit Stresses for Rating Existing Bridges which were offered as a conclusion for printing in the Manual. A tentative draft of these rules was published in Bulletin 228 and the discussions received were considered in the revision. These discussions were presented by the committee in Appendix B. The Principles for Detailed Design of Ballast Floors, Flashing, Drainage and Reinforcement for Waterproofing Purposes, published in Bulletin 223 and submitted as information to the 1920 convention, have been revised and are offered as a conclusion in Appendix C.

Conclusions

1. The committee recommended that the Rules and Unit Stresses for Rating Existing Bridges as printed in

Appendix A be approved and published in the Manual.

2. The committee recommended that the Principles for the Detailed Design of Flashing, Drainage, Reinforcement and Protection for Waterproofing Purposes appearing in Appendix C be approved and published in the Manual.

Committee: O. E. Selby (C. C. C. & St. L.), chairman; F. E. Turneaure (U. of Wis.), vice-chairman; F. Auryansen (L. I.), J. A. Bohland (G. N.), W. S. Bouton (B. & O.), A. W. Carpenter (N. Y. C.), M. F. Clements (N. P.), J. E. Crawford (N. & W.), O. F. Dalstrom (C. & N. W.), F. O. Dufour (Stone & Webster), Thomas Earle, W. R. Edwards (I. C. C.), G. A. Haggander (C. B. & Q.), R. L. Huntley (U. P.), P. G. Lang, Jr. (B. & O.), B. R. Lefler (N. Y. C.), P. B. Motley (C. P. R.), C. D. Purdon (St. L. S. W.), Albert Reichmann (Am. Brg. Co.), A. F. Robinson (A. T. & S. F.), H. N. Rodenbaugh (F. E. C.), J. M. Salmon (L. & N.), I. L.

Simmons (C. R. I. & P.), I. F. Stern (Cons. Engr.), H. B. Stuart (G. T.), G. E. Tebbetts (Roberts & Schaefer), Dr. J. A. L. Waddell (Cons. Engr.), H. T. Welty (N. Y. C.), Paul Wolfel (deceased).

Appendix A—Rules and Unit Stresses for Rating Existing Bridges

(1) In fixing the carrying capacity of any bridge under traffic, its location, design, details, material, workmanship, behavior, and physical condition must be taken into account.

(2) Before recalculating an existing bridge, a careful inspection should be made to determine:

(a) Whether the actual sections and details conform to the drawings.

(b) The loss of metal due to corrosion and wear. This determination should be made by caliper measurements, after thorough removal of scale.

(c) The general physical condition. Defects such as loose rivets, worn pins, crooked or damaged members, cracked metal, etc., should be carefully noted.

Particular attention should be given to the position of the track with respect to center line of the bridge, and to undesirable details, such as forked ends of compression members, eccentricity in riveted joints and connections, unequal stress in tension members, etc.

(3) In recalculating bridges for increased loading, the equipment in actual use, or which it is proposed to use, shall be taken for determining the live load stresses. Where the design or details are such as to cause eccentric or secondary unusual stresses, these stresses shall be taken into account. It is recommended that stresses in members subject to marked secondary effects be determined by strain gage measurements.

(4) In spans exceeding 150 ft. in length, and in viaduct towers, the effect of lateral (or wind) force shall be taken into account. The lateral force shall consist of a moving load equal to 15 lb. per sq. ft. on the vertical projection of the structure on a plane parallel with its axis, and a moving load of 400 lb. per lin. ft. applied 8 ft. above the base of rail.

(5) On curves, the centrifugal force, based on actual speed of operation, and assumed to act 6 ft. above the base of rail, shall be taken into account.

(6) Where speeds may exceed 15 miles per hour, the dynamic increment of the live load shall be added to the maximum computed live load stresses and shall be determined by the formula.

$$I = S \frac{300}{300 + \frac{L^2}{100}}$$

I = impact or dynamic increment to be added to the live load stress.

S = computed maximum live load stress.

L = the length in feet of the portion of the span which is loaded to produce maximum stress in the member.

Where maximum live load stress is produced by heavy cars or electric locomotives, impact stresses shall be taken as one-half of those given by the formula above.

(7) If a bridge is so located that speeds are definitely limited, or where absolute control of speed can be secured, 50 per cent of the impact given by the above formula shall be used when the speed is between 10 and 15 miles per hour, and 25 per cent when the speed is less than 10 miles per hour. If the bridge is located where the locomotive must be started, the speed increased, or the brakes applied, full impact shall be used in the calculations.

(8) Impact shall be added to stresses produced by centrifugal force, but not to those produced by lateral forces.

(9) For bridges on curves, and at other places where tracks are off center, consideration shall be given to the increased load carried by any truss, girder, or floor member due to the eccentricity of the load.

(10) The limiting stresses resulting from the loads and forces mentioned in the preceding articles, in combination with the actual dead load, shall not exceed the following, in pounds per square inch:

	Open-Hearth Steel	Wrought Iron and Bessemer Steel
Axial tension (net section).....	26000	22000
Axial compression (gross section).....	24000- 80 $\frac{1}{r}$	21000- 70 $\frac{1}{r}$
but not to exceed.....	20000	17000

l = length of the member in inches.		
r = least radius of gyration of the member in inches.		
Tension in extreme fibers of rolled shapes (except rolled beams and channels), built sections and girders (net sections).....	26000	22000
Tension in extreme fibers of rolled beams and channels (net section)	24000	20000
Compression in flanges of plate girders and I-beams (gross section)	26000-300 $\frac{1}{b}$	22000-250 $\frac{1}{b}$
but not to exceed.....	24000	21000
l = length of the unsupported flange, between lateral connections or knee braces in inches.		
b = flange width in inches.		
Tension in extreme fibers of pins (figured by assuming stresses concentrated at centers of bearings)	50000	40000
If the members are packed closely on the pin, the bending stress need not be considered unless the tension in extreme fiber exceeds 60000 lb. per sq. in. for open-hearth steel, or 50000 lb. per sq. in. for wrought iron and Bessemer steel.		
Shear in plate girder webs and rolled beams (gross section).....	18000	15000
Shear in rivets and pins.....	22000	19000
Bearing on rivets, pins, outstanding legs of stiffener angles, and other steel parts in contact	44000	38000
The above-mentioned values for shear and bearing shall be reduced 20 per cent for countersunk rivets, floor connection rivets, and turned bolts.		

In members subject to stresses produced by a combination of dead load, live load, impact, centrifugal force, and eccentric application of dead and live load, with lateral forces or bending due to lateral action, unit stresses 25 per cent greater than those given in Article 10 may be allowed; but, in such cases, the unit stresses due wholly to dead load, live load, impact, centrifugal force, and eccentric application of dead and live load, shall not exceed those given therein.

(12) In hangers having an unequal distribution of load, and in hangers or hip verticals consisting of a single member, consideration should be given to the necessity for reducing the allowable unit stress to meet this condition.

(13) Stresses in plate girders shall be computed either by the moment of inertia of their net sections; or by assuming that the flanges are concentrated at their centers of gravity. In the latter case, one-eighth of the gross section of the web, if continuous or properly spliced, may be used as flange section. For girders having unusual sections, the moment of inertia method shall be used.

(14) When the stresses exceed the foregoing limits, or when the design or physical condition makes it necessary, the structure shall be strengthened or renewed.

When these limits are closely approached, or when the physical condition of the structure is not good, it shall be kept under close inspection as long as it is continued in service.

Appendix C—Principles for Detailed Design of Flashing Drainage Reinforcement and Protection for Waterproofing Purposes

GENERAL

1. The following applies only to membrane waterproofing, as the "integral method" is not recommended for waterproofing railroad bridge floors.

2. The structure should be designed so that it can be waterproofed and it should be adaptable to waterproofing by ordinary methods and materials.

3. Strength and stiffness are desirable features in a structure which is to be waterproofed.

4. The structure and its construction and expansion joints, drainage and waterproofing, should be designed together, considering their separate and combined functions, so that each will help to secure a waterproof structure.

5. Due regard should be had for the available methods and materials of construction.

6. All waterproofed surfaces should be easily accessible, and as simple and smooth as possible; hence features should be avoided which would increase the difficulty of securing waterproof construction, such as open spaces, joints, holes, seams or projections.

7. Concrete bridge floors should be of ample strength and thickness and of dense non-porous construction. Special attention should be given to providing the correct amount and disposition of the reinforcement, and to securing the proper amount of water used in mixing.

8. Where contraflexure would injure the waterproofing, special details should be provided, such as elastic joints.

9. Minimize the number of construction joints in the structure, provided an ample number of workable expansion joints can be introduced.

DRAINAGE

10. Adequate drainage should be provided by means of suitable grades which will shed water by the easiest or most direct route. One per cent is a minimum desirable grade, but the grades away from points which are difficult to waterproof, should be correspondingly increased. While sewer and gutter grades may be considerably less than one per cent bridge floors, especially if ballasted, are subject to clogging by ashes, cinders, etc., and hence require steeper slopes to secure satisfactory drainage.

11. Avoid pockets which cannot be easily drained. Water with only a slight head may find an outlet through the waterproofing, which otherwise might be tight. Standing water is undesirable on a waterproofed bridge floor, from its destructive effect, both as a solvent and also on account of frost action.

12. Where gutters or pipes are necessary, they should be of durable material, of ample size, easy of access to install and maintain, and protected against clogging or damage. The grades should be enough to secure quick and entire escape of the water. Corrugated metal pipes are satisfactory where exposed to alternate freezing and thawing. Where sudden considerable variations in temperature occur, it is not desirable to encase drain pipes in concrete. Cleanouts and manholes should be provided where pipes cannot otherwise be cleaned.

13. Provide free exits for the harmless escape of drainage. Such drainage should not be allowed to disfigure the structure nor to injure persons or property. Icicles may be prevented by a basket of rock salt inserted in the top of the drain pipe.

14. Avoid features which would induce or permit capillary action.

15. Where possible, locate edges and joints above the highest probable water level.

REINFORCEMENT

16. Reinforcement of the structure should be suitably disposed, and ample in strength to prevent cracks or distortion which would injure the waterproofing.

17. Cloths, felts or fibers should be capable of holding the waterproofing pitch where placed and should be durable, strong and flexible.

18. Wire mesh or sheet metal reinforcement for the membrane should be of durable material, flexible where

necessary, and intimately bonded or introduced so that the waterproofing and reinforcement act together.

19. Necessary breaks in the surface of waterproofing or flashing, such as for drain pipes, or at construction or expansion joints, should be reinforced with extra flashing material.

FLASHING

20. Metal flashing shall be of material which is non-corrosive, and shall be insulated or protected against electrolytic action at points of contact with steel members of the structure.

21. Flashing should be of material which can be applied readily, and should retain the position in which it is placed when subjected to actual conditions of service and temperature.

22. Flashing should be firmly attached in its proper position, so that it cannot easily be displaced or removed.

23. The edges of waterproofing and flashing should be protected against drip, percolation and capillary action.

24. Joints between concrete and other material should be grooved and filled with an elastic expansion joint cement.

PROTECTION

25. Waterproofing and flashing should be protected, as soon as possible after installation, against mechanical injury, excessive temperature, chemical action, and deterioration caused by exposure to light and air.

26. The protecting covering should be dense, hard, durable and easy to apply.

It is recommended to use on flat surfaces either: (a) Brick laid in cement mortar or served with hot pitch, (b) plain or reinforced cement mortar, (c) plain or reinforced concrete, (d) bituminous mastic.

For surfaces with considerable slope, mastic is not satisfactory, being difficult to apply and also to retain in place.

Discussion

O. E. Selby, Chairman (C. C. C. & St. L.): You will recognize the distinction between rating existing bridges and the classification. Rating is figuring the unit stresses and deciding the capacity of the bridge. The classification is the assembling of the bridges on a railroad or on a division, together with the classification of the locomotives to be operated, and putting the information in the hands of the Transportation department, so that it may be available in assigning locomotives to the division, and for operating locomotives and other loads in emergency.

I move the adoption of Conclusion No. 1.

John B. Hunley (C. C. C. & St. L.): To my mind this is really more important than the specification for designing. There are a good many good specifications for designing new structures in particular, but there seem to be varied ideas as to the rating of old structures.

It seems to me the steel stresses are quite high, considering that even with the best inspection we cannot always find out the condition of the bridge. We are permitting under this proposed rating stresses of 20,000-lb. for actual tension of net sections, that is, wrought iron or Bessemer steel. I think we are going pretty far in recommending such high stresses, particularly old bridges of wrought iron and Bessemer steel. It is to my mind practically impossible to determine all the defects of the bridge by any inspection which can be made.

Chairman Selby: I will answer Mr. Hunley's first point in which he called attention to the inconsistency between the stresses by saying that in this case the designing stress is the one that existed and the proposed rating stress is correct. I will have to admit that the designing stress in Article 48 of the Specification is too low and is unduly conservative.

E. A. Frink (S. A. L.): These values that the committee has put forward, as I read them, seem to me to be about right in line with practice of bridge engineers whom I have learned to look up to as the heads of their profession.

At first sight it looks as though a stress of 20,000 lb. on ordinary iron is too large, but there are a number of factors that come into play in figuring the safety or carrying capacity of an existing bridge, which we cannot put down on paper. In every structure that is at all well designed, every part will help out—almost every part will help out another part.

C. F. Loweth (C. M. & St. P.): I am quite in accord with the expressions of the first speaker in this discussion, and I have a great many things to take exception to in the remarks that have just been made. The older bridges that we have to deal with in many cases have been well designed, and in many other cases the material of which they are composed is more or less uncertain. The record as to the quality of the material in the old bridges is not as definitely known as in the newer bridges today.

In my own practice I have frequently been compelled to carry in service old structures whose unit stresses were fully as high as those that are recommended by this committee, and I have tried to work these things out in a way that seemed to me to be wise and prudent. We have inspected bridges and calculated the load they will carry, and we have restricted the type of locomotive that should operate over that particular bridge, and then the tendency was to go away and forget it and just assume that that bridge was all right. You know the interval which elapses between the time you decide that a bridge must be changed for a heavier structure and the time in which it actually is changed. So we find that we are carrying our bridge without proper regard to the narrow margin of safety that we had agreed on.

I realize that you wish to make it clear that these specifications were not to apply to bridges to be carried indefinitely in service, but it seems to me that we ought to place considerable emphasis on the fact that those bridges are really weak sisters, and that careful inspection be given to them from time to time and frequent times, and that bridges that are stressed as high as proposed in these specifications are bridges which it is the intention of the company to replace at an early date.

Chairman Selby: Mr. Chairman, it seems to me that Mr. Lewis has answered himself. With reference to Article 14, which I read, and which Mr. Lewis called attention to, I think that covers the case precisely. If it is admitted, as Mr. Loweth seems to admit, that these stresses are safe under close inspection and watching, I do not see why we should not say so and go on record.

Mr. Hunley: That is one of the points I have in mind. We have practically gone the limit on stresses and at the same time depend on each and every instruction here given will be followed out. We all know that is not always the case. I think we should allow a little leeway for some such oversight as that.

Mr. Loweth: Perhaps the committee would be willing to lower these unit stresses and change Paragraph 14, to say that for bridges which for various reasons must be carried in service, and cannot be replaced promptly and which can be frequently inspected and kept in touch with, that the unit stresses as specified may be increased. That would simply add to the safe consideration.

G. H. Tinker (N. Y. C. & St. L.): I think it would be a mistake to adopt a lower unit of the specifications and then remove that limit by a permissive clause. In that case we have no standard whatever. I think the correct procedure is to adopt the top limit beyond which

we shall not go and to limit the application of these units in particular cases to something less than that, rather than to adopt the limit beyond which we may go under certain conditions, and in line with that I feel this Paragraph 11 is a mistake and should be omitted. Let the unit stress be fixed at a limit beyond which we may not go, and omit all provisions for a permissive stretch of these limits which this paragraph evidently does.

John V. Hanna (K. C. Ter.): The suggestion of the last speaker is very good. I know that it would be helpful to some of us, who do not specialize in this bridge work, if there could be an ultimate limit beyond which we should not go in continuing an old bridge in service.

P. B. Motley (C. P. R.): The units mentioned by the committee I think are about correct, as a general practice, and as has been mentioned on other occasions this specification or any specification is not intended to take the place of a properly qualified engineer. We must use our common sense and also the extensometer in some cases. In fact, I am inclined to believe the suggestion of a French engineer some years ago has a great deal in it. He suggested that figures should be almost thrown to the wind and the extensometer rule with regard to every stress.

With regard to bridges on the Canadian Pacific, we have adopted such stresses as these certainly over twenty years ago and have had no reason to regret it. Of course, they are well inspected and frequently, and any members that have been deformed by physical injury are watched especially. I know it develops on the shoulders of one man eventually to call a halt and to make such a report to the management as will force the overloaded spans to be replaced and that item is very important. The personality of that man will have to be of the highest order, because always there are large sums of money involved and the managements, especially in these times, do not relish the idea of spending comparatively large sums.

O. B. Robbins (I. C. C.): I find myself in close agreement with the last speaker in regard to the matter of the extensometer in computing stresses. Some years ago when I was connected with the Great Northern Railway we tested the spans in the Columbia River bridge in the state of Washington. We found our computations on the test members check closely with the extensometer test, but there were other members where we found stresses far greater than we had anticipated. This illustrates the fact that the computations do not take into account within several thousand pounds to the square inch the stresses that may be developed.

Chairman Sibley: Article 7 provides for limiting the speed of trains (reads article).

Mr. Loweth: Is there any such thing as an absolute control of speed?

Chairman Sibley: The committee thinks there is in the sense used here. There are places where physical conditions as to site limit the speed and there are other conditions where an operating control that is practical certainly may be secured, but we do not want to go on record as advocating a reduction in impact in cases where the speed is not controlled by anything better than a slow order.

Mr. Loweth: One of the speakers a few minutes ago said he felt it was desirable to have a definite unit stress which would be safe because we were not all bridge engineers, and it would be desirable if he could tell just where they would have to draw the line. I think that is just where the danger comes in. We should not go right up to the danger point, and feel that beyond that there was an absolutely dangerous condition.

The tendency with a specification of this kind, as I see it, will be to put in the drawing room these stresses and

employ a man who can compute the stresses and determine the questions which will come up and then perhaps it will be perfunctorily settled by the bridge engineer that because it does not exceed the unit stresses that are stated here that the bridge is all right. That may not occur, that may only occasionally occur, but there will be a tendency that way.

Chairman Selby: If anyone puts these rules in the drafting room and leaves them there and without any other responsibility he is doing a very unwise thing and it is certainly not the intention of the committee that the rules should be so abused.

Mr. Motley calls attention to the fact that no set of rules can take the place of the personal responsibility of the engineer.

Article 1 certainly cannot be complied with in the drafting room. In fixing the carrying capacity of any bridge for traffic, its location, design, material, workmanship, behavior and physical condition must be taken into account. No one can tell in the drafting room what the behavior of the bridge is.

Prof. W. N. Wilson (U. of Ill.): The discussion of the rating of old bridges has centered, to a considerable extent, at least, in the written discussion, on the life of the bridge under these high stresses. We seem to be pretty much in accord that for a comparatively short time at least the steel structure can be subjected to stresses of 24,000 to 26,000 lb. without danger of bending, but the question in which we are interested is how long the bridge will continue in service under these excessive stresses. Our work on fatigue of metals, I think, has demonstrated that as far as the physical properties of the material itself is concerned, we have very little reason to fear that material will deteriorate. A stress of 24,000 to 26,000 lb. for steel intension is below the stress which will cause a large number of repetitions. Furthermore, I think it is our experience that where a bridge shows signs of weakening it is not because of the deterioration of the metal, but because of the working loose of the parts that are connected.

The testing work which has been done on the strength of riveted joints has demonstrated that as the stresses increase, the members that are connected slip relative to each other at a stress below the stress that was used in the design. This deformation is the slipping of one piece upon another and is not an elastic strain. We would naturally expect, then, that if this slip is repeated a large number of times that some wear will take place and the joint become loose, for, as we know, the joint holds not by virtue of the strength of the rivet in shear, but by virtue of the friction between the plates induced by the tension in the rivet.

With this idea in mind at the experiment station at the University of Illinois, we have undertaken a tentative program in which we have tried to determine the effect of repeated stresses upon riveted connections, and while we do not feel that these tests have been carried on far enough to prove anything definitely, I would like to present to the Association some of the indications of our tests.

We find that repeated stresses, in which the stress is only one-half as great as the A. R. E. A. specifications permit in design, that the rivets will work loose if the stress is repeated.

In the new specifications for new bridges it is proposed to increase the allowable stress on rivets approximately 80 per cent. The tests which we have made indicate that such a stress as that will loosen a rivet in a few hundred reversals, so that the passing of the trains for a period of 1 or 2 or 3 years will cause the rivets to work loose, and in the rating of the old bridges I think we should

focus our attention upon the effect of the overstresses upon the rivets rather than upon the material itself.

Albert Reichmann (Amer. Bridge Co.): There are several points which were brought out in the discussion on these specifications. Mr. Loweth thought that it was undesirable to fix an upper limit for refiguring old bridges. I do not agree with Mr. Loweth on that point. I think the best thing to do is to fix an upper limit and if the chief engineer or the bridge engineer of a larger system feels that he does not like to go to that upper limit, I think he could easily inaugurate a rule in his own office which would require his people to call his special attention to any bridge which came to that limit.

F. E. Schall (L. V.): I want to say something in support of Mr. Loweth's contention. If I remember correctly Mr. Loweth presented a similar table of unit stresses 5 or 6 years ago and they were about the same limit, I believe, and evidently Mr. Loweth has felt and experienced difficulties that made him change his mind.

I feel these stresses are higher than this organization should support as a general license, and say it is perfectly safe to use bridges to that extent. It is not always possible to find the weakest point in a bridge by the inspection made.

Chairman Selby: These rules are not intended to be put out for indiscriminate use by inexperienced men. They are intended only as a guide for an experienced bridge engineer to use in passing on the safety of the bridge, and the necessity for keeping it in service. If articles 1, 2 and 14 of the rules are not strong enough on that point, it might be well to make them stronger, but it should be kept in mind all the time that there is a great deal in passing on the capacity of the old bridge besides the figuring. The figures are only one of the means used to arrive at the capacity of the bridge. The other things are the physical condition, the design, details, material and the general knowledge and judgment of the bridge engineer.

B. R. Leffler (N. Y. C.): The criticism has been made that these unit stresses are too high. I think it might be well to call attention to the secondary stresses, which usually or quite often are included in the calculation of stresses in bridges. The committee in recommending these unit stresses had in mind that every legitimate of possible stress was to be calculated. I think that in the past many of the bridges have been rated as what is known as the axial stress, but in view of the fact that the committee has distinctly stated that all stresses of whatever character are to be included, it seems to me that the so-called high unit stresses are justifiable. I think we should remember that these recommendations here are not to be thrown into the drafting room and stresses calculated and a ruling given on that perfunctory operation. The specifications distinctly call for an exercise of judgment, and it is not intended that the bridge engineers will simply take these rules and pay no further attention to the structures. They are supposed to watch the structure in the light of what they have found in the field as well as in the office. I notice that while these stresses have been criticized as being too high, no one has suggested a lower stress.

Mr. Reichmann: These specifications are drafted for structures well designed, not poorly designed, and where the structures are poorly designed these factors should be considered in going over the details and in that way these stresses should be reduced. If they figure out the various details where they find defective design these stresses should be reduced, as these stresses are intended for well designed structures.

Mr. Leffler: I think it is utterly impossible to recommend limiting stresses for poor design. If a design is

so poor that the defective details cannot be calculated, for instance, eccentric connections, unsymmetrical spacing of rivets, you must rely on your judgment anyhow.

Mr. Tinker: I think these stresses should be laid on the interpretation of the specification and the physical construction of the structure, and its behavior under traffic should be considered of greater importance than the actual figures of stress which may be computed.

As to the matter of the repetition of stresses which has been mentioned, in the case where there is a reversal of stress the majority of members in the structure will not have reversal of stress, and if they have they have been designed with that fact in mind. But they will have stress in the one direction, and I believe it is true that it will require a great many more repetitions where the stress is in one direction, and that that stress may approach considerably closer to the elastic limit than in the case where there is a reversal.

I do not feel that the stresses given here are too high if they are taken in connection with the remaining paragraphs of the specification, which I believe are fully as important as the unit stresses. I wish to refer once more to paragraph 11 and ask the committee if they would not agree to remove the paragraph, because it does open the way for a large increase over the unit stresses in the table which are more or less indefinite, and it permits

a man who might forget his structure, to carry those stresses to a point to which he should not.

I. L. Simmons (C. R. I. & P.): In regard to paragraph 11, it would seem to me that should remain. It defines and limits us in our work in the establishment of the unit stresses. The latter part of the paragraph states that the unit stresses due to dead load, live load, impact and centrifugal force alone shall not exceed those given in the unit stresses. The only thing you are allowing a unit stress for is on account of the wind load. While it is possible, it is quite improbable, that you will get a maximum live load, dead load, impact, and centrifugal force, and the maximum wind load at the same time and the paragraph is written to avoid allowing anything except the wind load.

(The motion for the adoption and insertion in the Manual of Appendix A, as a whole, was carried.)

Chairman Selby: Referring to Appendix C, these principles were published a year ago, submitted as information, and are now without substantial change offered as conclusions.

On behalf of the committee, I move the adoption of conclusion No. 2.

(Motion carried.)

The committee will be excused with the thanks of the Association.

Report of the Committee on Ties

A review of the cross-tie specifications shows that a majority of roads submitting data are adhering closely to a common standard, though none are using the present specifications of the A. R. E. A. A new set of standard specifications for cross-ties and switch-ties, which is based on the U. S. Railroad Administration specifications, is presented for adoption in place of those now in the Manual. Installation of test sections forms best method to obtain accurate data on life of ties, the installation and records being under the supervision of an experienced technical man. Comparisons on economics of different classes of ties proves difficult.



F. R. Layng
Chairman

F. R. Layng is rounding out his fourth year as chairman and his tenth year as a member of the committee. He served for two years as vice-chairman prior to his appointment as chairman. He also acted as chairman of the sub-committee on substitute ties for several years, a position for which he was particularly fitted because of his extensive use of metal ties. As chairman this year he has exerted a strong influence on the standard specification for ties which is presented for adoption this year. Mr. Layng is engineer of track on the Bessemer & Lake Erie, a railroad which has placed a large number of steel ties in its tracks.

IN APPENDIX A THE COMMITTEE tabulated proposed changes in definitions (omitted) and submitted new specifications for cross-ties and switch-ties.

A report on the economics and the use of various classes of cross-ties and various kinds of preservative treatment was reported in Appendix C.

Appendix D contains a report on trials of substitute ties.

Conclusions

1. The committee recommended that the changes in the Manual in Appendix A be approved and the revised matter be substituted for the present recommendations in the Manual.

2. The committee recommended that the reports in Appendices B, C and D, and the special report in Bulletin No. 227, be received as information.

Committee: F. R. Layng (B. & L. E.), chairman; W. A. Clark (D. & I. R.), vice-chairman; W. C. Baisinger (A. T. & S. F.), F. T. Beckett (C. R. I. & P.), M. S. Blaiklock (G. T.), F. Boardman (N. Y. C.), Carl Bucholtz (Erie), W. J. Bur-

ton (M. P.), S. B. Clement (T. & N. O.), E. L. Crugar (I. C.), L. A. Downs (C. of Ga.), John Foley (P. S.), O. H. Frick (C. M. & St. P.), G. F. Hand (N. Y. N. H. & H.), R. M. Leeds (L. & N.), A. F. Maischneider (C. C. C. & St. L.), A. J. Neafe (D. L. & W.), G. P. Palmer (B. & O.), George E. Rex (Nat. Lumber & Creosoting Co.), L. J. Riegler, Earl Sullivan (B. & O.).

Appendix A—Specifications

The committee presented the following "Specification for Cross-Ties" and "Specification for Switch-Ties" and recommended that they be adopted and printed in the Manual in substitution for the specifications approved in 1916 and appearing on pages 243 to 246 of Volume 17 of the Proceedings of the Association.

SPECIFICATION FOR CROSS-TIES

MATERIAL

Kinds of Wood—1. Before manufacturing ties, producers shall ascertain which of the following kinds of wood suitable for cross-ties will be accepted: Ash, Beech, Birch, Catalpa, Cedar, Cherry, Chestnut, Cypress, Elm, Fir, Gum, Hack-

berry, Hemlock, Hickory, Larch, Locust, Maple, Mulberry, Oak, Pine, Poplar, Redwood, Sassafras, Spruce, Sycamore and Walnut. Others will not be accepted unless specially ordered.

PHYSICAL REQUIREMENTS

General Quality—All ties shall be free from any defects that may impair their strength or durability as cross-ties, such as decay, large splits, large shakes, large or numerous holes or knots, or grain with slant greater than one in fifteen.

Resistance to Wear—Ties from needle-leaved trees shall be of compact wood throughout the top fourth of the tie, where any inch of any radius from the pith shall have not less than one-third summerwood in six or more rings of annual growth, or not less than one-half summerwood in fewer rings. Ties of coarse wood having fewer rings or less summerwood will not be accepted unless specially ordered.

Resistance to Decay—Ties for use without preservative treatment shall not have sapwood wider than one-fourth the width of the top of the tie between 20 in. and 40 in. from the middle, and will be designated as "heart" ties. Those with more sapwood will be designated as "sap" ties.

DESIGN

Dimensions—2. Before manufacturing ties, producers shall ascertain which of the following lengths, shapes, or sizes will be accepted, and whether ties are to be hewed or sawed and in either case whether on the sides as well as on the top and the bottom.

All ties shall be eight feet, eight feet six inches, or nine feet long.

All ties shall measure as follows throughout both sections between 20 in. and 40 in. from the middle of the tie:

Table with 3 columns: Grade, Sawed or Hewed Top, Bottom and Sides, and Sawed or Hewed Top and Bottom. Rows 1-6 show various thickness and width specifications for different grades.

MANUFACTURE

All ties, except those of... shall be made from trees which have been felled not longer than one month.

All ties shall be straight, well hewed or sawed, cut square at the ends, have bottom and top parallel, and have bark entirely removed.

INSPECTION

Ties will be inspected after delivery at suitable and convenient places satisfactory to the railroad, which reserves the right to inspect ties at points of shipment or at destination. Ties will be inspected at points other than the railroad's property whenever in the judgment of the railroad there is sufficient number to warrant it; but the shipper shall provide accommodations for the inspector while away from rail or steamer lines and transport him from or to a railroad station or steamer landing.

Inspectors will make a reasonably close examination of the top, bottom, sides, and ends of each tie. Each tie will be graded independently without regard for the grading of others in the same lot. Rafted or boomed ties too muddled for ready examination will be rejected. Ties handled over hoists will be turned over as inspected.

Ties will be rejected when decayed in the slightest degree, except that the following will be allowed: in cedar, "pipe or stump rot" up to 1/2 in. in diameter and 15 in. deep; in cypress, "peck" up to the limitations as to holes; and, in pine, "blue sap stain."

A large hole in woods other than cedar is one more than 1/2 in. in diameter and 3 in. deep within, or more than 1 in. in diameter and 3 in. deep outside the sections of the tie between 20 in. and 40 in. from its middle. Numerous holes are any number equalling a large hole in damaging effect. Such holes may result in manufacture or otherwise.

A large knot is one exceeding in width more than 1/4 of the width of the surface on which it appears; but such a knot may be allowed if it occurs outside the sections of the tie between 20 in. and 40 in. from its middle. Numerous knots are any number equalling a large knot in damaging effect.

A shake is a separation of one ring of annual growth from another. One which is not over 4 in. long or 1/4 in. wide will be allowed.

A split is a break across annual rings. One which is not

over 10 in. long will be allowed provided a satisfactory anti-splitting device has been properly applied.

A tie will be considered straight: (1) When a straight line along the top from the middle of one end to the middle of the other end is entirely within the tie; (2) when a straight line along a side from the middle of one end to the middle of the other is everywhere more than 2 in. from the top and the bottom of the tie.

A tie is not well hewed or sawed when its surfaces are cut into with scoremarks more than 1/2 in. deep or when its surfaces are not even.

The lengths, thicknesses and widths specified are minimum dimensions. Ties over 1 in. more in thickness, over 3 in. more in width, or over 2 in. more in length will be degraded or rejected.

The top and bottom of a tie will be considered parallel if the difference in the thickness at the two sides or ends does not exceed 1/2 in.; that is, one side may be 7/4 in. while the other is 6 3/4 in. wide; or one end may be 6 3/4 in. while the other is 7 1/4 in. thick.

All thicknesses and widths apply to the sections of the tie between 20 in. and 40 in. from the middle of the tie. All determinations of width will be made on the top of the tie, which is the narrower of the horizontal surfaces.

Ties which are oversize will be accepted as follows: 8 in. to 9 in. by 9 in. to 12 in., as Grade 4; 9 in. to 10 in. by 9 in. to 12 in., as Grade 3. Ties over 10 in. thick or over 12 in. wide on top will be rejected. Ties will be graded up by their smaller ends and graded down by their larger ends. The dimensions of the tie will not be averaged.

DELIVERY

All ties, except those of... shall be delivered to the railroad within one month after being made.

Ties delivered on the premises of the railroad for inspection shall be stacked not less than 10 ft. from the nearest rail of any track at suitable and convenient places; but not at public crossings, nor where they will interfere with the view of trainmen or of people approaching the railroad. Ties shall be stacked in alternate layers of two and seven, the bottom layer to consist of two ties kept at least six inches above the ground. The second layer shall consist of seven ties laid crosswise of the first layer. When the ties are rectangular, the two outside ties of the layers of seven and the layers of two shall be laid on their sides. The ties in layers of two shall be laid at the extreme ends of the ties in the layers of seven. No stack may be more than 12 layers high, and there shall be five feet between stacks to facilitate inspection. Ties which have stood on their ends on the ground will be rejected.

Each stack shall have fastened to it a tag on which is written the owner's name and address, the date when stacked, and the number of ties of each kind of wood in the stack.

All ties are at the owner's risk until accepted. All rejected ties shall be removed within one month after inspection.

Ties shall be stacked as grouped below. Only the kinds of wood named in a group may be stacked together.

CLASS U—TIES WHICH MAY BE USED UNTREATED

Table with 4 columns: Group Ua, Group Ub, Group Uc, Group Ud. Lists tree species like Heart Black, Locust, Heart White Oaks, Heart Black Walnut, Heart Douglas, Heart Pines, Heart Cypress, Heart Redwood, Heart Mulberry, Heart Catalpa, Heart Chestnut.

CLASS T—TIES WHICH SHOULD BE TREATED

Table with 4 columns: Group Ta, Group Tb, Group Tc, Group Td. Lists tree species like Ashes, Hickories, Sap Black, Locust, Honey Locust, Red Oaks, Sap White Oaks, Sap Black Walnut, Sap Cedars, Fir, Douglas Fir, Hemlocks, Larches, Mulberry, Pines, Redwood, Beech, Briches, Cherries, Gums, Hard Maples, Soft Maples, Mulberries, Poplars, Sassafras, Spruces, Sycamore, White Walnut.

SHIPMENT

Ties forwarded in cars or vessels shall be separated therein according to the above groups, and also according to the above sizes if inspected before loading.

SPECIFICATION FOR SWITCH-TIES

MATERIAL

Kinds of Wood—1. Before manufacturing ties, producers shall ascertain which of the following kinds of wood suitable for switch-ties will be acceptable: Ash, Beech, Birch, Cedar,

Cherry, Chestnut, Cypress, Fir, Gum, Hemlock, Larch, Locust, Maple, Oak, Pine and Redwood. Others will not be accepted unless specially ordered.

PHYSICAL REQUIREMENTS

General Quality [same as for cross-ties].

Resistance to Wear [same as for cross-ties].

Resistance to Decay—Ties for use without preservative treatment shall not have sapwood wider than one-fourth the width of the top between 12 in. from each end of the tie, and will be designated as "heart" ties. Those with more sapwood will be designated as "sap" ties.

DESIGN

Dimensions—2. Before manufacturing ties, producers shall ascertain what sizes of ties will be acceptable and whether ties are to be hewed or sawed and in either case whether on the sides as well as the top and the bottom.

All ties shall be 7 in. thick.

Ties sawed or hewed on top, bottom, and sides shall be not less than 9 in. wide on top throughout the section between 12 in. from each end of the tie. Ties sawed or hewed on top and bottom only shall be not less than 7 in. wide on top throughout the section between 12 in. from each end of the tie.

Each tie shall be of a length specified below:

(Bill of Material)

1. It is expected that each railroad will specify only the kind or kinds of wood it desires to use.

2. It is expected that each railroad will specify only the shape or shapes and size or sizes it desires to use.

MANUFACTURE

[Clause same as for cross-ties.]

INSPECTION

[All paragraphs same as for cross-ties except the one given below.]

A large knot is one exceeding in width more than one-quarter (1/4) of the width of the surface on which it appears; but such a knot may be allowed if it occurs outside the section between twelve (12) inches from each end of the tie.

DELIVERY

All ties, except those of..... (Specify kind or kinds of wood).....

shall be delivered to the railroad within one month after being made.

Ties delivered on the premises of the railroad shall be stacked not less than 10 ft. from the nearest rail of any track at suitable and convenient places; but not at public crossings, nor where they will interfere with the views of trainmen or of people approaching the railroad. Ties shall be stacked at least 6 in. above the ground. No tie shall be unsupported for more than 10 ft. of its length. The ties in each layer of 10 or more shall be not less than 1 in. apart, and such layers shall be separated by stacking strips at least 1 in. thick and not more than 4 in. wide. If ties are used to separate the layers of 10 or more, and they are rectangular, such strip ties shall be laid on their sides and the 2 outside ties as near as possible to the extreme ends of the ties in the layers of 10 or more. No ties shall be permitted to overhang more than 2 ft. No stack of ties shall be wider than 10 ft.

Each stack shall have fastened to it a tag on which is written the owner's name and address, the date when stacked, and the number of ties of each kind of wood in the stack.

All ties are at the owner's risk until accepted. All rejected ties shall be removed within one month after inspection.

Ties shall be stacked as grouped below. Only the kinds of wood named in a group may be stacked together.

CLASS U—TIES WHICH MAY BE USED UNTREATED

GROUP UA	GROUP UB	GROUP UC	GROUP UD
"Heart" White Oak	"Heart" Douglas Fir	"Heart" Cedars	"Heart" Chestnut
"Heart" Black Oak	"Heart" Pines	"Heart" Cypress	"Heart" Redwood

CLASS T—TIES WHICH SHOULD BE TREATED

GROUP TA	GROUP TB	GROUP TC	GROUP TD
Ashes	"Sap" Cedars	Beech	"Sap" Chestnut
"Sap" Black Oak	"Sap" Cypress	Birches	Soft Maples
"Sap" Locust	"Sap" Douglas Fir	Cherries	
Honey Locust	"Sap" Pines	Gums	
Red Oaks	Hemlocks	Hard Maples	
"Sap" White Oaks	Larches		
	"Sap" Pines		
	"Sap" Redwood		

SHIPMENT

Ties forwarded in cars or vessels shall be separated therein according to the above groups, and also according to the above sets or lengths if inspected before loading.

Appendix B—Methods of Installing and Keeping Records of Test Sections

The Association has decided that the method of test sections is the best way to obtain the necessary data. The methods of installing the test sections and of collecting and reporting the data on different railroads are not uniform, although the work of the Forest Products Laboratory has tended toward uniform methods of reporting.

The principal criticism of the test section method of obtaining data on tie life has been that it often gave abnormal results. This criticism, if merited, is probably due to the fact that the ties are in most cases selected, the maintenance is above the standard, and the renewals are watched with unusual care. The main object of the tests is comparative data, however, and the test sections as usually installed give this comparison, but it is believed that the tests might be made more nearly representative if care were taken to keep the conditions as near as possible to average actual practice.

Of 40 railroads canvassed by this sub-committee, only five submitted data to show that a systematic record of test sections had been kept; namely, the Chicago, Burlington & Quincy, the Great Northern, the Baltimore & Ohio, the Pennsylvania and the Northern Pacific. Several other roads are keeping a more or less complete and comprehensive record of this kind.

RECOMMENDATIONS

Installing Test Sections—(1) In locating test sections, it is of first importance that a piece of track be selected that has no switches and is not likely to be disturbed by new construction or abnormal rail renewals. It is not essential but it is recommended that the test ties all be put in at once "out of face," as this accelerates the gathering of the information and without greatly increasing the ex-

NORTH & SOUTH RAILROAD INSPECTION OF EXPERIMENTAL TIES

Location..... Between M. P..... and M. P..... Date Placed in Track.....

Tie No.	Condition When Laid	Condition at Date of Inspection	
	
1			
2			

Form for Report on the Condition of Each Tie

pense, as the good ties removed can be used elsewhere. All of the different kinds of ties in a test section should, so far as possible, be installed under the same conditions of curvature, grade and drainage. The committee recommends that not less than 100 ties of each kind under test be installed. If installed in multiples of 100, the percentages are readily obtained. If too few ties are put in, a few abnormal failures may make the test misleading. Each tie should be numbered and most roads think it necessary to mark each tie with its number, and in some cases with kind of timber and date of insertion. If a reliable record is kept in the office, however, it scarcely seems necessary to mark the tie with more than its number. The test sections should be marked by suitable monuments at each end.

Inspection of Test Tracks—(2) It is recommended that installation and records of the test sections be under the supervision of a technical man, experienced in that kind of work, who is qualified to make accurate observations and keep good records, so that the tests will be continuous and not affected by changes in the personnel. Regular inspection should be made of the test sections at least once a year. Ties should not be removed except in

emergencies without the approval of the official responsible for the record and should never be destroyed until inspected by him or his representative.

Tie Record—(3) The essentials of the record are covered by two forms: one being a report (Form No. 1) giving the location and principal data, such as traffic, weight of rail, kind of ballast, kind of tie, treatment, etc., and the other a record of the inspections (Form No. 2) showing the condition of each tie at each inspection. If many kinds of ties are under test in the test sections, a chart showing the location of the different kinds will be helpful and it is necessary to have a full record of the treatment of each different lot of ties under test.

In case the ties in the test sections are not put in "out of face," but the existing ties in the track are considered as test ties, the forms must be modified accordingly. Or if the test sections are to be built up by keeping a record of the ties used in renewals, still different forms are needed.

As renewal "out of face" is recommended in installing test sections, only the one set of forms is offered, though it is agreed that reliable records can be secured by any one of the three methods.

Form No. 1

NORTH & SOUTH RAILROAD
REPORT OF EXPERIMENTAL TEST TIE SECTIONS

District.....	Division.....
Location.....	
Kind of Ballast.....	
Tangent or Curve %.....	
Tie Plates.....	
Weight of Rail.....	
Rail Fastenings.....	
Rail Changed When.....	
Weight of Rail Originally in Track.....	
Size of Ties.....	
Kind of Timber.....	
Where Treated.....	
When Treated.....	
How Treated.....	
When Put in Track.....	
Number Originally Put in Track.....	
Number Still in Track Last Inspection.....	
When Last Inspected.....	
Traffic.....	
Remarks:	

Appendix C—The Economics of the Use of Various Classes of Cross-Ties and Various Kinds of Preservative Treatment

An investigation of existing data indicates that not only is satisfactory tie life data far from plentiful, but also that much of it has been obtained, primarily for the purpose of justifying treatment and without very much regard to the question of size of tie or kind of wood. Some of the more recent tie data is one-sided, in that certain variables, especially the treatment details, are recorded with particularity out of proportion to the provisions for other equally important or even more important variables.

Some of the many variables which influence the life of ties are: Kind of wood, dimensions, preservative treatment, ballast, fastenings, climate and traffic. Wrong conclusions might easily be drawn if these variables are based on present data exclusively.

Having in mind this incomparability of much of the limited data existing, as well as to elicit discussion, the committee sent out a questionnaire dealing with the subject, and asking for opinion data where actual results were not available. It would seem from the returns that in some cases "conventional" ideas as to life of ties of certain kinds are reported, and it is also apparent that the variable of traffic, which is very difficult to handle, must receive much greater attention before proper comparisons or conclusions may be made.

A tabulation of the replies shows that, without taking

into account such variables as traffic and climate, conclusions, as, for instance, between ties seven inches thick compared with those six inches, are out of the question.

In view of the lack of data and the conflicting ideas, the committee desires to report progress on the subject, but to draw no conclusions this year. The information in the exhibits is presented as having value in considering the subject.

Discussion

F. R. Layng (B. & L. E.) (Chairman): The first subject to be presented will be the revision of the Manual, which will be given by Mr. Foley, the chairman of this sub-committee.

John Foley (Penna.): Appendix A comprises recommendations of the Committee in connection with the revision of the Manual. They are mostly additions with a few corrections and some omissions.

The Chairman: The chairman suggests that opportunity be given for discussion of that portion of Appendix A, down to the word "Specifications."

Chairman Layng: I move that that portion of the Revision of Manual, shown under Appendix A down to "Specifications," be adopted for printing in the Manual. (*Motion carried.*)

Mr. Foley: The several tables following Appendix A is the summarized form of the material which was gathered by the committee in its consideration of a specification for cross-ties. The chairman calls attention to the fact that the committee was guided by the standard form adopted by the Board of Arbitration, which resulted in a slight rearrangement of this specification. The whole chapter on inspection is a development in the matter of specifications for cross ties, and brings to the manufacturer as well as to the railroad the standard practices which have developed in recent years.

In the ninth paragraph of the matter on Inspection, the committee has the following substitution to recommend: The lengths, thicknesses and widths specified are minimum dimensions. Ties over 1 in. and under 2 in. or more in thickness than the maximum specified will be accepted as one grade below the largest tie specified. Those 2 in. to 3 in. more in thickness than the maximum specified will be accepted as two grades below the largest tie specified. Those over 3 in. more in thickness or width of over 2 in. more in length than the maximum specified, will be rejected. Ties will be graded up by their smaller ends and graded down by their larger ends. The dimensions of the tie will not be averaged.

This does not alter the specification as you have it, but expresses it in a clearer form. It also makes it possible to apply the last paragraph to ties which may be ordered by a railroad that objects to purchasing grades larger than grade 3. As it is in the printed report, a railroad that stopped at grade 3 or grade 4 would not be able to apply this without certain alterations.

W. G. Arn (I. C.): In this paragraph on resistance to wear, what are we to do in the case where a railroad uses loblolly and woods of that kind quite extensively?

Mr. Foley: You will note that the specification does not bar the acceptance of a tie that any railroad might feel that it can accept.

Mr. Lewis: Under the head of "kinds of ties"—kinds of woods, rather—I wonder why the committee adopted that rather negative expression instead of saying: "Cross ties of the following kinds of woods will be accepted."

Mr. Foley: The committee figures that this is a general specification of ties which is going to be circulated. Some railroads which buy over a very large territory will not wish their specification to get into the hands of the manufacturer of ties, for he, without any consultation

with the railroad, might begin the manufacture of them, and end up by finding that some of the kinds of wood which he had in his timber land, and which he converted into ties, are not readily salable. We want it so that the manufacturer will find out from the railroad what it is they desire.

E. A. Frink (S. A. L.): Mr. Chairman, I would like to call the attention of the committee that we have this year presented to us three classifications for ties, this present one, two by the Committee on Wooden Bridges and Trestles, covering bridge ties and sawn ties and guard rails. It seems to me that these specifications should be made to harmonize before they are presented.

Chairman Layng: The committee felt it was certainly not the province of that committee to present specifications for either cross ties or switch ties. We feel that it is the duty of this committee to handle that, and if they have presented a specification we feel that they should withdraw it.

Mr. Foley: The committee felt that since switch ties were used as are cross ties, the specification should correspond as far as conditions would allow, and in that they followed the practice which was made standard in 1915, 1916 and 1917. Again, the specification follows the standard that is adopted by the Board of Direction.

(Mr. Foley gave the specification for switch ties.)

Chairman Layng: *I move the adoption of these specifications for cross ties and the specification for switch ties for printing in the Manual.*

(*Motion carried.*)

Chairman Layng: The next subject is shown in Appendix B, which will be presented by W. A. Clark, chairman of the sub-committee.

W. A. Clark (D. & I. R.): A year ago the Association approved of the test section method of collecting data on the life of cross ties. This committee was asked to report on methods of installing and keeping records of test sections. It developed from the information received by the committee that while many roads have installed test sections, there is no uniform method adopted for installing or keeping the records. With a view of promoting uniformity the committee had formulated the recommendations presented.

F. J. Angier (B. & O.): I suggest that in Form No. 1 the committee leave a line there for the average annual rainfall. It seems to me this is a factor that should be considered in any test tie section.

The Chairman: The committee say they will take that suggestion under consideration.

(Appendices C and D were next presented for the information of the Association, following which the committee was dismissed with the thanks of the Association.)

Report on Signs, Fences and Crossings

Revision of specifications for standard right-of-way fences is presented in order to make such fencing conform to the law in a large number of states. Old recommendations as to galvanizing are found impracticable when applied to manufacturing processes. Additional standards for signs for the use and information of railway employees are submitted for inclusion in the Manual. A valuation section sign is recommended on account of the valuation by the government and the probable continuation of reports by valuation sections. Regulations as to grade crossings already in effect in various states and Canada are presented. Wood plank is recommended for grade crossing construction.



Arthur Crumpton
Chairman

Arthur Crumpton has been a member of the committee for eight years, and served as vice-chairman for three years prior to his appointment as chairman two years ago. Through his active participation in the work of this committee he has rendered an important service to the railways through the development of a series of standard signs to replace the innumerable designs now in use over the country. As valuation engineer of the Grand Trunk, which has been taken over recently by the Canadian Government, he is now in the anomalous position of working under the direction of the United States Division of Valuation, in so far as the mileage in this country is concerned.

IN APPENDIX "A" are given proposed changes in the Manual, together with the reasons therefor, and its recommendations are given under the heading of Conclusions. In Appendix "B" the committee submits the results of its review of various signs. Its recommendations are given under the heading of Conclusions. In Appendix "C" the committee submits the results of its studies on highway crossing protection. This includes an abstract of laws on this subject in the United States and Canada (omitted).

Conclusions

(1) The committee recommended that the changes in the Manual in Appendix "A" be approved.

(2) The committee recommended that the following paragraphs be approved and published in the Manual at the bottom of page 316 in lieu of its recommendation adopted at the last convention. The additional signs

covered are End of Block, Lack of Clearance, Corporation or Sub-division and Passing Siding.

ROADWAY INFORMATION SIGNS

Signs for Dump Ashes, Blind Siding, Water Station, Fuel Station, Beginning of Double Track, End of Double Track, End of Block, Lack of Clearance, Corporation or Sub-division and Passing Siding to be similar to sketch shown on page 318, 1915 Manual, for Trespass Signs.

Length of sign plate to be changed, if necessary, on account of wording, and corners to be square on last two signs.

The committee recommended that the designs submitted of Mile Post, Section Sign, Sub-division and Section Sign, Property Post, Bridge Number, Curve and Elevation, Number and Valuation Section signs be approved and published in the Manual.

Committee: Arthur Crumpton (G. T.), chairman; Maro Johnson (I. C.), vice-chairman; Arthur Anderson (N. Y. C.),

F. W. Bailey (S. A. & A. P.), F. D. Batchelor (B. & O.), F. T. Darrow (C. B. & Q.), G. N. Edmondson (N. Y. C.), S. C. Jump (I. C.), L. C. Lawton (A. T. & S. F.), S. L. McClanahan, W. S. McFetridge (B. & L. E.), L. A. Mitchell (Un. Tr.), T. F. Rust (C. F. & N.), W. D. Warren (N. Y. N. H. & H.), K. G. Williams (Union), D. R. Young (D. L. & W.).

Appendix A—Revision of Manual

SPECIFICATIONS FOR STANDARD RIGHT OF WAY FENCES

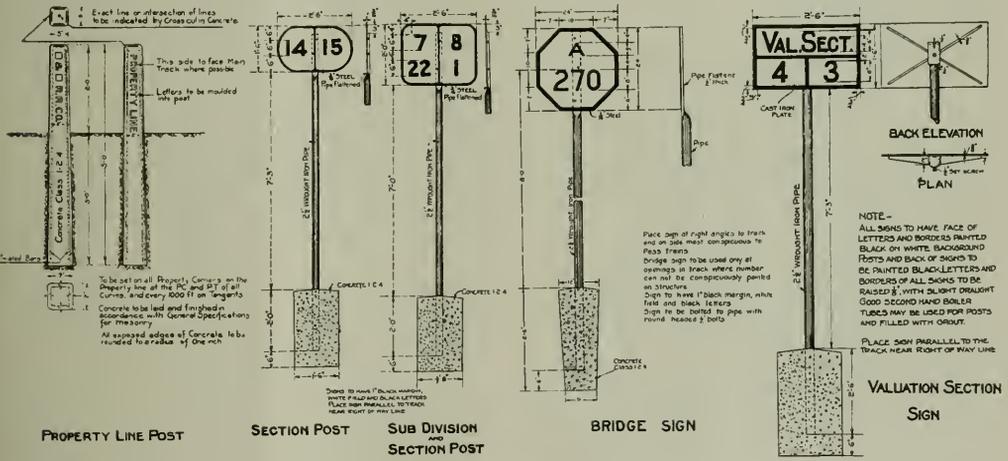
Class A Fence.—A fence 4 ft. 6 in. high is required by the laws of a great many states. The specifications for they now appear in the Manual provide that when this fence is used for hogs the bottom wire shall be not over 3 in. above the ground with a strand of barbed wire below. This would make the fence only 4 ft. 4 in. high, which would prevent its use in states requiring a 4 ft. 6 in. high fence. The sub-committee believes that the use of a barbed wire 2½ in. below the fencing will serve the purpose without lowering the woven wire.

Class B Fence.—A change from stays 18 in. apart to 12 in. apart is recommended because our largest makers of woven wire fencing do not fabricate this fence with

for line posts provide that they shall be 16½ ft. apart, without any reference to a short panel at the corners or ends. The sub-committee believes that a shorter panel should be used at these corners and ends and recommends 10 ft. If this panel is too long an unnecessarily heavy brace is required and if it is too short there is a tendency for the end post to lift out of the ground. Ten feet is thought to be about the right length. The change in the distance apart of other line posts to "not more than 20 ft." is to meet the practice of those roads which use 20-ft. centers, and, apparently, with good results.

Stretching.—The sub-committee is of the opinion that on curves it is desirable to have the fence on the outside of the curve from the posts so that the fence pulls against the posts instead of away from them. If this is not done it is thought that the staples would be likely to pull out when the wood in the post gets old and loses its holding power.

Splicing.—The sub-committee recommends the omission of the last two sentences advocating smooth wire, as it seems to us that while the use of smooth wire may be proper in some places it certainly is not desirable in



Recommended Designs for Inclusion in the Manual

18-in. stays. It is also our opinion that the use of 12-in. stays is fully warranted.

Class C Fence.—The Class C fence specified in the Manual is one that is only suitable under special conditions and in special locations. A fence 3 ft. 6 in. high is not suitable for general use, would be a legal stock fence in few, if any, states, and when used should be so placed as to suit the special conditions which caused its adoption. In its place the sub-committee has recommended a fence which is being used to some extent and which gives most of the advantages of the Class A fence at a considerably lower cost.

Concrete Posts.—The specifications for concrete posts, paragraphs 10, 11, 12 and 13 and the last sentence of paragraph 24, are obsolete, being largely amended by the conclusions adopted by the Association in 1918. Inferentially, also, they exclude the use of steel posts which have been adopted by several roads. The sub-committee thought it best, therefore, to omit all reference to concrete posts. Later on, if thought best, specifications of fence with concrete posts and with steel posts can be prepared by the committee.

Intermediate or Line Posts.—The present specifications

all places. On the western plains, for instance, smooth wire would scarcely be suitable for cattle fences.

GALVANIZED WIRE FENCING

The committee recommended that the two paragraphs on page 303 of the Manual headed Galvanized Wire Fencing be omitted.

Appendix B—Signs

The following is a resumé of the various signs, together with recommendations for their use. Signs should be divided between those serving the public and those serving employees, the latter of course being largely in the majority.

The first signs are those serving the public:

Highway Crossing Signs.—(a) At crossings. (b) Approach warning signs. The first sign, "at crossings," is covered in the 1915 Manual, page 317. The second sign, "approach warning signs," was adopted by the convention at its 1920 session.

Trespass Signs.—(a) Right-of-Way. (b) Bridge. (c) Crossing. These are covered on page 318 of the 1915 Manual.

Private Crossing Sign.—The committee does not believe a sign should be adopted by the Association to cover this, but considers it entirely a local matter as to their use.

the view is obscured or highway and rail traffic is heavy. Their use elsewhere is not ordinarily justified. Where a flagman is on duty bells should not be installed. There is a tendency for the flagman to depend on the bell.

Mechanically operated gates are simple and easy to maintain. The pneumatic gate is also satisfactory. Both types are subject to some trouble in the winter time. Pneumatic gates are adapted to situations where more than one pair of gates are operated from the same gate house. Such installations should be made where the gateman has a full view of both crossings. Electrically operated gates are more expensive in first cost, in maintenance and in operation. The use of automatic electric gates actuated by approaching trains through a track circuit is not desirable. It should be possible to operate gates on opposite sides of the track independently. It requires about 20 sec. to operate one pair of gates. The crossing should be closed about ½ min. in advance of the arrival of train. Striped gate arms are more easily seen than those painted in solid color.

Wigwags should be visible 500 ft. from the track. Bells should be loud enough to be heard above the noise of trains. Either device should be operated not less than ½ min. in advance of arrival of train. The length of track circuit will vary with the grade and with operating conditions. On double-track lines operation of warning devices is usually in the normal direction only.

Wigwags should be positive in action. The arrangement should be such that, when in working order, the disc will be concealed except when a train is approaching. When the device is out of order the disc should be in full view. Bells striking intermittently are more effective than those ringing continuously.

Discussion

Arthur Crumpton (G. T.), Chairman: In Appendix A the committee submit proposed changes in the Manual, together with the reasons therefor, and I will ask Mr. Rust, Chairman, to present the report.

T. E. Rust (W. C. F. & N.): Your committee, somewhat against its inclination, has recommended quite a number of changes in the Manual.

(Mr. Rust submitted Appendix A) and said:

"(3) The Sub-Committee recommends that the two paragraphs on page 303 of the Manual headed Galvanized Wire Fencing, be omitted."

In the first place they are rather conflicting. In one case they say that an electrically welded fence should be regalvanized after fabrication, and in the second place they say it should be galvanized after fabrication. The second paragraph also says that only wire of the specification of the Association should be used in the fences. That part of it, it seems to me, is entirely unnecessary. The adoption of the specification carries with it the recommendation that it should be used.

As to the regalvanizing of woven wire fencing, it is felt that this is impractical. In the first place, when the wire is to be coated with spelter, it is drawn through the bath and it will acquire the temperature of the spelter before it leaves the bath. If that is done, obviously the spelter which is first put on the wire will be melted off during its progress through the bath, and no more spelter will remain on the wire than remained after the first immersion. In the second place, wire metal which has been exposed to the atmosphere even for a few moments slightly oxidizes, and in order to be properly coated with zinc it is necessary that it should be chemically clean. There is no known method of chemically cleaning wire after it has been once zinc coated so that it will take a second zinc coat.

As to galvanizing after fabrication, I think that if the

members will consider what the result would be, even if such a process were practical, they would not desire to have a fence that had been regalvanized after fabrication. Large knots of spelter would unquestionably accumulate at the junction of the wires, and when the fence was unrolled for stretching, they would break off, and portions of the original metal would be exposed. At the present time there are no facilities in the United States for galvanizing woven wire fencing so far as this committee has been able to discover, and the principal manufacturers say that they have no machinery for doing it.

Chairman Crumpton: I may say in connection with this subject that the changes, which are rather drastic, are really for the elimination of some of the articles and parts of the specifications, to harmonize the parts so that they come in as a consistent whole. With that in view I will move the adoption of the committee's conclusions.

(Motion carried.)

Chairman Crumpton: The report of the sub-committee on Signs will be found in Appendix B.

(F. D. Batchelor (B. & O.) submitted Appendix B.)

Chairman Crumpton: This question of signs has been up for quite a number of years, and the committee from time to time has recommended individual signs. This year they attempted to cover the whole field of signs, and feel that the signs that have been spoken of this morning, together with those that have been recommended by this committee before, and also those that were recommended by the signal committee and adopted, will practically cover the field of signs. You probably will notice some signs are missing, but it was felt that these were of minor importance, and each road should do as it pleased.

The committee moves the adoption of its recommendation.

G. A. Mountain (Can. Ry. Com.): I would like to ask the committee why they omit the private crossing signs? My experience is that they are very important.

Chairman Crumpton: One of the reasons that sign was omitted is that we found the practice on the different roads in the country, both in United States and Canada, varied so much that we thought it was practically impossible to get anything that would meet the conditions.

W. A. Christian (M. & St. L.): I notice the size of the corporation signs is quite large.

Chairman Crumpton: That was obviously an error in the size.

Hadley Baldwin (C. C. C. & St. L.): I notice that the committee recommends a sign for the beginning and end of the double track similar to the sign for the end of a block. The signal is different, and I wonder why they recommend the same kind of sign. They should be distinct, it seems to me.

Chairman Crumpton: Some time ago the question of signs was brought up and divided into two classes, one for the guidance of the engineman which had to do with the operation of the road, and the other for the information of the employees. Those in connection with the operation of the road were dealt with by the Signal committee, which adopted very distinctive designs. This committee was of the opinion that these signs should be given great prominence, but that the balance of the signs, the right-of-way signs, should be as inconspicuous as possible, and one form of small sign was adopted for information purposes, and this sign was used as much as possible without any variation, the idea being to save expense.

John V. Hanna (K. C. Term.): As to the use of the 2½-in. wrought iron rod provided in some of these signs, I ask whether the committee has tried to work out a concrete rod for that purpose, and, if so, what difficulties they found.

Chairman Crumpton: As to the question of the 2½-in. pipes, every railroad has many old boiler tubes, and, as a great many roads use these, the committee carried out that idea.

J. B. Hunley (C. C. & St. L.): I note that the valuation section sign is cast iron, and the section post and the subdivision section post, which are practically the same, are steel plates. I was wondering why that difference was made. Of course, the section posts will be moved more frequently than the valuation section signs, and may be considered as of a less permanent nature, but, on the other hand, when they are moved they will be used again, and used until they are worn out. A cast iron sign would be more expensive.

Mr. Batchellor: I have nothing special on that, other than that the chairman took into consideration that the valuation sign was more permanent and not so frequently used as a section sign.

Mr. Hunley: That is true, but on the other hand the section signs, even if they are moved, will undoubtedly be used until they are worn out. The only purpose I can see about it is that with the cast letters it is absolutely permanent and fixed. I wondered what the idea of the committee was in recommending this.

Chairman Crumpton: The chairman of the sub-committee is not here, and that is a detail I do not know about. I know that the committee felt these valuation signs were very permanent, and when put up were put up once for all, and that applied also to the section signs.

Hadley Baldwin (C. C. & St. L.): Is it part of the recommendation of the committee that mile posts carry the numbers in both directions?

Chairman Crumpton: The committee discussed that matter and got information as to how mile posts should be numbered, and this is given merely as an illustration. It seemed to the committee that question should be settled, that is, roads should number from one terminal right through, and omit the double number, and as a matter of fact since the question of valuation has come into prominence this double numbering is leading to trouble.

The committee worked over that matter, but as I say, as so many roads have different practices, it was practically dropped, so far as this report is concerned, and we put in the mile posts, following the ordinary practice.

E. A. Frink (S. A. L.): I ask if the committee has developed any way of permanently marking the concrete posts and concrete signs?

Chairman Crumpton: The letters are indented. (*Motion for the adoption of the recommendations carried.*)

Chairman Crumpton: The third assignment to the committee was "to make a final report, if practicable, on Grade Crossings, Crossing Gates, Crossing Signal Bells, and Warning Signals."

Maro Johnson (I. C.): These specifications are presented with the idea of bringing out the views of the members, and the committee would like suggestions on this subject.

The matter on warning signals is submitted as information.

C. E. Johnston (K. C. S.): It seems to me the part of the report relating to the interest of state authorities in co-operating with railroads in the matter of reducing the number of highway crossings, etc., is a very important one, and something on which the members of this association can accomplish a great deal if organized in some manner to investigate these new road projects and to ascertain in advance where grade crossings might be eliminated. In many cases the management of these

roads were advised of points where the roads might be changed, even with little cost to the railroads, it would mean saving to all the lines. As far as our lines are concerned, it has put an idea into my mind to canvass the entire territory to see where we can eliminate grade crossings.

G. A. Mountain (Can. Ry. Com.): Is it meant, in connection with the matter concerning warning signals and bells, that where a flagman is on duty bells should not be installed? Our experience is, where we have a fairly heavily traveled route, somewhat dangerous, more particularly traveled in the daytime, we have found it advantageous to put a watchman on and also install a bell. The bell is cut out during the daytime and it is cut in by the watchman for use at night, when the travel is not so heavy as in the daytime. It has worked all right in our case.

Mr. Johnson: I think that is the situation the committee has in mind. Mr. Mountain states the bell is cut out when the flagman is on duty, and that corresponds with our view of the matter, that the bell and the flagman should not be there at the same time.

Mr. Mountain: The wording says that the bell should not be installed.

Mr. Johnson: That conveys the wrong idea.

Mr. Mountain: In the report where it says: "On double track lines operation of warning devices is usually in the normal direction only." I would like to ask the committee if they will give consideration to that. Our view of it is that for wigwags and bells the bonding should be in both directions against the current of traffic, and there you are in a very dangerous position. You are operating a bell in the direction of traffic. When you are operating against the traffic there is no warning. It seems to me if anybody is injured under those circumstances, you are absolutely out of court.

Mr. Johnson: The committee found this was the practice on a number of railroads and followed that suggestion with the assumption that traffic in opposite directions is protected by a flag.

C. F. Loweth (C. M. & St. P.): I want to congratulate the committee on this report, especially that portion of it which deals with the present trend of legislation with relation to grade crossings, and especially that part of apportioning the cost between the municipalities and the railroads. I recently had occasion to read into the records at a committee of one of our state legislatures a portion of this report, showing especially the trend of recent legislation in respect to the apportionment of the cost of grade separation between the counties and towns and the railroads.

The chairman referred to the Wisconsin law, a recent law which the railroads are not very happy about, and that law provides that the State Commission may apportion to the railroad as much of the cost for the improvement of the highway as would represent the capitalization of the protection which the railroad has or should have at that crossing. Now, that works out very strangely sometimes and it has resulted in the railroad sometimes being assessed the entire cost of a highway improvement.

It seems this matter of the apportionment of cost between the parties interested, the state as well as the railroad, is one of very great importance and one that the railroads should be kept in very close touch with.

J. L. Campbell (E. P. & S. W.): In the matter of co-operation between the railroads and the community on the question of the costs of grade separation, as a rule the railway alone is not responsible by any means for the grade separation problem. It has been the rule in this

country that the communities have built up around the railways and the growth of the community itself, of which the railway is only a part, has created the problem.

I suggest that you can render a very important service for your companies and the properties with which you

are connected in connection with these grade separation issues by making the community understand its obligation and the mutual interest that it has.

(Committee was then excused with the thanks of the Association.)

Report on Uniform General Contract Forms

Several revisions in the Manual are proposed, covering changes in the construction contract form and other agreements. A final report is presented for adoption on the form of lease agreement for industrial sites. The standardized form as submitted embodies the fundamental principles governing the preparation of this class of lease, and where not entirely adaptable because of peculiar or varying conditions, it can be modified or used as a guide. A form of license for wires, pipes, conduits and drains is also presented. Replies to a questionnaire on standardization of contract forms shows that a large amount of thought is being given to the question.



W. D. Faucette
Chairman

W. D. Faucette is completing his first year as chairman and his fifth year as a member of the committee. As chief engineer of the Seaboard Air Line since December, 1912, he has had frequent opportunity to realize the value of standard forms for contracts, leases and similar documents. He has therefore been able to appreciate the importance of the work of this committee to an extent that men in less responsible positions would not and to direct the preparation of these standard forms with more enthusiasm. The report for this year testifies to the amount of attention which the committee has given to the work assigned to it.

IN ITS APPENDIX A, COVERING revision of the Manual, the committee recommended certain changes for adoption by the Association. In Appendix B is presented a tentative form of Wire Line Agreement, and in Appendix C there is presented for adoption by the Association a form of Lease Agreement for Industrial Site.

Conclusions

(1) The committee recommends that the changes in the Manual be approved and that the revised matter be substituted for the present recommendations existing in the Manual or Supplements.

(2) The committee recommends that the form of license for wires, pipes, conduits and drains on railroad property set forth in Appendix B be received as information, and be assigned as part of the committee's work for the coming year.

(3) The committee recommends that the final report on Form of Lease Agreement for Industrial Site, Appendix C, be adopted and printed in the Manual.

In an Appendix D the committee presented a table of replies received to a questionnaire relating to the use of the standard forms adopted by the Association.

Committee: W. D. Faucette (S. A. L.), chairman; C. A. Wilson (Cons. Engr.), vice-chairman; C. F. Allen (M. I. T.), A. O. Cunningham (Wabash), G. L. Davenport (A. T. & S. F.), Clark Dillenbeck (P. & R.), C. E. Gifford (Br. Builders' Soc.), J. C. Irwin (B. & A.), E. H. Lee (C. & W. I.), O. K. Morgan (C. C. & O.), C. B. Niehaus (C. of Ga.), H. A. Palmer (G. T.), C. J. Parker (N. Y. C.), J. W. Pfau (N. Y. C.), A. C. Shields (C. R. I. & P.), E. L. Taylor (N. Y. N. H. & H.), Frank Taylor (C. P. R.).

Appendix B—License for Wires, Pipes, Conduits and Drains on Railroad Property

(Tentative Form)

THIS AGREEMENT, made this.....day of..... 19.., by and between the..... hereinafter called the Company, and..... having a principal office or place of business in..... hereinafter called the Licensee,

WITNESSETH, THAT:

Whereas, the Licensee desires to construct, maintain and use..... upon the property of the Company, situated in..... and more definitely shown on the plan hereto attached, designated as..... and dated..... and made a part hereof:

It is mutually agreed as follows:

- The Company grants permission to the Licensee to construct, maintain, and use..... upon the property of the Company, in accordance with said plan and the specifications forming a part thereof, and subject to the requirements of the Company.
- In consideration of this license, the Licensee shall pay to the Company, in advance, the sum of..... per..... beginning.....
- Every cost and expense of construction, maintenance, use and removal resulting from this license shall be paid by the Licensee. The Company may perform without notice any work which it considers necessary to the safe operation of the railroad. The Licensee shall do no work under this license, which may interfere with the operation of the railroad without the written permission of the Company.
- Use of the property of the Company however long continued shall not affect any estate or easement in the Licensee or any rights other than license.
- The Licensee shall indemnify, protect, and save harmless, the Company from and against all claims, suits, costs, charges, and damages, made upon or incurred by the Company in connection with this license.
- This agreement may be terminated by either party by..... notice to the other party, or without notice on disuse by the Licensee for.....
- Any notice given by the Company to the Licensee shall be deemed to be properly served if the notice be delivered to the Licensee, or if left with any responsible agent of the Licensee, or if deposited in the postoffice, post paid, addressed to the Licensee at..... last known place of business.
- Upon termination hereof the Licensee shall forthwith remove all his constructions from the property of the Company, satisfactory to the Company. In case of the Licensee's failure so to do, the Company may at its option either retain such constructions or remove them at the cost of the Licensee.
- This agreement shall not be assigned or in any manner transferred, without the written consent of the..... of the Company.
- Until terminated as hereinbefore provided, this agreement shall inure to the benefit of and be binding upon the

legal representatives and successors of the parties respectively.

IN WITNESS WHEREOF, the parties hereto have executed this agreement on the day and year first above written.

Witness..... Company.
Witness..... By.....

Appendix C—Form of Lease Agreement for Industrial Site

Parties. (1) THIS LEASE, Made in..... this..... day of..... 19....., by and between..... a corporation, the Lessor, hereinafter called the Company, and..... having a principal office or place of business in..... in the..... and..... hereinafter called the Lessee, WITNESSETH:

That the Company in consideration of the agreement of the Lessee herein contained, hereby leases unto the Lessee, all those certain premises, situated in..... County of..... State of..... described as follows:

Description. (2)..... the location and dimensions of said premises being more definitely shown on the plan hereto attached, designated as..... and dated..... and hereby made a part hereof.

Term. (3) To have and to hold same from..... 19....., to..... 19....., unless sooner terminated, as hereinafter provided.

Termination. (4) Either party hereto may terminate this lease at any time, by giving to the other party..... days' written notice to that effect. Acceptance of rent in advance by the Company shall not act as a waiver of the right to terminate this lease.

Notice. (5) Any notice given by the Company to the Lessee shall be deemed to be properly served if the same be delivered to the Lessee, or if left with any of..... agents, or if posted on said premises, or if deposited in the postoffice, postpaid, addressed to the Lessee at..... last known place of business.

Rent. (6) The Lessee shall pay a rental of..... per....., payable..... in advance, beginning on..... for the use of said premises, payable to the..... of the Company, at.....

Refund. (7) Rent paid in advance for a period extending beyond the termination of this lease shall be repaid to the Lessee within thirty days after demand, unless such termination shall be on account of violation or non-fulfillment of any of the terms of this lease by the Lessee, or on account of the abandonment of said premises by the Lessee, in which case the amount paid as rental shall be retained by the Company.

Taxes. (8) The Lessee shall pay all taxes, licenses and other charges which may be assessed or levied upon said premises, improvements thereon, and upon the business of the Lessee upon said premises, or against the Company by reason of occupation or use of said premises by the Lessee.

Purpose. (9) The said premises shall be used for the following purposes:.....

Assignment. (10) This lease shall not be assigned or in any manner transferred nor said premises or any part thereof sublet, used or occupied by any party other than the Lessee, nor for any other purpose other than that specified herein, without the written consent of the Company.

Abandonment. (11) The failure of the Lessee to occupy or use said premises for the purpose herein mentioned for..... days at any one time shall be deemed an abandonment thereof. An abandonment of said premises by the Lessee, shall operate as an absolute and immediate termination of this lease without notice.

Improvement. (12) The Company hereby gives to the Lessee, subject to all of the conditions hereof, the privilege of erecting, maintaining and using on said premises, suitable buildings and other structures for the aforesaid purposes; provided that such buildings and other structures shall be first approved by..... of the Company, and thereafter maintained as to meet with the approval of the..... of the Company; that the Lessee shall, so long as this lease continues, keep all buildings and other structures on said premises in good repair, including painting, so as to present a good appearance, so far as required by such..... and that the Lessee shall install, rearrange and maintain such improvements as may reason-

ably be required by said Company for the reduction of fire hazard.

Clearance. (13) The Lessee shall neither erect nor place, nor permit to be erected or placed, upon said premises any structures or obstruction that will, in any way imperil the safety of trains, engines or cars upon such railroad tracks as are now or may hereafter be located on, or adjacent to said premises, or the safety of persons or property in, upon, or about such trains, engines or tracks. The minimum horizontal and vertical clearances from the tracks shall be prescribed by..... of the Company upon request.

Removal of Improvements. (14) Upon the termination of this lease in any manner, the Lessee, upon demand of the Company, without further notice, shall deliver up to the Company the possession of said premises, and shall if required, remove all the improvements placed thereon by the Lessee, and restore said premises to substantially their former state, and in case the Lessee shall fail, within..... days after the date of termination of this lease, to make such removal or restoration, then the Company may, at its election, either remove said improvements and restore said premises for the account and at the sole cost of the Lessee, or may take and hold the said improvements as its sole property.

Inflammables. (15) No goods of an explosive, dangerous or inflammable nature or character shall, in any case, be stored in or upon said premises without the written consent of the Company.

Condition of Premises. (16) The Lessee shall at all times keep said premises and the vicinity thereof, in a safe, clean and sanitary condition. The Lessee shall not mutilate, damage, misuse, alter or commit to suffer waste in premises.

Advertising. (17) No advertising shall be placed upon said premises or upon any structures thereon, except for the Lessee's own legitimate purposes, and all advertising so placed shall be to the satisfaction of the..... of the Company.

Laws and Regulations. (18) The Lessee shall in all respects abide by and comply with all laws, rules, regulations and ordinances affecting the said premises.

Miscellaneous Charges. (19) The Lessee shall pay all charges for water and lighting and for street or road sprinkling, sweeping and oiling, that may be levied or assessed against said premises, covering the period of occupancy.

Snow and Ice. (20) The Lessee shall at all times keep the sidewalks in front of said premises free and clear of snow and ice, and any expense to the Company by reason of the failure of the Lessee so to do shall be paid by the Lessee to the Company upon demand therefor; such expense to include all loss or damage of whatsoever character, either to persons or property.

Use of Tracks. (21) The Lessee shall not permit nor allow tracks belonging to others than the Company to be constructed upon said premises, and the Lessee will not permit nor allow trains or engines belonging to others than the Company to be used upon or given access to said premises, without the written consent of the Company.

Company's Right of Entry. (22) The Company shall have the right at all times to enter upon and to construct railroad tracks on said leased premises, and to maintain and operate, and to extend or change the location at any time, of such tracks as are then on said premises, upon..... days' written notice to the Lessee. If any structure on said premises shall obstruct or interfere with the construction of additional main or passing tracks of the Company, or if required for proper clearance of tracks, the Lessee at..... expense, shall promptly move such structure to another location, either on or beyond said premises as may be necessary, upon..... days' written notice to the Lessee.

Access to Premises. (23) In the event it is necessary for the Lessee or his agents, servants, workmen and customers to pass over other lands of the Company and railway tracks of the Company, to have access to and from said premises, all such persons shall make use only of the way indicated by the..... of the Company for that purpose, and the Lessee hereby expressly assumes all the risk of accident and injury to the person and property of all such agents, servants and workmen, and all others resorting to the leased premises in connection with the Lessee's business, whether the same be occasioned by the negligence of the Company's servants or in any other manner whatever, and the Lessee shall indemnify the Company from and against all claims, suits, costs and charges made upon or incurred by the Company by reason or in consequence of any such accident, loss and injury.

Liability. (24) (a) The Lessee assumes all responsibility for and agrees to indemnify the Company against loss or damage to property of the Lessee or of others upon said

premises, regardless of negligence of the Company, arising from fire caused by locomotives operated by the Company in serving the lessee upon said premises, or in the vicinity thereof, except to rolling stock belonging to the Company or to others, and to shipments in the course of transportation.

(b) The Lessee agrees to indemnify, protect and save harmless the Company for loss of, damage to, or destruction of property of the Lessee or of others upon said premises whether caused by fire or otherwise (except fire caused by locomotives as hereinbefore provided for), or for death or injury to, any person or persons, arising out of the construction, maintenance, use, or operation on said premises (except where such death or injury was due solely to negligence of the Company).

Forfeiture. (25) Any breach of any covenant, stipulation or condition herein contained to be kept and performed by the Lessee, shall after.....days' written notice, if continued, at once terminate this lease, and all rights of the Lessee hereunder. No further notice of such termination or declaration of forfeiture shall be required, and the Company may at once re-enter upon said premises and repossess itself thereof, and remove all persons therefrom, or may resort to an action of forcible entry and detainer, or any other action to recover the same.

Right of Inspection. (26) The said premises shall be open at all reasonable times to the inspection of the Company, its agents, and applicants for purchase or lease.

Renewal. (27) If the Lessee, with the consent of the Company, holds over and remains in possession of said premises after the expiration of said term, this lease shall be considered as extended, and shall continue in effect from.....to....., subject, however, to termination as herein provided, and upon the same terms and conditions as are herein contained. Until terminated as hereinbefore provided, this lease shall inure to the benefit of and be binding upon the parties hereto, their heirs, executors, administrators, successors and assigns.

IN WITNESS WHEREOF, the parties hereto have executed this lease on the day and year first above written.

.....
Company.
Witness:.....
Witness:.....
By.....

Discussion

(J. L. Campbell (Second Vice-President) in the Chair.)

G. H. Wilson (Vice-Chairman): Three subjects were assigned to the committee for attention this year. The first is "Make thorough examination of the subject matter in the Manual and submit definite recommendations for changes. This subject was handled by a sub-committee, of which Mr. Clark Dillenbeck is chairman.

Clark Dillenbeck (P. & R.): The committee has carefully gone over the Manual and made recommendations for certain changes as here shown. The first is "Construction Contract Forms." And we propose that this heading be changed to "Form of Construction Contract." In going over the Manual we noticed that the headings varied considerably and it was the thought of the committee that it would be well to make them uniform.

With reference to form of proposal, page 655, it is recommended that this be placed to precede "(A) Agreement." It appeared to the committee that this one page in the form is out of place and should be placed preceding the "(A) Agreement."

The next suggestion is Section 30, change the heading in the first paragraph. It is proposed to change the heading to read "Land of company, use of by Contractor." And there is a new proposed form under this heading. (Read proposed form.)

Section 32, page 662, has reference to the annulment of contract and the present reading of it is that the contractor shall be paid for the work annulled. We simply change the reading of the last line and say that "payments shall be made for work done on such portion so abandoned, as provided in Section 38 of this contract."

Section 34, page 663, it is simply suggested to omit the words "30 days" from the second and third lines. Under the present reading after a contract has been annulled,

the contractor would be permitted to continue the work for 30 days, and it is the thought of the committee that it is frequently the case when contracts are annulled that work must be stopped at once.

On page 666, change the heading "Bond" to "Form of Bond."

In the form, "Industrial track agreement," change the heading to read "Form of Industry Track Agreement."

The committee realizes the changes are necessary in the form and regrets that definite recommendations must be abandoned to a later date. The principal reason for this is that the matter was under consideration by the corporate engineers. I believe they had reported to the executives and their report has not been approved, and also the freight traffic department is expecting an order from the I. C. C. With these things staring us in the face we did not see that we could properly go ahead and correct this agreement.

In the agreement for interlocking plant, change the heading to read: "Form of Agreement for Interlocking Plant," and omit the whole Section 9, on wage rates.

Owing to the present rules of the Labor Board we thought that was not compatible with present practice.

In the form headed, Agreement for grade crossings, change the heading to read: "Forms of Agreement for Crossing of Railroad at Grade." The present heading simply reads: "Agreement for Grade Crossings," and grade crossings are generally spoken of as highway crossings and it was the thought of the committee we had better change it as noted. We also suggest omitting the first note which refers to Federal control, and change the words "Grade crossing" to "Railroad crossing at grade," wherever they occur.

The committee recommends that the above changes in the Manual be approved and that when the Manual is reprinted the changes be incorporated therein.

(Motion to accept the changes was carried.)

Vice-Chairman Wilson: The second subject is to be a report on forms of agreement embodying rules governing the construction of undercrossing of railways with electrical conductors, conduits, pipe lines, and drains, conferring with Committee on Roadway and Electricity."

This will be presented by Mr. J. C. Irwin.

J. C. Irwin (B. & A.): The sub-committee on the preparation of this form collected a large number of agreements used by American railroads and, of course, found a great diversity of practice in the majority of these cases. The specification formed part of the License for Wires, Pipes, Conduits and Drains on Railroad Property, but in some there are other forms of license which seem to apply better to this particular case, and the committee proceeded on that basis.

This suggested agreement is presented in tentative form. This is the first time it has been brought before the convention, and we believe it is approximately correct. It is submitted for discussion, merely as information, with the request that it be laid over until next year for final action.

(Mr. Irwin here abstracted Appendix B.)

Vice-Chairman Campbell: If there are no objections, this subject will be left with the committee for further study and report. The committee invites written criticism by the membership during the year on this proposed form.

(Vice-Chairman Wilson read Lease Agreement for Industrial Site, and "Conclusions" (3).)

Vice-Chairman Wilson: I move that this recommendation be adopted.

(Motion carried.)

(The committee was excused with the thanks of the Association.)

Report of Committee on Water Service

Considerations of sanitation make it highly desirable that the supply of drinking water on railroads be under the direction of an officer with competent training in sanitary engineering. The incrustation of pipe lines results in great losses through reduced discharge and higher costs of pumping which can be overcome by mechanical processes for cleaning the pipes. The "after precipitation" in injector pipes can be overcome with the use of ferrous sulphate. Waste water at water stations results in loss of the water and increased cost of track work. Specifications for the substructures for steel and wooden water tanks are submitted in the report.



A. F. Dorley
Chairman

A. F. Dorley has served as chairman of this committee for the past eight years, which is a well-earned record for continuous service as chairman. He was a member of the committee two years previous to his appointment as its leader. Mr. Dorley is now district engineer on the Missouri Pacific, with which road he was engaged for a number of years as engineer of water service. While occupied in this capacity the road made marked advances in water treatment and it is because of his connection with this and other developments in railway water service that his experience has been of particular value to the water service committee.

A PROGRESS REPORT on the Supply of Drinking Water on Trains and Premises of Railroads appears in Appendix A. Plans and Specifications for Typical Water Station Layouts are submitted in Appendix B.

The Extent and Effect of Incrustation in Pipe Lines is reported in Appendix C and is followed by a monograph by C. H. Koyl.

A final report on the Disposal of Water Waste appears in Appendix D.

The Effect of Local Deposits on Pollution of Surface or Shallow Well Water Supplies is reported in Appendix E.

Specifications for Substructures of Wood and Steel for Water Tanks is covered in a final report in Appendix F for adoption and publication in the Manual.

Conclusions

The committee requested the following action on its report:

(1) That the subject of examination of the subject-matter in the Manual be again referred to the committee for further study and report.

(2) That the report on progress of drinking water regulations be received as information and that the subject be reassigned to the committee for further study and report.

(3) That the report on typical water station layouts be received as information.

(4) That the report on extent and effect of incrustation in pipe lines and methods for cleaning be received as information.

(5) That the report on methods of disposing waste water at water stations be received as information.

(6) That the subject of specifications for contracting water service be reassigned to the committee for further study and report.

(7) That the progress report on effect of local deposits on the pollution of surface and shallow well water supplies be received as information and the subject be reassigned to the committee for further study and report.

(8) That report on specifications for substructures of wood and steel for water tanks be adopted and published in the Manual.

Committee: A. F. Dorley (M. P.), chairman; C. R. Knowles (I. C.), vice-chairman; R. C. Bardwell (M. P.), J. H. Davidson (M. K. & T.), G. B. Farlow (B. & O.), J. H. Gibboney (N. & W.), E. M. Grime (N. P.), W. C. Harvey (C. G. W.), R. L. Holmes (T. & P.), H. H. Johntz (M. K. & T.), C. H.

Koyl (C. M. & St. P.), P. M. LaBach (C. R. I. & P.), E. G. Lane (B. & O.), Thomas Lees (C. P. R.), M. E. McDonnell, W. M. Neptune (M. P.), W. A. Parker (U. P.), E. H. Olson (A. T. & S. F.); A. B. Pierce (Sou.), C. P. Richardson (C. R. I. & P.), F. D. Yeaton (C. M. & St. P.).

Appendix A—Study Regulations of Federal or State Authorities Relating to Supply of Drinking Water on Trains or Premises of Railroads

At a meeting held by the sub-committee in the office of the Association on June 3 a representative from the office of the Surgeon-General was present and placed before the committee the following points outlining the position taken by the Public Health Service:

"First, it must be pointed out that the responsibility for furnishing or producing water safe for drinking purposes is a large and serious one, fully comparable with any of the other obligations or responsibilities of the common carriers. The railroads, therefore, must comply fully with accepted modern standards for the production and handling of water for drinking purposes.

"Second, the former and even the present methods of selecting and handling drinking water supplies by the railroads are in need of extensive improvements, which it is now imperative that the fullest consideration be given by the railways.

"Third, it is considered with adequate justification that satisfactory conditions in regard to railway water supplies can only be obtained by the responsible supervision over sanitary factors of the water supplies by a competent and qualified sanitary personnel of the railway organization, varying to be sure with the size of the system. In this connection, it has been noted with some concern that the recently adopted scheme of Water Service Organization contains no provision for the specific responsibility and supervision of the sanitary quality and safety of the drinking water supplies on railroads."

It was brought out in the discussion that the question of a pure drinking water was as much a question of safety as the standard mechanical safety appliances and should be so regarded. The chief objections raised appeared to be in the methods of handling of the water in and to containers on cars. A safe sanitary supply may be readily polluted by improper handling. One of the chief faults has been in lack of protection for the hose connection from hydrant to car reservoir.

It is the recommendation of the committee that the

detailed supervision of drinking water supplies on railroads should be under the authority of an officer with competent training in sanitary engineering, and such personnel should work in close co-operation with the recommended Water Service Organization as presented at the last convention.

Appendix C—Extent and Effect of Incrustation in Pipe Lines

In pursuing the study of the subject a questionnaire was sent to different railroads, covering practically all the United States, covering the following headings: Incrustation, nature, extent, cause.

Method of cleaning.

Results obtained from cleaning.

Replies were received which show that stoppage of pipe lines by foreign materials is to be found in all territories. Some replies indicate that certain railroads do not know of its existence, but municipalities in the same area report trouble and measures for its removal. One road reports a 4-in. line in Maryland as practically showing no diminution in diameter after forty years' service. This was ascertained on removal.

GENERAL CAUSES AND CHARACTERISTICS

A large proportion of stoppages is due to corrosion, tubercles or roughening of interior surface. Where pipe is well coated, before laying, trouble of this nature is not generally to be expected in ordinary water for a number of years. While in itself it may not result in serious trouble, it usually forms the foundation for other deposits by roughening the interior of the pipe. The amount of deposit depends entirely on local conditions.

Mud or suspended matter (other than found as a result of water treatment) seldom forms a deposit unless the foundation has been already laid. The amount found depends largely upon the nature of the water and the velocity of the flow.

Snails and similar growths are frequently found in suction lines, but little information is to be found on the subject.

Iron, manganese or aluminum promote the growth of various forms of Crenothrix in pipes or reservoirs. When these substances are absent apparently no difficulty is found from this source.

The usual sequence is for the pipe to roughen through corrosion. The mud or slime is deposited which forms a culture bed for a variety of growths.

Incrustation due to water treatment is commonly found in treating plants of various types. This deposit is greatest when the water is undertreated or raw and treated water are mixed in the pipe lines. There is also difficulty due to water being used before the reactions are complete. There is no evidence that filters will entirely eliminate this trouble, as the reaction frequently takes place after the chemicals pass the filter. That a good filter will help there is no question.

The application of heat will deposit a scale largely composed of the carbonates of lime and magnesia. In treated water the changes in temperature will also cause a deposit. When the temperature rises in passing from the treating tank any excess of lime or magnesia will deposit. The reverse is true of soda. As any excess is generally carbonate of lime, the latter is usually the main source of deposit.

METHOD OF CLEANING

The cleaning of pipe by hand can only be done when the deposit is comparatively soft. It is sometimes possible in short pipes under special circumstances to clean them in place by using a scraper of some sort, but mechanical means are usually found more effective.

Mechanical means are most frequently used. The pipe line may be removed and a revolving cutting tool fixed on a shaft pushed through the section of pipe. This has been found to answer the purpose with an air motor and a special cutting tool on a 13-ft. shaft. Flue cleaners have also been used for the same purpose.

The latest method is to clean the pipe in place. This is done by opening the pipe line in two places and running a cable between them. This cable is used to drag a cutting tool behind it. One railroad has used a flue cleaner successfully. However, most of the work has been done by contract.

What may be accomplished by cleaning, irrespective of the method, is given in the following cases:

An 8-inch main, 11,575 ft. long, was cleaned September, 1909. Pressure required before cleaning 140 lb. for 400 gal. per min. After cleaning 49 lb. was required to deliver 450 gal.

A 6-inch main 7,200 ft. long. Former pressure at pumps 85 lb. New pressure 65 lb. Former capacity 180 gal. per min.; new capacity 220 gal. per min.

Valves, etc., around treating plants or where treated water is used are usually cleaned by the use of hydrochloric acid. The pipe lines can be cleaned by the same process, but the cost would generally be prohibitive unless the chemicals are recovered. This method is used at times, but the committee has not sufficient information as to its practicability.

PREVENTION

Flushing is generally nothing more than a mechanical method. It may be used if the local conditions are proper. It will prevent the formation of chemical deposits but rarely. Raw water used to flush lines which may carry uncombined chemicals will only aggravate the trouble.

Aeration before pumping will aid where the water contains iron. Adding to the aeration in intermittent treating plants is a preventive when the treatment is too short for completed reactions. The same may be said of any type of agitation.

The prevention of chemical reactions in the pipe lines will, as a rule, stop all incrustation. By the nature of the subject this is not possible. It may be said that the better and more complete the treatment the less the trouble will be. No method has been devised which will eliminate temperature changes and their resultant effect.

The specifications for cleaning by contract usually include a stipulation that the pipe line will be restored to within 5 per cent of the normal friction loss as taken from a standard set of tables. This seems to have been attained when the contractor agreed to operate without injury to the coating in the inside of the pipe.

CONCLUSIONS

Pipe cleaning will pay when the water horse power hour cost per year is reduced sufficiently to pay 7 per cent interest on the amount needed for the improvement.

Pipe line cleaning will pay if there is a shortage when the cost of cleaning is less than the cost of an additional pipe line needed for adequate service.

After-Precipitation from Treated Water—Its Cause and Prevention

By C. H. KOVL, Engineer Water Service, Chicago, Milwaukee & St. Paul

In the early days of water softening in this country—from 1898—it was noticed that after water had been through the softening process, completed by passing through some simple kind of filter like a packed 12-in. of wood excelsior or a thin bed of sand from which it

issued brilliantly clear, there was a deposition of flakes of carbonate of lime found on standing.

After studying this for some time it became evident that the chemical reactions had not been completed in the softening plant—that the last molecules of calcium oxide (CaO) had not found the last molecules of carbon dioxide (CO_2); and since chemical reaction is almost instantaneous when once the atoms or molecules are within combining distance it was evident that the lime had not been thoroughly mixed with the water.

I then made a series of tests to determine the amount of mechanical mixing necessary to effect a softening down to three grains per gallon, at which point the reactions in ordinary water are nearly complete, and found it to vary from 25 min. in clean well water at 60 deg. F. to 50 min. in river water at 45 deg. F. Thereafter I built a reaction (mixing) tank as part of every "continuous" water softening plant.

In those days the "intermittent" plants, whose tanks were filled with water, treated with the proper amounts of lime and soda, well stirred for 20 min. and then settled for three hours, were doing excellent work. But "continuous" plants had solutions of lime and soda in proper portion continuously added to the incoming stream of water and the combination run around a few baffle boards for mixing purposes, and the softened water from these plants all deposited flakes of calcium carbonate on standing; and if the water was passed through a sand filter or through a pipe while the deposition was taking place small particles attached themselves to the sand grains or the pipe walls, and the sand grains were said to "grow" and the pipe to be incrustated.

The addition of a 50-min. mixing chamber as a preliminary to the settling chamber of the "continuous" water softening plant did away with this "after precipitation" and I never saw enough of it from one of these plants to be noticeable. It was remarked, however, that if the water was undertreated in lime after disposition took place in spite of the 50-minute mixing, for undertreated water requires much longer mixing than that. It was still noted, too, that when the best of treated water was fed to locomotive boilers through injectors there was a sufficient deposition in the injector and branch pipe and on the check valve to interfere with the operation of the injector.

In the winter of 1915-16 there was a treating plant at every water station on the Great Northern on the line from Devils Lake, N. D., to Shelby, Mont., a distance of nearly 700 miles, all near the Canadian border; and while boiler leaking was unknown there was so much trouble from clogging of the injectors that its prevention became a serious study.

The material deposited in the injectors was calcium carbonate. It came from the water at a temperature not far above 212 deg. At this temperature the content of calcium carbonate can be reduced to about two grains per gallon, but calcium sulphate, if it were present, would not be affected. Therefore, I decided to try to convert at least part of the 3 grains of calcium carbonate in the cold water into calcium sulphate by adding three grains per gallon of ferrous sulphate to the water before it left the mixing tank of the treating plant. This would leave in the water a small amount of ferrous carbonate which would give the injector no trouble.

The first test was made at Minot, N. D., because the switch engines in the yard had been the subject of continuous complaint. The water was treated as above for one month and then a switch engine was taken to the round house and its injector, branch pipe and check valve were found as clean as the day they were made. Imme-

diately thereafter the treatment with ferrous sulphate began to be extended to all treating plants on the line and the results have been uniformly good. On this road, so far as water is concerned, the winter handling of locomotives is as simple as the summer's.

Appendix D—Methods of Disposing of Waste Water at Water Stations and Keeping Track Free of Ice

It is impracticable to have a very wide range of movement for water tank spouts and so it is imperative that locomotives be carefully spotted at points where water is received direct from a tank spout. Also on divisions where both high and low locomotive tenders are in use, it is desirable to have the manholes on the low tenders raised up to the same height as that of the high tenders.

Where a rigid spout is used a sleeve, hanging by chains from the end of the spout, serves in a measure to make it adjustable for high and low tenders, but it does not entirely eliminate waste. The telescopic type of water column has now been made standard on some railroads and where it is in use there is very little water waste.

At water tanks there is frequently more or less waste due to firemen raising the spout before the water has entirely cleared from it or due to slight leakage from the tank valve. The maintenance of tank valves is a matter which must receive close attention from the water service department, especially in the winter season.

One of the best plans for taking care of the situation at a water tank is to ballast the track in the immediate vicinity for a distance of 10 ft. each way from the spout with a heavy layer of crushed rock and provide a catch basin with a grating cover directly under the end of the outlet pipe with an inlet at the level of the subgrade.

For the northern latitudes, such catch basins should have a sewer connection at least eight feet below the surface so the water will be rapidly carried off before it has an opportunity to freeze. A catch basin of this type is giving excellent service in North Dakota.

Where a steam pumping plant is located not too far away from the tank, a steam pipe connection into the catch basin will be a big help in keeping the drainage channel clear and the expense will be nominal. Catch basins may also be used to advantage near water columns. Where there is no danger from frost, some saving may be made by building the catch basin as a part of the water column pit. In cold climates the catch basin drain should not connect direct with the standpipe pit, as cold air entering through the drain is liable to cause freezing at the standpipe.

Appendix E—Effect of Local Deposits on Pollution of Surface or Shallow Well Water Supplies

1. (a) Water obtained from rivers, lakes, wells and other sources of supply usually contain a considerable quantity of foreign matter in suspension and solution, not only as inert mineral substances, but also in the form of living organisms and waste products or organic origin.

(b) Recent observations and experiments have proven that water in its raw state from small streams, lakes and reservoirs may be rendered unfit for locomotives or industrial use by reason of surface pollution, the effect of sewage, mine, drainage, coal storage, industrial waste and decayed vegetation on locomotive and industrial water supplies is very detrimental.

EFFECT UPON SURFACE SUPPLY

2. (a) *Coal Mines and Storage.*—Cases are known where coal mine drainage modifies or completely changes the character of streams. The most objectionable property of water containing mine drainage is its corrosive-

ness. The iron sulphates and acid will actively attack metals. Ferric sulphate (a common constituent of mine drainage) once admitted into a boiler will induce serious pitting conditions. The ferric sulphate will dissolve sufficient iron to reduce itself into the ferrous condition, and being oxidized by the air admitted with fresh water will again attack the boiler, and by continuous repetitions of this process will accomplish its early ruin. Brass piping or acid proof bronze is not immune.

The storing of coal on reservoir sheds should never be permitted. Reservoir water has been made unusable by this practice.

(b) *Cinders*.—It is a fact that water station attendants waste their cinders in places most convenient to them and usually they are deposited adjacent to the water supply. Cinder deposits should not be permitted near a surface water supply nor upon the water shed of surface reservoirs. Sulphates in large quantities are found in cinder deposits and are a source of contamination.

(c) *Oil Wells*.—Waste water from oil wells have been found to be highly mineralized and has been known to render surface reservoir water unfit for both boiler and domestic uses. This source of pollution should be guarded against by carrying the injurious waters to another shed or beyond the catchment area of the reservoir.

(d) *Sewage and Industrial Waste*.—Surface reservoirs should not be located where they will be subject to the flow of sewage or industrial waste, especially those of relatively small capacities. Water in small reservoirs has been known to have increased three hundred per cent in total solids, consisting of sulphates, chlorides and organic matter, by reason of sewage and industrial waste.

(e) *Mud and Cultivation*.—The committee thus far is unable to determine the effect of mud upon a surface supply, except that it materially reduces the capacity of the reservoir, primarily caused by permitting cultivation too near the flood line.

Water from an extensively cultivated catchment area is more or less turbid and for this reason is at times objectionable.

Turbidity and suspended mineral matter may be greatly reduced by using rapid sand filters, allowing about 3 GPM per square foot filter area.

EFFECT ON SHALLOW WELLS

3. (a) *Storage Coal*.—Storing coal near or in a position where the drainage therefrom will flow near a shallow well supply should not be permitted.

(b) *Cinder Deposits*.—Cinder deposits adjacent to or near a shallow well supply will in time give serious trouble. The ground under and adjacent to cinder piles will become saturated with objectionable chemicals, which through seepage will render the water in its raw state unfit for locomotive or industrial use.

Appendix F—Specifications for Substructures of Wood and Steel for Water Tanks

Number of Posts.—There has been but little change in the type of construction of substructure or towers for wooden tanks having a capacity of 50,000 gal. or more, the common practice on American railroads being a 12-post structure of 12 by 12 timbers, braced according to height.

Steel frames for wooden tanks, and in a great many instances for flat-bottom steel tanks, have also been of the 12-post type. This Association found in 1910 that 82 per cent of the 50,000-gal. tanks were supported on 12-post towers, 10 per cent on 16 to 26-post towers and 8 per cent on 4-post towers. Of the 100,000-gal. tanks 100 per cent had 12-post towers, with one exception of a 4-post tower. The general practice of constructing

12-post towers is explained in the fact that it is possible to secure a better distribution of the load with a 12-post structure and to support every part of the tank bottom without an elaborate floor system. It also permits of a good distribution of the foundation load and represents the most economical type of construction.

Height of Substructure.—The Water Service Committee reports on this in specifications for wood and steel water tanks, Volume 11, Part 2, page 1148.

Bracing.—While the general practice followed in construction of posts and floor system appears to be fairly uniform, the practice as to bracing is divided between plank bracing and strut bracing. The superiority of the strut type of bracing is recognized, but many roads have adopted the plank bracing on account of the lower cost.

The earlier type of construction of steel or iron towers consisted largely of bolted or riveted round columns and in some cases box columns. This was followed by the so-called star post or a post built up from angles. The objection to a post of this type is that it provides spaces in which moisture may collect and causes deterioration through corrosion which cannot be prevented. The best and most economical type of construction appears to be with post constructed of 6 in. by 6 in. by $\frac{1}{2}$ in. angles for the 50,000-gal. tank and 8 in. by 8 in. by $\frac{1}{2}$ in. angles for the 100,000-gal. tank. Three in. by 3 in. by $\frac{1}{4}$ in. bracing would be sufficient with a post of this kind, but on account of providing for possible corrosion it is considered advisable to use a 3 in. by 3 in. by $\frac{3}{8}$ in. angle for bracing. The floor system consists of 10-in. 25-lb. I-beams for tying in the different bents, joists constructed of 7-in. 15-lb. I-beams and caps of 12-in. 31 $\frac{1}{2}$ -lb. I-beams.

It is customary to include foundation bolts for steel towers, although they are seldom used on wooden towers. It would appear that there is little necessity for use of anchor bolts on tank towers 20 ft. or less in height.

It is the practice on some railroads to use steel floor joists instead of timber on wooden substructures, while a number of other roads advocate the use of second-hand steel rails for joists. The advantage claimed for the steel joists is that they will have a life equal to that of the tub, while untreated timber joists would have to be renewed at least once during the life of the tub. While this is perhaps true the same thing is true of all other parts of an untreated wooden substructure.

SPECIFICATIONS FOR STEEL SUBSTRUCTURES FOR WATER TANK OF 50,000 AND 100,000 GAL. CAPACITY

General.—1. The structure will consist of a 12-post steel tower, complete in all details, as shown on the attached plan, for supporting a wooden water tank of the specified size and capacity at the required elevation. The intent of the plans and specifications is to include all material required between the top of foundation and the bottom of tank.

Material.—2. Except as may be herein noted all metal in the structure will be made in accordance with specifications of the Association as given in Part Second, "Iron and Steel Structures," Manual of Recommended Practice (pages 494 to 499, 1915 edition).

Workmanship.—3. Except as may be herein noted workmanship on the structure will be performed in accordance with the requirements of the Association as given in Part Second, "Iron and Steel Structures," Manual of Recommended Practice (pages 499 to 503, 1915 edition).

Painting.—4. Steel work before leaving the shop shall be thoroughly cleaned and given one good coat of red lead ground in linseed oil or such paint as may be specified by the engineer. Except as herein noted, cleaning and painting shall be done in accordance with specifications of the Association as given in Part Second, "Iron and Steel Structures," Manual of Recommended Practice (pages 503 and 504, 1915 edition).

SPECIFICATIONS FOR TIMBER SUBSTRUCTURES FOR WATER TANKS OF 50,000 AND 100,000 GAL. CAPACITY

General.—1. The structure will consist of a 12-post timber tank tower complete in all details, as shown on the attached

plan, for supporting a wooden water tank of the specified size and capacity at the required elevation. The intent of the plans and specifications is to include all material required between the top of foundation and the bottom of tank.

Timber.—2. The timber shall be cypress, pine, fir, redwood, or such other timber as may be specified by the engineer, S. 4 S. and conforming to the specifications of this Association for No. 1 railroad bridge timber, as given in "Wooden Bridges and Trestles," Manual of Recommended Practice (pages 231 to 235, 1915 edition).

Workmanship.—3. All workmanship shall be in accordance with "Specifications for Workmanship for Pile and Frame Trestles to Be Built Under Contract," Manual of Recommended Practice (pages 238 to 241, 1915 edition).

Metal Details.—4. All metal details shall conform to the specifications of the Association as given in "Specifications for Metal Details Used in Wooden Bridges and Trestles," Manual of Recommended Practice (pages 236 to 238, 1915 edition).

Painting.—5. All exposed woodwork shall be painted with one priming and two finishing coats of such paints and colors as may be specified by the engineer.

Treating.—6. Where treated timber is used timber shall be treated with creosote oil in accordance with the requirements of Committee on Wood Preservation, Manual of Recommended Practice (pages 539 to 559, 1915 edition).

Discussion

A. F. Dorley (Chairman): The subject assigned to the committee for study and report are eight in number. The first subject is the revision of the Manual. Last year the committee recommended an entire rearrangement of the subject matter in the section of the Manual given over to water service. They also recommended certain changes in the recommended practice pertaining to water supply and water purification, and the committee has no additional changes to submit this year.

The supply of drinking water on trains and premises of railroads is a subject that has been in the hands of a special committee, of which R. C. Bardwell is chairman. The committee has kept in touch with the development of the regulations of the federal and state authorities, and the report of the sub-committee will be found in Appendix A. The work of this sub-committee is being closely followed by the health authorities at Washington, a representative of the office of the Surgeon General having attended one meeting of this sub-committee last June. The report on this subject is offered for information.

It is not an uncommon sight in railroad terminals today to see employees dragging the hose through which water is passed from the hydrant into car-containers along the ground and into the accumulation of filth that is generally around tracks or terminals, and it is not very hard to imagine that the chances of polluting an otherwise pure drinking water are very great by allowing a practice of this kind. One large mid-western railroad has made an effort to prevent pollution of this kind by using a protection for the hose which has only recently been devised and put into service and it is offered with the suggestion that other railroads try some such scheme.

The third subject is the making of a final report, if practicable, on plans and specifications for typical water station layouts. The committee feels that this subject should more properly come within the scope of the committee that has in hand the design of yard terminals, and that the work of the Water Service Committee be confined to devising facilities to supply water to locomotives, or to make it available.

The fourth subject is the extent and effect of incrustation in pipe lines and methods of cleaning.

The sub-committee that had this subject in hand, of which P. M. La Bach was chairman, offers the report given in Appendix C. This report is almost entirely the work of Mr. La Bach, and he reviews the subject, beginning with the causes leading up to incrustation, the operating costs affected, the methods for cleaning, pre-

vention suggestions that were offered for prevention, as well as the condition under which the cleaning of pipes is economical. Before I go to subject No. 5 I wish to call attention to a monograph by C. H. Koyl, on the subject of after-precipitation from treated water, its cause and prevention. This monograph is made part of the report on the incrustation of pipe lines.

The fifth subject is in the disposition of waste water at water stations, and on keeping tracks free from ice is covered by the report appearing in Appendix D. We believe the lesson to be drawn from this study is that railroads should as far as possible eliminate the waste water. There are several railroads, particularly the Illinois Central, that have had under way for several years a campaign to eliminate water waste, and the results in the saving of money have been astonishing. Water is only too frequently looked upon as free as air, and it may be as free as air while it is going by in the river, but it takes money to put the water into a tank or to put it under pressure in a pipe line. Railroad officials who sign vouchers in payment of water purchased from city or water companies, realize that waste of water means real money flowing into sewers or into drainage ditches.

The committee reports progress on the sixth subject, covering specifications for contracting water service work.

The seventh subject deals with the effect of local deposits on pollution of surface or shallow well-water supplies. The report on this subject will be found in Appendix E, the work of the sub-committee, of which R. L. Holmes is chairman. I would like to call particular attention to the section which makes reference to the pollution of well water and surface supplies from the storage of coal and cinder deposits. This source of pollution only recently attracted the attention of this committee. We will have more to say on this subject in the final report which we hope to make next year. In the meantime we would like to caution railroads against the very serious possibility of polluting reservoirs or wells by storing coal adjacent to the water supply.

This brings us up to the last subject, No. 8, covering specifications for sub-structures of wood and steel for water tanks. The final report on this subject will be found in Appendix F. The preparation of these specifications and the typical plans in the work of the sub-committee of which C. R. Knowles is chairman. There is so wide a variation in designing tank towers on American railroads that the committee feels that the adoption of these standards and specifications is very timely. Many of the details in use in tank towers all over the country are very uneconomical, and without actual justification. These specifications and typical plans are offered as a final report, with the recommendation that they be placed in the Manual, and I will ask Mr. Knowles to read that last subject. (Mr. Knowles abstracted Appendix F.)

Chairman Dorley: *I move that the specifications for steel sub-structures for water tanks; specifications for timber sub-structures for water tanks, and the typical plans be adopted and published in the Manual.*
(Motion carried.)

Chairman Dorley: Before the committee is dismissed I would like to call attention to No. 5 of the suggested subjects for next year's study and report.

The pitting of boiler tubes is something that is becoming a very serious problem on American railroads, and the effect of this pitting represents one of the very large items in the expense of locomotive maintenance today. At first thought it might appear that the problem is one that the mechanical department should handle but the water service engineer is vitally interested in it, for the reason that pitting is generally ascribed to water condi-

tions. The most disquieting thing about the whole problem is that it is beginning to show up on districts where originally or years ago it did not appear, on districts where the water is either naturally good, or where the water is now being treated.

It is the recommendation of this committee that an arrangement be made to have a committee of the Mechanical

section of the A. R. A. and possibly a committee of the American Society of Testing Materials, co-operate with this committee in the handling of this subject. We think that it is about the most important problem that the water service engineer has confronting him at the present time.

(The committee was dismissed with the thanks of the Association.)

Report on Economics of Railway Labor

An investigation of methods of hiring maintenance of way labor shows a lack of systematic selection, and a tendency to return to labor agencies. Adverse effects of unsatisfactory housing conditions and intermittent employment are becoming more generally recognized. Engineering department is in charge of maintenance of way on most roads, with many men with engineering training coming into supervisors' position. Investigations on 52 principal railways indicates the estimated relative efficiency in September, 1920, only 67 per cent as compared with results obtained during the pre-war period from 1912 to 1916. Committee will continue investigations.



C. E. Johnston
Chairman

C. E. Johnston, chairman of the committee, is completing his first year in this position and his third year as a member of the committee. He is representative of an increasing number of men who have risen through the engineering department to operating and executive positions in recent years. While chief engineer and for the last three years general manager of the Kansas City Southern, he has taken a keen interest in maintenance of way labor. Among his recent departures has been the organization of the foremen and higher maintenance officers on his road into a voluntary technical association, which meets monthly to discuss problems arising in their work.

IN PREPARING THE SECTION of the report on plans and methods for obtaining labor for railways, a carefully prepared questionnaire was sent to 65 representative roads in Eastern, Western and Southern territory and to representative roads in Canada, in order to develop the existing practices throughout the country. This questionnaire developed that very little is being done by the railways in the way of specializing for the selection of their maintenance of way labor. The returns, when carefully analyzed, also show that for maintenance of way labor, at least, the railways have not availed themselves of the lessons which the experiences resulting from the war merely developed and intensified, and that no positive action has been taken to overcome the economic conditions which tend to create serious labor shortages at different seasons of the year.

Except for such labor as can be obtained locally, on approximately two-thirds of the roads throughout the country, the great army of excess workers required during the working season are, as a rule, recruited through labor agents, the majority of whom charge the men for securing the temporary job. There is no uniform practice as to the officer charged with responsibility for such matters, the tendency, however, seems to be to leave it, in a general way, under the engineer maintenance of way, where same exists. Where the services of these labor agents are utilized, it is the almost universal custom for the railways to obtain labor from various agencies, there being little tendency to accomplish this through a single source of supply.

As a general rule, railways do not pay bonuses or compensation to agencies for maintaining a stated supply of workers on their lines, but there are cases where this method has been followed, especially in times of labor stringency, the agency being responsible for maintaining the supply and being paid accordingly. Very few railways pay the agencies for securing their labor, it being customary for the labor agent to require the laborers to reimburse him for his efforts. This has resulted in a

great many abuses which are alike prejudicial to the interests of the worker and the railways.

The majority of the roads do not contract maintenance work, although there is a tendency in this direction on some of the more important items requiring extra gangs, or where special skill is required. Prior to the war, it was the practice for many roads to maintain labor agencies in the large labor centers, like Chicago, St. Louis, Kansas City, Omaha, etc. These were abolished during the war, but since the armistice was signed pre-war conditions have been restored and there has been a marked tendency to increase agencies, either wholly or partially supported by individual roads entering the larger labor centers.

Practically no limitation is placed on free transportation for transporting labor that cannot be obtained locally, and apparently no means has been found for protecting against the abuses resulting from the flagrant misuse of transportation furnished for the purpose of transporting this labor. In times of shortages, where labor cannot be supplied locally or obtained by labor contractors from territory tributary to the carriers, it is customary for most roads to pay fare for laborers recruited in off-line districts over other lines in order to bring them to their own road. It is not the practice of the roads to invoke statutory requirements against the misuse of transportation, as no method has yet been found whereby this may be effectively used. No effective means has so far been developed to protect against the worker who, having accepted free transportation, fails to accept service. When such worker leaves the service after a few days' (or hours') service, as is frequently the case, few roads make any attempt to retain part of his earnings as partial compensation for such free transportation.

The investigations of the committee, previously reported, have shown that the length of service for the casual worker is of exceedingly short duration, and the facility with which these transient workers may move from place to place is almost entirely responsible for

this condition. The questionnaire, however, developed that the majority of the roads appear not to feel that the abolition of free transportation for the casual workers would operate to stabilize labor. The replies reaching the committee indicated a general recognition of this widespread abuse in connection with the transportation of laborers, but few practical suggestions have so far reached the committee for its remedy. The popular one seems to be that some arrangement should be worked out by each road whereby laborers will be piloted from the source of employment to the particular job for which they are engaged. Where the services of boarding contractors are utilized to feed extra or floating labor, it is customary to afford free, reduced or limited transportation for their camp and food supplies, on approximately half of the roads reporting, the others assessing charges in some form or other thereon.

The replies indicate a decided effort is being made to furnish houses for regular section foremen at nominal rental, and some feeble efforts are being made to furnish better quarters than heretofore for common labor, but it is not general. The conditions in the Eastern section do not, as a rule, require this for its excess labor, whereas in the West it is necessary in some form on account of the long stretches of open country and the comparatively long distances between the towns. The majority of the roads furnish bunk houses for their laborers for which no rental is charged, but as a rule they consist of old car bodies. Some tendency for improvement in this direction is reported. It is the general practice for the railways to supply housing with wood or steel bunks for their floating, or semi-permanent labor, but the bedding, kitchen and other utensils are supplied by the boarding contractors, or the laborers themselves. It is also the general practice to supply cooks for track gangs, but no uniformity exists as to the number in proportion to the men employed. This applies to Bridge and Building Department and miscellaneous employees as well.

The majority of the roads reporting apparently contract with companies or individuals for feeding their common labor that is seasonably employed, the balance evidently believing that better results are secured where this is not done. There is almost an entire absence of trained supervision over food, sanitation or camp supplies for the workers. Where such supervision exists it is usually of a sporadic character and confined to local officers engaged in other duties. One large Eastern road, however, has assigned the feeding of its laborers to its dining car department and through it secures the benefit of the same sanitation and supervision of its food and camp equipment that is afforded to its patrons.

There is a marked difference between the practices of Eastern and Western roads in the matter of engaging and caring for labor. The general tendency of the Eastern lines is to so arrange their maintenance work that it shall be done with regular forces and minimize, as far as possible, the use of extra gangs, whereas, as a general rule, the Western roads depend on the extra gangs and casual labor to supplement the work of the sections, principally for relaying rail, ballasting and similar heavy work. There appears to be an almost universal appreciation by the roads of the serious effect that intermittent labor has on their organization and efficiency in maintaining the railways of the country. There is also a general feeling on the part of a majority of the roads that this can only be corrected, or at least minimized, by working out a more scientific method of arranging the maintenance of way program whereby large armies of

workers will not be made idle during a very considerable part of the year.

There is a universal feeling that before very much can be done by railways to stabilize labor, housing and living conditions must be more in conformity with the current practice of industrial and similar concerns, who seem very much in advance of the railways in this particular. Better sanitation, proper facilities for bathing and improved structures for housing the employee would appear to be the medium that will react powerfully to stabilize railway track labor. A better distribution of the forces so arranged as to give consideration to the comfort of the foremen and their families are a greater asset than is popularly supposed for increasing the efficiency, contentment and loyalty of the worker.

Changed working conditions have now served to intensify the importance of securing greater efficiency and a better selection of workers than ever before in the history of our railways. Section 15-A, of the Transportation Act, expressly stipulates that in determining the allowable return, expenditures for maintenance of way and structures and equipment must be so managed "as to secure honest, efficient and economic results." Manifestly if methods are employed which are wasteful or extravagant and as a result the principal item of railway maintenance (labor) is affected, the net return may also be affected. It would seem that it is well within the province of this Association to study the effect of poor methods in housing, transporting and otherwise caring for railway labor to the end that nothing of this kind may ever occur.

TRAINING AND EDUCATING EMPLOYEES

The committee has not completed its study of the subject-matter, consequently it is not in a position to make conclusive recommendations. Of the 60 roads reporting in answer to a questionnaire, 75 per cent have a divisional and 25 per cent a departmental organization.

Notwithstanding the large percentage for a divisional organization, approximately 72 per cent of the lines charge an engineer or the engineering department with the direct responsibility of maintenance of way. We also find approximately 65 per cent of the lines give preference to engineers, or men having engineering training, in selecting division officers in charge of maintenance of way. Fifty per cent of the total of roadmasters and track supervisors employed by the roads reporting have had engineering training. Our reference to roadmasters and track supervisors are those having charge of an average of 111 main track miles and 75 sidetrack miles.

Our investigations to date show approximately 99 per cent of track foremen are selected from common labor, the percentage of common labor being about as follows: Native white, 40 per cent; negro, 17 per cent; Mexican, 10 per cent; other foreign, 33 per cent.

The average length of track section in charge of a section foreman includes: 6.7 miles main tracks and 3.1 miles side track. Section motor cars are in use on approximately 69 per cent of the mileage reported. The investigation to date (September, 1920) indicated an estimated relative efficiency of only 67 per cent as compared with the results obtained during the pre-war period, or, say, 1812 to 1916.

Committee: C. E. Johnston (K. C. S.), chairman; C. H. Stein (C. R. R. of N. J.), vice-chairman; W. J. Backes (N. Y. N. H. & H.), A. F. Blaess (I. C.), B. M. Cheney (C. B. & Q.), C. C. Cook (B. & O.), W. R. Dawson (N. & W.), John Evans (M. C.), R. H. Ford (C. R. I. & P.), L. C. Hartley (C. & E. I.), W. R. Hillary (Penna.), C. B. Hoyt (N. Y. C. & St. L.), T. T. Irving (G. T.), R. E. Keough (C. P. R.), E. R. Lewis (M. C.), C. A. Paquette (C. C. & St. L.), W. H.

Penfield (C. M. & St. P.), J. R. Sexton (Erie), W. J. Towne (C. & N. W.).

Discussion

C. E. Johnston (Chairman): The activities of the committee during the past year have been assembling information as a foundation upon which we might reach conclusions. The subjects assigned are, we think, so important, that we must go into all the details very carefully and endeavor to find some solution or arrive at some real honest-to-goodness recommendation in the handling of our maintenance labor, and what we have shown here in the report is to be taken as information. It is assembled with the idea of laying a foundation for our further study of the particular subject.

We have gathered considerable information with respect to maintenance of way labor, and I will admit it is hard to find a beginning point. We find that most lines have their own way of handling labor, and our questionnaires are giving us a very good line on the practices over the different parts of the country. In order to get the benefit of the views of the membership, we would like to invite discussion of these items, so first I will call upon Mr. Ford to read what we have said here with respect to the first subject.

R. H. Ford (C. R. I. & P.): I will take up some of the salient features on which the committee is very anxious to secure information. There are 3 or 4 things that have impressed us as being particularly important. One deals with the question of the misuse of transportation. Everybody recognizes this as a very flagrant evil, something that some united action will have to be taken to correct. No one was able to offer any real remedy.

The questionnaire has developed a great laxity of practice on methods of taking care of the men. We are paying so much for our track labor today, and the returns that we are getting must be measured by the ability of the laborer. Unless a man has good food and good housing conditions he will not deliver the work that he ought to do.

The Chairman: Are there any remarks or any suggestions to be offered the committee?

W. J. Backes (N. Y. N. H. & H.): The questionnaire would indicate that the majority of the railroads of the country have a divisional form of organization—that is, 75 per cent divisional and 25 per cent departmental. On the other hand, even though they have a divisional organization, the majority of the division engineers and roadmasters, or rather are engineers; that is, 75 per cent of the replies had engineers in charge of their maintenance of way departments; 65 per cent of the division engineers and 50 per cent of the roadmasters and track supervisors were men with an engineering training. Of course, in the east the tendency is to develop young engineers, and where the railroads take the time to give the men the training and establish a good line of promotion, we are able to attract some very promising young men into our service.

The territory covered by roadmasters and track supervisors generally averages about 11 mi. of main track and 75 mi. of side track. Possibly with the longer sections in the west, that average would be greater. The average age of roadmasters and track supervisors is 45 years. I think that on lines training young engineers you will find the average age probably nearer 35, between 35 and 40.

It has been very difficult to get young men to take positions as section foremen, although we have been able on some of the lines to get young men to take positions as general foremen, and those foremen have taken hold of the work very well.

The length of track sections under section foremen is 67 mi. of main track and 31 mi. of side track. That, I think, averages pretty well over the country, with the possible exception of where they have long motor car sections. Motor cars are now used on approximately 69 per cent of the mileage, and I believe there is a tendency for those who have had long motor car sections to shorten them.

I do not believe there is anything that we can do to strengthen our maintenance organization any more than to attract young men into our service who have had a good engineering education. That was the foundation of our work, and if we are going to develop the highest degree of efficiency we must have men who have the power to analyze the costs of their work and improve the methods of doing the work. Those railroads who have been doing experimental work, and using labor-saving devices are beginning to find out that material economies can be obtained through their use; it must be done intelligently. We cannot expect men to take these various mechanical devices without providing instruction and proper supervision in their use.

Chairman Johnston: We devote a great deal of thought and time and money to specifications for rails, ties and all other material, but we are overlooking to a considerable extent giving proper attention to labor and selecting the men who will develop into foremen and other supervising positions in the future. There seems to be a lack of uniformity all over the country—some do it one way, some do it another, some do not do it at all. Most of us do not do it at all, and I think that at the present time we are impressed with the importance of giving this entire subject a great deal more thought than we have in the past. We must get closer to the human side of labor. Personal contact probably will give us more results than anything else. Just how that can be brought about I am unable to say. We have a little organization on the line I am with called the Maintenance of Way Association. We have monthly meetings of our foremen and discuss things of interest—kind of a handshaking proposition—but at the same time we can notice a big improvement in feeling, in the fact that we are acquainted with the fellows. As Dean Potter said this morning, the engineering students think the time has come where they must be sorted and tested out. I think the time has come when our track laborer must be sorted and tested out if we are going to go along with the procession.

Earl Stimson (B. & O.): I hesitate to criticize the committee, because we assume that the committee represents the best thought on the subject that is in hand. In my opinion, the committee has the cart ahead of the horse.

The first thing to do when you undertake an enterprise is to establish what you are going to do and how you are going to do it, and then get together your supervising force that is going to handle the work, and train them. The last thing you do you get together your material and your men that are actually going to do the work and you are prepared to handle it. The committee get the men first, take care of them, keep them fed, and then educate them.

To my mind the first thing that should be undertaken is subject No. 3, "Study and report on standard methods for performing maintenance of way work, with the view of establishing units of measure of work performed." This elaborate preparation to get the men is more or less superficial and I think it is a mistake, as it applies to a very small percentage of the force which is employed regularly. We have men all the time. We do not have to organize a labor department, we do not have to build elaborate camps. We have plenty of men already to

start in and handle a piece of work in a well-organized way. On looking over the reports of the Committee on Economics of Railway Labor I find there has not been one single conclusion or one single recommendation that had been put forth, and this particular subject, which is the backbone of the whole thing, had been ignored. My suggestion to the committee is that it buckle down to work on subject No. 3 and arrive at a conclusion next year without indulging in the ancient and honorable American pastime of passing the buck. I suggest that the railroads take immediate individual action to improve the labor condition and to effect an organization to increase labor efficiency.

I think it is the duty of the committee to point the way and not leave it to the individual effort. The committee has been in existence four years and we have not gotten anywhere yet.

Chairman Johnston: It is all right to look at subject No. 3, with the view of establishing measure of weights of work performed, and say that is what we want. It is true, and we will get to it, and if there had been plenty of men during the past three or four years it would have been a comparatively easy matter to arrange for it. We have found it necessary to get men and show them what to do, and to measure what they are trying to do after we get them.

W. M. Camp (Railway Review): The trouble with the situation with regard to the maintenance force is that the men are not employed regularly all the year around. These men have families to support. The other classes of railway labor have work the year around. Under these circumstances you are not going to secure a class of men who will take pride in their work and who will expect to stay with that kind of work. I thoroughly believe that the point you have got to arrive at is to employ this labor regularly.

J. E. Willoughby (A. C. L.): On our road we have laid out our maintenance work so that the same number of men are employed throughout the year; that is, we do not increase or decrease the labor allowance on account of weather conditions. It is as much a part of the foreman's duty to see that his labor accomplishes sufficient work as any other thing of which he has charge. We hold the foreman responsible for the work accomplished. So far as the negro labor is concerned, the suggestion of the committee should be that the foreman be made responsible and measure the work of the foreman, and then require the foreman to see that the proper amount of work is done.

C. H. Stein (C. of N. J.): It was during 1916 and 1915 that this proposition of the equated track sections was considered, and we reached the conclusion that we could not do anything at that time, as the state of the art had not been advanced to a point where we could express conclusions in a mathematical form that would be substantial and effective in producing the results that this convention desired us to aim at at that time, and I want to say that we have been urged forward to make progress to stabilize the labor on American railroads. All of these subjects have been discussed and considered by previous committees and the labor situation was gradually becoming more satisfactory and the competency of labor was more nearly approaching a state of 100 per cent efficiency, but everybody knows what the experiences of 1917, 1918, 1919 and 1920 have been, and every man in this room knows but too well what the actuating forces have been which have been responsible for these restless conditions that have affected our general labor situation. The great factor in the problem is the human element, and I agree with one of the preceding speakers that this

has become not only a financial and economic problem, but it is becoming more and more as it was tending to do in '14, '15 and '16, a psychological problem. We have got to get nearer to the men. You must have approximately 100 per cent men in order to get any schedule or any program outlined or any method of equating track sections that will be productive of efficient and successful results.

R. G. Kenly (M. & St. L.): There are at least six months of the year in western Minnesota and the Dakotas when we operate with only a section foreman on a six-mile section. There is so little track work to be done that it would be difficult to arrive at any plan of dividing that work throughout the year so as to maintain our section force.

C. A. Morse (C. R. I. & P.): I have been in some labor meetings the last few months, where each railroad had an idea of its own, and no progress was made because there were as many ideas as individuals, and what we need to do is to give the committee the benefit of any suggestions we have for them to work on.

One of the subjects is in regard to trained men. On a railroad we have a lot of individual organizations; we have the water service gangs, the track gangs, building gangs, and signal gangs, etc., and it seems to me one of the things to do is to get the men in charge of these gangs into the habit of planning their work. The man who expends his money on track work or any other railroad work, hit or miss, cannot get the results that a man does who plans his work. We are up against the wage proposition, and in all these years of railroad in this country we have considered every man working on the section gang as a common laborer. The man who had been there 1 or 15 years got the same wages as a Mexican or Italian brought in who did not know the name of anything he had to work with. I think in this reconstruction period it would be a great thing if we could recognize the fact that there is such a thing as a skilled trackman, and part of our gang are skilled men, and I believe these men should be retained and the filling in part done with common labor. Probably one-third should be considered as skilled men and the rest put on as common labor.

J. L. Campbell (E. P. & S. W.): During the past 15 yr. we have been gradually improving the living conditions of our Mexican labor, and we are getting results every day. The tie shacks on our road in which the Mexicans lived at one time are being replaced at a reasonably steady rate with good buildings and improved labor conditions. We give prizes for flower gardens, and we do other work of that kind, which is producing good results.

Mott Sawyer (C. M. & St. P.): We do not need any system of standards to tell us that the men we are employing on the track do not come within hailing distance of doing a decent day's work and doing it in a proper manner, and something should be done to secure a better performance of duty by these men. Whether it will be by a system of bonus payment, or by some other system, possibly through welfare work, is difficult to say, but I do not see how you can stabilize section work throughout the year. But a means of improving the labor situation and giving us men enough to do our work efficiently and economically is a very serious matter, and I want to say that the committee in putting stress on means of recruiting and retaining labor is doing a very valuable work.

(The committee was dismissed with the thanks of the Association.)

Report on Economics of Railway Operation



L. S. Rose
Chairman

L. S. Rose is completing his first year as chairman of the committee, of which he has been a member since its organization in 1918. His varied experience in railway service particularly fits him to direct the work of this committee. As division engineer of the Big Four for six years and later as signal engineer at a time when an extensive program of grade reduction and signal construction was under way, he was brought into contact with the economics of operation. More recently as valuation engineer and for the last two years as assistant to the general manager, he has of necessity continued these studies under the changing conditions of today.

The efficiency of the employees not regularly receiving comparative reports can be increased by furnishing them with reports and comparisons for their information and to create their interest. Data to be compared should be up-to-date, issued regularly and in the units of work or material with which the employee is most familiar. In order to increase the traffic capacity of a road detailed studies should be made embracing both road and terminal facilities, organizations and operating methods and covering such points as effective utilization of existing facilities, possible changes in operating methods and minor additions to secure immediate increases.

THE COMMITTEE presented progress reports on the following subjects, none of which were recommended for insertion in the Manual, but offered solely as information: Subject (1) Methods for Increasing Efficiency of Employees by Furnishing Them with Reports and Comparisons, given in Appendix A; (2) Methods for Increasing Traffic Capacity, in Appendix B; and (4) Effect of Speed of Train Upon the Cost of Operation, in Appendix C.

Committee: L. S. Rose (C. C. C. & St. L.), chairman; G. D. Brooke (B. & O.), vice-chairman; J. B. Babcock, 3rd, L. W. Baldwin (I. C.), J. M. Brown (C. R. I. & P.), A. G. Boughner (M. K. & T.), J. W. Burt (C. C. C. & St. L.), Maurice Coburn (Penn.), F. W. Green (St. L.-S. W.), H. B. Grimshaw (S. A. L.), V. K. Hendricks, E. T. Howson (Railway Age), R. B. Jones (Penn.), E. E. Kimball, H. A. Osgood (Wabash), R. J. Parker (A. T. & S. F.), Dean Wm. G. Raymond (Univ. of Iowa), Mott Sawyer (C. M. & St. P.), J. E. Teal (B. & O.), C. C. Williams (Univ. of Kansas), Louis Yager (N. P.).

Appendix A—Increasing Efficiency of Employees by Furnishing Reports and Comparisons

The term "employee" in this subject refers to those employed in minor positions on the railroad who do not see regularly the comparative reports sent out from time to time of various statistics. The methods suggested are that comparisons of the effective work of individuals or groups of individuals or employees be tabulated and published; these comparisons to be of subjects in which an employee is engaged. The purpose of these comparisons is to stimulate friendly rivalry which may be developed in practically every line of railroad work. These comparisons should be discussed with the employee, in groups of his fellow-workmen, for the purpose of securing their criticism and advice, recognizing their knowledge and insuring their interest. Men are interested in their own line of work; in fact, they are inclined to think all other lines are subordinate to theirs. This idea should not be discouraged.

While the final result to be secured is the cost, the units for comparison should be those in which the employee thinks; for instance, if a section foreman is asked about the number of ties he can put in, he will reply, so many per hour or per day; or a locomotive fireman will keep tally on the number of scoops of coal he uses on a run for his comparisons. The data collected should be published at least once per month, in some instances oftener. During the season when the subject under discussion is being actively engaged in, such as insertion

of ties, reports should be made every week. The reports should also be kept up to date, and if the data are not furnished by the employee promptly, inquiry should be made to ascertain the reason for the delay. If this is not done, the employee will think it has been forgotten, interest will die out, and soon there will be no records.

Methods for keeping the records should be published to prevent misunderstandings, and to insure uniformity. Some data are published by presenting a tabulated statement of facts, others by graphic charts. The range of territory covering the performances should not be too great, for people are more interested in the work of their neighbors than of those a thousand miles away, and the comparison of the work will probably be on a more equitable basis.

Appendix B—Increasing the Traffic Capacity of a Railway

Two studies have been presented, the object of the first being to outline steps which will establish whatever weak points there may be in the organization of a railroad and the ways for improving operation so as to obtain increased capacity with the existing facilities or with slight modifications of them.

The second is a discussion of the physical elements which affect the traffic capacity. That is, it begins with the assumption that new facilities are required and a study is to be made to determine what these facilities shall consist of. This study was undertaken late in the year and is incomplete, due to lack of time to secure the data necessary to develop it to the point of determining where new facilities are required or to forecast what the benefits of the new improvements will be. It is proposed as a part of next year's work to collect such data from actual operations on existing railroads and to use it in the continuation of this division of the subject.

In considering the means of increasing the traffic capacity of a railroad, the logical first step is an examination to ascertain

- (A) If the facilities as they exist are being utilized to the maximum capacity;
- (B) What changes, if any, in methods of operation will produce increases of capacity;
- (C) What minor additions or alterations to facilities can be quickly made which will produce increases of capacity.

For this examination the engine district—embracing two terminals and the one hundred miles more or less of line between them—is the most suitable unit. If the

problem should have to deal with more than one such district, each will have to be examined of itself and then with the results so obtained they must be studied together, each in its relation to the adjoining districts and to the line as a whole, and thus by progressive study the examination completed for the entire railroad.

The facilities of an engine district consist roughly of the main tracks, passing tracks and other sidings, yards, telegraph offices, signals, water stations, engine houses, ash pits, coal chutes, etc., the locomotives assigned to the district, the locomotive repair shops, and the special equipment.

The detailed studies should embrace both road and terminal facilities, organizations and operating methods or such portions of them as the preliminary investigation may determine is necessary. They should be made by consulting the train sheets and the various daily and periodic reports of operating performance and by making comparisons with the performance during previous periods, by suitable observations of actual work and by free discussion of the problems and conditions with the officers in charge of the operations.

The problem is peculiar for the reason that the results which might be expected from theoretical considerations of the factors involved are greatly in excess of the results which have been obtained in actual operation. On this account it has been difficult to obtain the best facilities when needed, largely because of the fact that the true conditions could not be set forth. The purpose of this discussion is to obtain a conception of the physical elements which determine the traffic capacity of a line and to show how operating results may be analyzed so

as to form the basis for comparing the costs of providing new facilities with the financial benefits to be gained therefrom. Such analyses will be of value in demonstrating the feasibility of proposed undertakings for increasing the traffic capacity of a given line.

Discussion

L. S. Rose (Chairman): E. T. Howson will present Appendix A, "Method for Increasing Efficiency of Employees by Furnishing Them With Reports and Comparison to Inform and Interest All Concerned."

(Mr. Howson presented the report.)

Chairman Rose: G. D. Brooke will present Appendix B on "Methods for Increasing the Traffic Capacity of a Railway."

(Mr. Brooke presented the report.)

Chairman Rose: The Appendix of the report on the "Effect of Speed of Trains on Cost of Operation" will be presented by C. C. Williams.

(Mr. Williams presented the report.)

Chairman Rose: J. E. Teal will present that part of the report on "The Effect of Speed of Trains on the Cost of Operation."

(Mr. Teal presented the report.)

The Chairman: This report does not require action for adoption in the Manual, but is before you for discussion. I hope the good work which this committee has done will be appreciated by an active interest on the part of the members. It is a matter which is of great interest to nearly all of us.

(The committee was dismissed with the thanks of the Association.)

Report on Economics of Railway Location

Curves are presented for use in estimating freight and passenger train resistances at speeds ranging from 35 to 50 and 5 to 75 miles per hour, respectively, and temperatures of 35 deg. F. and upwards. In studying economy of electrification, conclusion is drawn that, taking into consideration the heavy fixed charges of investment, no general conclusion can be given at this time as to the relative economy of electric and steam operation. Each case must be considered by itself, taking into consideration all elements of cost and expense, both special and general, as well as operating conditions and the public comfort and safety.



C. P. Howard
Chairman

C. P. Howard is rounding out his first year as chairman of the committee, although he was vice-chairman for seven preceding years and has been a member of the committee for ten years. He has taken a prominent part in guiding it through its more or less turbulent career. He has contributed a number of monographs on subjects allied with the work of the committee and wrote an extended review of the Manual, which was published in the October issue of the Bulletin. He has been identified with the federal valuation work for several years, being senior civil engineer in the Division of Valuation of the Interstate Commerce Commission at Chicago.

IN APPENDIX A the committee submitted two proposed changes in the Manual to cover Sections 5 and 6. In Appendix B the committee presented a report on the resistance of trains between 35 and 75 miles per hour, with diagrams, tables and conclusions recommended for adoption and inclusion in the Manual. The committee submitted in Appendix C a report on economics of location as affected by electric locomotives with conclusions recommended for adoption and inclusion in the Manual.

Committee: C. P. Howard (I. C. C.), Chairman; A. S. Going (G. T.), vice-chairman; F. H. Alfred (P. M.), R. N. Begien (B. & O.), Willard Beahan (N. Y. C.), Edwin J. Beugler (West. Church Kerr), W. J. Cunningham, C. T. Delamere (C. P. R.), A. C. Dennis (Cons. Engr.), W. A. James (C. P. R.), Fred Lavis (Cons. Engr.), E. H. McHenry,

Edward C. Schmidt (U. S. A.), H. C. Searls, A. K. Shurtleff (Ass't Sec.), C. H. Splitstone (Erie), C. W. Stark (N. Y. N. J. Com.), M. F. Steinberger (B. & O.), John G. Sullivan (C. P. R.), Walter Loring Webb (Cons. Engr.), M. A. Zook (I. C. C.).

Appendix B—Resistance of Trains Running Between 35 and 75 Miles per Hour

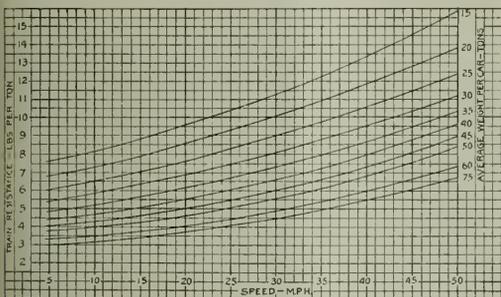
Throughout this report the terms "resistance" and "train resistance" mean the number of pounds of tractive effort required for each ton of the train in order to keep it in motion on straight and level track, at uniform speed. This resistance is only that of the train behind the locomotive tender—the resistance of the locomotive and tender, themselves, is not included.

The results here presented relate to trains running on good track and in moderate weather when the temperature is above 30 deg. F. and the wind velocity not over 20 miles per hour. Poor track, extremely low temperature, and high winds all increase train resistance; but there is not yet available enough information to enable the influence of any of these factors to be evaluated. The influence of low temperature is probably the most important, and some allowance should be made for it in attempting to predict resistance during extreme winter weather.

It should be emphasized that the resistance of both freight and passenger trains depends not only upon speed, but upon the average weight of the cars composing the train. In order to predict resistance at any speed, the average weight of the cars must be either known or assumed.

FREIGHT TRAIN RESISTANCE

The tests were made with a variety of trains in regular freight service upon well-constructed and well-maintained main-line track, 94 per cent of which was laid with 85-lb. rail, the remainder being laid with 75-lb. rail. The



The Relation Between Freight Train Resistance and Speed

track was ballasted with broken stone. The experiments were carried on during moderate weather when the minimum air temperature encountered was 34 deg. Fahr. and the wind velocities were less than 20 miles per hour.

The results are applicable to trains of all varieties of make-up to be met with in service. They may be applied, without incurring material error, to trains which are homogeneous and to those which are mixed as regards individual car weight.

The results are primarily applicable to trains which have been in motion for some time. When trains are first started from yards, or after stops on the road of more than about 20 minutes' duration, their resistance is likely to be appreciably greater than is indicated by the results here presented. In rating locomotives, no consideration need be given this matter except in determining "dead" ratings for low speeds, and then only when the ruling grade is located within six or seven miles of the starting point or of a regular road stop.

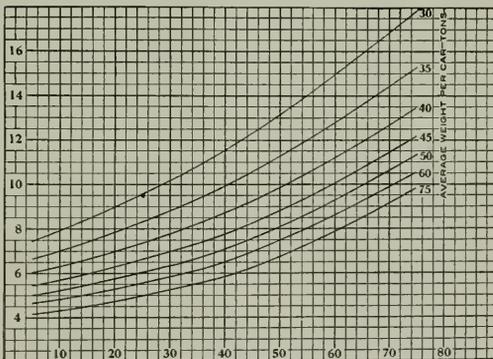
It is to be expected that some trains to be met with in service will have a resistance about 9 per cent in excess of that indicated by Fig. 1, due to variations in make-up or in external conditions within the limits to which the tests apply. If operating conditions make it essential to reduce to a minimum the risk of failure to haul the allotted tonnage, then this 9 per cent allowance should be made. This consideration, like the one preceding, is important only in rating locomotives for speeds under

15 miles per hour. At higher speeds, the occasional excess in the resistance of individual trains will result in nothing more serious than a slight increase in running time. It should be understood that this allowance, if made, is to be added to the resistance on level track—not to the gross resistance on grades. For all ordinary purposes, however, Fig. 1 may be used as it stands to estimate the resistance of freight trains running on straight and level track of good construction during moderate weather.

PASSENGER TRAIN RESISTANCE

The results are derived from tests of 28 passenger trains in "local" and "through" service. The average weight per car in these trains varied from 33 to 71 tons, and the number of cars from 4 to 12. The speeds ranged up to about 67 miles per hour. The tests were made upon well-constructed and well-maintained main-line track laid with 85-lb. and 90-lb. rail, and ballasted with broken stone. The experiments were carried on during moderate or warm weather, when the temperatures were above 40 deg. F. and the wind velocity generally less than 20 miles per hour.

Of the 240 cars composing these 28 test trains, 178 had six-wheel trucks and 62 had four-wheel trucks. All trains, except one, contained both four-wheel and six-wheel trucks, but in varying proportions. It was not possible under the conditions under which the tests were made to control the makeup of the trains. The tests had to be made in regular service and the trains had to be accepted with their usual makeup. This limitation has not defeated the main purpose of the tests, for they were undertaken, not to distinguish the resistance of



The Relation Between Passenger Train Resistance and Speed

four-wheel and six-wheel truck cars, but to measure the resistance of ordinary passenger trains of widely different average car weight; and wide variation in car weight carries with it, in American practice, a variation in truck construction similar to that encountered in the trains here discussed. Any train of 35 to 40 tons average car weight is sure to include in its makeup four-wheel truck cars—and in about the proportion which prevailed in these tests. Even the heaviest through trains are likely occasionally to include a car or two with four-wheel trucks.

A number of the trains tested developed resistance about 8 per cent greater than those found in Fig. 2, and it is to be expected that trains will occasionally be encountered which have a similar excess resistance, even

under conditions of air temperature and wind velocity such as prevailed during these experiments.

Conclusions

(1) Fig. 1 may be used in estimating freight train resistance at speeds from 35 to 50 miles per hour for Class A rating and temperatures of 33 deg. Fahr. and upwards.

(2) Fig. 2 may be used in estimating passenger train resistance at speeds from 5 to 75 miles per hour and temperatures of 35 deg. Fahr. and upwards.

Appendix C—Economics of Location as Affected by Introduction of Electric Locomotives

Railroad electrification, while most desirable from the point of view of the conservation of our fuel resources, is a matter than can not be undertaken wholesale, for several reasons. First, the capital outlay would be enormous; second, each individual railroad system or even subdivision is a problem in itself, to be judged on its own merits.

The modern steam locomotive by the use of brick arches, feed water heaters, superheater, stokers and trailer boosters has had its efficiency increased practically 50 per cent. At the same time its size and capacity have increased with this advance, and the question arises wherein the electric locomotive is superior. From an operating standpoint it has a number of minor advantages. It eliminates the turntable; cuts down standby losses; removes the delay at water tanks and coaling stations; its availability for service is very much greater, and its maintenance is considerably lower. Its capacity is increased with cold weather—the reverse of the steam engine. Its simplicity of control relieves the crew from many duties necessary on a steam engine, and permits closer observation of track and signals. When properly designed, it is much easier riding and can have a more uniform distribution of weights with less nosing and track pounding; all of which tend to lower track maintenance. In addition there is one great inherent advantage which the electric locomotive possesses, namely, the ability to concentrate large amounts of horse power under single control.

In steam railway operation each train has its own source of power, which has no relation to the propulsion of the other trains on the line. In electric railway operation every train draws its power from one or more centrally located power houses.

ADVANTAGES OF ELECTRIC OPERATION

The entire weight of the electric locomotive can be and frequently is on the drivers, while but 65 per cent to 75 per cent of the steam locomotive (except the switching type) is thus utilized. An electric locomotive allows an increase in tractive effort without a decrease in speed. A limiting factor of the horsepower output of a steam locomotive is the steaming capacity of the boiler, as well as the amount of coal per hour which the fireman can throw into the grate continuously throughout the shift. (The latter does not apply in the case of automatic stoker fired engines.) A comparison between the maximum weight of train permissible with the steam locomotive and the standard weight of train prescribed for electric locomotives shows there is an increase over steam operation of from 18 per cent to 25 per cent. The tractive effort and the motor capacity are far greater in the electric locomotives, due to the more effective application of power.

An advantage which is ascribed to electric operation is the benefit derived from the elimination of work at terminals necessary when steam locomotives are used. With

the same service to be handled there should be less electric locomotives necessary than steam locomotives, unless there are peculiarities in the service itself. It is maintained that under electric operation there is a saving in fuel of 50 per cent to 65 per cent. Assuming it is correct in stating that the power house consumes but one-half as much coal for the same number of ton miles, the cost of power would be more than one-half of the cost of coal. There are other factors entering powerhouse costs which do not appear in the cost of coal. The cost of other supplies than coal are the cost of power house labor, and the expense of maintaining the power house and its equipment, all of which are items of no mean importance. Another factor is the transmission loss between the power house and the locomotive. While engine house expenses of steam locomotives are important factors they are insignificant in electric operation. In freight service there is another factor tending to reduce further the cost under electric operation. Two or more electric engines coupled together may be operated by a single crew. This possibility of double heading without additional engine crews results in a considerable saving. Unit costs of electric operation decrease as the volume of traffic increases, whereas the unit costs in the case of steam operation remain comparatively constant.

DISADVANTAGES OF ELECTRIC OPERATION

As regards the disadvantages of electric operation, the most important objection is the enormous first cost and the heavy fixed charge which that involves.

Electric equipment is more costly than steam equipment. Electrification must not only bring about economics, but very large reduction in operating cost in order to prove itself economical. The electric locomotive is a piece of transforming apparatus which receives its power from an outside source, and is, therefore, subject to overloads. The steam locomotive is a self-contained mechanical unit and it is hardly possible to injuriously overload it.

There is additional danger to the lives of the employees and others. This is, of course, much more serious when the power is transmitted at higher voltage and where freight and switching service as well as passenger is operated by electric power. Another argument against electric operation is that which deals with the additional liability of train delays. In addition to equipment failures which occur on both steam and electric service, there are failures of the transmission lines.

With electric traction the territory protected with automatic block signals of the usual continuous current track circuit battery type will have to be replaced with alternating current track circuit apparatus, because the use of track circuits with propulsion currents in the rails requires selective apparatus to prevent false indications. Normal traffic cannot be exceeded for periods of long duration unless the system has been designed to take care of maximum traffic, which greatly adds to the capital charge.

Unless other load than the railway is carried on the generating stations on small systems a poor load factor is liable to be encountered which adds to the capital charge through maintenance of under-loaded equipment. It is more susceptible to the vagaries of the weather, as in addition to the snow, washouts, and other conditions that affect steam operation, lightning is apt to interrupt the electrical operation.

Steam locomotives are strictly interchangeable and can be moved from division to division, as the necessity for varying motive power capacity develops. Electric locomotives are limited in their field of operation strictly to

electrified track. Traffic must be handled as circumstances require. It cannot be spaced conveniently for power demands, but the terminal yards must be cleared as the cars accumulate.

GENERAL

As to the comparative efficiency of the two types of locomotives in the matter of failures, the electric locomotive seems to hold its own. There are certain factors, however, which within the last few years have made the steam locomotive a more formidable competitor of electrification. These are, particularly, the various outside valve gears, the superheater, the brick arch and the automatic stoker, which have increased the tractive power and sustained hauling power of an engine as well as resulting in greater economy of fuel and water.

From available data on the results of heavy electrification it would appear that the ton miles moved by six and one-half pounds of coal in a steam locomotive is approximately equal to that which can be moved by one kilowatt hour delivered from the power station, varying, of course, with the quality of coal. In a great majority of cases the profits from electrification must be realized indirectly rather than directly—increased track capacity, postponing second tracking or the like.

Steam railroads will generally consider electrification favorably when the reduction in operating expenses will pay the interest on the necessary investment, provided the capital requirements can be met, leaving the unevaluated advantages to be gained by electric operation as an additional asset. Also, when the traffic capacity is imperative and this can only be supplied by a large additional expenditure or by electrifying. Track maintenance will under present conditions be generally increased, not only by the additional charge for the maintenance of overhead or third rail contact and distributing systems, but also by the destructive effect upon rails and fastenings of the greater impacts, due to the imperfect cushioning of the heavy weights of the electric motors.

RISE AND FALL

The unit values of the several minor classifications under this head will be determined as before with modified factors of cost. Two new elements will be introduced and must be included in the final results, viz.: the time and temperature limitations of the electric motor and the possibilities of regeneration of power on descending grades. The cost of Rise and Fall will be reduced if advantage is taken of opportunities for the regeneration of power by trains on descending grades. The value of such regeneration is considerable under proper conditions. The actual percentage of power which can be utilized will depend upon the length and steepness of incline, total length of electrified section and the number and distribution of daily trains. Regenerative braking does not become economical except on long mountain grades.

The effects of rate of grade and of rise and fall are more closely inter-related in electric than in steam operation. Train tonnage ratings in steam service over lines of moderate grades are often determined by the average resistance of the division and the boiler horsepower of the engine rather than by the resistance of the maximum grades. If the inherent characteristics of the electric motor permit the development of higher speed and horsepower, within its nominal rating, then the resistance of the maximum grade may become the limiting factor, and its rate becomes economically important. In heavy service, and especially on mountain grades, the economic value of electric operation may be quite high, as it is possible to add engine units without adding engine crews.

Other differences affecting unit costs differ more in degree than in kind.

CONCLUSION

Taking into consideration the heavy fixed charges of investment, no general conclusion can be given at this time as to the relative economy of electric and steam operation. Each case must be considered by itself, taking into consideration all elements of cost and expense, both special and general, as well as operating conditions and the public comfort and safety.

Discussion

(C. P. Howard (Chairman) presented and outlined the report.)

A. S. Going (G. T.) presented the first subject, on "Make a Thorough Examination of the Subject Matter in the Manual, and Submit Definite Recommendations for Changes."

Chairman Howard: *I move the adoption and insertion in the Manual of the text under Appendix A.*

(Motion carried.)

Chairman Howard then read Appendix B—"Resistance of Trains Running Between 35 and 75 Miles Per Hour."

Chairman Howard: *I move that these conclusions be adopted.*

(Motion carried.)

Mr. Going: Referring to Appendix C, this information was taken from some of the data that is issued by the General Electric Company; in fact, most of the data that I have used in compiling this was information that we gleaned from different reports by Mr. Armstrong and other gentlemen that are with the General Electric Company.

C. F. Loweth (C. M. & St. P.): Many electric locomotives are built as two different units—they can be operated as independent units—but when you do that you are up against the enginemen's organization, and they want the double crew.

E. B. Katte (N. Y. C.): It did not occur to me that this report would take up operating features and comparison with steam locomotive operation, therefore, I have not read it. I find a great deal to criticize. The explanation from the chairman of the sub-committee that it is a compilation of information supplied by the General Electric and presumably other companies, perhaps manufacturers of steam locomotives, makes plain some of these statements, as for instance, this statement concerning insulators.

In fifteen years of operation on the New York Central we have broken many insulators, but we have never had the whole railroad tied up because one insulator was broken. It might cause a delay of four or five minutes to locate that particular insulator and isolate that feed-rail. No railroad built nowadays depends upon one feed-rail. I notice also a reference to electric operation being more apt to be interfered with by the vagaries of the weather, that lightning is apt to interrupt it. Lightning occasionally interrupts it, but very seldom, and other climatic conditions affect electric operation less than they do steam operation. The record of the New York Central on storms is far better than any of the adjacent steam companies. I hope that this report will be taken with a grain of salt.

May I suggest that when you write your next report you use the facilities of this Association and call upon the Committee on Electricity. I think this is more a report on electricity than on economics of railway location.

(The report was received as information and the committee excused.)

Report on Shops and Locomotive Terminals

The design of car shops is influenced by the consideration of track centers, safe clearances for cars, material handling, headroom, lighting, heating, etc. In studying this subject the committee investigated a large number of structures in use on various roads and presented plans of a great many of them. Data concerning ash pits were gathered from practically all railways in the United States and Canada, covering such features as the number of locomotives handled, the estimated cost, and the advantages and disadvantages. Many types are employed and nearly every type in common use is highly favored by some roads and adversely criticized by others.



F. E. Morrow
Chairman

F. E. Morrow is the first chairman of this new organization. As the attention of the committee is devoted largely to the subject of terminals it is fitting that it should be headed by a man occupying the position of chief engineer of a terminal railway, in which capacity a larger proportion of his time is devoted to terminal matters and terminal structures than would ordinarily be the case. Previous to his promotion to chief engineer he occupied the positions of principal assistant engineer and assistant chief engineer, in which capacities a large part of his time was occupied in matters of design which now serve him in good stead.

IN APPENDIX A THE COMMITTEE submitted certain studies for information on the design of car shops. It also reported progress on the subjects of (1) ashpits, (2) engine houses, power plants and shop extension, (3) storehouses, (5) design of coaling stations, and (6) typical layouts for storage and distribution of fuel oil, including fuel stations between terminals.

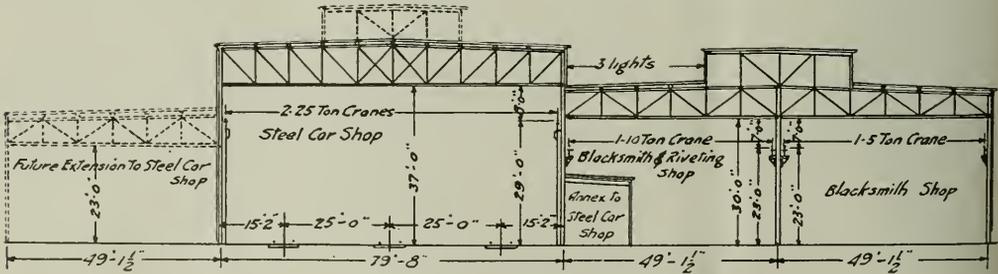
Committee: F. E. Morrow (C. & W. I.), chairman; A. T. Hawk (C. R. I. & P.), vice-chairman; C. N. Bainbridge (C. M. & St. P.), G. W. Burpee, Leland Clapper (D. & I. R.), C. G. Delo (C. G. W.), G. H. Gilbert (Sou.), Walter Goldstraw (G. T.), J. G. Gwyn (D. & R. G.), E. M. Haas (Austin Co.), R. J. Hammond (B. & M.), G. W. Harris (A. T. & S. F.), E. A. Harrison (A. T. & S. F.), J. L. Haugh (U. P.), L. P. Kimball (B. & O.), W. T. Krausch (C. B. & Q.), M. A. Long (B. & O.), J. B. Maddock, Adam Ritter (Sou.), L. K. Silcox (C. M. & St. P.), John Schofield (C. N. R.), E. M. Tucker, A. M. Turner (C. C. & St. L.).

Appendix A—Design of Car Shops

Many railroad companies find it desirable to provide shops for handling repairs to freight cars either on account of climatic conditions, legal requirements, or the belief that the provision of such shops will result in a

degree of efficiency. Arguments advanced in favor of such shops are that their provision will insure a better grade of workmanship, a lower rate of labor turnover, and that cars repaired in a shop will give better service.

In order to facilitate the design of car shops where their construction may be necessary or desirable, the committee has collected a considerable amount of data to which it has devoted careful study, and as a result presented general drawings of several plants actually in service and several proposed for the future, as an outline of actual possibilities in construction as experienced at this time. It was noted that, in general, the layout of many plants had been governed by existing property and trackage limits, and this condition is one which will probably be encountered even more seriously in the future, except where very extensive plants in new localities are contemplated. In reviewing freight car repair layouts throughout the country, it was found that they divide themselves into two general classes: light repairs and heavy repairs. The first-named group consists of equipment receiving running repairs given in transportation yards with trains under blue flag protection, where the safety appliances, doors, brake equipment, lubrication, brasses and minor truck repairs receive attention. Further to this, light repairs are handled, but require switching of the cars out of trains. Under this heading, cars are spotted on improvised tracks, where wheels are changed, brake rigging repaired, draft rigging and couplers replaced, and cars ne-



Cross Section of a Steel Car Shop

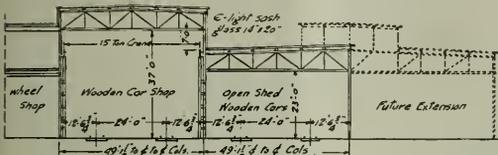
cessitating more extensive attention are temporarily strengthened and put in shape to meet safety appliance requirements, so as to be moved to heavy repair points having facilities and forces to do whatever is required.

Sheds or shops are not to be recommended as practicable at this time for the light repair work mentioned above, because of the frequent switching necessary and

Sheds or shops are not to be recommended as practicable at this time for the light repair work mentioned above, because of the frequent switching necessary and

the further fact that many hundreds of cars in this class are worked upon each day, depending upon the amount of business handled through any territory, and the number requiring repairs has little fixed relation to a road's ownership.

In the case of heavy repairs, however, shops may be desirable at certain points, especially when considered in conjunction with the power, tool and handling equipment necessary to intensive production. There are three subdivisions into which heavy repairs may be classed, namely: Medium repairs, consisting of moderate attention to trucks, underframes and superstructure with entire re-



Cross Section of a Wood Car Shop

painting; heavy repairs, occasioned by severe wreck damage or extreme deterioration; and rebuild, where cars are strengthened and made modern in construction through the application of steel underframes, ends, roof, etc. Where it is possible, most railroads prefer to do heavy repair work on their own cars, due to having suitable standard material, and the further fact that cars can be segregated by series and the work standardized. There are practical reasons requiring the rebuilding of foreign

named in section No. 1, it is desirable, considering present and future practice, to allow 60 ft. per car. Railroads using wider track centers, such as 30 ft. with material tracks, and 22 ft. without, usually only employ 50 ft. per car due to re-arrangement of work.

(3) **Supply Tracks:** Standard gage seems to be preferred throughout the country, due to the ease in handling wheels and the usual design of section push car upon which material can be carried. Further to this, erecting shops can be supplied with standard freight car loads of heavy material, such as underframes, sills, etc., which is not possible with narrow-gage tracks.

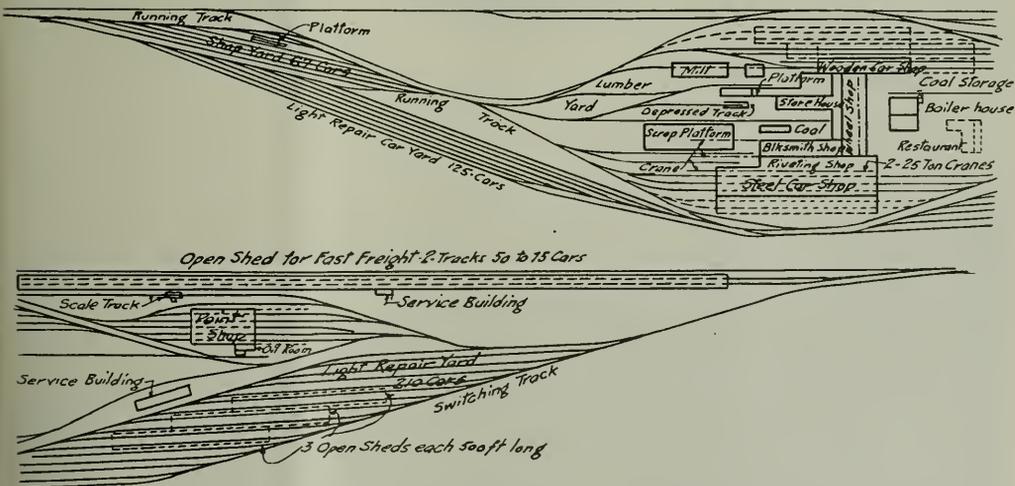
(4) **Clearances:** It is recommended that a minimum clearance of 10 ft. from center of track to face of pilasters and 12 ft. from center of track to face of wall.

(5) **Headroom:** Measuring from top of rail, overhead clearance in shops where cranes are not employed should be 20 ft. minimum, with 22 ft. desirable. Where cranes are used, clearance should be not less than 25 ft. unless careful study of local operating conditions should dictate a smaller dimension advisable. In mentioning clearance, it is the purpose to define it as the exact clearance possible either from the crane hook or crane cage or girder, whichever forms the limiting element and the farthest downward projection. Shops designed with cranes should be limited to include bays not to exceed four repair tracks.

(6) **Doors:** The minimum dimension for end doors in car shops should be 13 ft. wide and 17 ft. high, obtaining as large a door on supply tracks as clearance and general construction will permit.

(7) **Paint Shops:** Separate accommodation in line with the normal movement of cars through shops should be provided and installed in such a way so that equipment can be handled expeditiously and prevent blocking repair tracks.

(8) **Expected Increase:** Full consideration should be given to expected increases in demand and future extensions which can be foreseen. In cases where shops are constructed with traveling cranes, it was felt advisable to recommend that runways be advanced beyond the covered space which will provide for flexibility of operation and permit men to work either out-doors or in-doors as local conditions may govern;



Typical Layouts of Car Repair Facilities, Yards and Shop Buildings

cars occasioned by the handling lines' responsibility, but this only represents a small percentage of the total.

Where a railroad owns a sufficient number of steel cars to justify the expense, a special shop should be given consideration for this purpose. From what the committee could observe, based on experience throughout the country, it recommended the following:

(1) **Track Centers:** In cases where material tracks are employed, 24 ft. centers are recommended and in cases where material tracks are not used, 18 ft. centers as a minimum.

(2) **Space Allowance per Car:** With the track centers

also will assist in the handling of material and the adjustment of loads in cars.

(9) **Handling Material for Effective Service:** Every possible means should be provided for a prompt and economic handling of material through the application of necessary cranes, hoists, mono-rails, supply tracks, runways, and storage space, all located with the single purpose of concentrating work and materials into definite groups.

(10) **Lighting:** Ample lighting is essential. Construction of roof and walls should be such as to admit the maximum amount of natural light and ample artificial light should be provided, which, in a general way, should amount to just as much as is required in usual locomotive shop practice. In-

terior walls and ceilings should be painted and maintained as nearly white as possible.

(11) **Heating:** The question of proper heating should be carefully studied out so as to maintain a temperature of between 40 deg. and 50 deg. Fr. in the shop itself, whereas in adjacent machine sections and other points requiring operators remaining stationary at tools, etc., a temperature of 60 deg. to 70 deg. is preferable. The expense permissible in providing a heating plant will be governed largely by the form of construction to be employed. During cold weather it should be remembered that equipment has to be thawed out when brought into the shop in order to facilitate repairs, so that the heat should be delivered as near the floor line as practicable and well distributed so as to avoid drafts.

Discussion

Chairman Morrow: The committee has only had this year for the study of these subjects. It has been actively

engaged in collecting information as to prevailing practice on these subjects, but does not at this time present any definite conclusions as to recommended practice. This work is progressing, but has not yet reached the stage of compiling a report.

The Chairman: This is the first report of this newly-created committee, and I think they are to be congratulated for having brought together a great deal of good basic information which will be built on in coming months. It is a class of work on which I think we should place a great deal of importance, because it correlates the problem of the mechanical department with the engineering department.

(The committee was dismissed with the thanks of the Association.)

Report of Special Committee on Standardization

Standardization, considered solely in relation to railroad requirements, has been, because of its nature, scope and diversified application, the result of growth and will continue to be. Material benefits will accrue to the roads from standardizing such materials, tools, etc., as track spikes, track bolts, track jacks, switch lamps and track and ballast tools of all kinds. Work of standardization can be done by detailed handling of each article until a final design suitable to both producers and consumers is reached. A list of 43 different classes of articles is recommended for standardization by 10 different committees. Co-operation between committees is essential.



E. A. Frink
Chairman

E. A. Frink is the chairman of this committee, which was organized two years ago and includes in its personnel the chairmen of all the regular committees. It is largely because of the interest which he took in this subject as a member of the Board of Direction that the committee was formed. It goes without saying that Mr. Frink is an enthusiast on the opportunities for good work by this committee, but in the absence of well defined policies on the part of the various interests involved it is to be expected that progress will be slow. Mr. Frink is one of the closest students of the committee reports, especially matter proposed for inclusion in the Manual.

STANDARDIZATION—CONSIDERED SOLELY in relation to railroad requirements—from its very nature, as well as its wide scope and diversified application, has been in the past and must continue to be the result of growth, but its natural growth can and should be advantageously accelerated by judicious assistance. Material benefits will accrue to the railroads from standardizing track spikes, track bolts, track jacks, track and ballast tools of all kinds, rail drilling, switch lamps, etc., and this Association should lead in the work. This can be done by detailed handling of each article until the final design, acceptable to both producers and consumers, is reported to this Association. Our experience would lead us to believe that a purchasers' market would expedite results.

The committee recommended that all standards adopted by the A. R. E. A. be known and designated as R. E. standards. In case of the adoption of standards originated by other bodies, due credit should be given to the originators. In accordance with instructions a list of recommendations was prepared for the Committee on Outline of Work and attached as Appendix A.

Committee: E. A. Frink (S. A. L.), chairman; J. R. W. Ambrose (Tol. Term.), vice-chairman; F. L. C. Bond (G. T.), A. Crumpton (G. T.), A. F. Dorley (M. P.), W. T. Dorrance (N. Y. N. H. & H.), W. J. Eck (Southern), J. M. R. Fairbairn (C. P. R.), W. H. Hoyt (D. M. & N.), Edwin B. Katte (N. Y. C.), F. R. Layng (B. & L. E.), B. H. Mann (M. P.), G. E. Ray (D. L. & W.), H. L. Ripley (N. Y. N. H. & H.), O. E. Selby (C. C. C. & St. L.), H. M. Stout (N. P.), C. M. Taylor (P. & R.), W. P. Wiltsee (N. & W.), J. J. Yates (C. R. R. of N. J.).

RECOMMENDED STUDIES ON STANDARDIZATION

The following list of articles was selected for studies on standardization and where other committees are to be consulted the name of the committee is shown in parentheses:

- Committee: **II—Ballast;** ballast tools (Track).
- IV—Rail;** rail sections, rail drilling, bolts (Track).
- V—Track;** track tools, except ballast, tie plates (Ties, Ballast, Rail), frogs, switches (Signals), switch stands, spikes, screw spikes, guard rails, rail braces (Signals), details (Signals).
- VI—Buildings;** glass sizes, hydrants, fire (Water Service), hose, nozzles, etc., baggage trucks, hand, scales, freight house and baggage, fire extinguishers.
- VIII—Masonry;** Portland cement, cement testing, metal reinforcement.
- IX—Signs, Fences and Crossings;** highway crossing signs.
- X—Signals;** R. S. A. standards, switch lamps (Track), bridge lamps (Iron and Steel), highway crossing signs (Signals).
- XIII—Water Service;** wood tank details, tank fittings, water columns, tank gages, float valves.
- XVII—Wood Preservation;** No. 1 Creosote, No. 2 Creosote No. 3 Creosote, coal tar—creosote solution.
- XVIII—Electricity;** incandescent lamps (Signals), insulators, insulated wires and cables (Signals), tile and other conduits, friction, rubber and other tapes (Signals), knife and snap switches.

Discussion

Chairman Frink: Your committee has no conclusions to report this year, and the report is presented simply as information, but your attention is called to Appendix A, which presents a list of various items which the committee has suggested to the Committee on Outline of Work as fit subjects for standardization by the appropriate committee.

The Chairman: The report is before you for discussion.

J. L. Campbell (E. P. & S. W.): I think it would be a good deal of assistance to the Committee on Outline of Work, and possibly also to the Board of Direction, if we heard some discussion from the committee itself as to what the work of the committee on standardization should be, and how it should be done.

J. J. Yates (C. R. R. of N. J.): I have in mind the necessity of standardizing some articles. I have principally in mind one subject that is coming up, that has been up before our Association, that is, membership in the American Engineering Standards Committee. It is very important for this society to be represented in it. There are innumerable questions coming up that will interest the railroads, and at the present time we have some voice in that committee, but we have not as an association, and our Standardization committee suggested that this association become a member so as to have a voice in the standardization of articles that would be of interest to the railroads.

J. M. R. Fairbairn (C. P. R.): I think one of the most important things before the Association today is the question as to whether we are to continue as we have in the past to recommend practice, or whether we are to establish standards. Unless we do establish standards, I doubt if we will ever get the railroads of America to adopt our recommended practice to the same extent that they would if we establish standards. Further than that, I believe that we should keep ahead of the railroads. If we do not keep ahead then we will have to follow some one railroad and adopt what it has adopted or what manufacturers have made for them.

E. B. Katte (N. Y. C.): I, too, would speak in behalf of this Association taking membership in the American Engineers Standards Committee. That committee is now formed of only four or five of the national societies, and it is very desirable that the railroad interests and the railroad engineers should be represented.

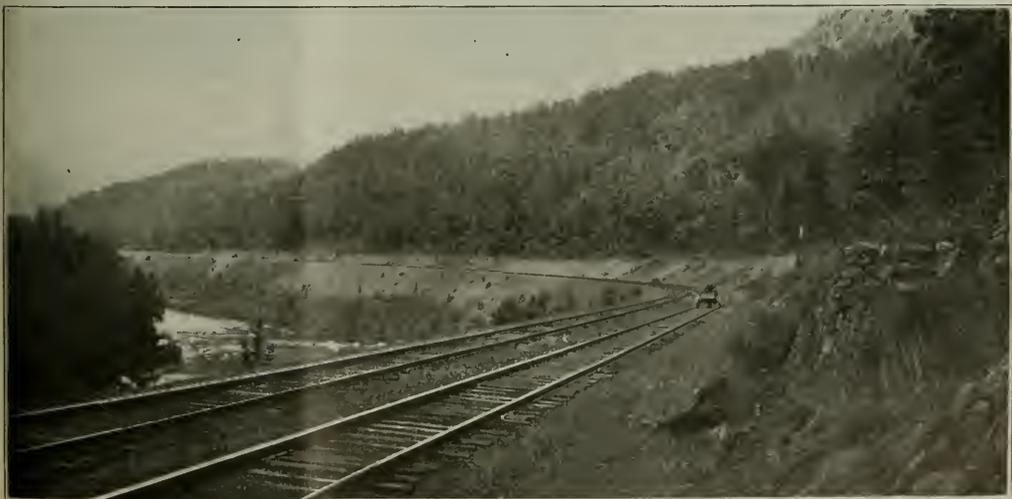
The matter was first brought to our board of direction a year ago, and met with some favor at that time, but we have not yet taken out a membership. A committee of three, I understand, will be appointed of the board to

look further into the matter, and I am quite sure that after they have familiarized themselves with the objects and aims of this National Standards Committee, that our Association will also be represented.

J. R. W. Ambrose (Tor. Term.): I am afraid I am that one. I do not agree with Mr. Katte at all. I think our Association is strong enough and able enough to stand upon its own feet. Surely at least we know as much or should know as much about railroad work as a standardization committee made up of various members from all branches of the technical world, and I think this Association should handle its own standards and look after its own standards. I now feel that the time has arrived when we should have standards, but it seems to me the fact that this Association prepares a standard does not mean it is to be used universally by the various roads, but if the Association could work in conjunction with the A. R. A., having the stamp of their approval on any standard we pass, it would seem then that it would be imperative that the standard be used, and we all know that the standardization of any article in railroad service spells economy and we also know that economy is the object we all want to attain.

Mr. Katte: Mr. Ambrose has done me the compliment to disagree with me, and perhaps I may be permitted to speak a little further. I think that the Committee on Standards, that is the American Committee on Standards, wants this Association to be with them, because this is the recognized authority on all railroad standards. I do not think that there would be any criticism of specifications of this Association for rails or track spikes, but there are other articles which we employ largely, yet which are employed to a greater extent by the members of other associations. I have, for instance, in mind the specification which we adopted yesterday on insulated wires and cables. The railroads of the country use a great many million dollars' worth of insulated wires and cables in a year, but that is only a very small part of the wires and cables used throughout the country. Now, if we can standardize on a number of cables the cost to the railroads and the other users will be materially reduced.

(The committee was excused with the thanks of the Association.)



A Bit of Picturesque Country Along the Boston & Albany



At the American Railway Engineering Association Dinner Last Evening

The Dinner of the Engineering Association

Abstracts of the Addresses Presented at the Twenty-second Annual Banquet Held Last Evening

THE TWENTY-SECOND ANNUAL dinner of the American Railway Engineering Association was held in the Gold room of the Congress hotel last evening, President H. R. Safford presiding. After invocation by Dr. George L. Sherger, professor at Armour Institute of Technology, addresses were presented by Dr. David Kinley, president University of Illinois; the Honorable William Renwick Riddell, Justice of the Supreme Court of Ontario, and John Findley Wallace, chairman Chicago Railway Terminal Commission.

The Association and the University

BY DR. DAVID KINLEY

President University of Illinois, Urbana, Ill.

I have been asked to say a few words about the common aims of the American Railway Engineering Association and the University, and possible points of contact and possible methods of co-operation between them. I gladly comply with such a request for several reasons. In the first place, even if I felt that the two organizations had nothing in common, I should still be appreciative of the request and thank you for the honor, sir, as did the old dinky who was unable to change the ten dollar bill. Moreover, the very presentation of such a request indicates a thought in the minds of those who make it of possible lines of usefulness on the part of academic men which a few years ago would have been scouted at. Still further, this request marks this Association as an unusual organization. Few even of the so-called learned societies have been able thus far to look out from their own confines and realize the possibility of co-operative work to the common advantage.

It is clear that the Railway Engineering Association and the University of Illinois have common interests in several respects. They are both interested in the education of the employees and officers of the railways from whose

organization your membership is drawn, and they are both interested in the two fields of research which you, the established officers of these railways, find it necessary or desirable to pursue—the economic and the technical.

Turning first to the field of education common to both organizations, it is evident that the University and the Association are both deeply interested in the curriculum of the College of Engineering, in which we are trying to train the future employees and officers of railways. The friendly advice which such an association as this could give the University through the faculty of the College of Engineering in the organization of such a curriculum and in the maintenance of proper educational standards would be of great value to us. I know that we are all human and that advisory committees which begin by being advisory not infrequently end by becoming dominating. It is easy to pass from advising what to do to telling what to do. That is a difficulty which the University has experienced occasionally in the past. Nevertheless, in spite of that danger and possible friction that comes from it, we would welcome a closer advisory relationship between organizations like this and the University for the purpose of helping us to solve our educational problems. This point of contact relates to the education and training of future employees and officers.

There is another field of educational contact. Occasionally members of the University staff have been asked by the officers of railways to give series of lectures at different points on the roads to their employees. In short, we have been asked to establish an extension service to present employees, giving lectures and conducting classes not only on technical aspects of the work they do, but on general educational subjects for the development of their morale and their general betterment. This particular field of inquiry, the best method of conducting such work, its organization, the subjects to be presented,

and the educational institutions that might be used in doing it, are all proper subjects of inquiry for your Association in co-operation with the University of Illinois or any similar institution. I have sometimes thought that the efforts of great corporations to maintain educational work of this kind might be more successful if, under a committee of some such association as yours, certain universities or colleges were enlisted in co-operation and the work left to them under your general direction. A University-Railway Association Education Committee might accomplish a good deal both for the railways and for the University.

You may think that such work is not within the scope of your Association, but it certainly is as much so as any other means for improving the morale of your employees or supply of labor or labor turnover, subjects on which one of your committees has already made a report.

But the main field in which co-operation between your Association and the University of Illinois is most promising is the field of research. Your committees are constantly making investigations into technical subjects which are also under constant study by the University Engineering Experiment Station and members of the staff. Co-operation with the Engineering Experiment Station in technical and scientific research is, therefore, the matter that deserves our largest consideration. A mere reading of the list of technical topics on which your committees report, side by side with those that form the subjects of report from our Engineering Experiment

vantage of the general public. The University cannot, therefore, enter into any arrangement whereby any discovery made in its laboratories which is evidently a matter of great public advantage and whose exploitation by the general public is economically feasible can be put at the service of any particular individual or particular organization. On the other hand, occasionally the University is in a position to conduct an experiment exclusively for the benefit of an organization when it is clear that the results are not a matter of public concern, but rather a matter pertaining to the welfare of the particular organization.

One great difficulty with all university research departments is the lack of sufficient funds to conduct their experiments, especially on a scale large enough to justify conclusions on an industrial or commercial basis. Co-operative investigations, therefore, must be financed by the interests especially related to them and most likely to benefit from them. But within this general limitation I can see a very large, indeed, a practically unlimited field of co-operation between your Association and the University of Illinois.

From remarks that I have already made it is evident also that many things of an economic or business character could be studied in common between the University and your Association. For many years it has been my ambition to see at the University of Illinois a Bureau of Economic Research corresponding in a way to the Engineering and Agricultural Experiment Stations. My suc-



David Kinley



Hon. William Renwick Riddell



John F. Wallace

Station, is enough to show that we are both at work along the same general lines. Electrolysis and its effect on reinforced concrete, electrical interference, maintenance of track, fatigue of metals, causes of rail failure, effect of speeding on track maintenance, elements influencing the strength of concrete, are subjects that might as well describe investigations in the laboratories of the engineering experiment station as in the libraries and laboratories of your committees. Undoubtedly some topics could be more advantageously investigated by us than you, and the opposite is also undoubtedly true. This fact suggests the possibility of a common committee for conference and advice as to the better agency to which to allocate a proposed investigation and a consideration of the ways and means of carrying it out.

I may say that the University of Illinois has on several occasions undertaken co-operative investigations with industrial and other organizations. The University work in research is designed, of course, to discover any scientific and technical truths, methods, processes for the ad-

cessor at the head of the Department of Economics and also my successor as the director in the courses of Business Administration have the same ambition, and I trust that it will soon be realized. If it is, I see no reason why co-operative investigation in the methods of doing business, business organization, cost analyses, labor matters which are scientific and not partisan, and many other matters may not be studied co-operatively.

Still a third possible mode of co-operation is in my mind. Some years ago I urged on the then state government the passage of a law establishing at the Engineering Experiment Station a State Bureau of Standards similar, in a general way, to the Bureau of Standards at Washington. That would be an organization at which tests of all kinds for commercial purposes could be conducted on payment of proper fees, and might well be a place where some of the problems of your Association could be sent. It may be that the University is not the best place for such a bureau, but there should be such a bureau somewhere in the State administration.

Aside from all these things, there is, of course, the large field of general educational improvement in which your Association and the University are alike interested. While this might not give a basis for continuous co-operation, yet it seems to me that there are large questions of educational public policy which an association like this might well study and on which they might well express themselves. For example, the question whether or not electric tramways, railways, and mines shall be publicly owned or privately owned is not a question for engineers or miners or electricians or economists or any other class of society as such. It is primarily a great question of public policy on which any fair-minded citizen is entitled to express an opinion, whose value will depend upon his knowledge of the subject and our estimate of his judgment. However, when it has been decided which policy is to be adopted by a given community or country, all questions relating to securing efficiency of operation and service to the public under the policy decided on are questions for experts.

Canada

By HON. WILLIAM RENWICK RIDDELL
Justice of the Supreme Court of Ontario

When we come to the United States we come not as strangers or as aliens, we come as one comes home. In all but the accident of political allegiance we are the same people. Aliens as we are by the strict and formal rules of international law, and standing apart by the evanescent and external form, by the great statutes of Heaven, in the essential and external, in all that is really worth while, Americans and Canadians are one.

What is it that so binds us in an indissoluble union? Race? Language? Religion? Oh, no. Race, language, religion, all are significant—immensely significant—but they are not everything—they are not even crucial.

The most potent and all-powerful force which binds us and unifies us is our common conception of human rights—individual rights—and the relative rights and the relative rights and duties of the State and the individual. We believe in democracy, real democracy, the rule of the people in whatever form.

In times of war we recognize the practical necessity for an autocracy more or less veiled—*inter arma silent leges*—but where such necessity does not exist we carry our love of liberty to great lengths. We follow Walt Whitman's advice, "Resist much, obey little." It is enough for us that a thing is "*verboten*" to make us wish to do it. The sign "keep off the grass" is taken as an implied invitation to trespass and the grass is promptly trodden down. Too often "we are content to believe that we cannot have both good government and liberty, and liberty we think the better of the two." This liberty necessarily means the right to govern ourselves, and that it is tyrannous for another to govern us—a concept unknown to the undeveloped or ill-developed races in some parts of the earth who claim the right to be governed, so that it is almost tyrannous to compel them to govern themselves. Such are they who could hear the head of their state boast, "There is but one will in this land and that is mine—him who opposes me I will crush," without rebelling or a universal outburst of derisive and inextinguishable laughter.

Self-government is democracy, whether the form be monarchical, republican or what you will. The vesture is naught, the soul is what counts, and here are seldom "the letter killeth but the spirit giveth life." What is called a republic may be a mere oligarchical tyranny. What are some of the so-called republics, even in modern times, of South and Central America?

Democracy is not a form, it is a vital principle man-

ifesting itself in many ways, under as divers shapes as life itself.

I am not one of those who believe, or pretend to believe, that democracy was born on the Fourth of July, 1776, and that her birthplace was upon this continent. I do not believe, nor do you believe, that liberty was unknown and non-existent before the Declaration of Independence.

The ultimate source lies far removed from the trodden path of civilization, not in Rome, not in Greece, still less in Babylon or Persia, but in the bleak, cold fens and the dense forests of northwestern Europe, where Angle and Saxon and Jute maintained their proud independence, and alone of all the nations refused to bend the knee to the Imperial Mistress of the world.

The English Bill of Rights in 1689 laid down principles of democracy in systematic form, and democracy was well advanced before George Washington was born.

The Revolution which sundered the British Empire was no cataclysm—it was not like the atheist and terrorist revolution in France which Goldwin Smith did not hesitate to call the "greatest of all calamities in history"—a complete breaking up of the foundations of society, of law, of government. There was nothing in the Revolution or in the conduct of it—though revolutions are neither made nor quelled with rose-water—which necessitated ill-feeling, once the new State had been established. Nor until driven by bitter necessity did the Fathers of the Revolution determine that America should sever her connection with the Empire.

It is a wicked libel to say that even before or during the Revolutionary war, England or the English were opposed to the aspirations of the American people. The best part of the public men of England or the English people were in favor, but their voice was overruled by the gross ignorance and foolish arrogance of the king and his chosen advisers.

The mass of the English people were always and are now not only friendly to the United States—they are proud of the United States. You may find here and there a relic of the dislike which the patrician class felt for republicanism. Prejudice dies hard, and the fool ye have always with you. I have seen as great, as unreasoning detestation of England and of modern Englishmen in Maine as I ever saw or heard of in England against Americans.

That Canada and the rest of the British Empire today are free is due largely to the example of American democracy in 1776. The embattled farmers who stood and fired the shot heard round the world, fought not only for themselves and the rest of those of the thirteen colonies and the great states that were to proceed from the thirteen colonies, not only for their descendants for generation after generation in these United States, but for Canada, too, for Australia and New Zealand, and South Africa, aye, for England herself, and all that makes the British Empire worth while.

With all these ties I do not fear that you need to im-bibe a more favorable knowledge of the Canadians and their character.

But I am not so sure that the nature and character of our government do not need to be more fully appreciated.

Not many weeks ago in this city, a man of eminence from New York was eloquently demanding that England should set Canada free—throwing in Australia for good measure. Not three weeks ago in this city, a person calling himself a Canadian was declaiming against the king and his pretensions over Canada. A well-known American author in a recently published book asks if England will, in the future, continue to rule Canada. Thousands of Americans insist that Canada must vote in the League

of Nations as Britain may wish, or British interests may indicate. I have myself been asked why does Canada not shake off the English yoke and elect a President for herself. These and a hundred other like facts indicate that there is a widespread misunderstanding of Canada's true position.

The "back number" who lives in the past has some ground for his ideas of Canada if he reads and thinks of the past only, for England did once rule Canada—as she once ruled America.

Let us speak of the present—for the Great War has forced a growth in the Constitution of Canada—greater than decades did previously. Before the awful Cataclysm, Canada had achieved with England's glad and proud consent, full control over her own territory, her own tariff, her own trade, her own people. Nay, she took part in Imperial Conferences in advising the general course of the Empire, and even succeeded in causing the denunciation of Imperial Treaties which stood in her way. She had negotiated treaties and formed an International Commission with the United States. She had repudiated the title "Colony."

Then came the War, *the War*, before which all other wars from the beginning of time pale their ineffectual fires.

When Germany made the assault on innocent Belgium, so long preparing, and at last thought certain of success, Canada did not delay a moment. The Atlantic cable carried the message: "The last man and the last dollar."

From the earliest days of Canada there has never been a stricken field where British troops fought but a Canadian was present—Waterloo, the charge of the Light Brigade at Balaklava, Kars, where the Canadian Williams held the foe at bay for months; these and many other fields of battle saw the Canadian fighting for his flag. But all these were volunteers, and while they were Canadians they were equipped and paid by Britain.

Now there was a change, Canada raised her own forces, equipped them, paid them, cared for them, and pays the pensions of the survivors, and widow and child of the honored dead. Sixty thousand Canadian dead and three times as many wounded prove how Canada acquitted herself. England could not call upon us for a soldier, a ship, an ounce of supplies, a cent of money; nor did we fight for England. We poured out our money like water, our men died in tens of thousands for a struggle which we call our own because we believed and believe it to be for humanity at large, and our chosen form of civilization.

May I venture the assertion that Canadians generally recognized that the war was the great Armageddon, the final and most terrible struggle for freedom the world has ever seen; and that the war was the crucial test of Democracy, sooner and more clearly than any other people, and Canada fought for herself, her own fight and not another's.

Her boys were dying in thousands, her mothers weeping the dead, her homes were desolate, and she thought that she should have some say in how the War should be carried on. Britain recognized that old things had passed away, and that the time had come frankly to acknowledge that Canada and the other Dominions had ceased to be in any sense dependent, but had become sister nations standing on an equality with her. The common effort and sacrifice in the war inevitably led to a recognition of an equality of status between the responsible governments of the Empire.

Accordingly in 1917, the prime minister of Great Britain called together the prime ministers of the self-governing Dominions for consultation on vital matters of policy relating to the prosecution of the war. They met as equals, as prime ministers of the nations of the Empire.

to discuss matters of common concern to the whole Empire.

The old forms remain like the old titles of the king—the spirit is new, the reality is transcendent.

In our British system, we build more stately mansions on the old foundations, we graft new and living buds on the old stock, without an outward change we renew, we quicken, we transform the spirit.

Some day, perhaps in a few months, there will be a conference of the statesmen of the Empire to frame a written constitution in some degree tying the theory to the reality, the letter to the spirit. Whatever be the result, we Canadians will remain steadfast; we cannot and will not give up our share of the old flag, or sever ourselves from the rest of the British world, but we will not revert to the status of a colony.

We are a free and self-governed people, an adjunct of no nation on earth, either on this side of the Atlantic or the other.

It is on these terms, and on no other or different, that we offer our friendship. We value beyond rubies the friendship of the United States, we offer our own, we yearn for yours. We will not beg for it—Canada can stand four square to the winds of Heaven, rely upon herself, her own industrial ability and resources, if she must, but she hungers for real brotherhood with the people of the United States.

Are we—have we shown ourselves to be—such as you desire for friends? Have our efforts and our sacrifices during the war shown us to be such as you would take up with? That is for the United States to answer.

A little broader is the real question upon which the future of the world depends. Are the English speaking peoples to stand together? If the answer be "Yes" civilization is safe, if "No," woe unutterable—one League of Nations must exist or all is lost. Let but the English speaking peoples be one in purpose and in determination and the future is secure.

When last I spoke to an American audience I ventured to say, and I repeat it here, "The world is to be made better, brighter, happier. It must be the task of the English speaking race to bring that about."

France, gallant, heroic France, must for generations watch the Rhine; two assaults she has experienced, a third might be fatal. Italy, worthy child of old Rome, relieved, indeed, of the spectre of evil omen scowling over the Alps, is cribbed, cabined, and confined by the necessity to overcome at home the effect of impoverishment of ages past. Germany, if she would, could not for generations do more than repair her shattered industrial and commercial life—and who would trust her in any case?

May the United States increase in wealth and prosper in every way—the more she does the more will the rest of the English speaking world rejoice.

Reminiscences of John F. Wallace

It is very gratifying to me to appear before you tonight and particularly so at a time when the outgoing president and the incoming president are Bob Safford and Larry Downs, two of your presidents who commenced their career under my administration as chief engineer of the Illinois Central.

It was suggested by President Safford and some of the other members of the Association that the younger members, particularly, would like to hear something of the causes which led to the organization of the Association and the forming of its constitution, with its peculiar organization and peculiar outline of work and how this association came into existence.

In about 1898 there was a maintenance of way association in this country which was called the Roadmasters' Association. In that day the roadmaster had charge of about 100 or 120 miles of track, and held a position that on the larger systems today is called a supervisor. These men were practical men, mainly.

At the Denver convention of the Roadmasters' Association in 1898 there was a small group of men known as engineers of maintenance of way who desired to associate themselves with the Roadmasters' Association and learn what they could from these practical railroad roadmasters. They were treated with more or less of a cold shoulder and this small group of the technical engineers and engineers of maintenance of way came back from that meeting and felt that the time had come when, if that association could not be broadened and controlled and developed by the technical men who were gradually working into positions in charge of maintenance of structures, that it was time to form an association on a higher, larger, broader plane.

They took the matter up with some of their superiors, and later on, I think it was the latter part of 1898, a small group of men met in Chicago among whom was Mr. Torrey, the chief engineer of the Michigan Central, Mr. L. C. Fritch, who sits on my left, Mr. Curtis Dougherty, then engineer of maintenance of way of the Illinois Central, and a few other engineers. They formed a temporary organization of which Mr. Torrey was chairman and Mr. Fritch secretary. At that time they wanted to get the sanction of some of the larger roads which were building at that time or had built up scientific maintenance of way organizations under engineering supervision.

They appointed a committee consisting of myself as chairman, Thomas Rodd of the Pennsylvania, Walter Katte, chief engineer of the New York Central, Mr. Curtis of the Southern Pacific and Mr. Peterson, chief engineer of the Canadian Pacific. When that committee was appointed I was unaware of it, but a few days afterward, Mr. Torrey, whom I presume a few of the old members of this association knew, came into my office and told me about this organization work, and asked me to accept the chairmanship on permanent organization.

One of the members of the committee was in San Francisco, another in New York, another in Montreal and another in Pittsburgh, and all of us were busy men. We corresponded, and then we sent out a circular letter and got all sorts of replies. One man wanted to confine the association to chief engineers; another wanted to confine it to engineers of maintenance of way, etc. Finally it occurred to two of us—I will not mention any names on account of the memories of some of you gentlemen here—that we had to have something different from any other organization that was formed if we expected to do successful work. We felt that the ordinary scientific papers which were prepared without any direction or without any correlation of the different members was a waste of effort. We finally made up our minds that we must block out a line of investigation of work that would mean something.

Out of that idea grew this plan of forming constant standing committees that would cover every branch of railway engineering work, even to administration. I think we even included accounts at that time.

Then our next idea was to get the members to work. Then we made up our minds that we would have a series of standing committees, and we assigned every member of the organization to a place on a committee; that we would have these committees make annual reports; that we would have each member, on account of the wide membership of the railroads, have credentials that would enable the chairman to get information along the line of

the work of that committee from every railroad in the land.

The main object and purpose of this committee work was to eliminate peculiarities. One of the first things that occurred to us was our rails. Every railroad in this country had its own peculiar standard and section of rail. We thought if we could get a standard rail we might induce the rolling mills to keep rails in stock so that we could get them as we wanted them. We have not accomplished that yet.

Then we found a great many different ideas among the railway engineers all over the country, and in every case we hardly approached a fixed standard; for as you gentlemen know who were in the Association 22 years ago there was hardly a committee that did not find that every chief engineer had his own ideas, his own standard frogs, his own standard switch stands and all that sort of thing.

After we drew up the constitution as it originally was outlined, the original skeleton, we sent it around to the other members of the committee and told them that this was what seemed to be in the minds of the majority of the committee, and asked them to sign it, which they all did.

A meeting to form the permanent organization was arranged at Buffalo and I got a telegram from Mr. Torrey, who said: "The report of your committee has created a great deal of criticism among a great many members. You had better come on to Buffalo and present it in person to the permanent organization meeting." We had a meeting at a hotel there and after I read the constitution and commented on it Mr. Torrey put it to a vote and it was adopted unanimously, to my great surprise. Later on I was notified that they had elected me president.

Roadway Committee Meeting

There will be a meeting of the Roadway Committee in Room 1102 of the Congress Hotel at 9 o'clock this morning.

Invitation to Visit Underwriters' Laboratories

G. B. Muldaur, general agent of the Underwriters' Laboratories, 207 E. Ohio street, Chicago, extends an invitation to the members and other railway men attending the convention to visit the laboratories and observe the work under way in that institution. These laboratories are a non-commercial institution organized to test construction materials to promote safety from fire and accident. Tests are continually in progress on various building materials to determine their relative resistances to hazards of this character.

Western Society of Engineers

The Western Society of Engineers, Railroad Section, will hold a meeting in the offices of the society on the 17th floor of the Monadnock block, at 7 o'clock, Thursday, March 17, at which C. F. Loweth, chief engineer of the Chicago, Milwaukee & St. Paul will present a paper on "The Classification and Maintenance of Old Railroad Bridges." A moving picture film showing the laying of rail on the Lehigh Valley by the use of locomotive cranes and the application of other labor saving equipment to auxiliary operations will also be shown. All members of the American Railway Engineering Association and other railway officers are cordially invited to attend this meeting and to participate in the discussion.

The A. R. E. A. Elects New Officers

Results of Annual Election Announced Yesterday; Sketch
of President-Elect L. A. Downs

SHORTLY BEFORE THE CLOSE of the afternoon session yesterday, Secretary Fritch announced the results of the balloting for officers for the ensuing year. The election resulted as follows:

President, L. A. Downs, vice-president and general manager, Central of Georgia, Savannah, Ga.

Vice-President, E. H. Lee, vice-president and general manager, Chicago & Western Indiana, Chicago.

Treasurer, G. H. Bremner, district engineer, Bureau of Valuation, Interstate Commerce Commission, Chicago. Secretary, E. H. Fritch, Chicago.

Directors: C. F. W. Felt, chief engineer, Atchison, Topeka & Santa Fe, Chicago; G. J. Ray, chief engineer, Delaware, Lackawanna & Western, Hoboken, N. J., and Colonel G. H. Webb, chief engineer, Michigan Central, Detroit, Mich.

Nominating Committee: J. R. W. Ambrose, chief engineer, Toronto Terminals, Toronto, Ont.; R. H. Ford, assistant chief engineer, Chicago, Rock Island & Pacific,

road which employs him. The case of Lawrence A. Downs is no exception to this rule. For many years he has had an active part in the affairs of the Association and as vice-president and general manager of the Central of Georgia, he occupies a position which permits of no question as to his ability as a railway officer.

In the affairs of the Association Mr. Downs has been identified primarily with the Committee on Ties because of his personal interest in this subject. He was an active member of this committee for many years and served for five years as its chairman. As a member of the Board of Direction he was the prime mover in the campaign for increased membership carried on during the last year, as a result of which 500 new members were added to the Association. Owing to the fact that it was deemed inadvisable to enlist the entire membership of the Association in this campaign, the results secured are largely the consequence of the personal work done by Mr. Downs.

In two respects the career of the new president and



J. L. Campbell
First Vice-President

L. A. Downs
President

E. H. Lee
Second Vice-President

Chicago; E. A. Hadley, chief engineer, Missouri Pacific, St. Louis; J. V. Neubert, engineer of track, New York Central, New York City, and A. F. Robinson, bridge engineer, Atchison, Topeka & Santa Fe, Chicago.

Lawrence A. Downs, President of the American Railway Engineering Association

The presidents of the American Railway Engineering Association are selected through the agency of a nominating committee subject to the popular approval of the Association. Whatever the opinion of this indirect method of selection, it must be conceded that the results secured under this system have been excellent. A study of the nominations from year to year will indicate that the committee has been governed by two prime considerations: the value of the man to the Association as demonstrated by a whole-hearted interest and service in its behalf and evidence of intrinsic worth as shown by the confidence bestowed upon the candidate by the rail-

road of his predecessor bear a marked resemblance. Both are graduates of Purdue—Downs in the class of 1894 and Safford in the class of 1895. Both gained a large part of their railway experience on the Illinois Central. For a time they were roadmasters together. Whether this comparison may be carried any further without encountering sharp contrast in personal makeup, the friends of both decline to be placed on record. It suffices to say that the outgoing president has established a mark which bids fair to be continued throughout the term of his successor.

The new president is a strong man, yet one who is particularly endowed with truly human characteristics which have served to endear him in the hearts of his associates and those who have been so fortunate as to have been employed under his direction. The magnetism of his personality is by no means restricted to the close contact that comes with friendship or professional relations, but has manifested itself in his appearance before the Association convention. With a certain straightforwardness, frank-

ness and air of confidence in his bearing, he is quick to win the confidence and sympathy of his auditors. He has also had the happy faculty of being able to punctuate his remarks with a humor that has served to drive home his arguments. Those who attended the convention in 1916 will recall his well chosen comments on the futility of forestry as a railway undertaking.

As a man who has graduated from an engineering or maintenance of way position to that of an executive officer, his career is of particular interest to those whose ambition leads them in the same direction. He is a product of the maintenance of way department of the Illinois Central which has produced more than its share of leading railway officers and not a few presidents and directors of the A. R. E. A. Following his graduation from Purdue University, he entered the employ of the Vandalia, but joined the Illinois Central organization in 1896 and continued constantly in the employ of that property until March 1, 1920, when he was elected vice-president of the Central of Georgia, a subsidiary. His experience with the Illinois Central included service in engineering parties, nine years as a roadmaster and a period as assistant chief engineer of maintenance, until December, 1910, when he entered the operating department as a division superintendent. Subsequently, he was advanced to general superintendent and in January, 1919, to assistant general manager. Mr. Downs' election as president of the American Railway Engineering Association will accrue to the advantage of that society and be a source of inspiration to its members.

A. R. E. A. Registration

THE REGISTRATION OF MEMBERS and guests of the American Railway Engineering Association yesterday aggregated 172, making a total registration for the two days of 765, as compared with 718 at the same period last year. Of the total registration this year 619 were members.

Abbott, W. P., Asst. Engr., B. & O., Cincinnati, Ohio.
 Adams, L. L., Roadmaster, L. & N., Etowah, Tenn.
 Anderson, Anton, Engr. M. W. C. I. & L., Lafayette, Ind.
 Andrews, J. T., Asst. Engr., B. & O., Baltimore, Md.
 Baird, R. C., Asst. Engr., C. R. I. & P., Chicago.
 Baldwin, Springfield, Ch. Engr., G. & F., Augusta, Ga.
 Barnhart, E. H., Asst. Engr., B. & O., Baltimore, Md.
 Baxter, J. J., Div. Engr., Wabash, Peru, Ind.
 Beckett, F. T., Engr. M. of W., C. R. I. & P., El Reno, Okla.
 Belcher, R. S., Mgr. Treating Plants, A. T. & S. F., Topeka, Kan.
 Bloecher, Theodore, Jr., Div. Engr., B. & O., Baltimore, Md.
 Bradley, A. C., Div. Engr., C. R. I. & P., Colorado Springs, Colo.
 Bratager, S. J., Prin. Asst. Engr., N. P., St. Paul, Minn.
 Briggs, Z. M., Asst. Engr., Pennsylvania, Pittsburgh, Pa.
 Brooke, G. D., Supt. Trans., B. & O. Western Lines, Cincinnati, Ohio.
 Brooke, Richard, Div. Engr., B. & O., Weston, W. Va.
 Brown, H. W., Div. Engr., Pennsylvania, Zanesville, Ohio.
 Browne, H. L., Asst. Engr., C. B. & Q., St. Louis, Mo.
 Burke, M. J., Asst. Engr., C. M. & St. P., Seattle, Wash.
 Burrage, W. H., Pilot, Val. Dept., N. Y. C. & St. L., East Cleveland, Ohio.
 Butterworth, A. S., Ch. Engr., G. F. & A., Pensacola, Fla.
 Campbell, H. A., Chicago.
 Cleveland, G. C., Ch. Engr., N. Y. C., West of Buffalo, Cleveland, Ohio.
 Correll, E. J., Div. Engr., B. & O., New Castle, Pa.
 Crable, Arthur, Engr. M. W., Hocking Valley, Columbus, Ohio.
 Crites, G. S., Div. Engr., M. W. B. & O., Baltimore, Md.
 Crowell, F. N., Div. Engr., Pennsylvania, Cincinnati, Ohio.
 Crumpton, Arthur, Val. Engr., Grand Trunk, Montreal Canada.
 Dansey, J. W., Asst. Engr., A. T. & S. F., Chicago.
 Delo, C. G., Chief Engr., C. G. W., Chicago.
 Dewees, A. R., Div. Engr., P. M., Saginaw, Mich.
 Doyle, T. L., Div. Engr., Penna. Lines, Grand Rapids, Mich.
 Edwards, W. R., Sen. St. Engr., I. C. C., Washington, D. C.
 Ehrke, John, Asst. Supt., G. T., Battle Creek, Mich.
 Elker, W. H., Dist. Engr., C. B. & Q., Lincoln, Neb.
 Elliott, L. B., Engr. M. W., Big Four, Indianapolis, Ind.
 Everham, A. C., West. Con. Man., Raymond Concrete Pile Co., Chicago.
 Flora, G., Val. Dept., G. T., Durand, Mich.
 Ford, R. H., Asst. Ch. Engr., C. R. I. & P., Chicago.
 Freeman, J. E., Mgr. Street Bureau, Portland Cement Association, Chicago.
 Freygang, A. H., Div. Engr., B. & O., Grafton, W. Va.
 Frick, O. H., Dist. Engr., C. M. & St. P., Chicago.
 Fritch, L. C. (Past-President), Vice-President in Charge of Construction, Maintenance and Capital Expenditures, C. R. I. & P., and Minneapolis & St. Louis, Chicago.
 Fulks, E. B., Pres., Arkansas Preservation Co., 913 Carleton Bldg., St. Louis, Mo.
 Gaines, R. H., E. M. Way, T. & P., Dallas, Tex.
 Gaut, J. B., Supt. B. and B., G. T., Chicago.
 Giles, W. H., Asst. Engr., M. P., St. Louis, Mo.
 Gowdy, R. C., Ch. Engr. for Corp., C. & S., Denver, Colo.
 Graves, W. F., Ch. Engr., Montreal Tramway Co., Montreal, Can.
 Griggs, A. B., Val. Engr., A. T. & S. F., Eastern Lines, Topeka, Kan.
 Griswold, H. C., Louisville, Ky.
 Hallsted, R. H., Div. Engr., Mo. Pac., Wynne, Ark.
 Hamilton, H. F., Res. Engr., G. N., St. Paul, Minn.
 Hammond, E. W., Engr. M. W., B. & R. P., Rochester, N. Y.
 Hanna, J. V., Ch. Engr., K. C. T., Kansas City, Mo.
 Hansen, H. J., Office Engr., C. M. & St. P., Chicago.
 Harman, H. H., Engr. Bridges, B. & L. E., Greenville, Pa.
 Harsh, H. H., Div. Engr., B. & O., Pittsburgh, Pa.
 Hartley, L. C., Chief Engr., Chicago & Eastern Illinois, Chicago.
 Harvey, A. E., Ch. Engr., Metr. St. Ry. Co., Kansas City, Mo.
 Hatch, H. A., Div. Engr., A. T. & S. F., Chanute, Kan.
 Hawthorne, F. M., Div. Engr., Pennsylvania, Logansport, Ind.
 Hayward, G. I., Asst. Dist. Engr., N. P., St. Paul, Minn.
 Heidenthal, W. C., Engr. M. W., N. Y. O. & W., Middletown, N. Y.
 Heritage, C. S., Bridge Engr., K. C. S., Kansas City, Mo.
 Herth, C. E., Div. Engr., B. & O., Seymour, Ind.
 Hewes, John, Jr., Div. Engr., B. & O., Florida, Ill.
 Hillman, A. B., Asst. Engr., Belt, Chicago.
 Hood, J. M., Supt., A. C. & Y., Akron, Ohio.
 Hopkins, A. T., Asst. Val. Engr., M. C., Detroit, Mich.
 Johnson, J. E., Saginaw, Mich.
 Johnson, J. M., Con. Engr., I. C., Louisville, Ky.
 Johnson, Noah, Val. Engr., Wabash, St. Louis, Mo.
 Johnston, C. E., Gen. Man., K. C. S., Kansas City, Mo.
 Johnston, D. B., Div. Engr., Pennsylvania, Louisville, Ky.
 Jonah, F. G., Ch. Engr., St. L. & S. F., St. Louis, Mo.
 Kissell, J. E., Engr. M. of W., Big Four, Mt. Carmel, Ill.
 Kulp, B. R., Div. Engr., C. & N. W., Madison, Wis.
 Lane, E. G., Engr. M. W., B. & O., Eastern Lines, Baltimore, Md.
 Lang, P. G., Jr., Asst. Engr. of Bridges, B. & O., Baltimore, Md.
 Larsen, Albert, Div. Engr., Miami Con. Dist., Dayton, Ohio.
 Lawton, L. C., Div. Engr., A. T. & S. F., Newton, Kan.
 Layng, F. R., Engr. Track, B. & L. E., Greenville, Pa.
 Leeds, R. M., Roadmaster, L. & N., Louisville, Ky.
 Longwill, M. F., Div. Engr., Wabash, Montpelier, Ohio.
 Mack, W. C., Draftman, C. R. I. & P., Chicago.
 Maenner, L. T., Office Engr., M. P., St. Louis, Mo.
 Mann, B. H., Sig. Engr., M. P., St. Louis, Mo.
 McFetridge, W. S., Prin. Asst. Engr., B. & L. E., Greenville, Pa.
 Miller, R. E., Engr. Br., St. L. S. F., St. Louis, Mo.
 Mullen, Joseph, Gen. Mgr., Southern Acid & Sulphur Co., St. Louis, Mo.
 Newhouse, C. E., Asst. Div. Engr., B. & O. S. W., Seymour, Ind.
 O'Rourke, G. M., Roadmaster, I. C. C., Mattoon, Ill.
 Petersen, W. H., Engr. M. W., C. R. I. & P., Des Moines, Ia.
 Petri, Philip, Div. Engr., B. & O., Cumberland, Md.
 Pfaflin, E. H., Ch. Engr., C. T. H. & S. E., Chicago.
 Pfeifer, H. J., Ch. Engr., Term. R. Assn., St. Louis, Mo.
 Phillips, H. C., Ch. West. Group Engr. Com., I. C. Val.
 Pifer, C. W., U. S. R. A., Chicago.
 Purdon, C. W., Dist. Consulting Engineer, St. L. S. W., St. Louis, Mo.
 Radspinner, W. A., Spec. Engr., B. & O., Western Lines, Cincinnati, Ohio.
 Ray, W. M., Asst. Engr., B. & O., Pittsburgh, Pa.
 Raymond, W. G., Dean, Col. Appl. Sc., State Univ. Iowa, Iowa City, Ia.
 Reagan, J. H., Supt. Track, G. T., Detroit, Mich.
 Riegler, L. J., Asst. Engr., Pennsylvania, Pittsburgh, Pa.
 Ringer, Frank, Ch. Engr., M. K. & T., St. Louis, Mo.
 Rist, C. J., Div. Engr., P. M., Saginaw, Mich.
 Roach, J. H., Val. Engr., N. Y. C., New York City.
 Robbins, O. B., Senior Str. Engr., Bureau of Val., I. C. C., Chicago.
 Rockefeller, R. P., Office Engr., C. M. & St. P., Chicago.
 Rodenbaugh, H. N., Ch. Engr., F. E. C., St. Augustine, Fla.
 Sawyer, Mott, Asst. Gen. Supt., C. M. & St. P., Minneapolis, Minn.

Scott, H. E., Asst. Engr., Wabash, Moberly, Mo.
 Simmons, I. L., Bridge Engr., C. R. I. & P., Chicago.
 Sisson, F. P., Div. Engr., G. T. W. L., Detroit, Mich.
 Smith, H. R., Engr. Acct., P. M., Detroit, Mich.
 Smith, R. M., Asst. Engr., M. P., Falls City, Neb.
 Snyder, J. A., Roadmaster, M. C., Jackson, Mich.
 Speiden, Theodore, Jr., Div. Engr., B. & O., Philadelphia, Pa.
 Spencer, C. H., Dist. Engr., Bureau Val., I. C. C., Washington, D. C.
 Sprague, Willson, Div. Engr., N. Y. C. & St. L., Conneaut, O.
 Stevens, Thos. S., Signal Engr., Santa Fe System, Topeka, Kan.
 Stimson, F. J., Ch. E. M., S. W. Region, Pennsylvania, St. Louis, Mo.
 Stugs, R. M., Engr. Bridges, M. K. & T., St. Louis, Mo.
 Sturdevant, C. F., Div. Engr., C. B. & Q., Lincoln, Neb.
 Teal, J. E., Asst. Engr., B. & O., Baltimore, Md.
 Vent, F. G., Asst. Engr., I. C., Chicago.
 Wait, B. A., Div. Engr., C. R. I. & P., Cedar Rapids, Ia.
 Washburn, R. H., Asst. Engr., M. C., C. & A., Springfield, Ill.
 Weatherly, E. P., Contracting Engineer, Kansas City, Mo.
 White, H. H., Asst. Engr., M. P., Little Rock, Ark.
 Whiting, C. L., Supt. Term., C. M. & St. P., Milwaukee, Wis.
 Williams, C. C., Prof. C. E., University of Kansas, Lawrence, Kan.
 Williams, H. W., Spec. Rep. to Supt. M. P., C. M. & St. P., Chicago.
 Williams, W. D., Engr. M. Way, C. C. C. & St. L., Van Wert, Ohio.
 Worner, A. H., Div. Engr., B. & O., Wheeling, W. Va.
 Wonson, S. L., Bridge Engr., M. P., St. Louis, Mo.
 Woodbury, W. H., Val. Engr., D. & I. R. and D. M. & N., Duluth, Minn.
 Young, R. C., Ch. Engr., L. S. & I. and Munising Rys., Marquette, Mich.
 Ziegweid, A. B., Sen. Civ. Engr., I. C. C. Valuation, Hinsdale, Ill.
 Zook, M. A., Res. Engr., Bureau of Val., I. C. C., Washington, D. C.

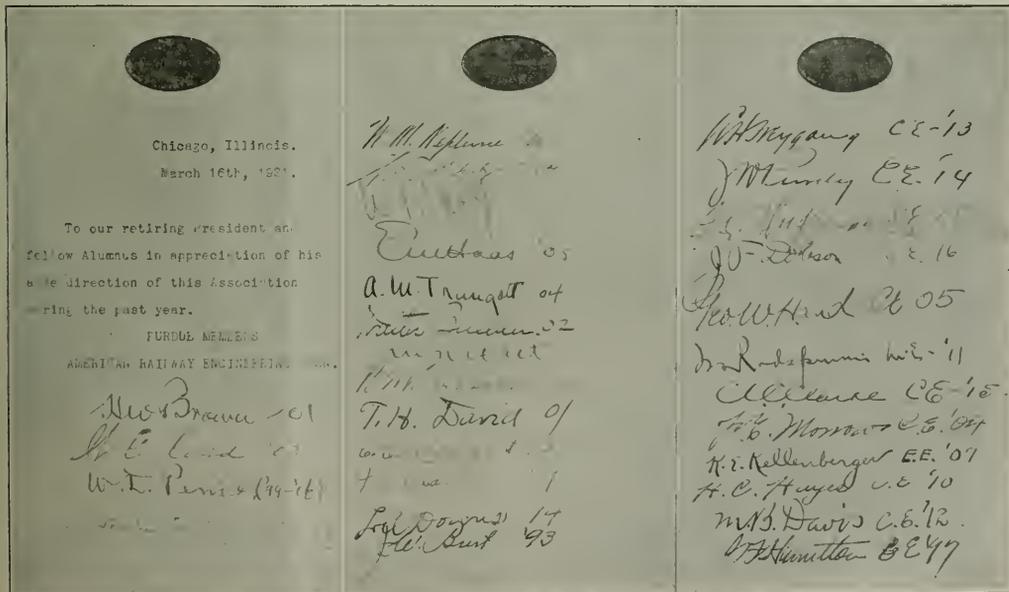
Davis, M. B., Asst. Engr., I. C., Chicago.
 Fulweiler, W. H., Const. Chem., United Gas Improvement Co., Philadelphia, Pa.
 Gainer, A. T., Designing Engr., L. & N., Nashville, Tenn.
 Graves, F. H. C., Asst. Supv. Track, B. & A., Springfield, Mass.
 Gibson, H. R., Div. Engr., B. & O., Clifton Forge, Va.
 Hammer, J. B., Arch. Draftsman, G. T., Detroit, Mich.
 Hayward, G. I., Asst. Dist. Engr., N. P., St. Paul, Minn.
 Hawkinson, W. M. G. T., Detroit, Mich.
 Hutchinson, J. B., Pennsylvania, Chicago.
 Haywood, A. E., Instrumentman, Battle Creek, Mich.
 Kallosce, William, Gen. Mgr., Leonard Construction Co., Chicago.
 Kennedy, R. E., Pilot Engr., B. & O., Baltimore, Md.
 King, Coleman, Supvr., L. I., Jamaica, N. Y.
 Leavell, J. C., Architect, Chicago.
 Lichty, C. A., Inspector, C. & N. W., Chicago.
 Lichliter, S. T., Supervisor, B. & O., Harrisburg, Pa.
 Moore, Milburn, Eastern Engr. Editor, Railway Age, New York City.
 McGuigan, J. F., Roadmaster, St. Louis, Mo.
 O'Keefe, T., Asst. Supv., B. & A., Springfield, Mass.
 Oliphant, A. L., Roadmaster, A. T. & S. F., Chanute, Kan.
 Pollak, F. A., Asst. Engr., St. L.-S. F., St. Louis, Mo.
 Purdy, J. W., Asst. Div. Engr., Banesville.
 Potter, A. A., Dean of Engr., Purdue Univ., Lafayette, Ind.
 Routerberg, H. M., Asst. Div. Engr., B. & O., Baltimore, Md.
 Smart, G. G., Gen. Roadmaster, G. N., St. Paul, Minn.
 Smith, G. S., Asst. Engr., M. P., St. Louis, Mo.
 Smith, R. H., Railway Age, Cincinnati, Ohio.
 Vandenberg, E. C., Asst. Gen. Br. Insp., C. & N. W., Chicago.
 Weeks, J. E., Instrumentman, G. T., Battle Creek, Mich.
 Walcott, Ray, Draftsman, G. T., Detroit, Mich.
 Willson, O. G., Bldg. Pilot Engr., B. & O., Baltimore, Md.

Purdue Alumni Luncheon

THE CHICAGO ALUMNI ASSOCIATION of Purdue University held its second annual luncheon at the University Club yesterday noon for alumni attending the annual convention of the American Railway Engineering Association. It was voted at the luncheon held in 1920 to make this an annual affair, the dinner to be on Wednesday of the week of the annual meeting. The object of the dinner is to get the Purdue men engaged in the railway field better acquainted with each other

Guests

Barrett, P. T., Office Engr., C. & W. I., Chicago.
 Beahan, R. J., Chief Engr., C. L. S. & S. B., Michigan City, Ind.
 Bochtelheimer, A. E., Gen. Bridge Insp., C. & N. W., Chicago.
 Bloom, J. G., Div. Supt., C. R. I. & P., Eldorado, Ark.
 Bennett, W. R., Track Supvr., Wabash, Montpelier, Ohio.
 Buchanan, E. G., Roadmaster, A. T. & S. F., Independence, Kan.
 Chipman, Paul, Val. Engr., P. M., Detroit, Mich.
 Cummings, A. E., Raymond Concrete Pile Co., Chicago.
 Davis, H. E., Grasselli Chemical Co., Cleveland, Ohio.



The Cards of Presentation to Mr. Safford

and with the work being accomplished by the alumni in other fields of industry. Thirty-five men were in attendance yesterday as compared to 59 a year ago. The fact that fewer men were in attendance this year was due, to a certain extent, to the March stated meeting of the Signal Section of the American Railway Association being called off this year. Among those present at the luncheon yesterday were: H. R. Safford, retiring president of the A. R. E. A., and L. Downs, the president-elect, who are of the classes of '95 and '94. Others present included: G. W. Hand, assistant to the president, Chicago & North Western; W. K. Hatt, head of the School of Civil Engineering, Purdue University; C. C. Albright of Purdue University; and A. A. Potter, dean of engineering, Purdue University.

Short addresses were made by Messrs. Safford, Downs, Hatt, Potter and Albright. Mr. Safford emphasized the benefits which the young college graduate entering railroad service can derive from becoming a member of the A. R. E. A. By becoming a member, the younger man is in reality continuing his schooling in the practical lines of work he has adopted for his life work. Endless opportunities for co-operative relationship exist between the A. R. E. A. and the various technical universities and Mr. Safford emphasized the necessity of cultivating these opportunities.

Mr. Downs emphasized the fact that the older men can help the younger men by looking them up and getting acquainted with them and their problems. He stated that the younger men are not making themselves known to the older men who are alumni of their universities and who are engaged in the same line of work. Mr. Albright stated that the university is compiling a list of Purdue men who are engaged in various branches of railroad service.

A feature of the dinner last evening was the presentation to Mr. Safford of a badge by his fellow alumni who are also members of the A. R. E. A. In making the presentation Dean Potter spoke in part as follows:

"President Safford, the Purdue members of the A. R. E. A. have asked me to present to you in their name this badge as a mark of their esteem and as a recognition of your lively interest in the welfare of the younger men who are in the rank and file of the technical organization of our railroads. These alumni of Purdue University desire also to express their appreciation of your continued interest in your Alma Mater and your vision of the mutually serviceable relations that should prevail between the colleges and the railroads. The visiting committees which you appointed to advise with the faculties of Illinois and Purdue will prove most helpful to us and we hope will result in interesting an increasing number of our best students in the profession for which the A. R. E. A. stands. Your energies have found outlet not only in the technical and professional phases, but also in the improvement of human relation."

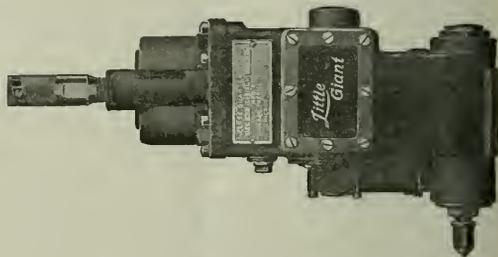
A Throttle-Reversing Close Quarter Air Drill

IT IS INTERESTING TO NOTE that the Chicago Pneumatic Tool Company, New York, has recently remodeled its Little Giant Close Quarter Air Drill so that it is now available in reversing types and that the reversing is accomplished at the throttle. By reason of these features the machine is said to be greatly improved for tapping in close quarters operations and is proving highly useful both for drilling and reaming holes at rail joints, and as a wrench in connection with track repair and construction work. Below are given various figures relating to the

size and performance of the two models of the new machine.

Description	Capacity		Speed Light	Air Consumption Cubic Feet per Minute	Total Length Including Throttle	Length from Spindle to End of Screw When Run In	Distance from Side to Center of Spindle	Net Weight, Lbs.
	Drilling	Reaming						
No. 81-R.....	1 1/4"	1"	240	35	24"	1 1/2"	1 1/2"	36
No. 91-R.....	1 1/2"	1 3/8"	120	35	24 1/2"	1 3/4"	1 3/8"	40

Similar to the non-reversible drills of this type, drilling can be performed within 1 7/16 in. of an end wall or corner. In them the power is transmitted to the drilling spindle by means of a compact train of gears which are



Little Giant Reversible Close Quarters Air Drill

said to insure smooth uninterrupted rotation, and give an increased drilling speed over the earlier ratchet types. The gears themselves are of the stub-tooth design, it being held that in this design the roots of the teeth are relatively much stronger than in gears of the involute type.

A Rail Failure Chart

HOW TO DETECT a defective rail before it breaks is one of the most difficult problems imposed on the section foreman. This becomes well-nigh impossible in many cases of transverse fissures, but owing to the serious consequences which follow the ultimate failure of rail containing a fissure, it is extremely important that these fissures be detected whenever any external evidence is shown. Information as to the nature of these troublesome flaws in rail steel is also of considerable importance to the foreman in order that he may report the rail failures accurately.

As a means for clearing up some of the misunderstandings concerning the transverse fissure and to assist in their detection, Robert W. Hunt & Co., Chicago, has issued a chart or card of instructions to section foremen illustrating three types of transverse fissures by a group of eight photographs. The card also contains an explanation of the nature of these fissures and details the various external manifestations by means of which some of them may be detected.

Roadmasters' Dinner

Over 50 members of the Roadmasters & Maintenance of Way Association met at dinner at the Auditorium hotel last evening to discuss the work of the Association and means of promoting a successful convention, scheduled to be held at the Auditorium hotel in Chicago next September.

EDITORIAL

Railway Age

EDITORIAL

The Table of Contents Will Be Found on Page 5 of the Advertising Section

In many respects the Sao Paulo Railway, which is described in some detail by J. P. Risque in an article appearing elsewhere in this issue, is one of the most remarkable steam roads in the world.

The Sao Paulo Railway

Although only 134 miles in length, it represents the investment of a great amount of capital because of the exceptional nature of the physical barriers it has had to overcome. Its earnings, too, which are derived largely from the profitable coffee traffic, are very great. It is chiefly, however, the unique engineering problems which were encountered in the construction of this line and the equally unique manner in which they were solved that make the Sao Paulo a really remarkable railway. About 11 miles from the seaport of Santos there is a sharp ascent to a high plateau. This obstacle has been overcome by an elaborate system of inclines over which the cars are operated by means of cables. The Sao Paulo road, in common with a great many others in Brazil, is British throughout and does not, therefore, offer a very promising market for American railway supplies. There are, however, many opportunities elsewhere in that vast country for establishing a market for American equipment and these will be discussed in another article by Mr. Risque which will appear in the *Railway Age* at an early date.

There is agitation in some quarters for a reduction of freight rates, the argument being that if freight rates are reduced shipping of commodities would thereby be encouraged. While it may be conceded that the present level of freight rates is made higher than would otherwise be advisable if it were not for the high wage scales of many classes of railway employees, we cannot but feel that the argument behind the present agitation for reduced rates rests upon an economic fallacy. It does not presume adequate realization of what constitutes a business depression. Prices of most commodities have fallen greatly during the past few months without bringing about buying on the part of the public on other than a bare hand to mouth basis. What justification is there then for the assumption of some that a reduction in rates would occasion heavier traffic to the railroads? It is the very nature of a depression that funds are not available for extensive buying and those who do have the funds are wary until they see signs of stability in business. Lower rates would, of course, decrease to some extent the cost of the commodities ordered when the present supplies are exhausted, and would be desirable if a large reduction of railway operating costs could be obtained. They would be of no assistance in helping the merchants to clear their shelves of present supplies. They would not, in other words, bring about an increase in buying and a revival of business. The problem now is to restore the earning power of the roads, which cannot be done without a reduction of operation costs and an increase of traffic. When that is done there will be a stabilizing of one of the greatest businesses in the country and an increasing confidence on the part of the public will follow. This increasing confidence would naturally tend to increase buying on the

Reduced Rates Not a Solution

part of the public and bring about eventually the revival of business for which the entire country is looking. A decrease in rates at this time could be expected to bring no such results.

The railroad news of the present month consists almost entirely of developments in the railroad wage question and the effect of the present wage scale on net earnings. The same observation applies also to the news that one reads in the financial columns of the daily press. The buyers of railway securities at the present time are following the reports of net earnings of the carriers as never before, and naturally the paucity of such net earnings has been reflected in decreased stock quotations and sharp declines in the market. The investing public, the speculators and the operators have quickly realized that one of the most important reasons for low net earnings has been the wages paid to railway employees. The announcements of the railroads requesting conferences with their employees and the fear of the delay that would occur in carrying matters to the Railroad Labor Board have thus been given their due importance and have accelerated the decline. The *Railway Age* does not often refer in its columns to the market quotations of railroad stocks, but when the attitude of the investor is so clearly shown as has been evidenced in this case it cannot properly omit reference to it. Conditions have been such as to point out that the business revival which all of us have been looking for this past several months depends more upon what the railroads and the Railroad Labor Board are going to do in this matter of wages than upon almost any other factor. There are many reasons why the matter should be settled in a short time, and the attitude of the buyers of railway securities is not the least of them.

The Stock Market

An official bulletin of the French Commission in the United States gives some very interesting figures showing the extent to which the French railways have been restored to normal since the signing of the armistice. It appears that of some 1,440 miles of double-track line destroyed during the war, all have been completely reconstructed. This work has involved not only the rebuilding of the tracks themselves, but of signal towers, stations and bridges also. Of the 1,665 miles of single-track line destroyed, 1,080 have been restored to service. Work on the remaining 585 miles is progressing more slowly, it is said, because they are being double-tracked. From the signing of the armistice until the end of 1920, 3,892 locomotives were placed in service, bringing the total up to 18,429. The amount of rolling stock and the efficiency of the shops can be said to have increased in like proportion during the period. In addition to the activities in reconstruction, the French railways are undertaking a vast program of electrification. The Midi company already has 90 miles of electrified line and the work of electrifying an additional 1,800 miles is in actual progress. In addition to this the Orleans and the Paris, Lyons & Mediterranean will

Progress of the French Railways

each electrify 1,800 miles of their lines. It is estimated that the saving in coal resulting from this electrification will more than pay the interest on the necessary loans. The reconstruction of the destroyed lines alone presented to the French railways a problem of staggering proportions. The way they have solved it and are now undertaking to carry out other plans, comparable in size and importance to the reconstruction of the destroyed lines, merits the admiration of everyone.

The statement was made at the March meeting of the Canadian Railway Club that open-top steel freight cars deteriorate so rapidly from corrosion in some sections of the country that they become candidates for the scrap heap after 10 or 12 years of service. J. J. Tatum, superintendent of the car department of the Baltimore & Ohio, advocated strongly that steps be taken to develop a steel for such use which will contain less impurities and be less liable to damage from moisture and acids. He referred to the iron box cars which were introduced on the Baltimore & Ohio in 1862. A few of the bodies of these cars are still in existence and show little if any damage from corrosion. An analysis of the iron shows a low percentage of impurities and a small amount of copper. The American Railway Association could well afford to make a thorough and painstaking study of the action in service of the steel plates and members of open-top steel cars, the insides of which it is impossible to protect with paint or other coatings because of the abrasive action in loading and unloading coal and other commodities. The whole problem is one of dollars and cents. If better steel is required it can undoubtedly be produced by the makers. If the increased cost of this better steel is so great as to more than offset the advantages of increased life of the cars and reduced maintenance expense, then it will be useless to follow the matter further. Mr. Tatum's suggestion should be looked into thoroughly. Meanwhile, it is important to keep ever in mind the statement which was made by Samuel Lynn, master car builder of the Pittsburgh & Lake Erie, at the conclusion of the paper on "Maintenance of Steel Freight Cars" which he read at the above mentioned meeting—if the railroad provides adequate facilities and a maintenance program "and an honest effort is made to maintain the cars in accordance with that program, the steel cars in the country will give the owners a better return for the money invested, in the way of better service and in increased life of the cars."

Non-Corrosive Steel for Freight Cars

adopted by the House under Mr. Esch's leadership, Mr. Esch, in co-operation with members of the Interstate Commerce Commission, had more to do with the bulk of the provisions in the act which rounded out the previously existing law. Mr. Potter, as a lawyer who has had some experience as a railroad executive, fulfils the demand which has been voiced for several years for a railroad man on the commission, and has already served for several months as a member of two of its divisions which have been intrusted with some of the most critical problems that have come before the commission. As a member of Division 5 Mr. Potter was closely identified with the commission's work in relation to car service last summer and fall and as a member of Division 4 he has been active in the work of administering the loan fund and in connection with the supervision of security issues.

It was like coming up out of a dark, damp, stuffy mine to the clear, bright air at the top of the shaft, with a stiff, refreshing breeze blowing. But it was not out-of-doors. It was in a large shop in which railway equipment was being repaired—quite evidently not a railroad shop where national agreements and McAdoo standardized wages hold full sway. The contrast from a previous visit to a railroad shop was as striking as the above simile. Men worked with a vim and as if playing a game. Exhausting themselves? No! Their good red blood was circulating freely and they seemed to get real enjoyment out of the game. After all work is no harder, and sometimes not nearly as exhausting as "soldiering" or loafing. The active, red-blooded man is the one who really enjoys living. After the closing whistle it was a delight to watch the faces of the men as they passed out of the shop gates. Slaves? No! Suffering? Not on your life! Happy? Most of them surely looked it! Exhausted after a strenuous day's work? Judging not, from appearances! What was the secret of this lively, red-blooded bunch? Each one of them had done a good, honest day's work. He was proud of it—and he was well paid on the basis of his individual output.

A Refreshing Breeze

An encouraging sign of improvement of the desperate railroad situation was afforded this week by the publication of the Car Service Division of the American Railway Association for the week ending March 5, showing a larger number of cars of revenue freight loaded than for any previous week this year and almost the first increase since the latter part of October. The total, 712,822, represents an increase of 54,000 cars as compared with the previous week, which, however, included a holiday, and an increase of 17,000 cars over the week before that. It is nearly 100,000 cars less than for the corresponding week of 1920, but it is larger than the figure for the corresponding week of 1919 for almost the first time this year. The car loading is now, however, only about 70 per cent of what it was during the fall. The peak week of 1920 was the third week in October, when 1,010,961 cars were loaded with revenue freight. Since then there has been a steady falling off of almost unprecedented proportions. An increase in traffic is, of course, to be expected at this time of the year but the recent depression has been so serious that the apparent turning of the tide is particularly welcome. The railroads, of course, need much more than an increase in traffic to put them in a healthy condition and their experience of last September and October when even the present high rates were insufficient to produce a fair return

Freight Car Loading Shows Increase

President Harding has made an excellent beginning toward commanding the respect of those interested in transportation by his first appointments of members of the Interstate Commerce Commission to fill two of the four vacancies. The importance of the commission was greatly increased by the passage of the Transportation Act and the many critical situations which have been and still are arising in the railroad world as incidents to the readjustment from the conditions resulting from the war and federal control demand ability of the highest type in its personnel. It is difficult to see how two better appointments could have been made than those of John J. Esch and Mark W. Potter. In addition to being a man whose personal character and integrity have won recognition, Mr. Esch has been a close student of transportation problems for many years and has probably been more closely identified with railroad legislation than any other single man. While those parts of the new law which have attracted the most attention had their origin in the Senate bill rather than that

Two Good Appointments to the I. C. C.

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with the heaviest volume of traffic ever known proves that a large reduction in the level of expenses, which the railroads are trying to accomplish by a reduction of the war-time scale of wages, is imperatively necessary.

The lading of approximately 1,700 cars is transferred monthly in the Chicago terminal district, at a cost of labor and material amounting to \$24,000.

**A Penalty
of Bad Car
Conditions**

This includes neither the cost of the extra switching involved nor of the inevitable crop of damage claims resulting from the transfers, which may

be of even greater importance than the actual cost of the unloading and reloading. This is a fair sample of one of the penalties paid by the railroads of the United States at every point where traffic is transferred in any quantity, for the chronically run down condition of freight cars. Any improvement in these uneconomic conditions undoubtedly will cost money at the outset. In the case of motive power, there are probably few railroad officers who would be willing to maintain that the expenditure in inspection and maintenance necessary to eliminate every preventable engine failure was not justified by the saving thereby effected. But is this not essentially as true with respect to cars? A failure of car equipment while moving in trains results in much the same character of delays to traffic as those caused by engine failures. The cost of these delays constitutes a direct loss in itself and here, as well as in the transfer of loads, the direct loss may be less important than the loss and damage to commodities, the claims for which the road must pay and the adjustment of which is a constant source of friction between the roads and the shipping public. The establishment of billing prices for labor and material expended in interchange repairs high enough to afford an average profit of 10 or 15 per cent, at the outset undoubtedly would cause an increase in the total cost of car maintenance. But without the incentive of such prices there is little possibility of ever establishing a standard of car maintenance comparable with that generally pertaining with respect to locomotives. Such a standard of maintenance would go far toward saving the present losses in transfers and damages due to bad car conditions. Furthermore, if experience with locomotives may be considered as a criterion, a high standard of up-keep, once established, may be maintained with less expenditure than is constantly required in the struggle to keep bad conditions from getting worse.

Readers of the *Railway Age*, and particularly those readers interested in foreign trade, are familiar with the work that

**The
Department
of Commerce**

has been done during the past few years by the Bureau of Foreign and Domestic Commerce of the Department of Commerce. This paper has printed

in abstract form and has discussed editorially the reports of Trade Commissioner Frank Rhea on markets for railway supplies in Australia, and in the Far East. The *Railway Age* also publishes monthly the instructive statistics compiled and issued by the Bureau's Division of Statistics. The new Secretary of Commerce, Herbert Hoover, has already announced in the few weeks, or rather days, that he has been in his new office, various ideas that he has in mind as to the improvement and enlargement of the work of the Department of Commerce. It is apparent that he does not desire to expand its work in a more or less haphazard way but that he desires rather to make its work such that it will be of most value to the business community. The administration of the Bureau of Foreign and Domestic Commerce in the recent past has been

of a high standard and there is little question but that it has kept up with the demands upon it due to our increased export trade. The consular information service in particular, while not perfect, is the envy of our competitors overseas. Nevertheless, there is room for some criticism in that the information supplied by the Bureau is sometimes not sufficiently practical to be of greatest service to the business man. Export trade at present is not what it was a year ago. The Bureau of Foreign Commerce, or whatever it may be called under the new order of things, has before it the task of rebuilding that trade to a more stable level. It is our opinion further that the Bureau should pay particular attention to exports of railway supplies. To do this it will have to give the business world information as to the advisability of investments in foreign railway securities, for it is well known that export business goes to that country that supplies the capital for improvements or new lines. The work to be done by the Bureau and by the Department of Commerce is of great importance. It is indeed fortunate that a man of Mr. Hoover's calibre and standing has been placed in charge of it.

In considering the possibility of obtaining more efficient and economical railroad shop operation, the important part played

**Training
Shop
Mechanics**

by foremen and gang leaders has been strongly emphasized in several recent editorials. It is true that a satisfactory shop output can never be obtained with inefficient, untrained foremen but

careless, incompetent workmen have an almost equally serious effect and some means should be provided to train them and change their point of view. It is perhaps most natural to consider apprentice schools as the source of trained mechanics and too much cannot be said in favor of giving more time and attention to railroad shop apprentices. The possibilities in this direction are indicated by the fact that one important western road is now benefiting by the services of 1,506 graduates of its apprenticeship courses. The subject of apprenticeship is too big to be considered in a short discussion, but a few words may be said regarding the possibility of training unskilled or inexperienced shop men to qualify for positions requiring more skill. Why cannot the foreman, by instruction and encouragement, help these men to become better mechanics and, therefore, of more value to themselves and to the railroads? The reason is that a good foreman is not necessarily a good teacher. Experience has shown that hardly one foreman in twenty is qualified to perform the duties of instructor. The establishment of training departments in industrial plants has been accomplished at small expense and with most desirable results. In a particular case during the war 65 per cent of the employees of a certain plant were in the first draft but new, trained workers were obtained through the training department at such a rate that the production of the plant was actually increased and it was claimed that the quality of the work was improved. It seems probable that a system, or at least certain features of a system, which has given such good results in industrial plants could be advantageously incorporated in railroad shops. It would be a distinct step in advance if all ambitious shop men could come under the supervision of shop foremen or apprentice instructors who have shown particular ability as instructors. Promising helpers could be encouraged to qualify as mechanics and low rate mechanics could be helped to fit themselves for positions requiring more skill. The result would be that in the future when pressure is once more brought to bear on railroad shops to repair the maximum number of cars and locomotives and get them ready for service, there would be no lack of skilled help to bring shop output up to the required point.

Wanted—A New Baptism of Courage

ONE OF THE VERY GREATEST needs of the railroads today is more courage on the part of their higher officers. They especially need more courage in defending themselves. Within recent months they have been publicly and repeatedly charged with doing things which, if the charges were true, would justify the removal in disgrace of every one of them from his position.

The Plumb Plan League has circulated among railway employees all over the country literature implying that many high railway officers own stock in companies from which the roads make purchases, and get graft at the expense of their railroads by paying to these outside concerns excessive prices for the things the railroads buy. This persistent and insidious propaganda is undermining the confidence of hundreds of thousands of railway employees in the integrity of their superior officers.

The spokesmen of the labor unions before the Railroad Labor Board have secured publicity throughout the country for allegations that railway officers last year gave locomotive and car repair contracts at excessive prices to outside companies in which they were financially interested. These charges have been circulated and not adequately met with the facts until millions of people believe them.

A fine example of the kind of charges which are being made against railway officers appeared in the Chicago Herald and Examiner and other Hearst newspapers on March 12 under the signature of Arthur Brisbane. Mr. Brisbane said: "The recent government management amounted to this: It took over the railroads temporarily. Permanent public ownership was feared by the owners. The government stupidly left in charge the hired servants of the private owners. Those private servants were instructed to make government management an absolute failure, and they did all possible to make it a failure."

Government control was adopted as a war measure. It was the patriotic duty of every railway officer who accepted service in the Railroad Administration to do his best to promote efficiency of operation. Any railway officer who had done, what Brisbane in effect charges that all of them did, would have been a crook and a traitor. Who are these men that Brisbane and Hearst in effect charge are crooks and traitors? They include C. R. Gray, president of the Union Pacific, and W. T. Tyler, vice-president of the Northern Pacific, who served successively as directors of operation. They include Edward Chambers, vice-president of the Santa Fe, who was director of traffic, and A. H. Smith, president of the New York Central; Charles H. Markham, president of the Illinois Central; Hale Holden, president of the Burlington; N. D. Maher, president of the Norfolk & Western; B. F. Bush, president of the Northern Pacific; B. L. Winchell, formerly president of the Frisco; and R. H. Aishton, president of the American Railway Association, all of whom served as regional directors. They include every railway officer who served as a federal manager. Brisbane says, and is paid by Hearst for saying, in substance, that all these men were traitors to their country in its time of greatest need. Up to the present, however, we have not heard of a single one of the men thus accused having sued Brisbane and Hearst for libel, or having even publicly denied and refuted the charges made against them.

The men who ought to answer these charges are those against whom they are made. It is their personal honor which is attacked, and no man should rely on anybody else to defend his personal honor. If they do not promptly strike back at those who thus attack them the public in due course is sure to conclude either that the charges are true or that the men attacked are too cowardly to defend themselves. But the effect of allowing people like Brisbane to "get by" with such charges is not confined to the men attacked. It brings under

suspicion the entire management of the railroads, and the planting in the public mind of the suspicion that the railroads are being managed by men who were traitors to their country during the war, and who have been grafting at the expense of the railroads since, is bound to have the most harmful effects upon the railroads themselves.

Senator Cummins has announced that a Congressional investigation of the management of the railroads will be held soon after the special session of Congress begins. Railway officers do, and should, welcome this investigation. They should demand that it shall be so conducted that either the charges which have been made regarding the conduct of railway officers during and since government control shall be substantiated, or that those who have made them will be proven liars and slanderers. They should especially insist that Brisbane and Hearst be put on the witness stand to substantiate under oath and in detail the charge they have repeatedly published broadcast that the higher officers of the railways were traitors during the war. They should demand that every spokesman of the labor unions who has been making wholesale charges of incompetency and crookedness shall be compelled to appear and give under oath such evidence as he has to support his charges. Railway officers themselves should also demand the right to be heard fully in vindication of their entire conduct.

The *Railway Age* believes it knows enough about the conduct of railway officers within recent years, and the way the railways have been managed, to express the utmost confidence that when all the charges against railway officers which have been made have been fully ventilated practically all of them will be shown to be villainous fabrications. Meantime, however, every fresh charge which is made against them should be met promptly and publicly with flat denial and disapproval; and we suggest that it is about time the railways and their higher officers seriously considered whether it is not their duty to themselves and to the railroads to begin invoking in their defense the laws against slander and libel. At any rate, the officers should cease to take "lying down" such charges as are being made against them. Their personal honor, the rights of their security owners, and the public welfare demand that they shall individually and collectively meet squarely and vindicate themselves from these wholesale charges that they are traitors and crooks.

Railway Wages and the Cost of Living

IT IS EVIDENT that the question of what wages the railways shall be required to pay to all their employees in future will soon be before the Railroad Labor Board. Most railways already have arranged for conferences with their unskilled employees regarding reductions and some have asked for similar conferences with certain classes of their skilled employees.

The large advances in wages that have been made within recent years, and especially since 1917, have been based mainly upon the cost of living. The cost of living is also the most important factor which the Railroad Labor Board is required to consider in fixing reasonable wages. There is a general impression that for some years the cost of living increased more than the average wages of railway employees. There is also a general impression that the advances in wages finally caught up with and passed the increases in the cost of living, and that for some time the wages of railway employees have been relatively much higher than the cost of living.

Statistics regarding the average annual wage of the employees and the cost of living during the last six years show that these general impressions regarding the tendencies of wages in railway service and the cost of living are sub-

stantially correct. Studies of the cost of living have been made both by the Bureau of Labor Statistics of the United States Department of Labor and the National Industrial Conference Board. Those of the Bureau of Labor show the changes in the cost of living from 1913 to December, 1920. We have recalculated the Bureau's statistics to make them cover the period from 1914 to December, 1920, the last month for which they are available. Comparison of these statistics with the average annual wage per railway employee since 1914 gives the following percentages of increase in the average wage of railway labor and in the average cost of living in the United States:

INCREASE IN AVERAGE RAILWAY WAGES AND IN COST OF LIVING AS SHOWN BY BUREAU OF LABOR STATISTICS

Year	Average railway wage	Per cent increase in average wage over 1914	Per cent increase in cost of living over 1914
1914	\$816	.....	.....
1915	831	1.83	2 (Dec., 1914)
1916	892	9.31	15 (Dec., 1916)
1917	1,004	23.04	38.2 (Dec., 1917)
1918	1,419	73.89	69.3 (Dec., 1918)
1919	1,483	81.74	93.5 (Dec., 1919)
1920 (before wage award)	1,806	121.32	113 (June, 1920)
1920 (after wage award)	1,910	134.07	94.5 (Dec., 1920)

It will be seen from the foregoing table that according to the Bureau of Labor statistics the increase in the cost of living outstripped the advances in the average railway wage until 1918, when average railway wages showed a total increase of 73.89 per cent and the cost of living 69.3 per cent. In 1919 the increase in the average wage had again fallen behind the increase in the cost of living, but in 1920 it again caught up with and passed it before the Railroad Labor Board's wage award was made last July. At the time that award was made the average railway wage was running 121 per cent more than in 1914, and the cost of living was only 113 per cent higher. The wage award made by the Railroad Labor Board caused the average annual wage of railway employees at the end of 1920 to be 134 per cent more than in 1914, while the cost of living, owing to declines in prices, had become only 94.5 per cent more.

The following table gives the percentages of increase in the average railway wage since 1915, and also the percentages of increase in the cost of living as estimated by the National Industrial Board:

INCREASE IN AVERAGE RAILWAY WAGES AND IN COST OF LIVING SHOWN BY THE NATIONAL INDUSTRIAL CONFERENCE BOARD

Year	Average railway wage	Per cent increase in average wage over 1915	Per cent increase in cost of living over 1915
1915	\$831	.....	.....
1916	892	7.3	8.7
1917	1,004	20.9	31.3
1918	1,419	52.2	71
1919	1,483	71	72.2
1920 (before wage award)	1,806	117.6	104.5
1920 (November)	1,910	130	93
1920 (December)	1,910	130	90
1921 (January)	1,910	130	81.2

It will be seen that the statistics of the National Industrial Conference Board indicate that the increases in the cost of living exceeded the increases in the average wage of railway labor until 1919. From that time on, according to its estimates, the average wage of railway labor exceeded relatively the cost of living, while in January, 1921, the average wage of railway labor was 130 per cent more than in 1915 and the average cost of living was only 81 per cent more.

This use of the increase in the average wage of railway labor as the measure of increases in wages during this period is more than fair to certain classes of employees, while it is less than fair to certain other classes of employees. For example, the increases in wages of certain employees in the shops, especially car inspectors and car repairers, have very greatly exceeded the increases in the cost of living, being as much as 200 per cent, while the advances of the wages of the employees in the train service never have equalled the increases in the cost of living. Furthermore, there have been very large increases in the number of employees in the shops,

while there have been no increases in the number of employees in train service. These facts show how unfairly the readjustments of wages have been made since government control was adopted, and seem to demand that any reductions in wages which are now to be made shall not be flat percentage reductions but shall be relatively much smaller for some classes of employees than for others.

But after all it is the increase in the average wage as well as in the number of employees that has caused the enormous increase in the railroad payroll, and since the statistics of both the Bureau of Labor and the National Industrial Conference Board show that compared with the cost of living the average wage is much higher now than it was in 1914 or than it was last July when the award fixing the present wages was made, it is plainly fair that consideration should be given at once to a general readjustment of railway wages.

It should not be overlooked in this connection that while the cost of living is now not over 80 per cent more than it was in 1915, and while the average railway wage is 130 per cent more, most of the employees who are receiving this higher average wage also have benefited by substantial reductions in their hours of work.

Getting Together

FREQUENT REFERENCE is made to the advantages which may accrue from co-operation between the manufacturers and the railroads in the study of many railway problems and without doubt much advance has been made in this direction in recent years. Failure to realize to the fullest extent the possibilities of joint work may be ascribed largely to the difference in the points of view of the railway man and the supply man. There are some officers in the employ of railroads who view with suspicion or even actual distrust any statement made by a manufacturer's representative. However, the vast majority of railway officers take no such position. They are willing to be shown.

The principal difficulty, as stated above, is in the point of view. In the eyes of the salesman his product is supreme while to the engineer all things are comparative. As an illustration—some years ago a manufacturer of a structural material published an account of some laboratory tests, each one of which was concluded with some mishap to the testing apparatus which prevented ultimate failure of the material. In other words, there was a misguided effort to create the impression that the material was too strong to be broken and that it would be a tactical error to admit that there was a limit to its strength, but to the engineer this obvious effort to avoid a statement as to the true ultimate strength could instill only a feeling of suspicion. As another illustration in point, an engineering officer, who was required recently to study the problem of painting some bridges subject to a particular exposure, endeavored to obtain some information from certain paint manufacturers which would help him in selecting those materials most suitable for the conditions and which would also enable him to determine a most economical painting program with reference to the number of coats to be applied at one time and the intervals between paintings. Unfortunately a considerable portion of the replies dealt in generalities and superlatives of little value to him.

A purchaser should not expect the impossible. While he may realize that some materials are better than others he knows that in most cases these differences are relative. He should, in consequence, be willing to give a trial to any material that is represented to him in terms that bear the stamp of sincerity, and reasonableness and indicate a thorough knowledge of the product and of the conditions under which it must be used. To obtain the greatest good from co-operation, each party must appreciate the other's point of view and endeavor to meet it.

Letters to the Editor

Systematizing Work in Shops and Engine Houses

DECATUR, III.

TO THE EDITOR:

I have read with interest your article in the issue of January 7, entitled, "Railways and Labor in 1921." Co-operation is certainly the right thing, if it can be established, but that "IF" seems to be a big factor.

I believe railways will have to undergo a complete change in their methods of handling repairs to locomotives and cars at repair shops and roundhouses. Repair shops and roundhouses are working and handling work practically the same way they did when I started serving my apprenticeship, or the largest per cent of them are. Railways will have to manufacture instead of repair.

The greatest expense in a repair shop is caused by fitting with calipers by the "cut and try" method. Every part will have to have a new size, scrap size and intermediate sizes. For example, why should cylinders just be trued? They should be bored in $\frac{1}{8}$ -in. sizes or some standard size. Then piston heads and packing could be drawn from the store department. Why should a cross head pin-hole be just trued up? Why not ream it to the next standard size and draw a pin to fit? In this manner large pins could be reclaimed very handily. This could apply to the link motion and all through the engine in the same manner.

Much time has been saved on engines by having extra back ends for fireboxes. This would help the schedule—the same number of engines repaired each week and the same amount out every day. By doing this the weak department can easily be located and the necessary help be given.

Large roundhouses, to be more successful, will have to adopt repair shop methods of departments and gangs. The most important foreman would be the one that gets the engineer's report as soon as it is posted on the book. He will then schedule the engine in a certain department or gang, then each could be apportioned light as well as heavy jobs. Roundhouses should be made more convenient in regard to tool room and machine shop layout. These should be made so as to make the shortest possible routes for the work and workmen. There are plenty of good foremen that see these things but they have not the time or authority to remedy these matters. It should be the business of a special department. Did you ever stand in a large roundhouse or repair shop and see everyone going some place and wonder who is doing the work? I often wished I knew how much actual time was actually worked and how much lost calipering, to fit and try.

I have never seen a repair shop successfully worked unless the machine department was at least ten days ahead of the erecting department. This is done in a few well-balanced shops. If the plan to repair the engine out of the store department is adopted, the erecting department will always have material and the machine department will be ahead with the stock. What a great improvement could be made in the blacksmith shop by forging machines and plenty of good dies for them, also other labor-saving machines and tools!

I think the greatest showing in the many departments of a railroad can be made in the smithshop by machinery and good tools, but it seems this is left to the foreman, principally. In the number of blacksmith shops I have visited, I remember just two good ones, and the thought strikes me.

How much could be accomplished if these men were given assistance by standard manufacturing, good machines and tools!

Railroad companies do not buy enough new machines and tools. Machines never grow old to them, and if they build a new shop they do not always have new machinery. If they do get some new tools, the old ones are sent to another shop on the system for a high priced mechanic to run. Shop walls never repaired an engine or car. It is only a place to house machinery. It takes convenient layout and machinery. A job should never back track. Manufacturers figure the cost of doing a job by hand or by machinery. When a job is done, it is either by hand labor or machine labor. Instead of paying out labor, buy a machine with the saving of labor; when the machine is paid for the profit starts. I believe railroads will have to consider manufacturing, more and better machinery, tools and re-arrangement of shops, etc., so as to balance them. They will then make a big step towards reducing repair costs.

W. M. F. CANAVAN.

The Increase in Freight Claims

CHICAGO.

TO THE EDITOR:

The Bureau of Railway Economics has prepared a statement of loss and damage payments which discloses the fact that the amount paid out for the years 1918 and 1919 increased 168.1 per cent over the four-year period from 1914 to 1917. Aside from the heavy burden which this unnecessary leakage imposes upon the carriers, a most serious phase of the freight loss and damage question is presented in the great economic loss sustained by the consuming public. The sum of \$106,000,000 paid out in freight claims during the year 1919, tremendous as it is, by no means represents the real value of the commodities destroyed. Claims are usually settled on an invoice price basis and represent largely the value of the raw products. Thus a claim payment of one dollar on grain lost or damaged means an actual loss of four dollars' worth of bread. But the drain on our economic resources occasioned by the loss of the commodities themselves is not the only waste. It is evident that the labor required to produce these goods is also a total loss. In the final analysis, the cost of producing a commodity is borne by the consumer whether the product serves its legitimate purpose, or is damaged or destroyed.

In considering the immensity of this burden on the carriers and the corresponding waste of the nation's goods, we are likely to overlook the direct hardship which freight losses impose on the shipper or receiver. A wholesale dry goods house might be considered a typical case. Such a concern depends largely for its patronage on its ability to serve its retail customers satisfactorily. One of the details that counts largely in this service is the promptness with which the house can place its merchandise in its customers' hands in good condition. If there are two or more wholesale houses competing for the business of one firm, and this is usually the case, and if one of these is located on a railroad which handles freight carelessly, it will soon lose the customer, for the latter will discover that he can obtain his goods with less delay and in better condition from the other house whose carrier is furnishing service which is continuously satisfactory.

The case of the small retailer who is the principal receiver of freight in the country towns, furnishes another illustration. He buys goods with the expectation of receiving them within a short time after the order is placed. As a general rule his orders are for small quantities. If a shipment is delayed or damaged in transit, he is very likely to run out of his stock in certain lines with the result that his customers

will go to some other store where they can purchase the commodity, and thus perhaps are lost to him permanently. Obviously no mere payment of his claim can make good any loss of his customers.

The duty of the carrier, therefore, does not rest merely with the prompt payment of claims. The railroad should make every reasonable effort to handle its freight so carefully at all times and under all conditions that it will reach the consignee in the same good condition in which it was delivered to the carrier.

F. E. WINBURN,

Special Representative, Freight Claim Prevention, American Railway Association.

Car Supply and Mine Production

WASHINGTON, D. C.

TO THE EDITOR:

A. G. Gutheim, manager, Public Relations Section, of the American Railway Association, called my attention some time ago to a passage on page 48 of the "Buy Now and Ship Now" issue of the *Railway Age* of January 7, 1921. The statement reads "Studies made in the bituminous coal mining industry show that when the car supply is 75 per cent of the normal requirements, the cost of production is 16 per cent greater than when all demands for cars are met. If the car supply is one-half normal, the cost of coal is increased 40 per cent."

This statement is apparently based upon a diagram shown at the bottom of page 34, and numbered Figure IV. That diagram drives home a very important fact in bituminous coal mining, namely, that any long interruption to normal operation greatly increases the cost per ton. As Mr. Gutheim points out (in a letter to the editor published in the issue of February 4, 1921, page 314), however, the diagram may be misunderstood.

In the first place, I am informed by R. V. Norris, engineer in the Fuel Administration, by whom the original diagram from which the one shown by the *Railway Age* was reproduced, was constructed, that the figures in the vertical scale entitled "Percentage increase in cost," should read 20 per cent, 40 per cent, 60 per cent, 80 per cent, 100 per cent, 120 per cent, and so on, and not .20 per cent, .40 per cent, .60 per cent, .80 per cent, 1.20 per cent, and so on, as they are printed.

In the second place, the increase in cost is due to the fact of interruptions to regular operation, not to the particular cause of the interruptions. In other words, any cause preventing operation, such as a strike, mine disability, or lack of market, would tend to increase costs in the same ratio as the failure of the car supply. Furthermore, there is so much loose talk about "car shortage" that the diagram can be used as an indicator of increased costs only when the figure of car shortage is an accurate measure of the loss of mine-working time caused by lack of cars. It is my understanding that the committee of engineers that made the study on which the diagram is based was careful to consider the actual running time of the mine rather than any theoretical figure of car shortage based on the established rating and the cars placed; and furthermore, that the committee figured the decrease in car supply not from a full-time supply but from the normal, ordinarily enjoyed at these properties. That being so, the diagram ought to indicate the increase in costs accompanying each increase in working time below the normal. As Mr. Gutheim very justly points out, however, it may give an erroneous and exaggerated idea of the increased costs if the "car shortage" is calculated on a rating inflated far above the capacity of the mine to actually load coal.

F. G. TRYON,

In charge of Coal and Coke Statistics, United States Geological Survey, Department of the Interior.

Automatic Signals and Train Operation

CHICAGO

TO THE EDITOR:

I have read carefully and with much pleasure your very interesting number of January 7, and would like to call your attention to the article on page 39, "What Additions to Physical Property Are Necessary?" Under various captions you specify certain types of improvements and end up with "Other Classes of Improvements." Under no head do you make any mention of automatic block signals.

I do not believe that there is any improvement which railroads can make today which will give as large and direct a return for the money in the speeding up of train movements as automatic block signals. I know of one subdivision of less than 120 mi. where automatic block signals were installed where a careful record was kept by the chief dispatcher for a year which showed that the average freight train movement after the automatic block signals were installed was more than an hour less per trip than it had been before. If this increase of efficiency does not represent a large economy I give up.

The whole trouble with the automatic block signal problem today is that the vast majority of the higher officers on railroads are men who learned railroading before the day of automatic block signals, and entirely too many of them still look on the installation of these devices as an expensive luxury, and not a necessity. They look principally on the safety feature of the signals and not on their increased efficiency and are loath to spend high-priced money for what they consider an unnecessary refinement.

Anyone who will ride on a passenger train over a railroad equipped with single track A. P. B. automatics and will give his attention to watching the actions of the crews on trains which have taken sidings to let the train he is on pass, will see the value of signaling. In almost every case, as he passes a freight train, he will see the head brakeman start towards the main track switch as soon as the rear of his train passes, knowing that in a minute or two the starting signal will clear up so that his train may pull out. In the old days, under manual block or with time limit rules, a train crew knew they had 10 or 15 min. to wait before the block would be clear, and that then it would be necessary to spend some time calling up the block operator on the phone; consequently nobody was in a hurry. The action of the men now is snappy where it used to be decidedly lazy.

I have many times heard the engineman of a train waiting on a siding for a meet, sound his whistle as soon as the starting signal went to the stop position (indicating that the train he was to meet had passed the limits of the next station ahead), so as to call in the brakemen, who may have been over in a cornfield chasing a rabbit, and the conductor who was taking a nap in the shade of a tree. In the old days, when there was no way for the trainmen to get advance information of the approach of the train they were to meet, this assembly would not be sounded until the opposing train had actually passed the siding and a considerable time would elapse before the train on the siding would get in motion; now, however, the train is ready to move as soon as the block ahead is clear.

The automatic block signal ought to be advertised much more than it is from the standpoint of efficiency. It is a big money saver as an operating proposition, aside from its use in preventing collisions.

JAMES B. LATIMER,

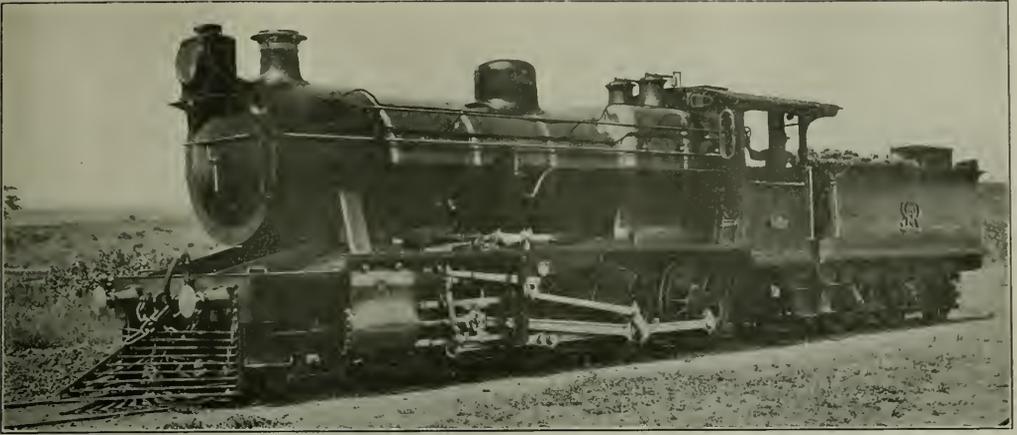
Signal Engineer, Chicago, Burlington & Quincy.

THE UNITED STATES CIVIL SERVICE COMMISSION has announced open competitive examinations for accounting and statistical clerks to fill vacancies in the Interstate Commerce Commission at \$1,500 to \$2,100 a year.



SCENES ON THE SAO PAULO RAILWAY

1.—Luz Station, Sao Paulo; 2.—Express Train from Alto da Serra to Sao Paulo; 3.—Tunnels on the Slope, Showing Three Rails and Cables; 4.—The Rugged Country of the Inclines; 5.—Trains on the Passing Tracks; 6.—A "Locomotive Brake"; 7.—A Power House on the Inclines.



Typical Consolidation in Freight Service Between Alto da Serra and Sao Paulo

Engineering Marks Sao Paulo as Novel Railway

Method of Overcoming Heavy Grades Unique—Virtual Monopoly of Coffee Traffic Gives Financial Strength

BRAZIL IS DIVIDED into 20 states, one territory and one federal district. This great country embraces 45 per cent of the area of the whole South American continent. The state of Sao Paulo lies to the west and south of Rio de Janeiro on the south coast of the country. The important seaport of the state is Santos and the city of Sao Paulo lies 50 miles inland from that place.

Lying mostly within this state but overlapping somewhat into the neighboring states of Rio de Janeiro, Minas Geraes and Espirito Santo is the irregular bottle shaped area which is said to supply 75 per cent of the world's coffee. The upturned bottom of this bottle can be said to lie somewhere around the northeastern boundary of the state of Sao Paulo; the mouth of the bottle is Santos, on the coast; the line of the Sao Paulo Railway from Jundiaby to Santos is the neck of the bottle through which this coffee flows from the hinterland traversed by the Paulista and other lines. Of the 1,400,000,000 coffee trees in the republic, 750,000,000, or 53½ per cent, are said to be within the borders of this state.

In 1915 the Sao Paulo Railway carried 13,444,756 sacks of coffee of 132 lb. each, or more than \$87,000 tons, from the coffee district to the port of Santos, this amount representing the entire production of the state of Sao Paulo and large quantities from the neighboring states. The Brazilian coffee crop of 1916-1917 was estimated at 13,500,000 sacks; that of the rest of the world at only 4,500,000. In 1916 the United States purchased 692,736,924 lbs. of the Sao Paulo crop, representing a value of \$65,176,310. A further expenditure for coffee from other districts, amounting to \$8,176,005 in that same year, brought Uncle Sam's Brazilian coffee purchases to the sum of \$73,541,315.

The presentation of these instructive figures is made in order to show that the Sao Paulo Railway, an English owned line, with its 134 miles of track is an important factor in the coffee trade of Brazil and to explain some figures on the earnings of that line in comparison with those of less fortunately located roads. In 1918 the Sao Paulo Railway

earned a gross income per mile of track operated which was more than 13 times the average amount per mile earned by 14 other lines. The amount in cold figures reached \$54,640; the average of the 14 other lines was only \$3,800 per mile. The highest earnings per kilometer of any other Brazilian road was \$7,700, which was the average for the Paulista Railway, a tributary to the Sao Paulo road and an important contributor of coffee tonnage to it. The next highest road in earnings per mile was the Central of Brazil, also somewhat of a coffee carrier from the states of Minas Geraes, Espirito Santo and Rio de Janeiro. The average earnings of this road reached \$10,500 per mile.

From the foregoing it is scarcely remarkable that travelers are wont to tell exaggerated tales of the "wonderful" Sao Paulo Railway which is alleged to "have so much money that the surplus is spent in painting the scenery along the right of way!"

This 5 ft. 3 in. gage line was constructed in 1867 in spite of baffling engineering problems, one of which involved finding an economic method of hauling traffic over 10 per cent grades which were encountered a few miles inland from Santos. These 10 per cent grades extended a distance of six miles and the method of hauling traffic over them which was finally adopted was the construction of a cable system with four stations. Over this line trains were hauled from sea level at the foot of the ascent to an elevation of 2,600 feet with comparative satisfaction. This route was successfully used for about 28 years when it was decided to lay a new line. In 1895, therefore, the relocation of the entire line was commenced, and finished in 1901, the latter construction superseding the former entirely insofar as the hauling of traffic is concerned.

The new line lies considerably above the level of the old one and provides an easier grade—8 per cent instead of the former 10—but its construction necessitated the boring of a string of 13 tunnels varying from 171 ft. to 853 ft. in length, a total of 4,428 ft. for all the tunnels combined, as well as the construction of 16 viaducts, the longest of which

is 620 ft. From Santos, on the bay, the new line follows the route of the old to the foot of the mountain, or Serra as it is called, and comprises the first section of the line, all of which is practically level.

The second, or Serra, section commences here and the details of the construction and operation of this section covering an ascent of 2,600 ft. mark it as one of the most interesting climbs in South America. The slope, or the entire section, is laid off in five equal inclines, at the base of each of which is a graded level of sufficient length and width to accommodate an arrangement of passing tracks. Below each of these passing tracks, at a suitable location, is a power-house for each incline. The tracks on each incline, except at the passing points mentioned, have three rails, the middle one of which is used in common by both ascending and descending trains. At the passing tracks the center rail divides into two, thus forming the inside rails of two separate tracks. Each line has its individual cable system driven by a distinctly separate set of rope driving engines. Thus, although operated independently the whole system is run as a single unit.

Unity of operation is facilitated by telegraph and telephone communication between the operators' towers on each incline. Each power-house has four coal burning boilers of the English type known as "Lancashire." These boilers are equipped with mechanical stokers and feedwater heaters. The two hauling engines in each power-house are of 1,000 h. p. each and drive two sets of drums upon which are mounted the driving cables, the two drums being connected through separate grooved pulleys of large diameter with 16 coils of hemp rope. The driving cable, entering the engine-room from the ascending line, makes four turns around the rope drums or wheels and then passes over a fixed return wheel 14 ft. in diameter at the back of the power-house and from there out and over the descending line.

At the base of each incline there is a special mechanism called a tension slide, which arrangement is designed to keep the driving cable taut at all times. The driving cable is

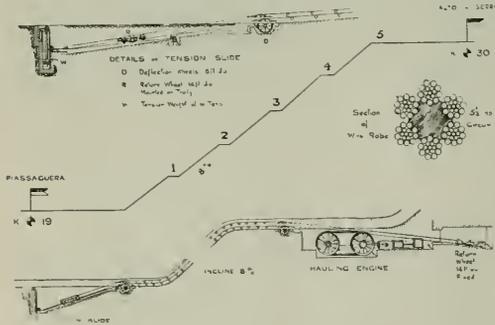


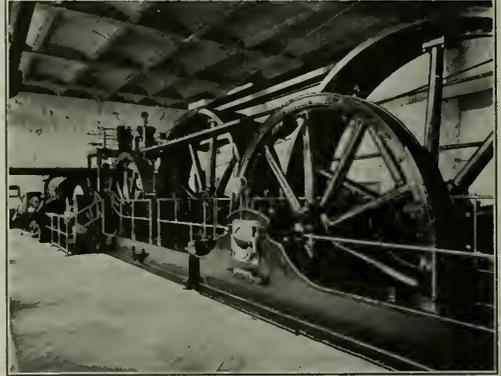
Diagram Showing Tension Slide, the Five Inclines, a Section of the Cable and Details for One Incline

made up of six strands of steel wire on a hempen core and is calculated to have a resistance to breaking of over 100 tons when new and of about 70 tons when worn. As the maximum working load on the rope from all sources is known to be not in excess of 18 tons, the factor of safety varies from 6 to 4. One train always ascends one incline while another descends the next higher incline and conversely. This makes for little delay at meeting points.

The maximum weight of each train, including the special locomotive built for this job, is 145 tons. Deducting the locomotive's weight of 31 tons and allowing an average weight for the cars it appears that the net paying load is

approximately 78 tons. A train will ascend the entire division or section of five inclines in 40 minutes; with five of them running, this is equivalent to a movement of 585 tons an hour.

The special locomotive built for and assigned to work on this interesting hill is an 0-4-0 affair entirely enclosed in a steel housing and would remind old timers of the steam "dummies" that were put to work in the cities of this country before the electric cars were introduced. The Sao Paulo officers call them "locomotive brakes," probably on account of the fact that they are far more efficient "brakes" than they are locomotives, their only use in the latter capacity



Interior of Power House Showing Cable Drive

being in light switching around the yard or on the level spaces at the foot of the inclines. They are equipped with a special clutching mechanism for gripping the cable and two sets of specially designed, mechanically operated, rail gripping, jaws for seizing the rails on both sides in the event of a failure of the vacuum brakes with which all the trains are equipped.

Extreme precaution is exercised in the operation of the inclines and aside from the fact that the car tips at one end, due to the steep grade, the passengers may feel perfectly at home. The "painting of the scenery," mentioned previously, is the only explanation the laymen has ever been able to make of the elaborate painted abutments that have been built along the right of way to forestall the extremely damaging effects of the slightest movement of earth which so frequently precipitates a slide of damaging consequences. The "painted scenery" which so highly amused the admirer of this perfectly equipped little road was the coating of tar which had been applied to the white faces of the solid concrete retaining walls in order to show up plainly a sudden crack. Thus has the road's engineering department been accused of extravagance when in reality the artistic setting which the passenger thought was prepared for his special edification was an evidence of engineering thought of the highest order! The trick has served its purpose well and has helped the line's inspectors to locate trouble in time to prevent a catastrophe. As the general manager of this railway seemed to be quite disturbed over his road's reputation because of the "painting" story, he asked that the truth be told; it is hoped that the facts as herein set forth are sufficiently clear and that the true explanation thus told will aid in the dissemination of correct information.

From the summit of the slope, called Alto da Serra ("top of the hill"), the line runs in a northwesterly direction to Sao Paulo which is 50 miles from the coast terminal at Santos. Here the railway intersects with the government

owned Central Railway of Brazil, which runs northeast in the direction of Rio de Janeiro, and the Sorocabana Railway, which is a meter and 5 ft. 6 in. gage line of 864 miles in length and which runs to the southwest. The Sao Paulo Railway uses the terminal in Sao Paulo known as Luz station. The through tracks at this terminal are below the level of the street, and four foot bridges are being used on the level with the station floor to convey passengers across these tracks to up and down trains respectively.

Sao Paulo is a typical town of modern Brazil. It covers about 14 square miles and its population is approximately half a million. Its manufacturing output is said to reach a value of \$20,000,000 annually and is made up of cotton, wool and jute goods, shoes, hats, beer, pharmaceutical goods and perfumery, matches and a number of other commodities. On the other hand, Sao Paulo is said to have imported more automobiles to date than any other city in Brazil. Remarks on the steamers from Buenos Ayres would seem to indicate that Sao Paulo is the business town of the republic and is fast outstripping in many ways the more attractive Rio de Janeiro. The same remarks likewise draw attention to the rumor that when a Brazilian has accumulated enough money in Sao Paulo he goes to "Rio" to spend it—which is in itself an advertisement for both cities.

Hurried railroaders—and others—should find time while in Sao Paulo to visit the "Instituto Serumtherapico," which



A British 4-6-0 at Alto da Serra

in plain unvarnished English means Snake Bite Farm. Here, in order to vary the monotony of rails, stations, engines and cars, he can look upon a collection of live snakes the like of which he never saw before and most likely will never have a chance to see again. This institution contributes its bit to the welfare of the prospector and railroad builder in the country in providing antitoxins for protection against the bites of the venomous snakes which infest the Brazilian jungles. The institution was founded by an eminent Brazilian physician, Dr. Vital Brazil, who originated the idea of preparing serums in that manner.

The Sao Paulo Railway continues on to Jundiaby, 84 miles northwest of Sao Paulo, where it meets the southern end of the Paulista Railway. A section of this line between Jundiaby and Campinas is now being electrified. The electrified division will be 28 miles long and double tracked. Power at 88,000 volts, 60 cycles, will be furnished by the Sao Paulo Light & Power Company and the initial motive power will be 8 freight and 4 passenger locomotives. The cost of the electrification is expected to be approximately \$2,000,000 and the work is being done by the International General Electric Company. The system to be used will be similar to that of the electrified divisions of the Chicago, Milwaukee & St. Paul, with a 3,000 volt overhead line and the locomotives are similar to those used by the Butte, Anaconda & Pacific Railway with the addition of regenerative braking apparatus. The eyes of Brazil are on this job and

none are going to watch its progress with more earnestness than the Paulista's affluent neighbor in the "neck of the bottle," the Sao Paulo Railway.

The road bed, like everything else on the Sao Paulo line, is excellent. Rails weigh 93 lb. per yard and are supported on rail chairs on each crosstie, such as is the custom in England. The motive power on the level stretches of the line consists mainly of the conventional designs of British locomotives similar to those referred to in the previous articles on the railways of South America which have appeared in the *Railway Age*.

Those who have watched the Britishers' way with locomotives have recognized their disposition to prefer side-tank designs. This tendency has been carried out, perhaps to a fault, in many instances in South America, where the distances to be traversed would seem to call for locomotives of extra liberal tender capacities. It is not a novelty to witness one of these otherwise excellent machines almost anywhere in South America hauling a flat car loaded with wood or coal, as the case may be, in lieu of the tender. A hole cut in the rear of the abbreviated coal bin on the rear of the frame behind the cab admits of passing coal or wood to the fireman. One of these engines is shown in an accompanying photograph. There are some handsome Consolidations and ten-wheelers in service as well. Cars, like a majority of those in South America, are of wood, well built and similar to our own designs, rather light and are mounted on two four-wheel trucks.

The next, and final, article of this series will deal briefly with several other Brazilian railways and will discuss in some detail the prospects of developing an extensive market in that country for American railway supplies. This article will appear in an early issue of the *Railway Age*.

Department of Transportation Proposed

WASHINGTON, D. C.

CREATION OF A NEW GOVERNMENT department of transportation with a cabinet officer at its head, to coordinate the government's relations with rail and water transportation, including inland waterways and possibly motor truck transportation, and to take over the administrative as distinguished from the judicial functions of the Interstate Commerce Commission and the Shipping Board, is now under consideration by the Harding administration. The question is particularly under the consideration of a joint Congressional committee appointed by the last Congress to study and recommend a reorganization of the functions of the executive departments and a department of public works and a department of public welfare are also being discussed. As an alternative to the separate department of transportation another plan being studied contemplates making the present Department of Commerce, of which Herbert Hoover is now the head, into a department of industry and transportation. Mr. Hoover is anxious to develop largely the scope of the Department of Commerce for the purpose of making it in the widest sense a department of service to the commerce and industry of the country and some of the tentative plans which he is understood to have considered for the reorganization of his department were briefly outlined in the *Railway Age* last week. One feature of the plan understood to be considered was the establishment of a bureau of transportation in that department, but Mr. Hoover's plans are to a considerable extent contingent upon the results of the work of the joint Congressional committee. It is necessary to find out what departments are to be established before much can be done in the way of reallocating the functions of the various bureaus and commissions now in existence.

Secretary Hoover has discussed some of the phases of the proposed reorganization in his conferences with newspaper

men and on March 10 authorized a statement in which he discussed some of the general phases of the subject in part as follows:

In order to do service to the greatest advantage I wish to establish a wider and better organized co-operation with the trade and commercial associations, and will in a short time present some plans to this end. I want to see our efforts to push our foreign commerce more closely related to our industries. This sort of enlarged activity is within the original purpose of the department, and requires neither legislation nor burden upon taxpayers. This is no time to ask for appropriations to undertake new work. It is the time to search for economy and reorganization, for effective expenditure on essentials, the reduction of less essentials, and the elimination of duplication.

Outside of voluntary measures, the only immediate extension of service lies in securing greater internal efficiency in which I am certain all the bureaus join. The future of the department in its abilities to meet the needs of our industries and trade must await the thorough reorganization of the whole executive machinery, now being vigorously undertaken by Congress. The need of it, both in economy and to secure more definite purpose in government departments, does not need demonstration.

The great economic difficulties that we inherit from the war are obvious enough and they emphasize the necessity of better governmental machinery to assist in their solution. In the long run, we may as well realize that we must face a lower standard of living in Europe many years ahead. The production costs of her people will in consequence be lower than even before the war. If we meet this competition and still maintain our high standards of living we will have to work harder; we will have to eliminate waste; we will need to still further improve our processes, our labor relationship and business methods. If we would so improve our national efficiency and our foreign trade we must consider our transportation, both railway, water and marine, as one system directed to serve the nation as a whole. The development of certain trade routes through our mercantile marine as the real extension of our inland transportation; the improvement of great waterways; the opening of the Great Lakes to ocean-going vessels; the development of great electrification of our power necessities; and the handling of our labor readjustment by moderate men on both sides are all problems that have a fundamental bearing on the recovery in commerce and on our ability to compete.

If I were outlining one of the most essential directions for expansion of governmental activity, it would be in the constructive study and ventilation of the whole gamut of these possible improvements and of elimination of our great wastes in labor, in material, in power and a host of other directions.

There are some economic difficulties arising from the war that will no doubt solve themselves with time, but an infinite amount of misery could be saved if we had the same spirit of spontaneous co-operation in every community for reconstruction that we had in war. Government departments can at least try to do something to inspire such renewed co-operation. For instance, we have three or four million idle men walking the streets, and at the same time we are short more than a million homes; our railways are far below their need in equipment; our power plants, waterways and highways are all far behind our national needs in normal commerce. To apply this idle labor to our capital equipment is one of the first problems of the country.

Another outstanding economic trouble is that our farmers and our manufacturers are overloaded with food, raw material and goods that we cannot market abroad, and at the same time great masses of people overseas are cold and hungry. These people can only purchase on credit pending their own economic recuperation, and our own recuperation depends greatly upon theirs. We are thus not facing over-production, but a breakdown of credit links between us and the areas of under-consumption. Congress has provided the way for creation of foreign credits by banking co-operation under the Edge Act, and the logical and economic thing in the whole national interest is for our bankers to work something out. Foreign credits are better than rotten food.

There are some new forces in the world's commerce that must cause concern. There is a tendency in European nations to definitely mobilize the export, and in some cases the import, trades for militant commercial invasion. In some instances this is being done under government direction and organization, and often even with government finance; in others, it is being carried out by government leadership and suggestion. Such formal or informal combinations may render the position of our merchants and exporters precarious

indeed. Beyond this, where these controls are instituted over their own imports of cotton, food and other agricultural products, they seriously dominate the prices of our own farmers, and where they are instituted to secure control of the world's natural resources in minerals, oils, etc., they may dominate our future supply of these vital raw materials. Our competitors are within their rights in these matters, but we must protect ourselves. Our commercial community has the right in law and has been encouraged by Congress to combine for business outside our frontiers, precisely for the purpose of meeting such contingencies as this. But it all requires that our trades co-operate in an enlightened sense of national service as well as immediate interest.

All together, more economic taxation, tariff, large economy in government through internal bureaus, reorganization and agreements on disarmament and systematic government co-operation, will all contribute to help us out of the ditch. We will get out—yet when all is done the rapidity with which we get out will have depended upon the degree to which we pull together.

Stoker Fired Locomotive Makes Continuous Run Over Three Divisions

TO DEMONSTRATE that a trip for a locomotive need not necessarily be limited to one division of approximately 100 miles as has been generally the fixed practice on railroads for many years past, the Erie Railroad recently planned a test run by which one of its through New York-Chicago passenger trains would be hauled over three divisions, by one engine alone instead of using three engines for the three divisions as is the practice at the present time.

This test was based on the belief that the superior firing service of the modern mechanical stoker on heavy locomotives and long runs would render fire cleaning unnecessary at the end of each division. Continuous operation over the three divisions would be advantageous as it would eliminate the costs of terminal handling, such as changing engines, cleaning fires, coaling, turn table and roundhouse service, time consumed, etc. It was believed these charges could be divided by three.

Accordingly on February 24, heavy Pacific type engine No. 2926 equipped with a Duplex stoker attached to Erie train No. 3, consisting of one mail car, one express car, two coaches, two Pullman cars and one dining car left Jersey City at 12:18 p. m. for a continuous trip over the New York, Delaware and Susquehanna divisions, a total distance of 332.3 miles. The train arrived at Hornell, the final terminal, at 11:28 p. m. on time, having covered this distance without incident in 9 hours and 13 minutes.

On the return trip, February 25, the same engine left Hornell at 10:57 a. m., one hour and one minute late, with train No. 4, consisting of one mail car, one express car, two coaches, two Pullman cars and one dining car, arriving at Jersey City at 7:00 p. m. on time. There was no hand firing done nor was the rake used during the round trip of 664.6 miles.

The fire was clean on arrival at Jersey City terminal, the ash pan being reasonably free from ash and not in any way clogged; and insofar as the condition of the engine was concerned, it could have been placed on another train and returned to Susquehanna over two divisions, a distance of 192 miles. This trip demonstrated decisively the practicability of one engine covering three divisions, and this was only made possible by this high speed Pacific type engine being mechanically fired.

THE WESTERN RAILWAY CLUB at the Hotel Sherman, Chicago, on March 21, will listen to a paper by J. Gardner, electrical engineer of the Chicago, Burlington & Quincy, the subject of which is "Electrical Development and Standards in the Power and Lighting Field."

Railroads Hold Conferences on Wage Reductions

Disagreement Marks Conferences with Unskilled Laborers— Reductions for Other Employees Announced

DECREASES IN WAGE RATES for many classes of employees have been announced by several important railroads during the past week. In the meantime conferences will be held with these employees in the attempt to arrive at an agreement. Several roads have during the week held conferences with unskilled labor and the general disinclination of these employees to accept reductions would seem to indicate that the Labor Board will have to decide on the merits of many of these controversies.

The Erie has withdrawn all its wage reductions in conformity with the decision of the Labor Board, summarized in the *Railway Age* of last week, which ruled that these reductions were put into effect contrary to the rulings of the Transportation Act. The road will now reduce forces in practically every department in order to make the necessary reductions in operating expenses until such a time as the adoption of lower wage scales will permit of an increase in the number of employees.

A reduction in operating expenses was absolutely necessary, according to the management, in order to avoid a receivership and the most equitable way to meet it was to effect the necessary economies by throwing as few men as possible out of work and distributing the enforced hardship over a large number of officers and employees from the president on down. Since this method of meeting the situation was not permitted the company had no recourse but a drastic reduction in the number of employees. The failure of income to meet expenses has brought about a situation, the management says, which calls for immediate action and it will not be possible to await a reduction in wages which may be some time in coming.

Erie Calls Conferences

The company, in restoring wages to their previous levels, assumed the same position before the Labor Board as any of the other carriers seeking reductions in rates of wages of their employees and is now in a position to seek reductions in wage rates in the same manner as the other roads. Consequently conferences were called at Hornell, N. Y., for March 17 and 18 with the shop crafts employees, the maintenance of way and signal men, the clerical forces, telephone and telegraph operators, train dispatchers and several other minor classifications of employees whose wages it is proposed to reduce. In the event of an agreement regarding these wage reductions they will be put into effect on April 15. Otherwise the road will appeal to the Labor Board to establish a wage scale in keeping with the reduced cost of living and the financial position of the road.

New York Central Unskilled Laborers

Refuse to Accept Reduction

The New York Central held a conference on March 15 with representatives of unskilled laborers on its lines in regard to a proposal to reduce the wages of this class of labor 5½ to 14 cents an hour. The result of the conference was unsatisfactory. The employees refused to accept the reduction and the company has announced that it will appeal to the Labor Board to put in effect the reductions it asks.

The management pointed out following the meeting that not only did the representatives of the workers decline to accept a reduction in pay but that they also refused to "join the railroad in submitting the question" to the Labor Board. In reply to this latter statement, A. Spair, president of the

New York district of the Brotherhood of Maintenance of Way Employees and Railroad Shop Laborers said, "The railroads wish the pay reduced. The grievance is theirs and therefore it is up to them to take the case before the Labor Board. . . . Our attitude does not in any way mean that we are not willing to have the case go to the Railroad Labor Board."

In addition to the decreases in wage rates asked for unskilled laborers the New York Central has announced reductions in the pay of the shop crafts employees, maintenance department workers, clerical forces and several other classifications. These reductions are to take effect on April 16. In the meantime the company will hold conferences with representatives of the employees effected in the effort to get them to agree to the proposed reductions. In the event of a disagreement an appeal will be had to the Labor Board. The date and place of the conference with the employees has not yet been decided upon.

In announcing the reduction a statement was issued at the general offices of the company which said in part:

This move is on behalf of the rate-paying public and of general industry just as much as of the railroad. The wage rates imposed upon the railroads by war-time government operation, aside from the absurd restrictions, inequalities and abuses brought about by the national agreements, are entirely out of line with the standards of today in all other branches of industry. The railroads have been compelled by law to maintain artificial standards and unbusinesslike practices in the management of their forces. The Transportation Act, however, expressly provides that the railroads shall be economically managed, so this action is in strict conformity with the letter and the spirit of the law.

The New York Central Railroad, throughout the years preceding federal control, successfully maintained harmonious and satisfactory relations with a loyal and efficient force of high class workers in all branches of the railroad organization. It now proposes to eliminate the gross evils which have been imposed upon it through the unprecedented events of the past few years, and to get back to management that is in harmony with correct business practices, on behalf of giving the traveling and shipping public the utmost of good railroad service at the lowest possible price.

Chief among the evils which the public rightfully should demand to be eliminated in wage waste, involving the payment of vast sums for services not rendered and a loss of normal efficiency amounting in many departments to upward of fifty per cent. The public is entitled when it pays a dollar to receive a dollar's worth of service from a railroad the same as from any other business institution. Artificial and unwarranted high wage scales upon the railroads are detrimental to industry generally, as well as a direct burden upon the railroads themselves which the public must pay in high rates, with the more serious alternative of suffering the deterioration or break-down of the transportation machine upon which the prosperity of our whole population depends.

On behalf of the public, the railroads are combating the so-called national agreements and rules which have produced grotesque injustices and almost insurmountable handicaps to efficient management, before the Labor Board, now sitting in Chicago. Before this tribunal the railroads are presenting volumes of evidence upon this subject and a decision will be reached in due time. The Transportation Act and the rulings of the Labor Board provide that the railroad management shall confer with their own employees in advance of any revision of wages in an effort to arrive at agreement. The New York Central is conforming strictly to these rulings and the first of these conferences, covering its unskilled labor, was held last Tuesday, with further similar meetings to be held as the task of rehabilitation of the working personnel proceeds.

It is a noteworthy fact that up to date, the representatives of labor have entered no denial whatever to the statement frankly presented to them by the managers that existing railroad wages are decidedly out of line with those prevailing in other industries. The New York Central has in progress a comprehensive study of the going rates of compensation being paid for all branches of the

labor which it requires, so that its position with respect to fair treatment of its valued employees and essential business prudence may be correct and entirely justifiable.

The New York Central, following the refusal of its unskilled laborers to accept a decrease, asked the Labor Board to put a temporary decrease in effect on April 1 and to make the permanent decrease finally decided upon retroactive to April 1.

Pennsylvania to Confer with Employees

The Pennsylvania, which announced general reductions in wages and salaries in a statement which appeared in full in the *Railway Age* of last week, has announced the dates of the conferences with its employees to consider reductions. These conferences will be held at Pittsburgh as follows:

March 31, maintenance of way and other unskilled employees; April 2, signal department employees except signal foremen, assistant signal foremen and signal inspectors; April 4, shop employees, except supervisory forces; April 6, telegraphers, telephone men, levermen, etc.; April 8, stationary engine and boiler room forces; April 9, clerical and station employees; April 11, engine service employees; April 13, train service employees; April 15, train dispatchers, yard masters and assistant yard masters; April 16, shop supervisory forces, signal foremen, assistant signal foremen and signal inspectors.

The amount of the proposed reduction in each classification has not been announced. The reductions are announced to take effect April 20.

New Haven Seeks Reductions

The New York, New Haven & Hartford has announced that on April 15 certain reductions will be put into effect in the rates of pay of the following classifications of employees: Store department employees, clerical forces, station employees, operators of office appliances, office and messenger boys, skilled and unskilled employees, and foremen in the bridge and building departments, draw-bridge tenders and pumpers, supervisory forces and mechanical craft-men in the mechanical department, stationery enginemen and boiler room employees, employees and foremen in the signal and electrical departments, dining car and restaurant employees and all other employees whose rates of pay were adjusted under decision No. 2 of the Labor Board effective May 1, 1920.

A conference was held with the unskilled laborers on March 11. No decision was reached at that time. The employees now have the matter under consideration. No conferences have been held as yet with the skilled workers and supervisory forces. In the event that the management and the employees cannot reach an agreement by April 15 the matter will be referred to the Labor Board for adjudication.

Other Roads Announce Conferences

Representatives of unskilled labor on the Philadelphia & Reading at a conference with the management held at Philadelphia on March 15 refused to accept the proposed decreases of from 15 to 25 per cent. Another conference will be held on March 29 at which time the representatives of the employees have agreed either to take final action on the company's proposal or to submit a counter proposal.

On March 15 an announcement of a reduction in wages of employees other than unskilled labor was issued by the Cleveland, Cincinnati, Chicago & St. Louis to take effect on April 16. The announcement invited conferences with the employees to decide their attitude on the question. The matter of a reduction in the rates of pay of unskilled labor has already been taken up by the company.

The Chicago, Indianapolis & Louisville has announced reductions in the rates of pay of practically all classes of employees with the exception of trainmen and engine

service employees, train dispatchers and telegraph operators.

The Delaware, Lackawanna & Western announced on March 15 that the rates of unskilled labor on its lines would be reduced, effective April 16, and that a conference would be held with the employees on March 23 to consider the reductions.

The railroads entering New York have announced that the wages of their marine workers in New York harbor will be reduced to substantially the same level as that which obtained on April 30 last, before the present wage scale was put into effect.

At the end of a four day conference with the management of the Gulf Coast lines at Houston, Tex., representatives of unskilled labor of that company on March 16 asked for several days in which to take up the proposed decreases in pay with the employees themselves. The decreases are scheduled to go into effect on April 6.

The Central of New Jersey has held conferences with representatives of unskilled labor on its lines relative to reductions in pay and will hold a final conference with these employees on March 24.

The Lehigh Valley held a conference on March 11 with representatives of its unskilled labor with the view of reaching an agreement to some reductions in the rates of pay. The representatives of the employees have asked until March 22 to submit a final decision. The reductions are scheduled to go into effect on April 4. The company has announced reductions in the rates of certain classes of skilled employees also, to take effect April 16. Conferences with these workers will be arranged later.

Cuyler Confers with "Big Four"

Warren S. Stone of the Brotherhood of Locomotive Engineers, L. F. Sheppard of the Order of Railway Conductors, W. S. Carter of the Brotherhood of Locomotive Firemen and Enginemen and J. E. Doak of the Brotherhood of Railway Trainmen conferred in Philadelphia on March 14 with T. DeWitt Cuyler, chairman of the Association of Railway Executives, on the proposal of the brotherhoods that "regional" boards be set for the settlement of disputes between employees and the managements of the carriers in each region.

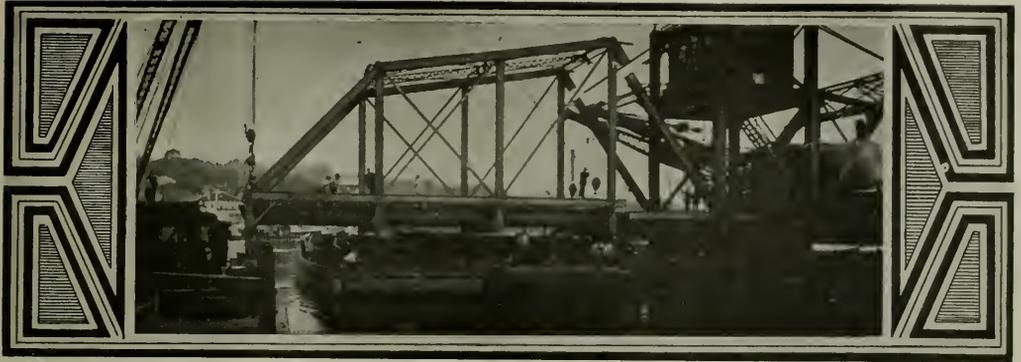
The proposal of the unions some months ago that "national" adjustment boards be set up to deal with these differences was rejected by the Association on the ground that rules and working conditions could not be equitably determined for the nation as a whole. The proposal for regional boards may be looked upon as a compromise between the idea of adjustments on a national basis and that of having a local adjustment board for each individual road. Definite action on the proposal of the unions has not been taken as yet.

Atlanta, Birmingham & Atlantic Strike Continues

The Atlanta, Birmingham & Atlantic has resumed business on a small scale, on parts of its lines, having hired a few new men and taken back a few former employees who returned voluntarily. Receiver B. L. Bugg refused to enter into proceedings with Messrs. Chambers and Klutz, the government mediators, and they returned to Washington on March 12. Receiver Bugg said: "No matter what conclusion might be reached by arbitration, I could not pay any more money than the road earns, for the obvious reason that I would have no means with which to pay. The proposition is not susceptible to compromise."

At the beginning of this week a train was running (apparently on every other day) between Atlanta and Cordele, 171 miles, and one between Birmingham and Lineville, 104 miles. At the Birmingham end of the road some freight was moved.

The Railway Mail Service used automobile trucks to carry mail to some of the towns deprived of railway mail cars.



Lifting Out One Leaf of the Old Draw Span

Bridge Renewal Marked by Interesting Methods

The Replacement of the Mystic River Draw Span Involves an Interesting Erection Program

THE RENEWAL of a double-track swing span on the Shore line of the New York, New Haven & Hartford involved the construction of an interesting type of false-work. It also entailed the use of a temporary lift span operated by two stiff-leg derricks set up on each side of the track

usual reason, namely—increased weight of traffic, had to be replaced by a stronger structure—a double-track, through, riveted truss draw span 181 ft. center to center of bearings. This is of the center or pivot-bearing type with wedges under the trusses at the center pier and is electrically operated.

As the old end piers were in very poor condition, it was necessary to replace them. This was done by cutting off the ends of each pier and building two concrete towers—one at each end—resting on piles. The end bearings of the new draw were later to be carried by a cross girder made up of heavy I-beams spanning transversely between these towers.



General View of the Bridge

that were also employed for a portion of the erection and dismantling operations. The work was hampered by both railway and water traffic and had to be carried on with a minimum of interference with each.

The Shore line of the New York, New Haven & Hartford crosses the Mystic river in the outskirts of the town of Mystic, Conn., and at a point where the river empties into one of the many indentations in the Connecticut coast line. As the river is navigable, any bridge over it must care for both river and railroad traffic. The old structure was a double-track, through, pin-connected draw span of the rim-bearing type 178 ft. center to center of end bearings, and steam operated. The approach on either side consists of a pile trestle and an earth fill protected by retaining walls and rip rap. The old draw span was built in 1892 and for the



A Partial View of the New Superstructure

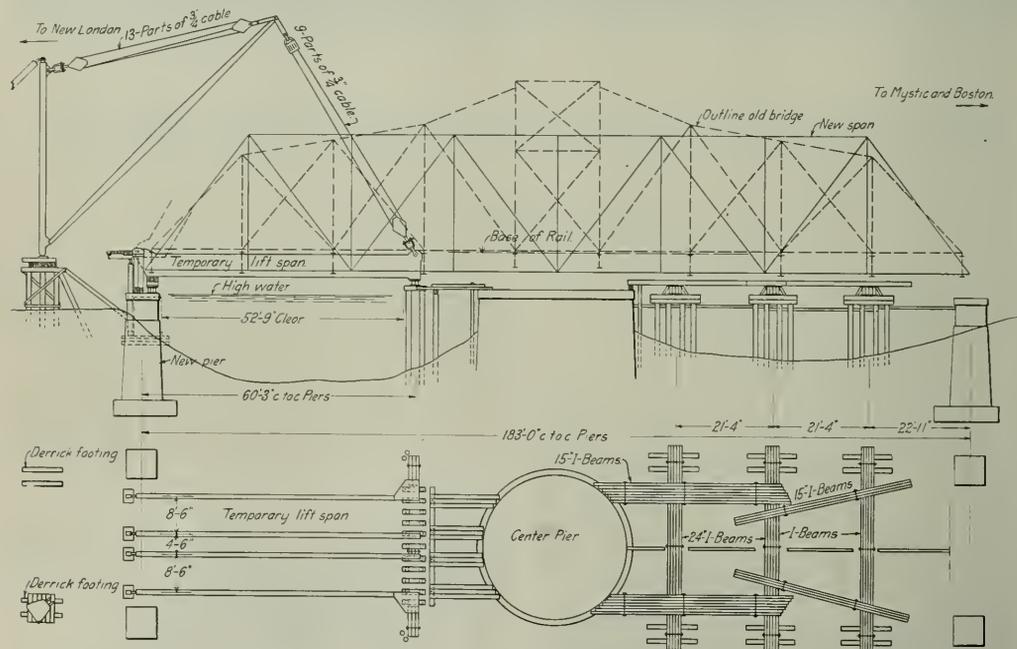
During the building of the towers, the ends of the old span were carried by temporary pile and I-beam supports.

The removal of the old span and the erection of the new bridge had to be carried on so as to interfere as little as possible with either the railroad or river traffic. The water at the bridge is shallow except for the channel dredged for navigation under the west arm of the bridge. The rail level across the bridge is low, so that there is but little headroom under the bridge. There is a total of about 12.26 ft. from base

of rail to mean low water. Because of these conditions the floating of the old or the new bridge intact would have been greatly hampered by the surrounding shallow water while a trestle run-around for traffic would have been very expensive. A further complication arose from the fact that the center pier also required considerable work done upon it before receiving the new bridge. All of these considerations made it advisable to erect the new bridge in the permanent position and at the same time maintain railroad service and river navigation. The latter consisted mostly of the passage of many fishing vessels, an occasional schooner and tugs with barges, the passage of which could be interrupted, when absolutely necessary, for a period of 36 hours.

In brief, the general erection scheme was to place falsework in the east channel, and at a predetermined time suspend navigation, block the east arm upon falsework, float

The hinge lift span in the west channel consisted of two single-track, deck plate girder spans braced together at the ends and at intermediate points, and with top and with bottom laterals. At the inboard end, the girders were connected to hinge shoes with the connecting pins at the elevation of the top of the rail. These shoes were carried upon a timber bent which rested upon timber beams spanning transversely between the concrete towers, and in addition, were blocked upon the old pier. When the span was in a closed position for carrying traffic, the bottom flanges of the girders at this end were also supported on the I-beams of the permanent cross girder. At the outboard end, the girders were supported on 15-in. I-beams which were carried by a double pile bent driven in the channel west of the center pier. These girders were obtained by cutting in half the two girders of a 120 ft. draw span which had been removed from another



Falsework Plan and Elevation, Showing the Position of the Temporary Lift Span

out the west arm, and place in the west channel a temporary hinged lift span. Following this it was required to erect as much as possible of the new bridge with all necessary machinery for turning and later suspend navigation again for 36 hours and remove the temporary lift span and erect the west arm.

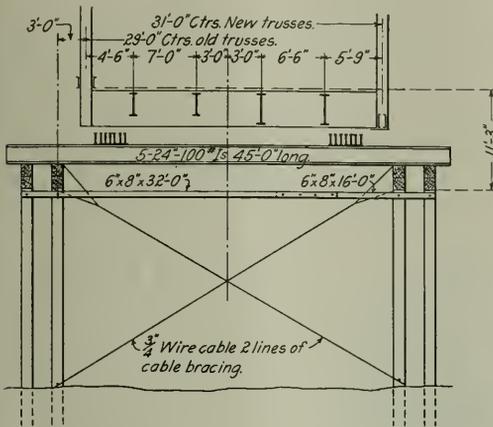
The falsework in the east channel consisted of 12 pile bents driven outside of the trusses, and arranged in pairs to receive the ends of 24-in. I-beams placed transversely of the bridge. Upon these I-beams, longitudinal 15-in. I-beams were inserted, upon which the old floor beams were later blocked up. As the caps were located close to the water, it was impossible to place any effective timber cross bracing, either transversely or longitudinally. However, submarine cross bracing of wire cable was placed transversely and the bents were shored longitudinally to the piers. The position of the piles outside of the bridge made it possible to drive them from a floating driver with little interference with the railroad traffic.

bridge, and were adapted to the work by the addition of bracing and suitable details at the ends.

To provide for the placing of the temporary lift bridge as well as for its operation, and any other necessary work, two 30-ton steel derricks with 70-ft. booms and two-drum hoisting engines were located on pile supports, one on either side of the trestle approach and near the west end of the bridge. The booms of the two derricks were set in a fixed position of about 45 deg., with the load falls secured to the outer ends of the lift spans, which were raised and lowered by operating the hoisting engines in unison.

A 60-ton locomotive crane was provided for handling the erection. This was supplemented on occasions by another from a nearby operation. As traffic was heavy, a 30-ton steel derrick with a 90-ft. boom was erected on piling to the south of the bridge to take material from a storage space on piles at the east end of the bridge and carry on some of the erection or dismantling when the locomotive crane was not permitted out on the main line.

After all falsework in both channels had been completed and the derricks erected, the temporary I-beam supports carrying the west end of the old structure were replaced by the permanent pier girder. Later all navigation was suspended for 36 hours beginning at 5:00 a. m., and ending at 5:00 p. m. the next day. The east arm and the first panel



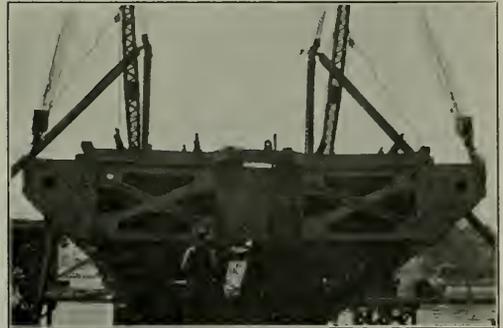
A Cross-Section of the Falsework

of the west arm to the west of the center pier, were blocked upon the falsework, and two deck barges with blocking were floated under the west arm. Rail traffic was suspended at about 6:50 a. m. and the two locomotive cranes were run out on the bridge over the center pier and hooked onto the first floor beam west of the pivot pier. The load falls of the two derricks for operating the lift span were hooked onto

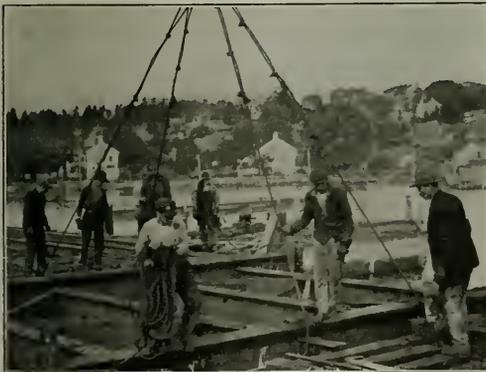
in pairs with their bracing and ties. One pair was then brought out on the trestle by the work-train, and the two derricks picked up the girders and set them to place in the west channel. Rail was laid on these; the second pair of girders brought out on cars on this track, and set to place by the derricks. The first track was ready by 10:53 a. m. and the first train crossed at 12:01. The second track was ready by 12:16 p. m.

On the following day the old west arm was dismantled on the boats lying in the west channel by all three derricks, and the various parts loaded on cars or set off in shallow water. The connections for the load falls were placed on the outboard ends of the girders, and these falls connected. By 5 p. m. of the second day the channel was clear and the temporary lift span ready to open for navigation, which was awaiting this moment.

The crane and the derrick then removed the remaining portions of the old structure and erected new material in the east arm and the first panel of the new west arm. This was riveted up, the operator's house built, and all machinery and electrical equipment installed, ready to operate the bridge as soon as the west arm was completed. In the meantime the changes were completed in the old pivot pier, and trans-



The Temporary Lift Span Partially Open



Lifting Out the Last Panel of the Floor System in the Old East Arm

the west end floor beam. The trusses and bracing were cut through with acetylene torches on the east side of the first panel point west of the pivot pier. The cranes and derricks then lowered the three panels of the west arm to the boats and they were floated a short distance away. In the meantime the bent for supporting the hinge shoes of the lift span was placed, and various other details were perfected at the west pier.

Previously the girders for the lift span had been assembled

verse I-beams placed for distributing the load from the wedges under the trusses over the pier.

For the purpose of completing the erection across the channel navigation was again closed for 36 hours, beginning at 6:30 a. m., when the temporary lift was put out of commission. The remaining three panels in the trusses of the west arm and one panel of top bracing were then erected, using the locomotive crane and the derricks which had operated the lift span. At 6:34 a. m. on the following day railroad service over the bridge was stopped, and the west derricks removed the two pairs of lift span girders and loaded them to be carried away. All temporary material was cleared from the west pier, the pier girder shifted to permanent position and the floor system filled in and the portal placed. By 12:02 p. m. one track was ready and the first train moved across, and by 12:30 the second track was ready for traffic. The remaining top and bottom laterals were placed; also all shafting and machinery which had not been previously bolted in place on the bottom chords in the yard, and at 5:22 p. m. a partial opening was made to permit boats to pass through.

After this there remained the riveting of the west arm and any final adjustment of the wedges, the removal of the falsework and whatever old structure had been temporarily placed in the water, the removal of the derricks and a general cleaning up.

While the general sequence of the erection was not that

which is usually employed, the alinement and the deflections of the two arms of the bridge worked out satisfactorily.

The design and the construction of this bridge were under the direction of Edward Gagel, chief engineer of the New Haven; W. H. Moore, engineer of structures; I. D. Waterman, engineer of construction, and P. B. Spencer, resident engineer. The bridge was fabricated and erected by the American Bridge Company of New York, under the direction of J. B. Gemberling, manager eastern division, erecting department; H. H. Starr, assistant engineer, and E. R. Collins, foreman.

Benefits Derived from Apprentice Training**

By John H. Linn

Assistant Supervisor of Apprentices, A. T. & S. F.

WHEN THE WORK of apprentice training was first begun on the Santa Fe thirteen and a half years ago, we were told the object was not to make mechanical engineers, but skilled mechanics for our shops and round-houses, men trained and educated Santa Fe way. This we have done.

During this period we have graduated 1,528 of the best mechanics that can be found anywhere in the country; at least we think them the best. Certainly no others would be so well suited to our particular needs. During the next six months we will graduate about a hundred more, and so on.

Just as a manufacturing plant finds in the development of its primary product that certain by-products can be produced with but very little extra effort or expense, so we have found in training and developing mechanics, a number of other good results have been obtained, a few of which I wish to call to your attention.

First, I would mention the output in work performed by the apprentices. We do not like to speak about this, for we have always insisted that the ultimate output in skilled mechanics for our future needs is more important than the immediate output in work done by those being trained, but our more than 1,700 apprentices, under the supervision of competent shop instructors, have performed a surprising amount of work. But if you stop to think about it, it is not surprising. We not only teach our boys correct and up-to-date methods, but impress upon them that time is just as important as materials. Moreover, a young man can excel an older man in any contest requiring quickness of mind or of muscle. So it is not to be wondered at, that when you give him competent instruction, he can turn out a great amount of work, often excelling the older mechanic.

But to do this you will have to have a number of competent shop instructors, skilled mechanics themselves, to give him the instruction he needs in the shop. There is a by-product from the work of these shop instructors. They greatly assist the foremen, are able to relieve the foremen during the latter's temporary absence, and are particularly good material for selection to permanent positions as foremen or supervising officers. The salary of a shop instructor should not be considered as an expense but as an asset or investment. There is also a by-product in the work of the school instructor. In addition to instruction in the school room, he looks after all shop drawing, and sketching, and blueprints. He is frequently the only technical man around the plant. As such he is a very valuable assistant to the master mechanic or superintendent of shops.

The instruction of apprentices also has a very wholesome

effect upon the other men in the shop. They are more anxious to use up-to-date methods in a vain effort to keep these younger boys from surpassing them.

But perhaps the greatest by-product outside the making of skilled mechanics is the value to the company of the promoted graduate. Mr. Basford has told you what railways need is not new blood, but to circulate the blood we have. Many men would make good if given the chance. You do not always know what they can do until you try them. It has long been a policy on the Santa Fe to promote from within our own ranks. As evidence of this policy and of the fitness of our apprentice graduates, we have 220 of our graduates filling positions above the ranks, many of them positions of great responsibility. In fact the last three master mechanics appointed were selected from our roster of apprentice graduates. Remember, these are all young men who have been graduated in a little more than a decade. We shall have a great many more in another ten years. To what heights may not some of them climb?

Someone has said that the greatest good one individual can do for another is to help that individual become an independent self-sustaining member of society. We are doing this for our young men; we are teaching them the best way to help themselves is to co-operate with the management; that their own success and prosperity is dependent upon and closely linked with the success and prosperity of the corporation as a whole. We are endeavoring, too, to make them young men of upright moral character, good citizens, loyal to the corporation which they serve.

Commenting further on Mr. Basford's paper, I would like to emphasize what he said about labor turn-over. Did you ever stop to think how many men must be hired to maintain our normal forces; what this costs in mere clerical labor involved, what the cost due to breakage of machinery, due to work spoiled by newly hired help; what the loss to the company due to the time machinery is idle from time one man leaves until his successor actually gets on the job, what the cost due to increase in frequency and severity of personal injuries of ignorant and inexperienced employees, what the cost of training these new men to take the places of the men who quit, what the effect upon the older, more contented employees of this continuous influx of the boomer element, most of whom are generally disgruntled and dissatisfied? I think if railway managements could realize how greatly these factors enter into and affect the balance sheet and the cost of production and operation, greater attention would be paid to selecting, training, and placing men. There is no better way than by adopting and carrying out some system of definite training for the employees in the various departments. There is no time like the present for doing this. It is well known that when times are dull, building operations and extensive repairs to equipment may be carried on more economically and more successfully and with less interference with regular business routine than when business is at flood tide. Men and materials are both more plentiful and can be more carefully selected and tested. For these and similar reasons, times of depression are most fitting for the training of employees and for sifting out and building up the man power which, like buildings and equipment, will be so badly needed for the good times which are bound to return.

EIGHT MILLION DOLLARS is the total amount of the losses sustained by the American Railway Express Company, because of thefts of merchandise in transit, during the period of Government control, according to a statement made by W. A. Benson, assistant vice-president of the company, in the Federal Court at Macon, Ga., on March 15, in connection with the trial of 54 men indicted on charges of conspiracy to rob the company of more than \$1,000,000 worth of goods.

*From the discussion of the paper on foremen by George M. Basford at the February meeting of the Western Railway Club.

Two Interstate Commerce Commissioners Appointed

WASHINGTON, D. C.

PRESIDENT HARDING on March 11 sent to the Senate the nominations of John J. Esch, who has been chairman of the House committee on interstate and foreign commerce, and Mark W. Potter, who has been serving on the commission under a recess appointment by President Wilson which expired on March 4, as members of the Interstate Commerce Commission. Mr. Esch was appointed for the full term of seven years, succeeding Robert W. Woolley, whose term expired on December 31, and Mr. Potter for a term ending December 31, 1923. This leaves two vacancies upon the commission, one to succeed James S. Harlan, whose term expired on December 31, 1918, and one for one of the new positions created by the Transportation Act when the membership of the commission was increased from nine to eleven, for the term expiring December 31, 1924. Henry J. Ford, who has been serving under a recess appointment since last summer, was appointed to succeed Mr. Harlan, and James Duncan, first vice-president of the American Federation of Labor, was appointed for the other vacancy, but never accepted the appointment. The Senate committee on interstate commerce at once held a meeting and voted a favorable report on confirmation of the appointments by the Senate, but it was announced that Senator La Follette of Wisconsin, intended to oppose the appointment of Mr. Esch. Mr. Potter's nomination was confirmed by the Senate on March 12, but that of Mr. Esch was held over until the next session to allow Senator La Follette to file a minority report.

A photograph and sketch of Mark Winslow Potter were published in the *Railway Age* of May 14, 1920, at the time of his original appointment by President Wilson. Mr. Potter was a member of the law firm of Hornblower, Miller, Garrison & Potter, of New York, and has been connected with the Carolina, Clinchfield & Ohio, of which he became counsel in 1905, chairman of the board in 1907, and president in 1911. He has been very active in the work of the commission, serving during the summer and fall on Division No. 5, which had charge of car service matters, and recently as a member of Division 4, which has particular charge of the financial matters within the commission's jurisdiction, such as the administration of the loan fund and supervision of the issuance of railroad securities.

John Jacob Esch has been in Congress since 1899, has been a member of the committee on interstate and foreign commerce for about 18 years, and has been chairman of that committee since 1919. He has manifested a special interest in railroad and transportation affairs in Congress and has played a very active part in the framing of railroad legislation. He was one of the authors of the Esch-Townsend bill, which was largely the basis for the Hepburn law of 1906,

and as chairman of the committee he had much to do with the framing of the transportation act of 1920. Mr. Esch was born at Norwalk, Wis.; on March 20, 1861, graduated from the University of Wisconsin in 1882 and received the degree of LL.B. in 1887. He was admitted to the bar in 1887 and engaged in the practice of law at La Crosse, Wis., as a member of the law firm of Winter & Esch.

New York Commission and Automatic Stops

THE NEW YORK STATE Public Service Commission, Second District, has been asked by the New York Central to defer action looking to experiments with an automatic train-stop, and apparently intends to make no order in the premises until after a further hearing. Counsel for the road, at the hearing held by the Commission in Albany on March 10, objected to the issuance of an order requiring the road to install apparatus, asserting that the Federal Government having taken action, in Section 26 of the Transportation Act of 1920, the New York Commission had no jurisdiction in a matter of this kind. By that Act, Congress clothed the Interstate Commerce Commission with mandatory power to order the installation of safety appliances. It was claimed also that the proposed installation and tests would cost probably \$200,000. The counsel of the railroad company was accompanied by E. B. Katte, chief engineer of electric traction, who also is a member of the A. R. A. committee on automatic train control.

It appears that the request of the A. R. A. Committee that the Sprague automatic train control be tried on the New York Central has been favorably received by the road; but with the suggestion, or condition that as the proposed test would be made for the purpose of general information and not for the benefit of the New York Central alone, the American Railway Association ought to bear the expense of the test.

Frank J. Sprague, who was present at the hearing, asked the Commission to consider that the expense of automatic stops would be offset by the savings from loss of life and property, and by possible increases in efficiency of operation and capacity of tracks. He suggested further that on sections of road made specially safe by automatic stops there might be an increase in passenger fares, on the same basis that passengers pay an additional sum for the better protection afforded by limited trains. He had already suggested to the Interstate Commerce Commission that the Federal Government provide funds for the promotion of automatic train control.

The Commission, whose report on automatic train control was abstracted in the *Railway Age* of March 4, page 497,



J. J. Esch

examined a number of devices besides those which were mentioned in that abstract.

The following five companies, responding to inquiries from the Commission, declared themselves ready to contract for an installation on the New York Central and to guarantee its adaptability to the conditions on that road: General Railway Signal Company, Rochester, N. Y.; National Safety Appliance Company, San Francisco, Calif.; Schweyer Electric & Manufacturing Company, Easton, Pa.; Sprague Safety Control & Signal Corporation, New York City; Union Switch & Signal Company, Swissvale, Pa.

The Commission finds the present status of the devices examined to be as follows:

General Railway Signal Company: Now being developed in the laboratory with intentions to make a further test on a short piece of track with one locomotive. Mechanical parts practically completely developed.

Union Switch & Signal Company: Complete laboratory demonstration developed, with all parts mechanically complete. Ready for track installation test.

Schweyer Electric & Manufacturing Company: This device has been subjected to test on a branch of an eastern railroad. Mechanically should be further developed. This is in process. Ready for track test after a few modifications.

Sprague Safety Control & Signal Corporation: Complete laboratory and mechanical development. Ready for immediate track test.

National Safety Appliance Company: Has been tried on a railroad in California, but has since been modified. Apparently ready for test within reasonable time.

New York Air Brake Company: Device has been developed and is installed on a locomotive in the yard of the company.

Regan Safety Devices Company, Inc.: Induction portion of apparatus not yet fully developed. Remainder of device in manufacturing stage, and on trial under operating conditions on 20 miles of double track railroad.

G. P. Finnigan: A test of the fundamentals of this device has been made on two railroads. Apparently the design of parts now recommended has not been developed beyond the making of drawings.

Pittsburgh Train Control Company: At present in the laboratory development stage.

Automatic Train Control Developing Company, Inc.: In the laboratory stage. Test on track could be made in a reasonable time.

The snow flangers used on the New York Central extend the full width between the gage lines of the track and extend downward $3\frac{1}{2}$ in. below the plane of the tops of the rails. The Commission says that these flangers would have to be changed so as to leave free a space in the center of the track 20 inches wide; for it would not be practicable to require the flanger to be raised at all of the points where track magnets, etc., would have to be installed. The Commission, in its report, intimated also that certain proposed devices designed to amplify electric current induced in receiving elements might need further development, as they have not yet been tried in signal work.

State Rate Case Argued in Supreme Court

WASHINGTON, D. C.

ORAL ARGUMENTS before the Supreme Court in the Wisconsin intrastate rate case, in which 43 states are contesting the order of the Interstate Commerce Commission increasing rates within the state by the amount of the interstate increases, were begun on March 11 and concluded on March 15. The state of Wisconsin was represented by M. B. Olbrich, the railroads by Alfred P. Thom and Bruce Scott, and the Interstate Commerce Commission by P. J. Farrell, while John E. Benton presented the argument for the state commissions generally. Mr. Olbrich did not contest the constitutionality of the Transportation Act, but contended that the federal commission had exceeded the

authority conferred upon it by the act. Mr. Benton contested the constitutionality of the 6 per cent rate-making rule of the act and also declared that if the order of the commission is upheld the states would be deprived of all rate-making powers. Both of the state representatives tried so hard to give the impression that the commission had merely ordered the rates increased for the purpose of increasing revenues without finding discrimination that Mr. Scott devoted a large part of his argument to the facts in the case and the commission's findings of discrimination. The chief justice at one time remarked that the principal argument seemed to be on the question of fact as to what the commission had found rather than on the question of its power because the state representatives, he said, seemed to concede that the Interstate Commerce Commission had power to correct discrimination.

Brief of I. C. C. Counsel

Extracts from the briefs in the case were published in our issue of two weeks ago. Chief Counsel Farrell of the Interstate Commerce Commission said in part in his brief:

We have shown that in making and issuing the order involved in this suit the commission did not exceed the authority conferred upon it by the interstate commerce act as amended by the transportation act, 1920, and in doing so we called attention to the provisions of law under which the commission operated. We think an examination of these provisions will be entirely sufficient to demonstrate that in making them Congress did not manifest any intention to interfere, or to authorize the commission to interfere, with rates, fares, or charges for transportation of passengers or property in commerce which is purely intrastate. The appellants contend that Congress did so interfere, and we understand this to be, in substance, the only claim advanced by them in support of their contention that the action of Congress referred to is unconstitutional.

We thus see that the power of Congress over interstate and foreign commerce is full and complete; that where it extends it dominates; that it was vested in Congress to secure uniformity of regulation against conflicting and discriminating state legislation and to protect the national interest by securing the freedom of interstate commercial intercourse from local control; that such power enables Congress to enact all appropriate legislation for the protection and development of interstate and foreign commerce; that this power necessarily embraces the right to control the operations of interstate carriers in all matters having such a close and substantial relation to interstate traffic that the control is essential or appropriate to the security of that traffic, to the efficiency of the interstate service, and to the maintenance of conditions under which interstate commerce may be conducted upon fair terms and without molestation or hindrance, and that, wherever the interstate and intrastate transactions of carriers are so related that the government of the one involves the control of the other, it is Congress, and not the state, that is entitled to prescribe the final and dominant rule.

That the constitutional power of Congress over interstate and foreign commerce, as that power is defined in the above-mentioned decisions, and in a large number of other decisions, of this court, which might be referred to, was not exceeded in enacting the provisions of law here involved is so clearly apparent, when the definitions are compared with the powers exercised, that, in our opinion, further argument in this connection is unnecessary.

In paragraph (4) of section 13 of the interstate commerce act, above quoted, it will be seen that all Congress did was to authorize the Interstate Commerce Commission to make orders which would remove and prevent any undue or unreasonable advantage, preference, or prejudice as between persons or localities in intrastate commerce on the one hand and interstate or foreign commerce on the other hand, and any undue, unreasonable, or unjust discrimination against interstate or foreign commerce; and that by paragraphs (2) and (3) of section 15a Congress simply authorized and required the commission to initiate, modify, establish and adjust rates so that carriers as a whole, or as a whole in each rate group or territory which the commission may from time to time designate, may earn an aggregate annual net railway operating income equal, as nearly as may be, to fair return upon the aggregate value of the railway property of such carriers held for and used in the service of transportation.

It is true, that by said paragraph (3) Congress fixed, for two years beginning March 1, 1920, the annual net railway operating income at $5\frac{1}{2}$ per centum of said aggregate value, except that it authorized the commission, in its discretion, to increase said percentage to 6. In this connection, however, we do not apprehend

that an effort will be made by the appellants to show that this action of Congress is in excess of its constitutional power.

At the time matters covered by the transportation act were being discussed, Congress was confronted with the necessity of preserving and strengthening the interstate common carriers of the country, and making them efficient and serviceable agencies for the transportation of interstate and foreign commerce, and also for the transportation of intrastate commerce. Under these circumstances we think it is obvious that the most important matter presented for consideration was the means by which the

necessary railway operating revenues might be secured. After several months of discussion, deliberation and reflection, Congress perfected and put into operation the plan now under consideration, and our understanding of a large number of decisions heretofore rendered by this Court convinces us that in taking this action, Congress did not exceed its power under the Constitution of the United States.

A brief was also filed by the National Association of Owners of Railroad Securities.

Shipping Board Asks Re-establishment of Rates

Shipping Board Asks Re-establishment of Export and Import Rail Rates Through Pacific Coast Ports

WASHINGTON, D. C.

CHAIRMAN W. S. BENSON of the Shipping Board has recently asked the Interstate Commerce Commission to institute a proceeding of inquiry and investigation with a view to bringing about the re-establishment of export and import rail rates to and from points east of Chicago through Pacific coast ports in relation to the corresponding domestic rates on the basis which existed prior to the rate advance order of the director general of railroads in 1918, and the recent decision of the Interstate Commerce Commission in Ex Parte 74. In a letter to Chairman Clark of the Interstate Commerce Commission, Chairman Benson complained of the attitude of the eastern lines in failing to carry out promptly what he refers to as a promise made by the carriers at the time of the hearing in Ex Parte 74. Reviewing the situation, he says that for many years prior to the war, it was the practice of railways to maintain export and import rail rates through Pacific Coast ports on a basis lower than the domestic rates. This rate adjustment permitted the movement through the ports of traffic originating in or destined to territory both east and west of the Mississippi river. The exigencies of the war made it advisable for the director general to discontinue this practice temporarily and he accordingly on May 25, 1918, issued General Order 28, effective June 25, 1918, which cancelled all export and import rates and provided that domestic rates should apply to and from the ports. Early in 1919, requests were made to the Railroad Administration by the Gulf, South Atlantic and Pacific ports for restoration of the former relationship so that the ports might be placed in position to secure a reasonable share of the import and export traffic.

After a careful analysis the Railroad Administration made effective export and import rates lower than domestic rates via Pacific Coast ports to and from territory north of the Ohio river and east of the Mississippi river. Thereafter the Railroad Administration made effective export and import rates to and from the same eastern territory via South Atlantic and Gulf ports, using the same basis to determine the through rate as was used to determine the through rates via the Pacific Coast ports.

When the application for a percentage increase in rates was sought by all of the railroads in the United States in Ex Parte 74, Chairman Benson says, it was recognized that if the increases were allowed as applied for on a horizontal percentage basis, it would throw out of line the import and export rates via Pacific Coast ports, and attention was called to the fact that this would result at the time of the hearing on the applications.

Thereupon the Interstate Commerce Commission requested the petitioners to furnish for the record and for the information of the commission and the parties concerned, certain information. In response to questions propounded by the commission, the carriers through their counsel filed on June

8, 1920, their joint and several answer, which was designated Exhibit 1. The answer to the inquiry relating to export and import rates via Pacific Coast ports is quoted as follows:

"Export and Import Rates via Pacific Coast. Rates made to equalize the rail and ocean rates via the North Atlantic ports to be advanced the same amounts in cents per hundred pounds as the base point rate to and from North Atlantic ports is advanced."

"The questions propounded, including No. 11 as above set out," Chairman Benson says in the letter, "were presented to the carriers as a whole and not to any one carrier or any one group of carriers, and it was answered and filed in the record on the behalf of all carriers without reservation. No doubt the Interstate Commerce Commission in common with shippers and carriers relied upon the answer as one made by all the carriers without reservation, and it was regarded by all interested parties as a definite promise on the part of the carriers to expedite the readjustment and restoration of export and import rates via the Pacific Coast ports on the basis stated—a relationship and basis that was thoroughly understood by all concerned.

"Thereafter the interested transcontinental lines prepared a tariff on the basis as stated. The eastern lines refused to concur in the adjustment proposed by the transcontinental lines, giving as a reason that they could not afford to make the reductions that would result from the establishment of rates on the basis stated. This condition of affairs having come to the attention of the Shipping Board and having in mind the fact that several months had elapsed since the order in Ex Parte 74 was made and entered, it requested the executives of certain of the eastern roads to attend a conference or send representatives to confer on the subject of export and import rates at a meeting to be held in the office of the Shipping Board in Washington on February 4, 1921. The conference was held, on which occasion representatives were present on behalf of the following roads: Pennsylvania Railroad; New York Central Lines; Baltimore & Ohio; Erie; New York, New Haven & Hartford. There were also present Commissioner McChord of the Interstate Commerce Commission, Director of Traffic Hardie, and members of the Shipping Board.

"At said meeting it developed that after the order had been issued in Ex Parte 74, there had been a number of conferences between the representatives of Transcontinental lines and said Eastern lines, and that the proposition of the Transcontinental lines in respect to the establishment of export and import rates via Pacific Coast ports was rejected by the Eastern lines as they did not consider the proposition fair to them. Without further detail, the result of the conference was an agreement on the part of the chairman of the Shipping Board to call a joint meeting of the representatives

of the Transcontinental and Eastern lines in New York at an early date."

Following this conference, telegrams were exchanged between George H. Ingalls, vice-president of the New York Central, and the chairman of the Board, including the following:

WASHINGTON, Feb. 17.

G. H. Ingalls, Vice-President, New York Central Lines, New York City. Your wire 12th advising conference has been held. Shipping Board greatly interested and would view failure to agree on fair basis as placing serious handicap on development American merchant marine. Particularly call your attention to answer submitted Interstate Commerce Commission Ex Parte 74 by Attorney Wood for all carriers in response to commission's direct question as to how export and import rates via Pacific Coast were to be adjusted. Rates made to equalize the rail and ocean rates via the North Atlantic Ports to be advanced the same amount in cents per hundred pounds as the base point rate to and from North Atlantic Coast Ports is advanced. All parties concerned expecting rail carriers promptly carry out this adjustment. In view of long time this matter has been under consideration board feels it should have your answer not later than Saturday, February 19.

BENSON, Chairman,

NEW YORK, Feb. 18.

W. S. Benson, Chairman, U. S. Shipping Board, Washington, D. C. Yours 17th. Would respectfully advise there are other considerations not outlined in statement before commission in Ex Parte 74 that Eastern lines consider part of any concurrence on their side in statement made by Mr. Wood. I beg to assure you that this question involves large revenues and is being dealt with by the lines in Eastern territory with as much dispatch as is commensurate with importance of subject.

G. H. INGALLS.

"The answer of Mr. George H. Ingalls is considered by this Board entirely unsatisfactory," Chairman Benson says in the letter, "and in view of the statement made in Ex Parte 74 heretofore referred to, meetings that have been held since by the interested parties, the failure to arrive at agreement and the time that has elapsed, the Board has concluded that there is no likelihood of an adjustment of said rates by the interested carriers within a reasonable time.

"The Shipping Board views the question involved as one of great importance and urgency. The Interstate Commerce Commission is aware of the export and import rates applied through Canadian ports to points on Canadian rail lines, and that said rates affect not only movement through the American ports and to Canadian territory but to points in the United States as well. The maintenance of these rates by the Canadian lines, and the failure to establish such rates by the American lines directly affects the business and operation of vessels of the United States Shipping Board and other operators, as well as the business of the Pacific Coast ports. The traffic of American rail carriers is also reduced. The failure and refusal by the American rail lines to establish export and import rates from the territory referred to through Pacific Coast ports is opposed to the expressed policy of Congress with respect to the upbuilding of an American merchant marine, and the use of the various ports of the United States as we understand the law and policy declared therein. After having exhausted every effort to bring about an amicable adjustment of this matter, the Shipping Board believes it to be its duty to do all possible to enforce and maintain the law and the policy with respect to the subject matter of this communication as declared by Congress.

"The policy of placing Pacific Coast ports as well as the Gulf and South Atlantic ports on an equality with North Atlantic ports as to through rates on export and import traffic in the large producing and consuming territory east of the Mississippi river and north of the Ohio river has long been recognized as a helpful one in enabling the operation of regular lines of ships to and from the ports on the different seaboard.

"The division of the country's import and export traffic to a reasonable extent among all ports places the different sections of the country in position to get minimum rates to foreign countries for local production, which production by itself would not support a regular line.

"The policy outlined above is generally accepted as being wise and in the best interests of the country as a whole, not only in connection with the particular matter involved herein, but in preventing congestion and securing a better use of the

ports and in tending to build up an American merchant marine of the greatest use and service. It is the opinion of the board that in both the Transportation Act and Merchant Marine Act, 1920, the policy herein above stated is recognized and approved.

"The board, therefore, appeals to and requests the Interstate Commerce Commission to institute a proceeding of inquiry and investigation into this matter at as early a date as possible, with a view to issuing such order against the interested carrier as it may find necessary and just, to correct the rate adjustment against which complaint is made, and to bring about the re-establishment of export and import rates to and from eastern territory through the Pacific Coast ports in relation to corresponding domestic rates on the basis which existed prior to General Order 28 of the director general, and the decision of the commission in Ex Parte 74."

Additional Payments Being Made on Railroad Guaranty

WASHINGTON, D. C.

ADDITIONAL CERTIFICATES for partial payments to railroads on account of their guaranty for the six months following the termination of federal control have been issued by the Interstate Commerce Commission and the Treasury Department in in most cases paying the certificates within a day or so of their issuance. The following certificates have been announced by the commission since those published in last week's issue, which brings the total of certificates since the passage of the Winslow bill up to \$49,777,990:

		Previously advanced
Chicago Great Western.....	\$1,335,000	\$1,700,000
Texas & Pacific.....	1,000,000	.....
Ulster & Delaware.....	218,800	.....
Tennessee Central.....	115,000	.....
Gulf, Mobile & Northern.....	200,000	528,000
Philadelphia & Reading.....	2,000,000	2,500,000
Raritan River.....	60,000	.....
Chicago, Milwaukee & St. Paul.....	2,500,000	14,934,892
Chicago & Northwestern.....	12,000,000	.....
Chicago, Rock Island & Pacific.....	6,000,000	.....
Chicago, Indianapolis & Louisville..	400,000	500,000

The Treasury Department has also announced the payment of additional loans from the revolving fund, which had been approved by the Interstate Commerce Commission, to the Hocking Valley for \$1,053,000; New Orleans, Texas & Mexico, \$234,000; Indiana Harbor Belt, \$579,000; Western Maryland, \$1,500,000.

The Interstate Commerce Commission has also issued a final certificate for \$114,414.91 to the Western Allegheny under Section 204 in settlement of its deficit for the period of federal control, after deducting \$527.05 owed to the Railroad Administration for traffic balances and other indebtedness.



Photo by International
One of the World's Largest Zinc Mines, at Franklin, N. J.

Training and Developing the Railroad Worker*

Individual Must Be Studied Critically and Special Instruction
Given to Suit His Needs

By J. C. Clark

Assistant to General Manager, Oregon Short Line

THERE ARE TWO METHODS of training men. One is to provide instruction in the form of lectures, libraries, literature, etc. This does not contemplate rating or grading the individual, but simply provides the instruction

individual employee according to his value to the service, determine what his weak points are, and see that he gets the instruction best fitted to his needs.

A common method of providing instruction for employees is to fit up an instruction car and send it over the road in charge of a competent instructor. No doubt a great deal of good has been accomplished in this way and there is still room for good work along these lines.

One of the best means of offering instructions is the moving picture. This has not yet been developed as it should be, and it offers a field of wonderful possibilities. Films can be made showing the operation of the air brake, that will illustrate the action of the air pump, the manner in which the air flows from the main reservoir through the brake valve, the train pipe, the action of the triple valve, and all other parts of air brake equipment. This will be of immense value, because it will show the air actually flowing through pipes and valves, and the action of every part of the apparatus. This same idea could be followed out with the injector, superheater, valve motion, circulation in a boiler, combustion and any other subject that it is desired to illustrate.

The moving picture could also be used to give all classes of employees a larger outlook on their work. For example, a piece of freight could be followed from the time it is unloaded from the truck onto the receiving platform until it is delivered to the consignee, showing the proper manner of making up every form incident to the movement and the importance of keeping the proper record. It could show what happens if the proper record is not made, and if the piece of freight is damaged through rough handling or improper packing it could also be shown what procedure is necessary when the claim is made for damage. Too many railway employees do their work because someone has told them what to do, but do not understand the relation the part which they perform bears to the whole operation. Any instruction designed to broaden this outlook will unquestionably create more interest in the work and improve the morale. This suggests only a few things that can be done with the moving picture; the possibilities in this direction are enormous, and deserve immediate attention on the part of railroad managements.

Concentrate on the Individual

Instructing men in groups has accomplished good results in some cases, and as outlined in the last paragraph it can be developed along new lines that will be extremely beneficial. In order to accomplish the best results, however, it will be necessary to rate each employee according to his value to the service. Where a considerable number of employees are doing exactly the same work under exactly the same conditions, their value to the organization they serve can be measured by their output or production; these conditions, however, are seldom or never found in railroad work. In the railroad game a large number of men may be doing the same class of work, but it is always under varied conditions. It is therefore necessary to find some other means of rating employees. Psychologists have devised a means for doing this which they call the "method of limited impressions."

To illustrate the application of this method to railroad

<u>TRAIN AND ENGINEMEN'S INDIVIDUAL PROGRESS</u> <u>REPORT</u>	
Name	JONES, WALTER A.
Occupation	CONDUCTOR Division CENTRAL
District	2 Class Work LOCAL FREIGHT
Note: Before making out this report, read carefully instructions and definitions on the back.	
Qualification	Rating
Intelligence	9
Judgment	8
Sense of Responsibility	8
Obedience of Rules	8
Vigilance or Alertness	8
Team Work	10
Powers of Observation	9
Punctuality and Steadiness	10
Knowledge of Equipment	8
Loyalty	9
Character and Habits	9
Disposition and Temperament	6
Do you consider the subject of this report capable of filling a position of more responsibility? YES	
Have you any recommendation to make with reference to this employe? _____	
Remarks _____	
Signed	EDWARD HINGKLEY
Title	TRAIN MASTER

Fig. 1—Train and Enginenem's Individual Progress Report Card

and leaves it optional with the man whether or not he will take advantage of it. The second method is to rate each

*This is the third of a series of articles on personnel problems. The first one, "Labor Turnover—Not a Disease, but a Symptom," was published in the *Railway Age* of December 31, 1920, page 1157. The second, "The Functions of a Railway Employment Service," was published in the issue of February 4, page 329.

sider how this method of rating could be used in the best manner. When this system has been thoroughly established, a list should be made of all employees in a given class and an average percentage rating obtained for the entire class. We will suppose, for example, that the average for an entire class of employees was 75. Any employee whose rating fell below 75 would be called in by the supervising officer and informed that his rating was not up to the average of his class. He would be shown his rating card, which would indicate the qualifications in which he was deficient. He would be given the necessary instruction to improve his service and he would be told that his performance would be watched very carefully and every aid possible afforded him to improve his service and make good. Every supervising officer who had contact with this employee would be notified to help him in every way possible, by individual instruction, furnishing literature or other information that would be of aid, and in fact exert every effort to make the man see that he must improve his service or become a failure. Every employee who raises his individual average under this treatment would tend gradually to raise the average for the entire class, so that eventually a much higher average could be attained.

This system of rating could be applied to practically all classes of railroad employees, particularly in the higher crafts, the only thing necessary being to choose the most important qualifications applying to each class of work. The same methods of handling men who fall below the average could be followed and the same results obtained.

This method also provides a basis for the selection of employees for promotion, which is a most important feature. With information available that would show the rating of every man in all classes of employment, it would only be necessary to review the record of about 10 men with the highest rating from the class in which the promotion was to be made, and give each of these 10 men special study to determine which one was best fitted for the new position. If this policy were adopted and followed religiously, all employees would soon come to know that their promotion depended entirely upon their individual qualifications and this fact alone would have a wonderful effect, improving the morale, creating more interest in the work, more loyalty, more initiative, and increased safety and efficiency, resulting in better service and greater safety for the public.

A Test to Determine the Cost of Pneumatic Tie Tamping

A TEST WAS RECENTLY CONDUCTED by the Delaware, Lackawanna & Western, in conjunction with the Ingersoll-Rand Company of New York, for the purpose of establishing some basic cost data on pneumatic tie tamping. The test was made on a stretch of main line track between Bonton, N. J., and Lincoln Park, the railroad furnishing the equipment and men to do the work. The plant consisted of an Ingersoll-Rand four tool compressor with hose and tampers. The work was done by a contractor who paid his men 55 cents an hour, but the data on the test have been compiled in such a way that the cost for any other rate of pay may be readily ascertained.

The Lackawanna required that only such time and other costs be charged as actually applied to the machine and its operation in the performance of its duty of tamping ties, and on that basis the following methods were used. For instance, the machine being a four-tool outfit, four men were used on the "guns" or tampers and their time was charged only when actually employed tamping. The foreman's time was charged only during the period that the machine was in actual operation, while the operator's time was charged for the full day whether or not the machine was in actual use.

This was done in view of the fact that it was deemed good policy to have the operator go over his machine carefully and thoroughly when not in operation.

The gang consisted of 40 to 50 men. However, only those actually working with the machine were charged to tamping. Such work as jacking up the track, cleaning the ballast, replacing ballast, putting in new ties equipped with tie plates and screw spikes, was conducted by the remainder of the gang. The ballast consisted of crushed stone of 2½-in. mesh, with 105-lb. rail laid on crossties with tie plates and screw spikes, all of the Lackawanna standard specifications.

The man compiling the data was in no way connected with the operation of the machine nor did he make any repairs and, with the exception of selecting a capable operator and instructing him originally in its operation, etc., he had nothing to do with the machine. The operator was not a mechanic and although he was fairly familiar with automobiles, he possessed no particular qualifications with reference to the machine or its operation. The men used on the tampers were all picked at random and were changed about every three or four days so that no specially trained men were used in connection with the operation of the machine or the tampers. In determining the number of ties and the lineal feet of track tamped, owing to the fact that the track was raised as high as 6 in. in many instances, run-offs were necessary and such ties as were tamped in the run-off as well as the lineal feet covered were counted in on the total for the day.

Throughout the duration of the entire test, which covered eight consecutive weeks, the tamping outfit was out of service 2½ hr., of which 1 hr. was due to the battery being exhausted and time consumed in waiting for a renewal, while the remaining 1½ hr. was due to dirt and water, making it necessary to remove and clean the carburetor and feed pipe. All the time so consumed was charged against the machine.

The summary of the results shows that for the eight weeks' run the average cost for tamping, including all items, was 11.3 cents per tie or 6.2 cents per lineal foot of track.

To determine a fair comparison or equation it is necessary to separate the average total cost into its component parts and to then reduce each part into its determining factors. These factors consist of a constant which, multiplied by the wage scale, will give the cost per tie for that particular item of the total cost. In reducing the total cost of \$1,155.92 for tamping 10,226 ties or 18,358 lineal feet of track, it will be found that this is made up as follows:

Items	Cost	Per cent	Cost per tie	Constant
Foreman	\$169.06	14.62	1.65	0.024 × wage
Operator	238.50	22.36	2.53	0.046 × wage
Labor	565.40	48.90	5.52	0.103 × wage
Gasoline	148.06	12.82	1.45	0.053 × price
Oil	9.38	0.81	0.10	.....
Grease	2.04	0.18	0.02	.....
Repairs	3.48	0.31	0.05	.....
Total	\$1,155.92	100.00	11.13 cents	.....

The constant as shown in the right-hand column consists of the figure which, multiplied by the wage scale of the man or men doing the work of tamping, will give the cost per tie for tamping by compressed air. For example, with a foreman receiving \$5.27 per day, or 66 cents per hr., with labor at 46.4 cents per hr. and gasoline at 27½ cents per gal. the proportionate cost per tie would be 0.024 times 66 or 1.58 cents; 0.046 times 46.4 or 2.12 cents; 0.103 times 46.4 or 4.78 cents, and 0.053 times 27.5 or 1.45 cents. This adds up to 9.93 cents to which should be added 0.15 cents for oil, grease and repairs, this cost remaining practically the same with the machine in good order. The result is a total cost of 10.08 cents per tie for tamping pneumatically or on a basis of 20 ties per rail length a cost of 6.11 cents per lineal foot. Other wage scales may be substituted in the manner outlined and the basic cost for any particular piece of work derived.

Standard Locomotives for the Argentine State Railways

THE NEW ARGENTINE RAILWAY ADMINISTRATION is exerting its greatest efforts towards the unifying of locomotive and rolling stock types and the standardization of its equipment, so that the efficiency of the state railways may be brought to the high level of the best operated railways in South America. With the addition of 25 Mikado type locomotives recently completed by the Baldwin Locomotive Works, the state railways will possess 125 freight locomotives, duplicate in all their parts.

The Argentine railways during the world war deferred the placing of even the most essential orders for additions to their motive power because of the difficulty of securing deliveries. Since the signing of the armistice, however, a number of contracts have been placed with American and British locomotive manufacturers and negotiations are under way with German locomotive builders. Previous to the war most of the locomotives and cars were supplied by British manufacturers. This was due mainly to the fact that most of the private railroad corporations are British owned and

erected in the Laguna Paiva shops of the company. Detailed specifications are listed below:

General Data:

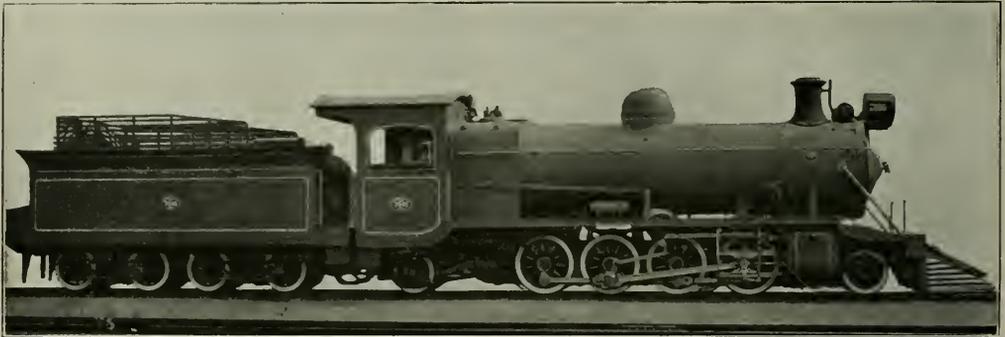
Gage	.....	1 meter.
Fuel	.....	Wood or coal.
Cylinders	.....	457 mm. by 560 mm.
Weight in working order	.....	59,550 kg.
Weight on drivers	.....	45,500 kg.
Weight on leading truck	.....	6,750 kg.
Weight on trailing truck	.....	7,300 kg.
Weight of engine and tender in working order	.....	97,550 kg.
Wheel base, driving	.....	3,600 mm.
Wheel base, total	.....	7,975 mm.
Wheel base, engine and tender	.....	14,625 mm.

Wheels:

Driving, diameter over tire	.....	1,067 mm.
Driving, thickness of tires	.....	80 mm.
Driving, journals, diameter and length	.....	184 mm. by 205 mm.
Engine truck wheels, diameter	.....	780 mm.
Engine truck journals, diameter and length	.....	127 mm. by 203 mm.
Trailing truck, wheels, diameter	.....	780 mm.
Trailing truck, journals, diameter and length	.....	127 mm. by 203 mm.

Boiler:

Style	.....	Straight top
Working pressure	.....	12.7 kg. per sq. cm.
Diameter	.....	1,500 mm.
Firebox, length and width	.....	1,806 mm. by 1,412 mm.
Tubes, number and outside diameter	.....	140—51 mm.
Flues, number and outside diameter	.....	21—137 mm.
Tubes and flues, length	.....	4,300 mm.
Heating surface, tubes and flues	.....	137.9 sq. m.
Heating surface, firebox	.....	10.2 sq. m.



One of the New Mikados on the Argentine State Railways

operated and also to the fact that a great number of the railway officers of the state railways have been taught railroading under British supervision and are accustomed to British equipment.

In order to assist the state railway engineers in standardizing their motive power, the Baldwin Locomotive Works guaranteed to construct these 25 locomotives to all of the railway requirements. The working drawings with dimension according to the metric system were completed in April, 1920—two months after the order for these engines was placed. To make the earliest delivery possible, the Baldwin company transported large quantities of materials by motor trucks, thus avoiding delay due to railway congestion and the steel strike which occurred at that time. The locomotives were completed between July 3 and September 15, 1920, and the first shipment made direct from the Eddystone Works to Santa Fe, Argentina.

These locomotives are of the most up-to-date type, and have open bar frames of cast steel. They are equipped with the Superheater Company's superheaters having an area of 40.6 square meters each and are provided with a modern automatic damper arrangement. Westinghouse air brakes are included in the equipment. Outside bearings are used on the trailing trucks, which are of the Hodges design.

These locomotives are also equipped with electric headlights operated by a turbo-generator set which supplies a current for electric lights at the steam, air and water gages in the cab. The last two of these engines are now being

Heating surface, total	.....	148.1 sq. m.
Superheating surface	.....	40.6 sq. m.
Grate area	.....	2.55 sq. m.

Tender:

Water capacity	.....	3,300 imp. gal.
Fuel capacity	.....	5.9 gross tons.



Photo by Ewing Gallowsy

The Southern's Station at Atlanta, Ga.

Railway Executives Summoned by Labor Board

Employees Expect to Prove Workability of National Agreements by Cross-Examining Witnesses

ON THE INSISTENT demand of Frank P. Walsh and B. M. Jewell, respectively counsel and spokesman for organized railroad labor, Robert S. Binkerd, assistant to the chairman of the Association of Railway Executives; General W. W. Atterbury, vice-president of the Pennsylvania, and chairman of the association's disbanded labor committee; Carl R. Gray, president of the Union Pacific, and a member of the labor committee before its abolishment, and Thomas DeWitt Cuyler, chairman of the association, have been summoned by the Railroad Labor Board to appear before it on March 18 as witnesses in the hearings on the demand of the employees for continuation of their national agreements.

In addition, the following, all members of either the old labor committee or the Conference Committee of Managers of the Association, have been notified to hold themselves in readiness for a similar call: Hale Holden, president of the Chicago, Burlington & Quincy; C. H. Markham, president of the Illinois Central; H. E. Byram, president of the Chicago, Milwaukee & St. Paul; W. G. Besler, president of the Central Railroad of New Jersey; E. E. Loomis, president of the Lehigh Valley; J. H. Young, president of the Norfolk & Southern; J. H. Hustis, president of the Boston & Maine; N. D. Maher, president of the Norfolk & Southern; W. R. Scott, president of the Southern Pacific, Texas and Louisiana Lines; J. W. Higgins, executive secretary of the Association of Western Railways; C. P. Neill, manager of the Bureau of Information of Southeastern Railways; A. W. Trenholm, vice-president of the Chicago, St. Paul, Minneapolis & Omaha, and J. G. Walber, secretary of the Bureau of Information of Eastern Railways.

Mr. Binkerd has been requested to bring with him the minutes, letters, recommendations and other records having to do with the proceedings of the association and its labor committee with reference to the dispute now before the Board.

These developments were brought about by the adoption of resolutions by the board on March 14 after Mr. Walsh and Mr. Jewell had maneuvered for additional delay and again declined to meet the issue, namely, the justice and reasonableness of the national agreement now in effect. The board's order, however, states specifically that these witnesses are called "to give testimony on the reasonableness or unreasonableness of the so-called national agreements."

After a delay of two weeks, granted by the Board to Mr. Jewell to prepare his rebuttal statement to the presentation which had already been made on behalf of the carriers, Mr. Walsh and Mr. Jewell appeared before the board on March 14, stating in substance that "it will be impossible for us to proceed with the presentation of our case until the witnesses we have called for have been subpoenaed and have presented themselves for examination." Mr. Walsh specifically requested that Mr. Binkerd be subpoenaed first to present the minutes of the meetings of the labor committee of the association. Following the presentation of this material, Mr. Walsh said General Atterbury and Mr. Cuyler would be cross-examined by the representatives of the employees in the order named. Then, Mr. Walsh stated, the other members of the labor committee will be called to the stand, followed by the financiers, as requested in their original subpoena demand, which has been reported in the *Railway Age* of February 11 (page 367).

During the course of Mr. Walsh's opening remarks it developed that in reply to the employees' request for subpoenas, the Board, before taking action, had requested them to state what

they expected to prove from the testimony of these witnesses. In reply to this Mr. Walsh stated that the employees expected to establish:

(1) What led to the carriers' decision to have national agreements abrogated; (2) why the carriers have refused to meet representatives of the employees on this subject; (3) whether the executives are fundamentally interested in doing away with the waste and extravagance chargeable to the national agreement; and (4), whether these executives really believe that national agreements are unworkable, unjust and unreasonable.

The absence of the executives from the hearing on March 14 indicated, Mr. Walsh charged, that the carriers were not acting in good faith in this case, inasmuch as the expressed desire of the employees to question these men had been widely circulated.

At the suggestion of Henry T. Hunt, acting chairman in Judge R. M. Barton's absence, the board then adjourned to consider the employees' request. Mr. Hunt's remarks indicated that many members of the Board were heartily opposed to bringing these witnesses before the Board. However, a portion of Mr. Walsh's remarks also indicated that he was aware of this feeling. In requesting again the subpoenaing of the men, he addressed his remarks first to the Board as a whole, then to "any group or to any individual on the board which recognizes our fundamental rights." The provisions of the Transportation Act give the Board, as a whole or each individual thereon, full power to subpoena any witnesses which the board or the individual deem necessary to complete the evidence in any case.

In addressing the Board on March 14, Mr. Walsh said in part:

"My clients are in no sense responsible for the delays in these proceedings, nor will they remain silent under any such imputation. We have been ready from the outset to go forward in an orderly way to a speedy determination of the issues involved in this controversy, and we submit that the whole matter could have been disposed of weeks if not months ago, if we had been granted the conferences which we asked of the railroad executives, or if this board had taken steps to bring about such conferences.

"The delay has been both disturbing and costly to the general public. It has contributed largely to the uneasiness and uncertainty in all business and in all industry which have prevented that return to normal activity and productivity in which we are all so vitally concerned. It has recruited thousands upon thousands to the army of the unemployed. I, for one, am apprehensive of the economic and political consequences that may ensue when we have a horde of hungry men, women and children in this country."

Referring to the present controversy over wages and hours of work in the packing industry, Mr. Walsh said:

"It means that the packers are backing up the railroad owners and the Morgans and the Gays of the steel industry in a concerted drive to break down all labor organizations and to turn back the clock that has registered all the progress that has been made in the relations between those who work and those who employ them. We are not deceived as to what is transpiring. When it comes to consider wage schedules, the railroad owners will argue that wages of railroad workers should be reduced because the wages of the packing house employees have been lowered and their hours of labor increased. And whatever tribunal is interposed

between the parties to the controversy in the packing industry will be told by the packers that wages in that industry must be reduced because wages of railway workers are about to be reduced. Then, in the next great struggle over the shorter workday they hope to be able to say that the eight-hour day is a failure and to offer as proof of that a return to longer hours in the packing industry.

"That is the vicious circle of which labor complains. That is the way the plan has been set up, and that is the way it will be played through by the financial interests unless they are restrained."

Shippers Demand Part in National

Agreements Controversy

As a representative of the public which pays railway expenses, the National Industrial Traffic League, on March 15, filed a petition of intervention in the case involving national agreements. It charged that many freight rates are now so high that they are destroying business; and that the high rates are chiefly due to excessive pay rolls. It maintained that the Board was created to represent the public as well as the railways and their employees, and that therefore the public has a right to be heard. The Illinois Manufacturers' Association and other state organizations of manufacturers joined with the National Industrial Traffic League in its petition.

After showing that the League is composed of industrial and commercial organizations and representative shipping concerns throughout the United States which pay many millions of dollars in freight, the petition of the League said in part:

"Many of our members find that the increased freight rates are prohibitive and are destroying the business of those who produce and deal in such commodities. It is not possible to increase revenues of the carriers by horizontal increases in freight and passenger rates, as further increases will restrict the volume of business and thus reduce instead of increase the aggregate revenues of the carriers. Therefore, we allege that in order to give the carriers the return provided for in the Transportation Act, there must be a curtailment of operating expenses. We allege that a very substantial part of the necessary reduction in operating expenses may be brought about by the establishment of reasonable rules and working conditions without change in rates of pay, as the present rules and working conditions are unjust and wasteful. The failure to establish just and reasonable rules and working conditions adds to the operating expenses of the carriers which must be paid by our members and others similarly situated."

In defining the reasons for this stand, the League's petition pointed out the increases in the number of men employed and in the pay roll of the classes of employees which now operate under National Agreements, adding, "We believe that these large increases in the number of employees and wages result in large part from the establishment of so-called national agreements and the rules and working conditions now in effect."

The petition also calls upon the Board to request the Interstate Commerce Commission to transmit data pertinent to the determination of whether the present rules and working conditions are just and reasonable, and what would constitute just and reasonable working conditions. The factors on which data could be obtained in this matter, the petition points out, includes

(a) The efficiency with which labor is now being performed on the various railways,

(b) The effect of present rules and working conditions upon the efficiency of labor.

(c) The number of employees and the amount paid by the carriers to such employees by classes for the years 1914 to 1920 inclusive.

(d) The effect of increases in freight rates effective August 26, 1920, upon the volume of freight.

(e) The possibility of increasing revenues of the carriers by further increases in freight and passenger rates.

(f) Facts showing, or tending to show, whether the present rules and working conditions of the various crafts are just and reasonable.

(g) The probable operating expenses and revenues of the carriers for the calendar year 1921.

To the seven relevant factors, outlined in the Transportation Act as a basis upon which the Board should determine the justness and reasonableness of wages, rules and working conditions, the League asks that, in addition, the Board "consider as a 'relevant' factor the ability of the railroad company to pay wages and to maintain rules and working conditions."

"Whatever rules and working conditions," the petition added, "are prescribed by this Board for the various classes of employees affected thereby will materially affect rules and working conditions of similar classes of labor in various industries other than transportation. Therefore, we are vitally interested in having just and reasonable rules and working conditions established on the railroads."

In closing its petition, the League said: "Farmers, manufacturers, merchants and dealers and practically all other industries are now suffering from lessened volume of business and excessive cost of operation, the cost of transportation being not the least important. The highly inflated cost of material, capital and labor existing during the war time period must be brought to reasonable levels at as early a moment as is possible."

When the official report of the Board's proceedings on March 15, at which time Luther M. Walter presented an intervening petition of the National Industrial Traffic League, was completed this portion of the hearing was censored by order of the Board. There is grave doubt, therefore, that the Board will permit presentation of further evidence by a body representing the shipping public. However, this will be decided later by the board in executive session.

Labor Board Again Enters A. B. & A. Controversy

In the opinion of the Board the Atlanta, Birmingham & Atlantic is still within its jurisdiction even though it is in the receiver's hands and the wages of its employees have been reduced by a federal court order. It has accordingly set March 21 as the date for a hearing to determine whether or not either the carrier or its employees have violated the Board's award of last July. The progress of this controversy has been reported in previous issues of the *Railway Age* from the time the carrier issued notice to its employees that their wages would be reduced below the rates fixed by Decision No. 2 to the time that the employees walked out after the federal court had reduced their wages to the rates asked of and denied by the Labor Board.

The Board in calling representatives of both the carrier and its employees to the hearing on March 21, said in part:

"This Board has reason to believe that Decision No. 2 has been violated by the receiver of the Atlanta, Birmingham & Atlantic and by its employees in the following respect, to wit, by the receiver: (1) that effective March 1, 1921, the receiver reduced the wages of track men and other common or unskilled labor determined to be just and reasonable by Decision No. 2, to such wages as may be made necessary by the conditions prevailing in the various communities of the carrier in which it is necessary to employ such common or unskilled labor; (2) by reducing the wages found to be just and reasonable as to other classes of employees to the wages and salaries prevailing on December 31, 1917, plus one-half the increases effective since December 31, 1917; and by the employees in authorizing and directing the cessation of work in concert by the membership of the organiza-

tions involved, on or about March 1, 1921, without reference to this Board of the dispute."

In issuing this order the Board referred in two places to "the legal duty" of the carrier to pay the wages fixed in Decision No. 2 and of the employees to exert every reasonable effort to avoid any interruption to the operation of this carrier. This is the first use of terms of this character by the Board and is taken by many to indicate that the Board intends to establish its legal status by means of this case.

Reports from the territory served by the Atlanta, Birmingham & Atlantic indicate that service on that line is gradually being restored with the aid of new employees.

The presentation of rebuttal statements on behalf of the employees continued during the past week. The first part of these presentations was outlined in the *Railway Age* of March 4 (page 519), and of March 11 (page 550), and they were concluded on March 11.

D. W. Helt Defends Signalmen's Agreement

D. W. Helt, grand president of the Brotherhood of Railroad Signalmen of America, based his arguments in support of the signalmen's national agreement on the responsibility of the signalmen and the absolute necessity, from the point of view of safety of the traveling public, of maintaining this national agreement which he claimed has greatly increased the signalmen's morale. The signalmen's agreement, he said, has made it possible to operate the railroads without serious interruption to traffic through critical periods and it has actually saved the railroads millions of dollars inasmuch as the signalmen have been willing, under it, to accept wages which they felt were below those paid in other and less important industries.

To support the contention that the employees' morale had been increased Mr. Helt cited the fact that they are demanding that the Brotherhood aid them in educating themselves in signal work because "the national agreement has given our men this sense of security; they now feel there is some incentive to increase their skill and efficiency." Regarding Mr. Whiter's contention that the national agreements result in inefficiency, Mr. Helt cited voluminous statistics to show that the percentage of signal failures on various carriers have decreased since the national agreement was placed in effect. He further attempted to prove this point by citing the increases in the efficiency of operation which took place the first six months after federal control. These increases in operating efficiency he maintained were due largely to the increased efficiency of the signalmen.

Regarding the continuation of this efficiency, Mr. Helt said: "The managements, in recently making such drastic reductions of signal forces have sown the seeds of a dangerous decrease in efficiency. In a few months, even in a few weeks possibly, the railroads will be able to show an inefficiency of signals due solely to the drastic reduction in the number of signalmen employed but in no wise due to a drop in efficiency of individual signalmen. Signal forces today are reduced far below the number required to insure proper safety."

Mr. Helt took up the various paragraphs of Mr. Whiter's presentation, basing his rebuttal statement contending that similar rules have been in effect on certain carriers prior to the formation of the national agreement, that these rules were brought about by sharp and evasive practices by the carriers and that their effect is the protection of the workers and bolstering up their morale.

Regarding Mr. Whiter's objection to paying men for work not performed, Mr. Helt said, "It is a function of efficient and economical management to so arrange the work of the employees that they can get their work done without being on duty for an excessive amount of time when they are not doing actual work."

In summarizing his presentation, Mr. Helt outlined the

development of signaling and the increasing intricateness of the apparatus which the signal men are called upon to maintain. He said in part, "The signalmen's national agreement in its salient features must be retained for the safety of the traveling public and the welfare of the railroads as well as the employees. Without the signalmen's agreement, the present railroad problem would not be decreased, but would be tremendously added to."

Maintenance of Way Union

Revives "Conspiracy" Charges

J. C. Smock, grand vice-president of the United Brotherhood of Maintenance of Way Employees and Railway Shop Laborers, devoted the first part of his testimony in support of the maintenance of way agreement to a capital-labor harangue. He contended that in their stand for reasonable working conditions and a living wage, they have to contend not only against the railway managements, but against organized capital. Evidence, he said, that there is a concerted movement on foot in this country on the part of organized capital and employers is found in the clamor that is being made before Congress for amendment to the immigration laws. Furthermore, he charged that thousands of Mexicans, in direct violation of law, have been brought into United States within the past year and placed in direct competition with former employees of the railroads. This has been done, he said, for the purpose of lowering the level of the railway employees to the standard that exists in the country from which they came.

In support of a national agreement, he stated, "an agreement applicable to all railroads establishing a uniform working condition will have a tendency to encourage the employees to become steady workers, thus being an agency in preventing the fluctuation of labor, which is authoritatively considered to be a waste of energy and a genuine loss to the country as a whole."

Regarding Mr. Whiter's statement that representatives of the individual railroad companies are willing to negotiate agreements individually with their employees, Mr. Smock cited instances dating back as far as 1902 to show that the railroad companies have refused to meet the men in conference to arrange schedules of working conditions. The majority of the instances cited took place prior to 1915.

Following this Mr. Smock took up the seven specific objections to the proposed maintenance of way agreement, flatly denying in the majority of cases Mr. Whiter's statements.

Mr. Smock's specific objections to Mr. Whiter's presentation followed in general the objections which have been rendered by the other organizations, namely, that they serve as a protection to the worker thus creating contentment and efficiency, and that without them the carriers would begin indulging again in alleged sharp and evasive practices.

The rebuttal testimony which has been given so far has been more in support of the carriers' contentions than it has been in support of the employees' demands. The fact that this hearing is over the question of national agreements, and that the carriers have definitely stated that they do not oppose agreements between the individual road and its own employees has been largely ignored in the testimony on behalf of these organizations. The major part of the presentations made since March 1 outline the necessity for having agreements as to working conditions, the protection they afford to the workers, their beneficial results in as far as the worker's frame of mind is concerned, etc., but comparatively little has been said to justify making these agreements national in character. It is true that several of the organizations have touched on this point in their summaries, the clerks, for instance, stating that clerical work was the same on all railroads, several of the others stating that the formation of national rules would prevent excessive labor turnover, but

in general, that they have ignored the basis of Mr. Whiter's testimony, i. e., that the national application of rules which do not take into consideration varying local conditions results only in inefficiency and waste.

The presentation on behalf of the International Association of Railroad Supervisors of Mechanics was made by W. V. O'Neil, president. This presentation followed, in general, the preceding presentations.

Mr. O'Neil was followed on the stand by Timothy Healy, president of the International Brotherhood of Stationary Firemen and Oilers, who cited as evidence in support of that organization's demand for continuation of their national agreement many schedules and agreements now in existence between members of the Brotherhood in other industries and their employers. Practically all of these agreements, however, are local either to a district or city. This evidence, Mr. Healy said, proves the "workability" of national agreements.

E. J. Manion, president of the Order of Railroad Telegraphers, in making a rebuttal statement for that organization contended that its only request of the Board was a ruling on time and one-half for Sunday and holiday work. Mr. Whiter, he said, has offered no direct testimony on this matter. His presentation took practically two days and relied in detail to Mr. Whiter's testimony, however, little new material was injected into record.

In response to the suggestion of the Board that those carriers which feel that they are not parties to the present hearings on the national agreements present their reasons therefor several smaller Class I roads have appeared before the Board seeking a release. B. A. Worthington, president of the Cincinnati, Indianapolis and Western, was the first to appear, stating that his carrier wished to withdraw because it did not want to be obligated if an adverse decision is rendered and that it could negotiate its own agreement.

H. T. Brady, Jr., general counsel of the Mississippi Central, likewise held that his road was not properly before the Board because no conferences on subject of working conditions have been held and no dispute has therefore arisen. R. E. Faulkner, general manager of the Mississippi Central, also presented similar testimony. Ben L. Cain, assistant to the president of the American Short Line Railroad Association, testifying on behalf of the Abilene & Southern, the Georgia, Florida & Alabama, the Nevada Northern and the San Diego & Arizona, presented similar arguments on behalf of these carriers.

A Correction

In describing the progress of the controversy between the Missouri & North Arkansas and its employees in the *Railway Age* of March 11 (page 349), C. A. Phelan, general manager was quoted as saying that that carrier would hereafter be operated as an "open shop" road. This statement has since been denied by Mr. Phelan.

Report on Piedmont Collision

THE INTERSTATE COMMERCE COMMISSION has issued a report, dated January 15, 1921, and signed by W. P. Borland, chief of the Bureau of Safety, of its investigation of the disastrous collision on the Chicago, Milwaukee & St. Paul at Piedmont, Mont., on September 30, 1920, when one employee and seven trespassers were killed and one employee and two trespassers were injured. The employee was Engineman Mutz, who was off duty and who had tried to move the standing train in order to avert the collision. Who the trespassers were or how they happened to be killed, is not explained.

This collision was briefly reported in the *Railway Age* of October 8, 1920, page 623, and October 13, page 669.

The collision occurred a few minutes after midnight. East-bound freight Extra 10215, consisting of 50 cars and two electric motors, No. 10215 at the head and No. 10209 about the middle of the train, was standing at or near Piedmont station. Information had just been given by the operator that a runaway was approaching, and efforts were being made to clear the main track, but these were not successful. The collision was the result of 55 cars breaking away from west-bound extra No. 10203 at Vendome, about five miles west of Piedmont. These cars had run from Vendome at high speed, uncontrolled, the grade, descending, being nearly or quite two per cent for more than half the way.

The westbound train (10203) consisted of 96 cars with a helper motor, No. 10227, in the train behind the 34th car, the custom on this grade being to put helping engines at or near the middle of the train. While on the siding at Vendome a coupler was pulled out of the eighth car behind this helper and, very soon after, the 55 cars and caboose ran back down the mountain. Two cabooses and 42 cars were wrecked and a portion of the wreckage was destroyed by fire. The rear brakeman of 10203, who had been ordered to set 10 or 12 hand brakes, was injured in the accident and could not be questioned; but it appears that he had released some of the brakes to facilitate backing the train a short distance to clear the main track for an eastbound passenger train. However, the air brakes appear to have been in such poor condition that it was estimated that the air would not hold the cars more than 15 minutes. The evidence is not very definite and the only conclusion of the report as to cause is that the accident "is believed to have been caused by inoperative or inefficient brake equipment on extra 10203." The conductor and engineman of this train had both been habitually neglectful of rules requiring careful inspection of air brakes, and officers of the division are said to have been lax in their supervision; some of them stated that they did not consider the observance of the strict rules for mountain grades to be necessary at Piedmont, where the brakes of this train ought to have been examined with special care.

Following the investigation, inspectors of the commission arranged to ride on a westbound freight train on the night of October 9. This train, with 100 empty cars was to leave Three Forks, 35 miles east of Piedmont, at 11 p. m. The making up of the train took about two hours and then the air brake inspection took nearly five hours more, and the train did not get away until 5:57 a. m. The first brake-pipe reduction disclosed two cars with short piston travel, three with excessive piston travel, two with air brakes cut out and 18 on which the brakes did not apply. Eleven cars were then set out, but a second test disclosed further defects, and a third one still others. Going up the grade tests were made at ten-minute intervals for the first 55 miles and showed brake-pipe pressure about 9 lb. higher on the motor than on the caboose.

Later and after a helping motor was cut in behind the 35th car and the governor on the motor was set at 80 lb. the other pressures were increased to about 70 lb. Inquiries made by the inspectors showed that air brake rules had been much neglected. The use of cards on cars to indicate that air brakes were cut out, required by the rule, had been habitually neglected. One conductor said that the only time that he had known of a train being delayed on account of an air brake test was when some government inspectors were present. In conclusion the report says:

"It is a matter of surprise that such dangerous practices should have been allowed to continue until finally they resulted in the occurrence of a disastrous accident, causing the loss of many lives. The responsible operating officials of this railway should take prompt and efficient measures to improve air-brake conditions on this line and to insure the strict enforcement of their rules. * * *"

Progress Report on the Superpower Survey

Cost of Electrifying Railroads Within the Zone Estimated at \$40,000 Per Mile

WASHINGTON, D. C.

ONE-THIRD OF THE MILEAGE of Class I railroads in the Boston-Washington industrial region apparently can be economically electrified, at a cost of approximately \$800,000,000, which with salvage would be reduced to \$650,000,000, effecting a saving equal to approximately 14 per cent on the investment, says a progress report on the work of the Superpower Survey just submitted to the President by John Barton Payne, Secretary of the Interior.

The Congress, in appropriating for the Geological Survey, June 5, 1920, provided for the survey of power production and distribution in the United States, including the study of methods for the further utilization of water power and the special investigation of the possible economy of fuel, labor, and materials resulting from the use in the Boston-Washington industrial region of a comprehensive system for the generation and distribution of electricity to transportation lines and industries.

An organization was effected under the Geological Survey with offices for the engineering staff in New York City. The engineering staff includes: William S. Murray as chairman; Nathan C. Grover, the chief hydraulic engineer of the United States Geological Survey; Ozni P. Hood, chief mechanical engineer of the Bureau of Mines; Lorin E. Inlay, division engineer for the subjects of power and transmission; Henry W. Butler, division engineer for industries, and Cary T. Hutchinson, division engineer for railroads, with Henry Flood, Jr., engineer-secretary. The engineering staff has been aided by the hearty co-operation of an advisory board of business and professional men, who accepted appointments for this special service. Of this board Prof. Lester P. Breckenridge of Yale is chairman, and the various interests connected with this investigation are represented as follows: Magnus W. Alexander of Boston, representing the National Industrial Conference Board; Edward G. Buckland, vice-president, New York, New Haven & Hartford Railroad; Charles L. Edgar, of the Boston Edison Company, representing the National Electric Light Association; Abraham T. Hardin, vice-president, New York Central Railroad; Herbert Hoover, representing the mining industry; William Kelley, lieutenant colonel, U. S. A.; Elisha Lee, vice-president, Pennsylvania Railroad; Dr. Arthur D. Little of Boston, representing the electro-chemical and by-products industries; James H. McGraw, president, McGraw-Hill Company, Incorporated, representing the technical press; John H. Pardee, of New York, representing the American Electric Railway Association; Henry Cleveland Perkins of Washington, representing the mining industry; and Matthew S. Sloan, of the Brooklyn Edison Company, representing the National Electric Light Association.

The progress thus far made, Secretary Payne says, warrants the belief that the report will be completed by June 30, 1921.

Having in mind the object of the Superpower Survey, viz.: (1) allocation and amount of waste in labor, coal, and other materials, due to the improper form of power generation and distribution within the Boston-Washington zone, and (2) recommendations regarding a regional power system by means of which these wastes may be eliminated, the report naturally divides itself into three divisions: (1) Physical, (2) Legal, and (3) Financial.

With regard to the physical aspect, the investigation has been concerned with the power necessary to (a) railroads, (b) industries, (c) utilities, and (d) a system of centralized

electric generation and transmission to supply their power requirements up to and including 1930.

Railroad Electrification

Regarding railroad electrification, the report says:

We find that there are 20 Class I railways included in the Superpower zone. These are divided as follows:

First track 14,500 miles.

Second track 6,500 miles.

Total trackage (including yards and sidings) 36,000 miles.

There are a total of 10,000 steam locomotives, of which 44 per cent are freight, 29 per cent passenger, and 27 per cent switching.

The total annual railroad coal consumption for 1919 was 19 million tons.

Apparently one-third of this mileage can be economically electrified, including the greater part of double track mileage. Due to lack of traffic density upon the branch lines these can not be profitably electrified.

The above 33 per cent of mileage will carry more than 50 per cent of the traffic and by preferential arrangement of routes probably 60 per cent of the total traffic could be put over this mileage.

Through the electrification of the above mileage a fuel saving of 6,000,000 tons, or \$40,000,000 per annum would be effected. Added to this saving will be \$50,000,000 annually as a difference in favor of electric versus steam engine repairs and maintenance.

The total unit cost of electrification will be approximately \$40,000 per mile of main line track, which with 12,600 miles to be electrified would cost \$500,000,000. In addition, yard and siding trackage would call for \$300,000,000 or a total of \$800,000,000. This sum will cover the necessary construction and equipment for the railroads beginning with the electric substations and with the driving wheel of their electric motive power.

The electrification above outlined will displace approximately 7,000 steam locomotives, which at salvage value of \$22,500 each will credit the electrification estimate with approximately \$150,000,000, leaving a net investment of \$650,000,000, which taken in connection with the afore-mentioned savings of \$90,000,000 per annum would return approximately 14 per cent on the investment.

Regarding other phases of the subject, the report says, in part:

There are approximately 50,000 industrial plants in the zone which either purchase or generate power. The Bureau of the Census is at present compiling the statistics of the 1919 Census of Manufacturers. As soon as the tabulations are completed by the Bureau of the Census, we, in conjunction with experts in the various industries, will analyze and ascertain what possible fuel savings could have been made by the Superpower System in 1919. From the data at hand, a saving of between six and eight millions of tons of coal is indicated. In the anthracite coal mines of Pennsylvania, by means of electrification and the supply of superpower, a conservative estimate based on actual tests shows a saving of 6,500,000 gross tons of anthracite. We are at present preparing estimates on the cost of completely electrifying the anthracite mines.

The data required of the Industrial Division will be ready by May 1, for assembly in its final form.

A large saving of coal can be effected through the more efficient generation of power by the new superpower stations. We find that the average rate of coal consumption for present central station output is 234 pounds per kilowatt-hour. Power can be produced in the superpower system at an average rate of 134 pounds per kilowatt-hour. The present central station output of coal-generated power within the zone is 8,000,000 kilowatt-hours. Therefore, 1 pound saved per kilowatt-hour will conserve 4,000,000 tons of coal annually.

The location of the large superpower stations and their attendant transmission lines is related to the establishment of load centers throughout the superpower zone to which power will be transmitted from them at minimum distance. To date it is indicated that some 20 load centers will be established. By March 1, sufficient data will be at hand to establish these load centers, after which the location of new superpower stations and their interlinking transmission systems can be promptly determined.

The development of power outside of but for transmission

to the zone is being most carefully considered having relation to the St. Lawrence River, other hydroelectric powers and the bituminous coal mines.

A conference with the coal authorities indicates that a fair figure to take for the average price of coal during the period 1919, was \$2.90 per ton at the mine, and that during the period from that date to 1930, \$3.50 per ton.

With regard to water power for the zone, a summation of the possible outputs from the Potomac, Susquehanna, Delaware, St. Lawrence (American rights), Raquette and the Adirondack powers indicate that for an average year there will be available 12,000,000 kilowatt-hours, and for a minimum year 8,360,000,000 kilowatt-hours; the plant capacity being 2,300,000 kilowatts to furnish this amount of energy. It is of interest at this point to state that in 1930, the total power requirement in the superpower zone indicated by projected growth curves will be 48,000,000,000 kilowatt-hours, of which amount the superpower system could supply 36,000,000,000 kilowatt-hours. This, therefore, indicates that the water power supply can be but from 20 to 25 per cent of the total.

I am pleased to be able to say that through the unusual co-operation of the public utilities, the railways, and the industries, the completion of the work will be, after May 1, substantially a matter of computation and tabulation.

Concerning legislative and financial status, the following paragraphs represent the general expression of opinion at the Washington meeting of the advisory board February 18.

Needed Legislation

Legislation should take the form of an act permitting the formation of a corporation authorized to take by eminent domain lands or interests therein necessary or appropriate to the construction, maintenance and operation of lines for the transmission of electric energy. Such legislation may be by a separate act or by an amendment to the Federal Power Commission Law.

As a condition precedent to the formation of such a corporation the proposed incorporators should be required to apply to the Federal Power Commission for a certificate that the project is desirable and is justified in the public interest. This application should be followed by a hearing after due notice to the governors of the states through which condemnation rights are asked. If the certificate is granted the incorporators should be permitted to form a corporation with the usual powers and in addition thereto (subject to the approval of the utility commission of the state where the power is to be exercised), the right to construct, maintain and operate power plants and transmission lines, the right to purchase electrical energy from and sell it to electrical power producing and distributing companies. All of these rights should be subject to the exercise by each state of its full police and taxing power.

Financing

The plan of financing which has been suggested is based on the supposition that the superpower system is in its very nature an extension of present power supply systems, whereby, combining several large plants with present relatively small plants, economy in generation and conservation of natural resources can be secured over that at present attained. Therefore, the vested rights of existing public utility power generating and distributing companies should be protected.

Dependence must be placed on the incentive of private initiative to lower costs and on some form of public regulation of prices to the consumer. The power generated and distributed by the superpower system will finally be distributed to the public by means of existing companies and the economies to the public utility companies which will result must ultimately be reflected in prices to the consumer through the action of present state regulating bodies.

The financial plan in bare outline provides for a superpower company with non-par stock as its only class of security. The public utilities within the Boston-Washington zone to be entitled to subscribe for this stock pro rata, based upon capacity demand and load factor. Stock not taken by these customers of the superpower system to be offered to public subscription.

A contract between the superpower company and a local public service company would be a selling contract or a buying contract, while in many cases both buying and selling of current would be involved. These contracts on which the state regulatory bodies would pass to be adjusted from time to time to meet the progress of the art and changing conditions, whether favorable or unfavorable to costs of operation.

Returns upon the stock of the superpower company should be limited by specific provision to a fair division of the benefits derived from its operation between the investing public and the consumers that will make it possible for the superpower company to come into existence, and at the same time be able to serve

the public adequately. New capital is the keystone of the project, but the public demand is its foundation. This division of benefits would be attained by a rule under which the customer companies shall participate equally with the stockholders in any distribution at stated intervals, of net earnings in excess of a specified rate of return, which itself should be more liberal than is commonly contained in the idea of public regulation. Thus efficiency in management would be rewarded and the public interest directly served. To secure the participation of the ultimate consumer in this division of benefits, provision should be made that the superpower stock held by any public service company be regarded as representing an extension to its existing station capacity rather than an outside investment security.

Absolute publicity of the superpower company's operations will be an essential condition. Freedom of action should, however, be also sought for this company in order to promote the free flow of capital to this enterprise whose requirements will be large and continually increasing.

The prime object of the superpower plan is a larger supply of cheaper power. The superpower survey looks to the full utilization of all resources and conservation of the country's fuel can not be attained except with the aid of large capital investment. Neither the nation, by coal conservation, nor the individual consumer, by lower rates, can profit by the project, however sound in its engineering and economic phases, unless the conditions of financing are sufficiently attractive to warrant the use of the country's financial resources.

Employees and Their Compensation Under New Wage Scales

WASHINGTON, D. C.

THE FIRST OFFICIAL STATISTICS showing the effect of the wage award of the Railroad Labor Board of July 20, 1920, on the compensation of railway employees have just been issued by the Interstate Commerce Commission in its quarterly report on employees, service and compensation for the three months ending September 30, 1920, which does not include any back pay retroactively attributable to the months of May and June. The report shows an average number of employees for the quarter of 2,157,989, as compared with 2,004,760 for the second quarter of 1920 and 1,993,524 for the first quarter. The average for July was 2,111,280, for August 2,187,824 and for September 2,164,880. The total compensation for the quarter was \$1,052,109,451, as compared with \$801,063,938 for the second quarter and \$795,616,330 for the first quarter. The increase in the third quarter over the second quarter is about 31 per cent, but there was an increase in the number of employees. As the operating revenues for the third quarter of 1920 were \$1,699,000,000 the payroll represents 61.9 per cent of the revenues. The operating expenses as reported for the same quarter were \$1,691,000,000, of which the payroll represents 62.2 per cent, but the expenses as reported included a considerable amount of back wages. The report gives the total compensation for each class of employees, the compensation per day or hour and the average number of days or hours.

THE TRANSPORTATION CLUB of Flint, Mich., has adopted resolutions declaring that, whereas "the betterment of transportation services requiring purchase of needed equipment and additional facilities, is an important necessity in speeding economic readjustments; and whereas, the present schedule of rates as prescribed in EX Parte 74 is not producing for the railroads the financial returns contemplated by the act of 1920, thus proving that high rates are of no value unless traffic moves under them; and whereas, the railroads in southern Michigan by reason of excessive rates on sand, gravel, and other road building material, are depriving themselves of millions of dollars in revenue and the respective communities of very badly needed improved highways; be it resolved that the Michigan railroads be urged to give serious consideration to voluntary rate reductions on these commodities in line with the thoughts recently expressed by the Interstate Commerce Commission."

The Lamont Six-Wheel Truck for Freight Cars

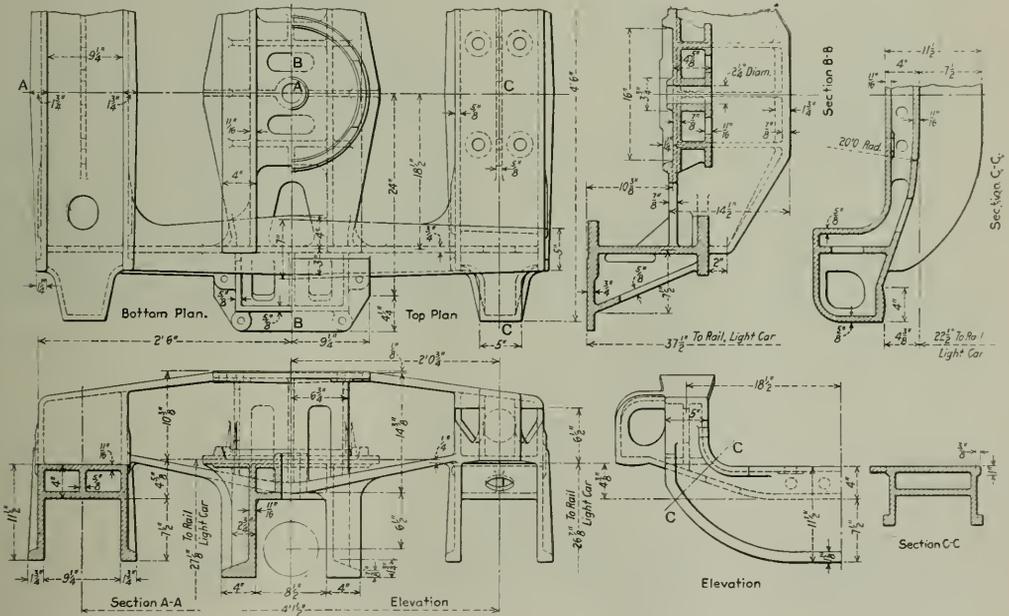
Side Frames Are Continuous Over Three Journals—New Design of Equalizing System Used

A NUMBER OF designs of equalizing six-wheel trucks have been developed for freight cars varying in capacity from 90 tons to 120 tons. The Lamont truck, the most recently developed of this type, has been brought out by the American Steel Foundries, Chicago, and has received its first installation under several of the new 120-ton coal cars built for the Virginian.

This truck differs from other six-wheel trucks for freight cars in bolster construction, the method of equalizing and the arrangement of the springs. The feature of the bolster design is its three-part construction, which provides for

the center of the cross bolster and nominally take one-quarter of the center plate load at each end. The bearing surfaces of these end portions of the equalizing bolster are curved to a radius of 20 ft. This permits a rocking movement of the equalizing bolster on the cross bolsters, and also provides for a limited amount of upward or downward movement of the ends of the cross bolsters as the wheels pass over inequalities in the surface of the track.

Under average track conditions this insures an equal distribution of the center plate load over the four points of delivery to the equalizing system. When a combination of



Details of the Equalizing Bolster

cross equalization of the load distribution to the four points of delivery to the longitudinal equalizing mechanism. The equalizing mechanism permits a symmetrical location of the bolster ends between the wheels, thus making possible a short wheel base and a simple arrangement of the brake rigging. The springs are placed directly over the journal boxes and coil springs are used throughout.

The bolster consists of three parts: two cross bolsters and one equalizing bolster. The ends of the cross bolsters rest on the equalizing levers, and the equalizing bolster, which carries the center plate and truck side bearings, bears at the center of the cross bolsters with a clearance of $\frac{1}{4}$ in. at the side bearings when the car is riding level. The construction of the equalizing bolster is shown in one of the drawings, from which it will be seen that the center plate load is delivered to the side members of the equalizing bolster and through these to end portions which, taken separately, are inverted U-shaped bolsters designed to bear at

vertical movement of the end of a cross bolster and side motion of the car brings a side bearing of the equalizing bolster and cross bolster together, the additional load at this point is distributed through the equalizers on that side of the truck and, if the end of the other cross bolster is free, it may be partially carried back across the truck to the other equalizing system.

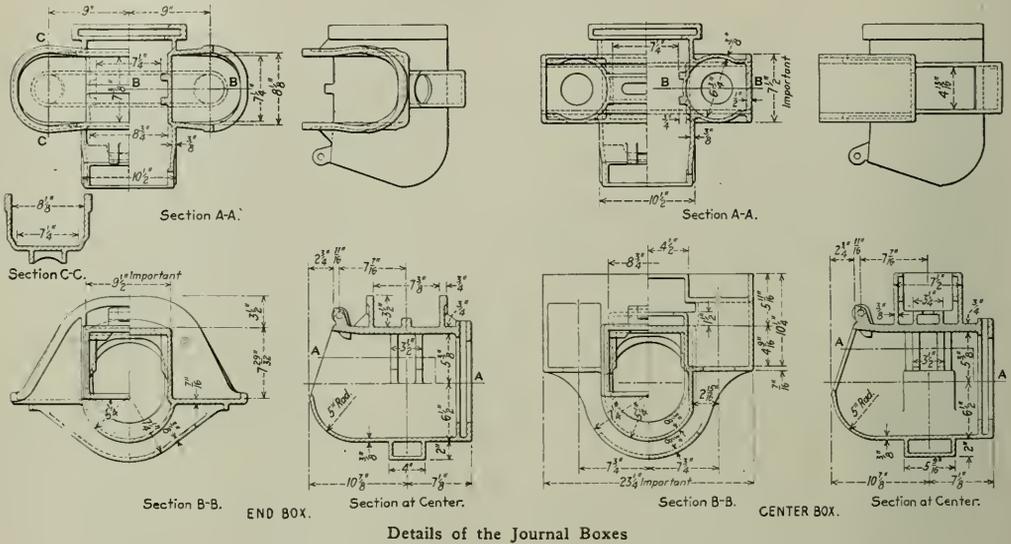
Because of the clearance provided between the side bearings of the equalizing bolster and the cross bolster, very little clearance, if any, is necessary between the car body side bearings and the roller side bearings attached to the equalizing bolster.

The equalizing mechanism on each side of the truck consists of two equalizing levers, two lever hangers and an equalizing beam. The mid point of the equalizing beam bears on the middle of a spring cap which spans the two coil springs of the middle journal box. The location and relationship of the parts are clearly shown in the general

drawing of the truck. The load delivered to either end of an equalizing bolster is taken up by an equalizing lever and delivered in the ratio of two to one, to the end and middle journals, respectively—to the end journal indirectly through

up shocks from the individual wheels without passing them on to the equalizing system.

Double coil springs are used on the end boxes and single coils on the middle journal boxes. The inner coils used

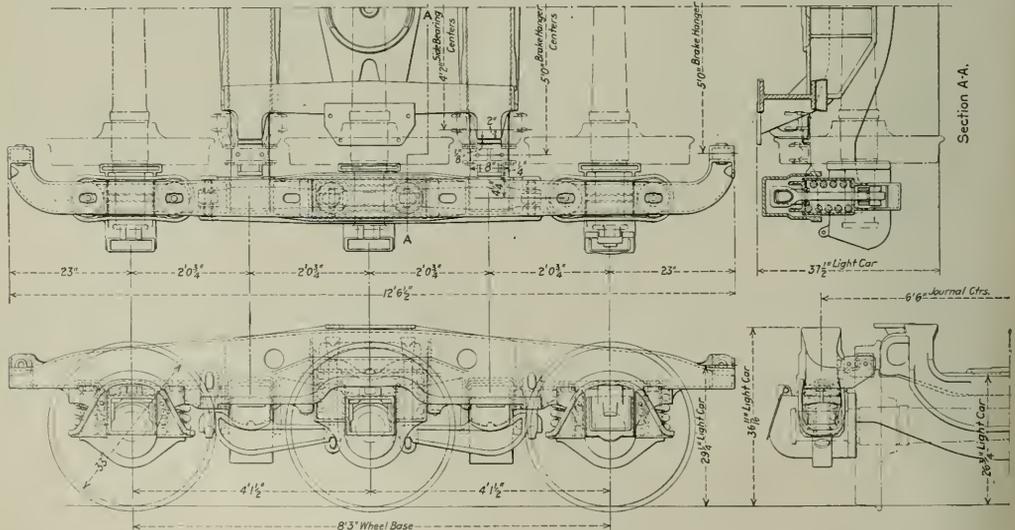


Details of the Journal Boxes

the side frame, springs and journal box and to the middle journal through the lever hanger, equalizing beam, springs and journal box.

on the end journal boxes have a free height 2 1/4 in. greater than the heavy outside coils. They are compressed to the height of the outer coils under the light weight of the car, and with this compression exert a force on each of the end journals

The journal boxes are of special design in which pockets



Lamont Six-Wheel Truck for Clasp Brakes

have been provided on either side to receive the coil springs. Thus located, the springs support the maximum amount of dead load, they are protected through the equalizing mechanism against overloads and are in the best position to take

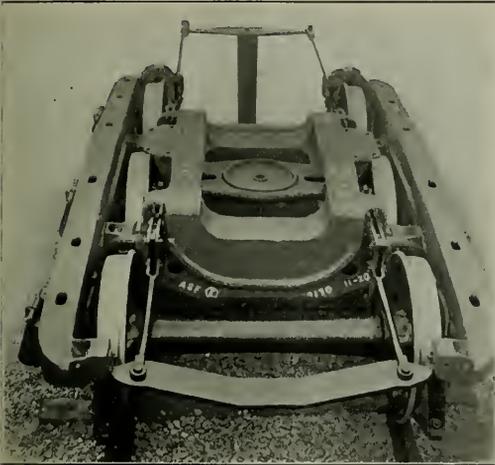
of approximately 1,750 lb. The heavy coils are the same on both the end and middle boxes and are necessarily of high capacity, compressing only about 1/8 in. under the light weight of the car. Because of this comparative lack of

resiliency under the weight of the empty car the inner coils have been provided at the end journals as a protection against possible derailment. The middle wheels being free to act through the flexible equalizing mechanism, do not require the protection of the inner coil springs, and only the heavy coils are used.

The middle journal boxes are guided by the side frames on their ends only. Clearance is provided between the upper portion of the boxes and the side walls of the frames to permit freedom of lateral movement of the middle pair of wheels on curves. When the middle journal boxes move

which, with the three-part bolster construction and clasp brakes, is 36,300 lb. per car. All parts of the truck are designed to carry a center plate load of 140,000 lb. and a 50 per cent overload on the side bearings without exceeding a fibre stress of 12,000 lb. per sq. in. All surfaces of contact between the journal boxes and the side frames are protected against wear by 3/16-in. hard steel liners. On the end journal boxes these liners are shaped to fit the top and sides of the boxes as well as the vertical flanges. For the middle journal boxes the liners are attached to the frame surfaces.

The truck has been designed for either clasp or single brakes. The trucks furnished for single brakes differ from those designed for the clasp brake rigging only in the shape of the side frames. For the single brake rigging the frames terminate at the outside spring pockets for the end journal boxes.



A Top View of the Truck, Showing Arrangement of Bolsters and Brake Rigging

laterally, an inverted pendulum motion takes place in the equalizing lever hangers, suitable provisions for this movement being made in the bearing surfaces of the hangers, keys and connecting parts.

This truck has a wheel base 8 ft. 3 in., which is the shortest of any six-wheel truck yet developed. This has been an important factor in keeping down the weight of the trucks

Freight Car Loading Shows Increase

WASHINGTON, D. C.

THE FREIGHT CAR LOADING reports compiled by the Car Service Division of the American Railway Association for the week ending March 5 indicate that the tide of business depression has turned and railroad freight traffic is beginning to increase after an almost continuous weekly reduction since the latter part of October. The number of cars of revenue freight loaded during the week was 712,822, which is the highest figure recorded this year. It represents an increase of 54,000 cars as compared with the preceding week, but as that included the holiday of February 22 it is more significant that it represents an increase of 17,000 cars over the week of February 19. The loading was considerably less than for the corresponding week of 1920, when it was 811,106, but it was greater than for the corresponding week of 1919 when it was only 675,276. The weekly figures since the first of the year have heretofore generally been lower even than for the corresponding weeks during the depression of 1919.

The loading of grain and grain products was 41,936 cars, which was greater than for any preceding week this year. Most of the gain was shown, however, in the loading of merchandise and miscellaneous freight, the combined total for which was 431,000 cars, or 21,000 more than for any

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY—ALL DISTRICTS: COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO, FOR WEEK ENDED SATURDAY, MARCH 5, 1921

Districts	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Merchandise L.C.L.	Miscellaneous	Total revenue freight loaded			Received from connections		
										This year 1921	Corresponding year 1920	Corresponding year 1919	This year 1921	Corresponding year 1920	Corresponding year 1919
Eastern	1921	6,305	2,617	40,116	893	7,348	681	50,514	58,016	166,490	.....	.....	185,169	.....	.....
	1920	5,861	3,212	47,951	3,516	6,128	2,744	33,387	90,262	.....	192,061	159,670	.....	221,044	177,223
Allegheny	1921	2,386	2,575	44,258	4,722	3,034	1,909	37,682	45,697	142,263	.....	.....	100,291	.....	.....
	1920	2,648	2,704	48,853	3,791	3,872	2,967	39,336	64,081	.....	168,222	184,327	.....	128,420	110,997
Poconahontas	1921	180	90	14,125	59	1,461	36	2,648	5,407	24,006	.....	.....	12,670	.....	.....
	1920	147	73	21,934	728	1,856	292	1,68	10,342	.....	35,540	26,553	.....	19,672	17,376
Southern	1921	4,397	2,188	20,717	600	13,837	872	38,513	33,533	114,657	.....	.....	61,804	.....	.....
	1920	3,470	2,288	24,191	194	17,495	2,799	20,557	56,432	.....	127,421	110,784	.....	77,535	60,937
Northwestern	1921	11,554	8,906	5,232	1,272	16,874	1,331	25,901	29,922	109,992	.....	.....	45,011	.....	.....
	1920	8,417	7,209	9,883	1,261	19,468	1,363	20,304	39,866	.....	107,771	101,147	.....	56,889	44,172
Central Western	1921	12,414	10,089	15,227	211	3,222	2,036	29,302	33,295	105,799	.....	.....	47,601	.....	.....
	1920	8,836	10,018	23,057	333	5,907	2,799	24,242	47,934	.....	118,126	93,684	.....	71,097	51,698
Southwestern	1921	4,700	1,792	3,761	71	6,440	450	16,508	24,953	58,675	.....	.....	43,053	.....	.....
	1920	3,935	2,447	6,423	281	7,230	651	15,989	35,033	.....	61,961	49,105	.....	54,760	37,701
Total, all reads	1921	41,936	28,257	143,436	7,828	52,216	7,315	201,068	230,826	712,882	.....	.....	495,399	.....	.....
	1920	33,314	27,951	182,272	10,104	61,956	13,615	152,972	328,922	.....	811,106	.....	.....	629,417	.....
	1919	31,090	27,324	139,738	.....	53,369	15,205	.....	48,696	.....	.....	675,270	.....	.....	500,104
Increase compared 1920		8,622	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Increase compared 1920		.....	.....	38,836	.....	2,276	9,740	6,300	.....	98,096	.....	.....	.....	133,818	.....
Increase compared 1919		10,846	933	3,698	7,828	.....	.....	201,066	.....	37,612	.....	.....	.....	4,505	.....
Increase compared 1919		.....	.....	.....	.....	1,153	7,890	.....	177,718	.....	.....	.....	.....	.....	.....

L.C.L. merchandise loading figures for 1921 and 1920 are not comparable as some reads are not able to separate their L.C.L. freight and miscellaneous of 1920. Add merchandise and miscellaneous columns to get a fair comparison.

February 26	1921	41,218	26,885	142,226	8,109	51,257	7,196	173,678	207,653	658,222	783,295	666,708	448,343	608,476	674,634
February 19	1921	36,059	27,892	146,438	8,735	54,417	11,702	187,064	223,199	695,506	773,102	700,613	471,877	579,452	540,123
February 12	1921	32,879	27,456	151,786	9,026	53,882	8,094	184,892	213,612	681,627	786,633	687,128	488,983	610,231	537,109
February 5	1921	36,875	31,277	155,917	10,381	54,066	8,501	182,221	217,759	696,097	762,680	692,614	495,860	599,454	551,312

previous week this year. This indicates an increase in manufacturing activity.

In spite of the increased loading, the number of surplus freight cars for the week ending March 8 showed an increase over the previous week. The total was 422,207. For the week ending March 1 the number was 413,450, but this represented a decrease of 10,000 as compared with the week ending February 23, which thus far represents the peak since the car shortage gave way to a surplus last fall. For the week ending March 8 there was a surplus of 191,012 coal cars and 164,005 box cars.

The semi-monthly summary of general car conditions issued by the Car Service Division as of March 11 says that the demand for grain cars is increasing in the west. The refrigerator car supply is said to be adequate in all sections, but there seems to be some tightening up. The railroads are asked to give special attention to the repair of refrigerator cars, as undoubtedly the demand will be quite active in the near future. There has been no noticeable increase in the demand for open top cars during the past few weeks but within a few weeks the usual spring demand for open top cars to transport road and building construction material will be upon us.

Flood Lights With Crossed Beams for Engine House Lighting

By F. B. Freeman
Chief Engineer, Boston & Albany

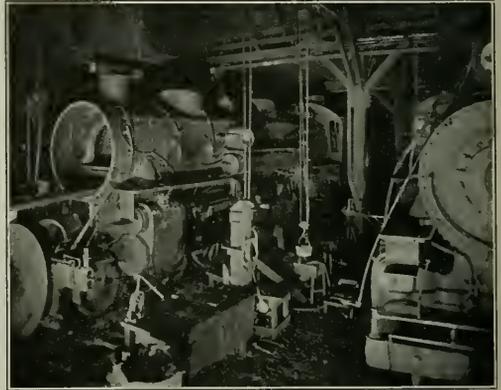
THE ENGINEERING DEPARTMENT of the Boston & Albany has been working for some time on the possibilities of a more economical and efficient lighting system for engine houses, old methods proving so unsatisfactory and costly. It believes that it has now developed a system which is a distinct advance.

The new system consists of abolishing the old high over-

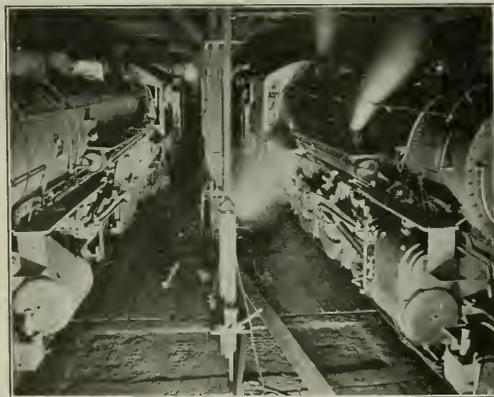
removes the conduits and wires out of the hot gases in the engine house which were found very destructive to interior wiring.

The flood lights adopted are of the Davis type, the case being all of heavy cast iron and the reflector of silvered glass with a plain glass front.

One of the greatest troubles with the old form of lighting was the rapid accumulation of a black coating on the exposed lamp due to the damp, dirty atmosphere and the heat generated in the lamp itself. This rapidly lowered the amount of light emitted and due to the height above the floor cleaning of the lamps was much neglected. The lamps being so high



The Angle of the Light on the Back Wall Is Great Enough to Furnish Light for an Open Front End



The Crossed Beams Provide Light on the Sides of the Locomotives in the Stalls

head lighting and wiring and substituting therefor two flood lights to each stall, placed on the rear wall of the house, ten feet above the floor surface and seven and one-half feet each side of the center line of the pit tracks. The conduit for carrying the wires is run on the outside of the house under the eaves, and branches run down outside to the location of the flood lights and then through the wall. This

up the rising steam and vapor which hung against the roof also diminished the amount of light. With the new arrangement the lamp is not exposed to the damp atmosphere and so cannot get a deposit of dust on it. The plain glass front on the flood light being only ten feet from the floor is easy gotten at with a hand ladder and can be readily kept clean. The lamps used in the flood lights are 1-100-watt type C Mazda as against the 400-watt lamps which were found necessary with the old overhead arrangement, so that the saving in current is considerable. It is also found that the new lights being so low the steam accumulating in the house is usually above the line of lights.

It was thought at first that trouble might be experienced with men running engines into the house due to the glare but this has not developed. The beams of light from the two flood lights crossing each other break up glare and diffuse the light very satisfactorily over the stall and light up all the moving parts of the engine very well indeed. The first installation was made in the Beacon Park house, Boston, and it has proved so satisfactory to everybody that all the houses on the road are now being equipped with the new system as rapidly as possible.

COMMENDED FOR SAVING THREE SECONDS.—Quick action on the part of Flagman M. H. Allred prevented a probable loss of life at Asheboro, N. C., recently, when a party in a large automobile started across the tracks in front of train No. 141, which was backing into the station. The motor of the automobile stopped when the automobile was on the track. Flagman Allred immediately applied air and brought the train to a stop within two feet of the stalled machine. Superintendent J. W. Fletcher has commended Mr. Allred for his presence of mind.—*Southern Railway Bulletin.*

General News Department

The **Official Guide** has resumed the publication of its quarterly supplement entitled "The Official List of Interline Ticket Agents and Passenger Traffic Officers" of the United States, Canada and Mexico. The February issue is No. 1, Volume 6.

The **Western Railway Club** will meet at the Sherman House, Chicago, on March 21. J. E. Gardner, electrical engineer, Chicago, Burlington & Quincy, will read a paper entitled "Electrical Development and Standards in the Power and Lighting Field."

At the annual meeting of the Chamber of Commerce of the United States at Atlantic City on April 27 to 29 the Transportation Group will consider a report by the chamber's railroad committee, the present financial situation of the railroads in relation to plans for consolidation, and the shippers' part in rate-making.

The **Interstate Commerce Commission** and the **Railroad Labor Board** will hold a joint hearing at Washington on March 30 for the purpose of hearing objections or amendments to a proposed plan for revising the rules for reporting information to the commission regarding the work and compensation of employees.

President Harding is understood to be planning a trip to Alaska this summer to make a personal study of conditions, including the Alaska government railroad. A plan has been under consideration for completing the railroad as rapidly as possible and for the operation by the government of a steamship line between Alaska and various ports on the Pacific Coast.

Senator La Follette's speech in the Senate on February 21 and 22 in opposition to the passage of the Winslow bill has just been published in the Congressional Record, and, with the appendices, takes 64 pages, mainly in small type. The appendices consist largely of charts showing interlocking directorates and various statements presented by the labor leaders to the Railroad Labor Board at Chicago in connection with their charges that railroads have paid extravagant prices for car and locomotive repairs in outside shops.

Inspection of Railway Stationary Boilers in Canada

The Board of Railway Commissioners for Canada has ordered that the railway companies subject to its jurisdiction put in force not later than June 1, 1921, regulations promulgated by the board for the inspection of railway steam boilers other than locomotive boilers. The orders cover the design and construction of the boiler and appurtenances and provide for periodical inspection.

Wrong Use of \$28,000

The Interstate Commerce Commission has issued a notice quoting a letter which it has received from the auditor of a railroad which is less than 120 miles in length and which operates one train on alternate days, stating that the company had paid out \$28,935 in attorney's fees in connection with the collection of its claim under Section 204 of the transportation act. The letter stated that this amount, if taken into the operating expense for 1921, would seriously distort them; and permission was asked to put the item in profit and loss account. The commission says in its notice that there was nothing about this application for reimbursement which could not have been adjusted by correspondence. Applications under Section 204 and 209 of the transportation

act ordinarily require nothing on the part of the applicant except compliance with the commission's request for information.

Fuel Conservation Campaign Shows Results

A saving of 15,875 net tons of coal in December, 1920, over the same month in 1919 in freight service was effected by the Philadelphia & Reading through its fuel conservation campaign. In December, 1920, the consumption of coal per 1,000 gross ton miles of freight was 254.6 lb., a reduction of 9 per cent as compared with December, 1919, when the consumption was 280 lb. per 1,000 gross ton miles.

Preliminary Returns Show Deficit for January

Preliminary compilations of railway returns to the Interstate Commerce Commission for the month of January reveal a situation even worse than that in December. One hundred and sixty-six Class I roads, operating 200,000 miles of line, show a deficit of \$1,289,291 for the month. The same roads in January, 1920, had a net operating income of \$52,971,220. Total operating revenues show a reduction of 5.8 per cent, while total operating expenses increased 6.9 per cent. Freight revenues of the 166 roads increased 4.6 per cent and the passenger revenues increased 15.7 per cent as compared with January, 1920. The fact that total revenues show a decrease is probably attributable to the fact that in January last year an estimate of \$500,000,000 for back mail pay was taken into the accounts. These figures do not take into account lap-over items growing out of settlements with the Railroad Administration.

Discipline and the Golden Rule

Discipline in the railroad business is as essential as it is in the army. We are responsible for the lives of our fellow men. Discipline may not always be easy to apply. It may seem easier to follow the lines of least resistance and let little things go, than to apply firm, impartial discipline, but in this we deceive ourselves. When we follow the "let alone" policy we make it harder in the end. Just discipline is a necessity, and to apply it, the officer charged with the responsibility must study conditions thoroughly and his conclusions must be based upon understanding, reason and justice. The Golden Rule is the best basis for discipline: that means treating the other man as you yourself would like to be treated. It is always good policy when discipline is necessary to take some time to think it over. Sleep on it. Be sure you are right and then go ahead. Frequently we find that the merits or demerits of a case present themselves in a different light after we have had an opportunity to reflect on them. If an employee is permitted to continue doing the things he should not do and is not disciplined, he becomes careless and irresponsible, a result that reflects not only upon himself, but upon his superior officer.—E. E. Nash, *Minneapolis & St. Louis.*

Railway Fire Protection Association

W. F. Hickey, New Haven, Conn., president of the Railway Fire Protection Association, has issued "News Letter No. 2," dated March 10. The executive committee of the Association has appointed seven committees to prepare reports for the next annual meeting on the following subjects, the chairman of the committee being named after each subject: Protection of Shop Plants, J. R. Peters (Penn.); Statistics, G. R. Hurd (I. C.); Locomotive Hazards, E. M. Floyd (C. C. & St. L.); Telephone and Telegraph Hazards, E. Richards (S. P.); Coaling Plants, W. E. Cathcart (Penn.); Hand Book on Merchandise in Transit, E. B. Berry (South-

ern); Gasoline and Electric Motor Trucks in Freight Houses, E. J. Reilly (Erie).

The executive committee proposes that a half day be given at the meeting to a "question box" for the purpose of discussing inspectors' problems.

The Pacific Coast sectional meeting of the association, which will be in charge of W. S. Wollner (N. W. P.), will be held in San Francisco on June 16 or 17.

No Exhibits at June Conventions

The Railway Supply Manufacturers' Association at a meeting of its executive committee at Pittsburgh, Pa., as briefly noted in last week's issue, voted against having an exhibit at the convention of the American Railway Association, Division V—Mechanical—in June.

Further details relative to this decision are given in a letter sent to members of the association, dated March 10 and signed by J. D. Conway, secretary, and J. F. Schurch, president. The letter follows:

After a thorough canvass and study of the entire situation, both among the manufacturers composing this organization and the railroad executives, your executive committee has unanimously decided that the part of wisdom and good business judgment to postpone the June, 1921, R. S. M. A. exhibit at Atlantic City for the following reasons:

1. We are all familiar with the present depression in railroad and general business and the attendant desire and demand to curtail expenditures in every possible direction to strengthen the existing financial situation with the prime motive of developing greater economy and efficiency in operation.
2. In the opinion of men of mature judgment in the manufacturing as well as the railroad fields we are confronted today with the serious situation of not knowing with any degree of certainty as to just when business conditions will improve. Many manufacturing concerns engaged in the production of railroad devices and specialties are either shut down or running at an unusually low rate of operation.

While we realize this action is drastic, we feel that present conditions demand it. We are confident, however, that it will meet with the full approval of the business interests of the country, and we further believe that the future will warrant our resuming plans at a later date for the 1922 exhibit as in former years.

The executive committee also decided that it would not be necessary, in view of the cancellation of the exhibit and the annual meeting, to send representatives to such meetings of the Railroad, Mechanical and Purchases and Stores divisions, A. R. A., as may be held. The wisdom of cancelling hotel reservations was also suggested.

Proposed Senatorial Investigation of Railroad Situation

WASHINGTON, D. C.

Senator Cummins is actively engaged in preparing for the proposed general investigation of railroad conditions, for which he will introduce a resolution at the opening of the special session of Congress on April 11, and is gathering a large amount of data. He has been conferring for some time with members of the Interstate Commerce Commission and others on the subject and Thomas DeWitt Cuyler, chairman, and Alfred P. Thom, counsel, for the Association of Railway Executives, have conferred with him, assuring him that the railroads welcome this opportunity for a thorough airing of the situation. Senator Cummins has denied public statements which have indicated that one object of his proposed investigation is to consider the desirability of the government taking over the railroads and has made it clear that he is opposed to government ownership. He has also indicated that one of the primary purposes is to give an opportunity for making public some of the facts about the railroad situation which he has learned but which are not generally understood. It is reported that S. Davies Warfield, president of the National Association of Owners of Railroad Securities, is planning to lay before the committee a plan to carry out an idea which Senator Cummins has advocated for bringing about a greater centralization of railroad purchases. It is also understood that a strong effort will be made by the railroad labor organizations affiliated with the American Federation of Labor to take this occasion for strongly urging legislation to prevent the Railroad Labor Board from acting on the reductions in wages which the railroads have proposed by establishing some substitute organization along the lines of their boards of adjustment which they have heretofore advocated.

Traffic News

Charles J. Sprague, for the last six years freight claim investigator for the New York Central, with headquarters at Buffalo, N. Y., has been appointed traffic manager for O. H. Willson at Lockport, N. Y.

The Interstate Commerce Commission has reopened the railway mail pay case to allow of consideration of the recent petition of the New England roads for a further increase in their rates for the transportation of mail and a readjustment for the period since September 11, 1920.

The Mallory Steamship Line announces that, beginning April 9, freight rates will be made from New York through to Birmingham, Ala., in connection with the barge lines on the Warrior River, and that the first-class rate will be \$1.75. This is 43 cents less than the all-rail rate from New York to Birmingham.

The Interstate Commerce Commission on March 3 vacated, as of March 6, its Service Order No. 17, which was issued on September 16, 1920, restricting the supply of cars to coal mines which are unable to load open-top cars within 24 hours. The Commission says the emergency which caused the issuance of the order has in general been measurably relieved.

The Transportation Club of Feoria, at its annual meeting on February 25, elected the following officers: President, H. D. Page; vice-presidents, G. I. Sweney and N. M. Love; secretary-treasurer, O. B. Eddy; directors, E. F. Stock, A. T. McMaster, E. E. Kester, G. H. McHugh, O. T. Arnold, W. J. Gorman, S. M. Russell, W. D. Upton, R. I. Colvin, A. H. Harwood.

The American Railway Express Company reports that from December, 1919, to November, 1920, 1,858,130 claims for loss and damage were filed against the company. The Express Company is conducting a "Right Way" campaign and is calling special attention to the importance of packing shipments properly so that unnecessary wastage in transit can be avoided.

The Pennsylvania has begun loading the lake coal boats tied up for the winter at Cleveland, Erie, Ashtabula and Sandusky, and expects to enable the boats to move cargoes aggregating about 200,000 tons as soon as the lake is open. Of the 28,000,000 tons of coal delivered by the railroads at the lake ports during the shipping season the Pennsylvania carries approximately 20 per cent.

The Spokane Transportation Club, at its tenth annual banquet held in the club rooms on February 18, elected the following officers: President, W. H. Ude, general agent, Northern Pacific; first vice-president, A. S. Cobb, manager wholesale department, Sherman Clay Music Company; second vice-president, T. W. Emerson, manager, Emerson Fuel Company; secretary-treasurer, George A. King, assistant general freight and passenger agent, Spokane International.

The production of soft coal, which had been declining steadily since mid-December, recovered slightly during the first week of March, according to the weekly bulletin of the Geological Survey, but whether the recovery was due to unfilled orders carried over from the week of Washington's birthday or whether this signifies that the bottom of the present depression has been reached cannot yet be stated, the bulletin says. The total output is estimated at 7,406,000 tons.

The Stark County Traffic Club was organized at Canton, Ohio, on February 28 and the following officers were elected: President, A. J. Burns, traffic manager, the Bonnot Company, Canton; vice-president, C. H. McCowen, traffic manager, Transue-Williams Steel Forging Corporation, Alliance; secretary, M. L. Underwood, traffic manager, Buckeye Cereal Company, Massillon; treasurer, B. T. Braucher, traffic manager, the Hoover Suction Sweeper Company, Canton. The Board of Governors consists

of D. J. Morris (W. & L. E.), W. A. Bell, A. O. Ellis (W. & L. E.), T. B. Ray and J. B. Mertes (W. & L. E.).

The "Shippers' Conference Committee of Greater New York," at its annual meeting, held in the Woolworth Building on March 8, elected as chairman for the ensuing year W. J. L. Banham of the Otis Elevator Company; P. W. Moore, Queensboro Chamler of Commerce, is secretary. This association, organized a year ago, now has 196 members. In connection with the annual meeting there was shown a motion picture illustrating right and wrong ways of handling freight. This picture, provided by the American Railway Express Company, is entitled "The Lost Millions." A report was received from a committee dealing with proposals to revise charges for cartage of export freight in the neighborhood of New York City.

A readjustment of rates on lumber from the Pacific northwest to eastern points was arranged for at a conference of traffic officials of the transcontinental lines with the Interstate Commerce Commission on March 16 under which the rates via Omaha will be equalized with those via St. Paul. The Omaha rate of 73½ cents will be reduced to the St. Paul rate of 66½ cents, which will also be applied to the lower river crossings with the usual differentials. The effect will be to reduce the Chicago rate from 80 to 73 cents. It is stated that the reduction will give a considerable degree of relief to the western lumber shippers. The commission authorized the new rates being made effective on five days' notice.

Virginia Apples

The total movement of Virginia-grown apples from stations on the Harrisonburg-Manassas branch of the Southern Railway during the 1920 season amounted to 221,560 barrels, or about 1,390 carloads, distributed as follows: To eastern cities, 67,167 barrels; to Virginia and West Virginia, 48,112 barrels; to Ohio and Mississippi River crossings, 7,098 barrels; to southeastern and Carolina cities, 33,482 barrels; export, 33,482 barrels; to Charlottesville, Broadway, Winchester and Front Royal, for cold storage, 31,737 barrels. Total, 221,560 barrels.

Abuse of the Order-Bill Form

The National Industrial Traffic League has sent out the following circular in its campaign against the misuse of the order bill of lading and also to limit its use:

The use of the order bill of lading covering carloads should be confined to those shipments where the consignee is required to pay for the goods before obtaining them from the carriers, or expressed in a different way, where goods are sold sight or arrival draft with bill of lading attached. Some shippers use the order bill of lading for the purpose of retaining control of the goods until they are ready for delivery to the consignee or to the notify party. Again shippers will consign goods to their own order at destination and endorse the bill of lading to a consignee who fails to notify the carrier, that upon the arrival the car should be delivered to him; such cars are unnecessarily delayed at destination. If a shipper desires to retain title to the goods it is not necessary for him to consign them to his order, but merely to consign them to himself in care of the consignee to whom he wishes them delivered. If, for any reason, he does not wish to show the consignee in the bill of lading, he should merely consign the goods to himself and promptly notify the consignee how the car is billed, and send him the bill of lading.

The practice of consigning goods to order, even where there is no banking transaction, is an old one and a great many shippers are following the custom which has prevailed for years without knowing why, or having any good reason for doing so. In many cases, the shipping clerk is merely following precedent without knowing why. This practice should be discontinued and shipments should be consigned to the order of the shipper only in cases where it is the intention to use the bill of lading as collateral or for collection purposes.

The carriers should be assisted by the shippers in getting rid of improper practices, particularly where such assistance will not only result in less car delay, but in better service to the shippers, and league members are urged to look into this matter and endeavor not only to regulate their own shippers in the present, but to urge them to do so. It is suggested that the league can induce non-members to discontinue the use of the order bill of lading except in those cases where it is to be used as the basis of a banking transaction, for it must be obvious that any unnecessary delay in the delivery cars should be avoided in the interest of better service as well as car supply.

Member-roads of the Association of Railway Executives, working in co-operation with the League, have been instructed to send to the office of the chairman concrete examples of the misuse of such orders and to advise as to whether there has been any such misuse upon their lines.

The campaign against the misuse of the order bill of lading was started by the National Association of Credit Men, who brought the subject to the attention of the League.

Commission and Court News

Interstate Commerce Commission

The commission has suspended until July 14 certain proposed cancellations of rates on grain c. l., from points on the Chicago, Burlington & Quincy in Colorado, Idaho, New Mexico, Utah and Wyoming to Texas and Louisiana Gulf ports when routed via Denver and the Colorado & Southern.

The commission has reopened the Indiana intrastate rate case for further consideration of rates on coal applicable to intrastate shipments in Indiana for distances of less than 30 miles, including their relation to rates for distances of 30 miles and more, and their relation to interstate rates. The commission's order in this case did not apply to intrastate coal rates for distances of less than 30 miles, but it appears that the rates as now in force complicate the relations between mine groups in which some of the mines are a little more than 30 miles from the markets.

Personnel of Commissions

The usual change in the chairmanship of the Interstate Commerce Commission will not take place in March this year, but at the end of June. When Commissioner Clark was elected chairman of the commission a year ago the commission adopted a change in its practice by which Chairman Clark will serve for the balance of the fiscal year ending June 30 and the chairman will hereafter be elected for the fiscal year. This makes the change come at what is ordinarily the dull season of the year rather than at a period of greatest activity.

A New Commission in New Jersey

Governor Edwards, of New Jersey, has appointed a new public utilities commission, the court having sustained the governor in his action in dismissing the former commissioners last October. Acting under a new law, passed by the legislature—vetoed by the governor and then passed over the veto—the governor has appointed the following three: Joseph A. Hammill, of Hudson County, former Assemblyman and Congressman for twelve years; Joseph S. Hoff, of Mercer County, former Civil Service Commissioner; and Harry Bachrach, of Atlantic City, twice Mayor of Atlantic City. Two of the men named are Democrats and the other a Republican. The term of Commissioner Hammill will be for six years, Commissioner Hoff for four years and Commissioner Bachrach for two years.

State Commissions

Twenty-four Station Agencies Cut Out

New Hampshire Public Service Commission has authorized the Boston & Maine to discontinue twenty-four station agencies. The commission's report says:

"This move on the part of the railroad is in the interest of economy. The company finds its financial condition such that it is only by the strictest economy that it can continue serving the public. After paying operating expenses and fixed charges, including interest and rental of leased lines, the following deficits are shown:

September, 1920	\$588,520
October, 1920	1,082,704
November, 1920	1,773,031
Total	\$3,444,255

"In all cases under consideration the company proposes to place a caretaker in charge of the stations. No tickets will be sold and no freight billed out. Passengers must pay their

fare to the conductors after boarding the train and have the baggage master on the train check their baggage. So far as the passengers are concerned, the inconvenience will not be great.

"In regard to freight, however, the inconvenience is considerable. Nothing but prepaid freight will be carried to these stations. In the case of l. c. l. freight, it will be at owner's risk after delivery on the platform or in the warehouse, which will be unlocked. There will be no one representing the railroad to take charge of the freight upon its arrival. If a shipper wishes a car set he must arrange for it at the nearest station from two to four miles away."

Court News

Not Liable for Death of Wrecking Foreman

The Texas Court of Civil Appeals holds that a railroad furnishing a wrecking crew with chains of various and ample strength is not liable under the federal Employers' Liability Act for the death of an experienced foreman due to the breaking of a chain of insufficient strength selected by him to raise a wrecked car.—*Robert v. Houston & Texas-Central (Tex.)*, 220 S. W. 790.

Flowers of Rhetoric, Director-General

Hines and Georgia Justice

In affirming a verdict for the defendant in a personal injury case by a passenger against a railroad, the Georgia Court of Appeals, dealing with the complaint of strong language used by the trial court in cautioning the jury to do "exact justice between the lady on one side and the defendant on the other," approved the trial judge's opinion in overruling a motion for a new trial, in which he said: "Reference to the evidence shows that the case was between a lady with a sprained ankle and a soulless corporation that sees as much beauty in a crowbar as in a pretty foot. The case afforded a field where the flowers of rhetoric grew wild. The plaintiff not only had a sprained ankle with all of its horrors, but she 'couldn't get a cook last summer, and had neighbors to come in and see about the children.' Doubtless the plaintiff suffered very much from not having a cook in Savannah in the summer, but that suffering, bodily or mental, could hardly be ascribed to Mr. Hines, the Director General of Railroads. Seriously, cases should be tried under the rules of law and evidence and without appeals to prejudice. No higher duty rests upon a judge than to see that a recovery is based on exact justice."—*Green v. Hines (Ga.)*, 102 S. E. 899.

United States Supreme Court

Freight Rates for Government Property

The Supreme Court of the United States has affirmed the decisions of the Court of Claims holding that the Oregon-Washington Railroad & Navigation Company and the Western Pacific are not entitled to recover the difference between the amounts paid the roads by the government for the transportation of the effects of army officers changing stations—being the rates for such transportation over land-grant roads fixed in the land-grant equalization agreements—and the usual commercial rates. Under these agreements such freight was accepted by the carriers without prepayment of the charges therefor upon the basis of the commercial or tariff rates with appropriate deductions on account of land-grant distance as provided in the Railroad Land-grant Act. The court bases its decision upon the railroad's non-action during a long course of years notwithstanding an explicit and contrary assertion by the government of the validity of the lower rate. It was also pointed out that section 22 of the Interstate Commerce Act permits reduced rates to the United States and that by conference ruling of the Interstate Commerce Commission No. 33 of February 3, 1908, section 22 is made applicable to property transported for the United States.—*Oregon-Washington R.R. & Nav. Co. v. United States; Western Pacific v. United States*. Decided March 7, 1921. Opinions by Justice McKenna.

Foreign Railway News

Car Exports in January

The exports of passenger cars in January were more than twice as heavy as during any month in 1920. The total was 64, valued at \$520,293, and the largest shipments were to Cuba. The exports of freight cars—1,452, valued at \$2,535,887—mark a considerable decline from December's totals. By far the largest shipments of these cars, too, were destined for Cuba. The totals by countries as compiled by the Bureau of Foreign and Domestic Commerce follow:

Countries	Passenger		Freight and other		Parts of cars, Dollars
	Number	Dollars	Number	Dollars	
Belgium					375
France					5,105
Greece					145
Italy					133
Norway					2,585
Spain					30,325
England					796
Canada			15	36,731	85,631
Costa Rica					375
Guatemala					2,824
Honduras			14	14,630	169
Nicaragua			14	17,355	.....
Panama					7,488
Mexico	21	34,500	208	381,145	63,003
Jamaica					5,406
Trinidad and Tobago			72	46,241	5,567
Other British West Indies					1,333
Cuba	27	463,393	1,021	1,927,975	537,623
French West Indies					6,226
Haiti					348
Dominican Republic			5	8,340	138,565
Argentina			18	34,830	18,299
Brazil			20	27,949	205,459
Chile			1	1,919	15,217
Colombia			6	19,723	13,220
Ecuador					1,075
British Guiana					731
Peru					36,060
Uruguay					12,508
Venezuela					458
China					176,161
Kwantung, leased territory					19,036
Chosen					6,793
British India					80,788
Dutch East Indies			4	13,379	1,249
Japan			5	6,000	76,559
Turkey in Asia					157
Philippine Islands	16	22,400			124,304
British South Africa					15,192
French Africa					3,104
Morocco					15,652
Egypt					150
Total	64	520,293	1,452	2,535,887	1,736,334

Exports of Locomotives in January

In the exports of steam locomotives January showed a slight decline over December. The totals are 149, valued at \$4,248,147. Cuba, with 66, was the destination of the greatest number of these engines, while Brazil, with 23, comes next. The detailed figures by countries, as compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce, are as follows:

Countries	Number	Dollars
Russia in Europe	2	25,000
Canada	2	16,488
Nicaragua	1	17,000
Mexico	6	51,275
Cuba	66	2,064,030
French West Indies	2	34,660
Dominican Republic	5	86,614
Argentina	2	28,460
Brazil	23	657,841
Colombia	3	102,700
Dutch Guiana	4	28,080
Peru	2	18,525
Venezuela	1	13,425
Chosen	12	692,340
Dutch East Indies	2	42,825
Japan	3	40,390
Australia	1	17,000
Philippine Islands	6	60,650
Egypt	6	250,934
Total	149	4,248,147

Equipment and Supplies

Cars and Locomotives Delivered in January

The number of freight cars delivered in January by the car building companies reporting to the Railway Car Manufacturers' Association totaled 7,008 for domestic service and 819 for export. The passenger cars delivered totaled 43 for domestic service. On January 31 the companies had on order and undelivered orders for 32,874 freight and 786 passenger cars for domestic service and 2,903 freight and 42 passenger cars for export.

The figures for the month are as follows:

NEW CARS DELIVERED			
	Domestic	Foreign	
Freight	7,008	819	
Passenger	43	...	
ON ORDER AND UNDELIVERED			
	Domestic	Foreign	Total
Freight	32,874	2,903	35,777
Passenger	786	42	828
CAR REPAIRS			
Delivered—January			4,229
On order and undelivered January 31.....			21,469

The members of the association co-operating in this report are as follows:

- American Car & Foundry Company, New York.
- Bethlehem Shipbuilding Corporation, Wilmington, Del.
- Bettendorf Company, Bettendorf, Iowa.
- Osgood Bradley Car Company, Worcester, Mass.
- J. G. Brill Company, Philadelphia, Pa.
- Cambria Steel Company, Philadelphia, Pa.
- Cincinnati Car Company, Winton Place, Ohio.
- Greenville Steel Car Co., Greenville, Pa.
- Haskell & Barker Car Company, Chicago.
- Keith Car & Manufacturing Company, Sagamore, Mass.
- Keith Railway Equipment Company, Chicago.
- Laconia Car Company, Laconia, N. H.
- Liberty Car & Equipment Company, Chicago Heights, Ill.
- Magor Car Corporation, New York.
- McGuire-Cummings Manufacturing Company, Chicago.
- Mt. Vernon Car Manufacturing Company, Mt. Vernon, Ill.
- Pacific Car & Foundry Company, Seattle, Wash.
- Pressed Steel Car Company, New York.
- Pullman Company, Chicago.
- Ralston Steel Car Company, Columbus, O.
- Ryan Car Company, Chicago.
- St. Louis Car Company, St. Louis, Mo.
- Standard Steel Car Company, Pittsburgh, Pa.
- Manufacturers not members of the association co-operating in this report are as follows:
- Chicago Steel Car Company, Harvey, Ill.
- Pennsylvania Tank Car Company, Sharon, Pa.

Locomotives

THE LOUISVILLE & NASHVILLE, reported in the *Railway Age* of November 19, as inquiring for locomotives, will build 34 locomotives, including 16 Mikado type locomotives, in its own shops.

Freight Cars

THE ST. LOUIS, TROY & EASTERN is inquiring for from 50 to 100 cars.

THE BALDWIN LOCOMOTIVE WORKS is asking for prices on 100 tank cars for export.

THE LEOPOLDINA RAILWAY (Brazil) is asking for prices through the car builders on 60 flat cars.

THE UNITED FRUIT COMPANY, New York, is inquiring for 50 all steel ballast cars for the Truxillo Railroad, Honduras.

THE HURON PORTLAND CEMENT COMPANY, Detroit, Michigan, is inquiring for 20 steel ore cars of from 40 to 50 tons capacity.

THE ATCHISON, TOPEKA & SANTA FE is inquiring for 300, 50-ton gondola cars, in addition to those noted in the *Railway Age* of February 25 (page 483).

Signaling

THE PENNSYLVANIA has ordered from the Union Switch & Signal Company for proposed alternating current signal installations between Atglen, Pa., and Downingtown, a total of 227 Vane type a. c. relays; 40 d. c. relays; 60 position-light dwarf signals, and 60 "A-1" electro-pneumatic switch and lock movements, complete, with Style "C" cut-off valves. This material is for revisions to three electro-pneumatic interlockings now in service between Atglen and Downingtown.

Railway Construction

ANN ARBOR.—This company will replace its woodworking shop at Owosso, Mich., recently destroyed by fire, with a steel fabricated building.

CENTRAL OF GEORGIA.—The Interstate Commerce Commission has issued a certificate authorizing the construction of a branch line in Jefferson County, Ala., from McCombs, which is 12.6 miles east of Birmingham, in a southwesterly direction for a distance of 5.8 miles with a spur line of 3 miles.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—This road is contemplating realignment and grade revision in the vicinity of Terre Haute, Ind.

NORTHERN PACIFIC.—This company will erect temporary structures to replace the machine shop, wood working mill, car repair shop and minor buildings which were destroyed by fire at Tiburon, Cal., as definite decision has not been made as to whether a modern shop will be constructed at that point, or some more advantageous location along the line.

PHILADELPHIA, NEWTON & NEW YORK.—The Interstate Commerce Commission has rendered a decision that the proposed relocation of the main line in the city of Philadelphia, by which the company proposes to abandon a short piece of line and construct a new line about 1,150 feet in length across privately owned property, is not within the scope of Paragraph 18 of Section 1 of the interstate commerce act and that a certificate of public convenience and necessity is not required.

WISCONSIN-NORTH WESTERN.—This company has applied to the Interstate Commerce Commission for authority to abandon its line of 11½ miles in Marinette County, Wis., which was built to serve a logging traffic which, the petition says, is now adequately handled by other lines.



Photo by International

From Left to Right: F. P. Walsh, B. M. Jewell and W. Jett Lauck

Supply Trade News

The **Simmen Automatic Railway Signal Company** has moved its offices from Buffalo, N. Y., to Eden, N. Y.

The **Regan Safety Devices Company, Inc.**, has moved its New York City office from 140 West Forty-second street to 522 Fifth avenue.

The **H. K. Ferguson Company**, southern department, has removed its offices to Room 218, Healey building, Atlanta, Ga. **Richard W. Alger** is the manager.

The **Hegeman-Castle Corporation**, Chicago, has taken over the activities of Holden & White, Incorporated, and moved its offices from the McCormick building to 343 South Dearborn street.

Manning, Maxwell & Moore, Inc., New York, on May 1, will take over the merchandise and goodwill of Patterson, Gottfried & Hunter, 211 Center street, New York. This firm handles mill and factory supplies.

Ralph T. Hatch, for the past 14 years with the National Malleable Castings Company, Cleveland, Ohio, has been appointed general manager of sales for the **Reading Steel Castings Company**, a subsidiary of the American Chain Company, with headquarters at Reading, Pa., effective April 1.

F. E. Whitcomb, special representative of the Federal Signal Company, Albany, N. Y., has left that company to become vice-president and sales manager of the **Consolidated Equipment Company, Ltd.** This firm handles railway, marine and signal supplies, with headquarters at Montreal, Quebec.

The **American Mason Safety Tread Company**, 480 Lexington avenue, New York, on March 1 consolidated its general sales office for New England, New York State and New Jersey with the local New York City office, under the supervision of **J. W. Scott. L. H. Devoe** will continue to serve the trade in this territory as in the past, with headquarters at New York.

A. M. Castle & Co., of Washington, dealers in steel and hardware, have recently purchased a large portion of the real estate and buildings owned by the Skinner & Eddy Shipbuilding Corporation at Seattle, Wash. The purchase covers 250 ft. fronting on Railroad avenue and 560 ft. fronting on Connecticut avenue. A building 100 ft. by 500 ft. is located on this property, also a brick office building with two stories and basement 50 ft. by 120 ft. With the present purchase, the company now has three buildings, having approximately 100,000 sq. ft. of area, with an additional seven acres for building expansion.

The **Equitable Equipment Company**, 411 Whitney Central building, New Orleans, La., has just completed its organization for the purpose of handling locomotives, cars, railroad equipment, rails and rail accessories, machinery of all kinds, contractors' equipment and second hand machinery and equipment. This new company is taking over the equipment, rail and machinery business of **A. Marx & Sons**, Southern Scrap Material Company and the Ship Supply Company. The new firm will be under the direct management of **O. D. Cleveland**, who has been the manager of the New Orleans branch of the General Equipment Company.

American Steel Foundries

The gross earnings of the American Steel Foundries for the year 1920 (including the Griffin Wheel Company) reached the largest total in the history of the company—\$59,481,563.58. The annual report, signed by **R. C. Lamont**, president of the company, says: "During the first three-quarters of the year the net earnings ran at the rate of about 10 per cent on the above figures, or approximately \$6,000,000; but,

of course, we could not hope to escape the very serious decline in business which became marked during the latter part of the year; our business began to shrink rapidly in the fourth quarter." In continuing his report, **Mr. Lamont** stated: "At the first sign of this shrinkage we stopped all purchases and by the end of the year had reduced our supplies and raw materials to the lowest point in many years; such materials as we had on hand, however, were written down to market prices, necessitating a reduction in profits of approximately \$1,500,000. In addition to this we took a loss on Liberty Bonds and Victory Notes of about \$320,000. In spite of this heavy write-off we were able to carry forward to surplus the very satisfactory sum of \$4,496,442.16. We have a total profits and income of \$6,670,994.13. From this must be subtracted \$924,951.97 for interest charges, losses on securities sold, earnings of subsidiary company belonging to outstanding minority stockholdings, also \$1,249,600 reserved for excess profits and income taxes, leaving net profits as above stated—4,496,442.60. Cash dividends of 7 per cent on the preferred stock and \$3 a share on the common stock were declared during the year; in addition, stock dividends aggregating \$6 a share on the common stock was paid out of appropriated surplus. The balance in this account is now \$2,869,263.85. The unappropriated surplus is \$11,144,730.71, as compared with \$9,274,166.52 last year." **Mr. Lamont** states that "the very high figure of \$13,219,235.34 of accounts receivable shown on the balance sheet is largely the result of the decision of the Comptroller of the Treasury that he cannot make payments on accounts to the railroads of the sums due from the federal government. The bill recently passed by Congress," he continues, "authorizing the Treasury to make payments should bring speedy relief and enable us to pay our bank loans."

The consolidated balance sheet follows:

ASSETS	
Real Estate, etc. (less depreciation reserve).....	\$32,946,233.19
Preferred Stock Sinking Fund (in Bank).....	84,813.00
Current Assets.....	27,024,791.77
Deferred Charges to Operations.....	148,955.53
	\$60,204,793.49
LIABILITIES	
Capital Stock.....	\$28,882,300.00
Capital Stocks (par value) of subsidiary company net held by American Steel Foundries and surplus appertaining thereto	4,955,458.61
Four Per Cent Debentures.....	684,860.00
Current Liabilities.....	11,048,830.99
Sundry Operating Reserves.....	619,209.33
Unappropriated Surplus (deducting stock dividends).....	2,869,363.85
Unappropriated Surplus.....	11,144,730.71
	\$60,204,793.49



Photo by Erving Galloway

Looking Westward Along Thirty-third Street Toward the Pennsylvania Station, New York

Railway Financial News

ALABAMA, FLORIDA & GULF.—*Asks authority to issue bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue \$150,000 of 7 per cent, first mortgage sinking fund gold bonds to finance additions and extensions.

BOSTON & MAINE.—*Consolidation of Subsidiaries Bill.*—In a bill passed by the House of Representatives of Vermont on March 10 this road is permitted to consolidate all its subsidiary lines in Vermont into a single corporation. The measure gives the Public Service Commission jurisdiction over consolidations of railroad companies in certain cases, and while the merger provisions apply generally to railroads in the state which parent organizations may decide to take over, it was stated that it resolved down in practicable application to the Boston & Maine. In 1915 a similar bill passed by the Senate was killed in the House. No opposition was offered the measure this year.

CHESAPEAKE & OHIO.—*Asks Authority to Pledge Bonds.*—This company has applied to the Interstate Commerce Commission for authority to pledge \$487,000 of its general mortgage 4½ per cent gold bonds of 1892 from time to time as security for short term notes.

CHICAGO & ILLINOIS WESTERN.—*Asks Authority to Increase Capital Stock.*—This company has applied to the Interstate Commerce Commission for authority to increase its capital stock by the issuance of 6,000 shares of 7 per cent non-cumulative preferred stock.

CHICAGO & NORTH WESTERN.—*Authorized to Issue Bonds.*—This company has been authorized by the Interstate Commerce Commission to issue and hold in its treasury \$1,440,000 of its general mortgage gold bonds of 1887 and \$416,000 of first and re-tunding mortgage gold bonds.

CHICAGO & NORTH WESTERN.—*Authorized to Issue Bonds.*—The Interstate Commerce Commission has issued an order authorizing the issuance of \$15,000,000 of 15-year, 6½ per cent, secured gold bonds, maturing March 1, 1936, which had been sold to Kuhn, Loeb & Co., subject to the Commission's approval, at 95.40. Authority was also granted for the issuance of \$15,000,000 of general mortgage gold bonds of 1987, at 5 per cent, and for their pledge, together with \$3,000,000 of such bonds heretofore issued, as security for the 6½ per cent bonds.

CHICAGO JUNCTION RAILWAY.—*Annual Report.*—A comparative statement of the annual gross and net earnings of the Union Stock Yard & Transit Company, the Chicago Junction Railway Company and the New Jersey Company for the years ended December 31, 1918, to December 31, 1920, is as follows:

Year	Gross	Taxes, interest and operating expenses	Net
1920	\$10,231,200.82	\$9,128,452.45	\$1,102,748.37
1919	6,237,411.83	4,744,955.03	1,492,456.20
1918	5,644,627.41	4,130,862.27	1,513,765.14

The following is a comparative statement of live stock and car receipts for the two years ended, respectively, December 31, 1919, and December 31, 1920:

	1920	1919
Cattle	3,107,696	3,502,400
Calves	742,405	751,008
Hogs	7,536,120	8,672,476
Sheep	4,005,237	5,243,957
Horses	43,020	45,762
Cars	207,955	303,948

President Frederick H. Prince, in his report, said:

The live stock receipts for 1920 show a decrease in all classes of animals, as well as cars. These decreases were largely due to a general depression which prevailed in the live stock business and to the railway strike, which seriously interfered with shipments during the greater part of the year. The Chicago Junction Railway was operated under government guarantees up to September 1, but for the last four months of the year suffered from heavy increased expenses, the general decrease of business, and particularly from entirely inadequate switching rates, which were not increased until December 20, 1920. These factors all contribute to produce the decrease in combined earnings shown.

During the last year approximately 50 new industries were located in the district and on the Chicago Junction Railway and the Chicago River & Indiana in territory adjacent to the district. This is, by far, the largest number of new concerns locating in the district in any one year since its

inception. Many well known and important concerns are included in this list.

CHICAGO, ROCK ISLAND & PACIFIC.—*Asks Authority to Guarantee Bonds.*—This company has applied to the Interstate Commerce Commission for authority to guarantee \$619,000 of first mortgage bonds issued by the St. Paul & Kansas City Short Line, and \$227,000 first mortgage bonds issued by the Rock Island, Arkansas & Louisiana.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—*Asks Authority to Issue Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue \$1,052,000 of 6 per cent refunding and improvement bonds, dated January 1, 1921, and maturing January 1, 1941, for the purchase or payment and retirement of prior lien bonded debt.

DENVER & RIO GRANDE.—*To Raise \$100,000.*—The stockholders' protective committee has appealed to stockholders for a contribution equal to \$1.25 per share of stock for the \$100,000 necessary to show evidence of desire to purchase the road by March 25. There are approximately \$88,000,000 worth of stock outstanding and letters containing the appeal have been sent to 5,000 stockholders.

HARTWELL RAILWAY.—*Asks Authority to Issue Stock.*—This company has applied to the Interstate Commerce Commission for authority to issue \$20,000 of common stock.

INDIANA HARBOR BELT.—*Equipment Trust Agreement Authorized.*—This company has been authorized by the Interstate Commerce Commission to enter into an equipment trust agreement with the Guaranty Trust Company of New York for the issuance of \$354,000 of equipment trust certificates.

LAKE ERIE, FRANKLIN & CLARION.—*Application for Loan.*—This company has applied to the Interstate Commerce Commission for a loan of \$51,250 from the revolving fund, to be applied on the purchase of one freight locomotive.

LEHIGH VALLEY.—*Bonds Paid.*—The \$500,000 4 per cent collateral trust bonds which matured on February 1 were paid off on that date.

LOUISIANA & ARKANSAS.—*Asks authority to issue equipment notes.*—This company has applied to the Interstate Commerce Commission for authority to issue \$66,000 of equipment trust notes at 6 per cent to purchase 25 coal cars.

LOUISVILLE & NASHVILLE.—*Authorized to Pledge Securities.*—This company has been authorized by the Interstate Commerce Commission to pledge from time to time as security for short-term notes, which may be issued without authorization, certain bonds and stocks nominally issued and now held in its treasury.

MAINE CENTRAL.—*Bonds Paid.*—The \$400,000 Knox & Lincoln Railway 5 per cent mortgage bonds, series "A," which matured February 1, 1921, were paid at the First National Bank, Boston. The company obtained a government loan of \$320,305 to help it in meeting this maturity.

MISSOURI-ILLINOIS.—*Asks Authority to Issue Securities.*—This company has applied to the Interstate Commerce Commission for authority to issue \$1,800,000 of capital stock, and \$300,000 of bonds, for the purpose of taking over the Illinois Southern, which it has acquired in reorganization.

MISSOURI-ILLINOIS.—*Granted certificate of public convenience.*—The Interstate Commerce Commission has issued a certificate authorizing the acquisition and operation by this company of the railroad formerly owned and operated by the Illinois Southern.

MISSOURI-PACIFIC.—*New Directors.*—William C. Potter, Carl A. De Gersdorff, C. C. Hughtis and H. L. Utter have been elected directors to succeed Nicholas A. Brady, A. H. Wiggin, J. H. McClement, resigned, and A. J. Hemphill, deceased. Matthew C. Brush, Bertram Cutler, W. C. Potter and J. G. Drew have been elected members of the executive committee.

MONONGAHELA CONNECTING.—*Bonds Paid.*—The \$685,000 first mortgage 5 per cent bonds, due February 12, 1921, were paid off on that date.

NASHVILLE, CHATTANOOGA & ST. LOUIS.—*Asks Authority to Issue Bonds.*—This company has applied to the Interstate Com-

mence Commission for authority to issue and sell or hypothecate \$1,000,000 of its first consolidated mortgage 5 per cent gold bonds of April 2, 1988.

NEW ORLEANS, TEXAS & MEXICO.—*Loan from Revolving Fund Approved.*—The Interstate Commerce Commission has approved a loan of \$926,000 to the National Railway Service Corporation for the purpose of enabling the New Orleans, Texas & Mexico to provide itself with equipment at a total estimated cost of \$2,315,000.

NEW YORK, CHICAGO & ST. LOUIS.—*Asks Authority to Pledge Bonds.*—This company has applied to the Interstate Commerce Commission for authority to pledge \$1,036,000 of its second and improvement mortgage bonds from time to time as collateral security for short term notes.

NEW YORK CONNECTING.—*Asks authority to issue notes.*—This company has applied to the Interstate Commerce Commission for authority to issue two demand notes, for \$270,000 each, to cover advances made by the New York Central and the Pennsylvania to enable the company to pay the February interest on its 4½ per cent bonds.

NEW YORK, NEW HAVEN & HARTFORD.—*Receivership Advocated.*—Edgar J. Rich, counsel for the Associated Industries of Massachusetts, testifying before the governor's committee of New England, which is investigating the conditions at Boston, on March 15, made the statement in his testimony that he doubted if anything could save the New Haven from a receivership, and it was not to be deplored.

"Increased labor costs and a decrease in traffic due to higher rates, coupled with the fact that lines are in the hands of transportation men rather than traffic experts," Mr. Rich said, "were responsible for the present transportation crisis in this section. The cost of a receivership for all of the New England roads," he added, "would not be more than 3 per cent of the proposed increase in rates.

"It is highly important that the credit of the railroads be restored," he said. "The New Haven ought to be reorganized and this opportunity ought not to be lost. One of the essential reasons for a receivership for the New Haven is the millions sunk and investments impaired in outside properties."

James H. Hustis, president of the Boston & Maine, who testified before the committee on the following day, admitted also that the New Haven was the weakest spot in the New England railroad system. Further details of the hearing will be given in next week's issue of the *Railway Age*.

NORWOOD & ST. LOUIS.—*Asks Authority to Issue Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue and sell \$199,000 of first mortgage 5 per cent bonds, dated April 1, 1902, to discharge or refund existing obligations.

PORT WENTWORTH TERMINAL CORPORATION.—*Receivership.*—Thomas B. Felder and C. E. Gay, Jr., were appointed receivers by Judge Evans in the Federal Court at Savannah, Ga., on March 9. The Savannah & Atlanta Railway, which was placed in the hands of receivers on March 4, owns the entire \$1,500,000 capital stock of the terminal corporation.

RARITAN RIVER.—*Authorized to Issue Promissory Notes.*—This company has been authorized by the Interstate Commerce Commission to issue \$100,000 of promissory notes, with interest at 6 per cent.

READING.—*New Plan from Common Stockholders.*—The Prosser common stockholders' committee has filed an amended and supplemental petition with the Federal District Court at Philadelphia, in which it asks the court to adopt an alternative plan in case the court cannot require the Reading Company to reduce the par amount of its stock, as requested in the committee's first application. The alternative plan would confine the subscription for stock of the coal company to the common stockholders and require them to purchase the same for about \$7 per share of Reading common, subject to correction on bringing the Reading Company's balance sheet down to date. The petition states that this alternative modification of the plan would accomplish the requirements of the Supreme Court decree and still preserve the equities between the holders of the several classes of Reading stock in accordance with the contract between them.

The committee asks that the following be substituted for the section of the plan giving the three classes of stock equal subscription rights, in case the court refuses to order a reduction in the par value of the stock:

Such no par value stock will be sold to the holders of the common stock of the Reading Company for an aggregate sum equal to the amount by which the book value of the stock and debt of the Coal Company of which the Reading Company must be divested, after deducting the aforesaid \$10,000,000 in cash or current assets and \$25,000,000 in bonds of the Coal Company, exceeds the existing surplus of the Reading Company, for illustration:

Value of Coal Company's stock and debt as carried on books of Reading Company, December 31, 1919.....	\$77,919,770
Deduct cash or current assets and bonds to be received from Coal Company	35,000,000
Net book value of distribution to be made.....	\$42,919,770
Surplus of Reading Company (to be brought up to date).....	33,201,149

Amount to be paid by common stockholders to restore capital, or about \$7 a share of Reading Company common stock (based on surplus shown in December 31, 1919 statement)... \$9,718,629

Petition Against Plan.—The Continental Insurance Company and the Fidelity-Phenix Fire Insurance Company of New York have asked the court for a modification of the proposed plan. This action is taken independently of the Prosser common stockholders' committee, although the changes asked are substantially the same. Objection is made to that part of the plan which provides that the preferred stocks shall share in any distribution of the accumulated surplus, and also to the payment of a bonus of \$10 for \$1,000 bond to holders of Reading general mortgage 4s.

The Continental Insurance Company is the owner and holder of 4,200 shares of Reading common and the Fidelity-Phenix likewise owns 4,200 shares. Referring to the general 4s, the petition says:

Your petitioners aver that a segregation of the coal and railway properties of the Reading Company, pursuant to the decree of mandate entered herein, can be effected by permitting the general mortgage to remain undisturbed and by providing for the making of such agreements with trustee under said general mortgage as will render impossible any common control of the coal and railway properties, and that such plan can be effected without requiring the release of any property from the lien of said general mortgage.

SEABOARD AIR LINE.—*Abandonment of Line Authorized.*—The Interstate Commerce Commission has issued a certificate authorizing the abandonment of a branch line in Nassau County, Fla., a distance of 1.39 miles, which was built to serve a beach resort, now abandoned.

WESTERN MARYLAND.—*Loan from Revolving Fund Approved.*—The Interstate Commerce Commission has approved a loan to this company of \$1,500,000 to aid the carrier in providing itself with freight locomotives at a total estimated cost of \$3,000,000. The carrier itself is required to finance \$1,500,000 to meet the loan of the government.

WEST JERSEY & SEASHORE.—*Defers Dividend.*—The directors have decided to defer for the present action on the semi-annual dividend of 2½ per cent upon the stock until business and financial conditions for the year can be definitely ascertained. The West Jersey & Seashore has been paying dividends since 1896, most of the time at 5 per cent. In 1906 the rate was increased to 6 per cent, but in 1908 reduced to 4 per cent. Since 1910 it has been 5 per cent. The total stock issue is \$11,586,250, of which the Pennsylvania Railroad owns \$6,747,900.

Dividends Declared

Beech Creek.—½ of 1 per cent, quarterly, payable April 1 to holders of record March 16.
 Cleveland, Cincinnati, Chicago & St. Louis.—Preferred, 1¼ per cent, quarterly, payable April 20 to holders of record April 1.
 Green Bay & Western.—5 per cent, payable March 21 to holders of record March 19.
 Joliet & Chicago.—1¾ per cent, quarterly, payable April 4 to holders of record March 23.
 New York Central.—1¼ per cent, quarterly, payable May 2 to holders of record April 1.
 New York, Lackawanna & Western.—1¼ per cent, quarterly, payable April 1 to holders of record March 14.
 Pittsburgh, Bessemer & Lake Erie.—Common, 1½ per cent semi-annually, payable April 1 to holders of record March 15.
 Southern Railway.—Mobile & Ohio stock transfer certificates, 2 per cent quarterly, payable April 1 to holders of record March 15.
 Wisconsin Central.—Preferred, 2 per cent, payable April 1 to holders of record March 21.

Railway Officers

Executive

J. L. Wilkes, whose election as president of the Jacksonville Terminal was announced in the *Railway Age* of March 5 (page 534), was born at Columbia, Maury county, Illinois, on October 3, 1880. He began railroad work in 1896 as a telegraph operator on the Nashville division of the Louisville & Nashville and was later promoted to despatcher. In 1905 he entered the service of the Illinois Central as a despatcher and subsequently served as chief despatcher of the Louisville division of the same road. In 1917 he left railroad service for a brief period during which time he was general manager of the Bell-Union Coal & Mining Company, Union county, Kentucky. He returned to railroad service as assistant superintendent of the Atlanta division of the Nashville, Chattanooga & St. Louis, with headquarters at Atlanta, Ga. On August 1, 1918, he became supervisor of the operating division of the Railroad Administration reporting to the regional director of the Allegheny region. In February of the following year he became superintendent of the Washington Terminal at Washington, D. C. On March 1, 1920, he went to Jacksonville, Fla., as general manager of the Jacksonville Terminal and was holding that position at the time of his election as president. Mr. Wilkes will continue as general manager in addition to his new duties.

Financial, Legal and Accounting

H. T. Newcomb has been appointed general solicitor of the Delaware & Hudson with headquarters at New York, effective February 1.

C. E. Coomes, whose appointment as auditor of the Florida East Coast was announced in the *Railway Age* of March 4 (page 534), was born at St. Marys, Ky., on November 3, 1880.

He attended high school in Davies County, Ky., and was graduated in 1898. In 1901 he entered the service of the Illinois Central as clerk to the road supervisor at Cecilia, Ky. The following year he entered the office of the division superintendent and served in various capacities in that office until August, 1905, when he was appointed chief accountant of the Kentucky division. He resigned that position in 1914 to go with the Valuation Division of the Interstate Commerce Commission as

an accountant. In 1917 he entered the service of the Florida East Coast as a special accountant. The following year he was appointed chief clerk to the comptroller and was holding that position at the time of his recent promotion.

G. C. Gahan has been appointed general auditor of the Canadian Pacific with headquarters at Montreal, succeeding F. E. Shrimpton, deceased.

George W. Lamb, assistant comptroller on the Louisville & Nashville, with headquarters at Louisville, Ky., has been appointed general auditor for the Association of Railway Executives, with headquarters at New York City, effective March 1.

Operating

William H. Page, trainmaster on the Seattle division on the Northern Pacific, returned to his former position as conductor on January 18. **Belger H. Hammer**, trainmaster on the Fargo division, was returned to position as conductor on January 7.

H. W. Purvis, general superintendent of the Seaboard Air Line, with headquarters at Savannah, Ga., has been transferred temporarily to the staff of the general manager with headquarters at Norfolk, Va., effective March 3. **P. G. Walton**, general superintendent at Hamlet, N. C., has had his jurisdiction extended to include the entire system.

Traffic

John A. Dolan has been appointed general agent on the Erie, with headquarters at Cincinnati, Ohio, succeeding **John H. Webster**, who has been transferred.

C. J. Acost, traffic manager of the Macon, Dublin & Savannah, with headquarters at Macon, Ga., has had his jurisdiction extended to include the duties of auditor.

J. D. McCartney, whose appointment as assistant general passenger agent of the Central of Georgia was announced in the *Railway Age* of March 4 (page 534), was born at Linton, Ohio, on September 18, 1881. He was educated in the public schools of Denver, Colo. In 1899 he entered Northwestern University and continued his education at the University of Georgia, from which institution he was graduated in 1902 with the degree of bachelor of science.



J. D. McCartney

Upon leaving college he became editor of the Thomasville (Georgia) Times-Enterprise. In 1908 he went to Rome, Ga., as managing editor of the Tribune-Herald. He remained in that position until his recent appointment with the Central of Georgia. In his new position, Mr. McCartney will have charge of the new department of public relations which has just been established by the company.

Arthur F. Long has been appointed commercial agent on the Chesapeake & Ohio, with headquarters at Minneapolis, Minnesota, succeeding **F. J. Vanderblue**, who has been promoted.

T. F. Harding, traveling agent on the Chicago & North Western, has been appointed traffic manager of the Utah-Idaho Central, with headquarters at Ogden, Utah, effective March 15, succeeding **J. W. Ellington**, who has been appointed to the position of traffic manager of the Amalgamated Sugar Company.

A. C. Hilton, whose appointment as general eastern passenger agent of the Erie, with headquarters at New York, was announced in the *Railway Age* of March 5 (page 534), was born at Altamont, N. Y., on October 15, 1872. He entered railroad service in 1892 with the Erie. In 1901 he was transferred to the general offices of the company in New York, and was subsequently appointed Pacific Coast agent for the company, with headquarters at San Francisco, Cal. In 1907 he became general agent, passenger department, with headquarters at Cincinnati, O. The following year he went to Buffalo, N. Y., in the same capacity, and continued to hold that position until the time of his recent promotion.



C. E. Coomes

Mechanical

E. E. Chapman has been appointed engineer of tests of the Atchison, Topeka & Santa Fe with headquarters at Topeka, Kans., succeeding H. B. McFarland, resigned. The headquarters of this office were formerly at Chicago.

Engineering, Maintenance of Way and Signaling

W. E. Fitzsimmons has been appointed roadmaster of the Dakota division of the Northern Pacific with headquarters at Carrington, N. D.

G. M. de Lambert has been appointed roadmaster of the Lake Superior division of the Northern Pacific with headquarters at Duluth, Minn.

W. D. Simpson has been appointed division engineer of the Florida division of the Seaboard Air Line, effective March 1, succeeding B. Land, Jr., resigned.

G. W. Abbott, division engineer of the Boston division of the Boston & Albany, has been appointed principal assistant engineer, with headquarters at Boston, Mass., succeeding E. S. Draper, deceased. **W. B. Knight**, division engineer of the Albany division, has succeeded Mr. Abbott as division engineer of the Boston division. **E. K. Mentzer**, supervisor of track of sub-division 1, has been appointed division engineer of the Albany division with headquarters at Springfield, Mass. **F. A. Jones**, office engineer with headquarters at Boston, has succeeded Mr. Mentzer, and **E. G. Hartford**, assistant engineer, has succeeded Mr. Jones.

Special

M. L. Bishoff has been appointed assistant chief surgeon of the Atchison, Topeka & Santa Fe Hospital Association.

General

The New York Central, Lines East of Buffalo, has announced that, effective March 16, the following offices have been abolished:

Operating

- General superintendent, New York Terminal, First and Second districts.
- Superintendent, Little Falls and Dolgeville division.
- Assistant general superintendent, New York Terminal district.
- Assistant manager, Marine department.
- Assistant superintendent, Electric subdivision, West Shore Railroad.
- Assistant superintendent on all divisions.

Mechanical

- Superintendent, fuel and locomotive performance.
- Assistant superintendent, fuel and locomotive performance.
- Fuel instructor.
- Supervisor of fuel and locomotive performance, First and Second districts.
- Superintendent, rolling stock.
- Assistant to superintendent, rolling stock.

Engineering, Maintenance of Way and Signaling

Engineer, maintenance of signals.

The following offices have been abolished on the Lines West of Buffalo:

Operating

- General superintendent, Third and Fourth districts.

Mechanical

- Superintendent, rolling stock, at Cleveland.
- Assistant district master car builders at Collinwood and Englewood.
- Assistant superintendent, motive power, at Cleveland.
- Master mechanics at Collinwood and Elkhart.

Engineering, Maintenance of Way and Signaling

- Assistant signal engineer at Cleveland.
- Engineer, maintenance of way.

Purchasing and Stores

Assistant general storekeeper at Collinwood.
Assistant district storekeeper at Elkhart.
Traveling storekeepers at Englewood.

Obituary

Oscar A. Constans, freight traffic manager of the Baltimore & Ohio, Western lines, died in Chicago on March 8. Mr. Constans was born November 23, 1862. He was educated in the grammar and high schools at Columbus, Ohio, and entered the service of the Baltimore & Ohio in 1883 as a clerk. In 1884 he became secretary to the assistant general freight agent and remained in that capacity until 1887, when he became secretary to the general freight agent at Pittsburgh, Pa. He was later appointed chief clerk in the general freight office at Pittsburgh and held that position until 1895, when he became division freight agent at Pittsburgh. Two years later he was transferred



O. A. Constans

in a similar capacity to Columbus, O., where he remained until 1907, when he was transferred to Cleveland. In April, 1910, he was appointed western freight traffic manager at Chicago. In 1916 he was appointed freight traffic manager, Western lines, which position he held at the time of his death.

Edmund D. Brigham, assistant freight traffic manager of the Chicago & North Western, died suddenly at the Union League Club, Chicago, on Saturday, March 5, following an attack of heart trouble.



E. D. Brigham

Mr. Brigham was 65 years old, and had been in railroad service for 48 years. He entered railroad work in October, 1873, as a telegraph operator on the Chicago & North Western at Ishpeming, Mich., but went with the Chicago, Milwaukee & St. Paul in December of that year as a night telegraph operator at Western Junction, Wis. From May 29, to November 2, 1874, he served as a night telegraph operator in the dispatcher's office on the St. Paul at Racine, Wis., but on the latter

date he returned to the Chicago & North Western, being made cashier, with headquarters at Ishpeming, Mich. In March, 1879, he was made agent at Peshtigo, Wis.; he was transferred to Ishpeming, Mich., in February, 1880, and in January, 1882, he was promoted to traveling freight agent, with headquarters at Fond du Lac, Wis. Mr. Brigham came to Chicago in March, 1885, having been appointed chief clerk in the general freight department. In October, 1888, he was promoted to division freight agent, with jurisdiction over the Wisconsin, Galena, Madison and Peninsular divisions and in January, 1893, he was promoted to assistant general freight agent. He was made general freight agent in February, 1900, and assistant freight traffic manager in 1910.

EDITORIAL

Railway Age

EDITORIAL

DAILY EDITION

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Among the important subjects presented by the Committee on Wooden Bridges and Trestles yesterday morning were the specifications, classifications and grading rules for timber and lumber for use in maintenance work. These specifications strike at a condition which has long prevailed on

The Specifications for Timber

the railways and which has been complained of by the manufacturers of lumber. It is unfortunately true that there is much merit to the criticism often voiced by lumber manufacturers that there has been no uniformity of specifications, grades or sizes of timbers required by the railroads, each road being a law unto itself in this respect. This wide variation in opinion has made it difficult for lumber manufacturers to proceed with the cutting of timber in advance of definite orders, for there was no assurance that these orders would include timbers of the sizes on hand. However, the position of the lumbermen has also been open to criticism in that they have endeavored to induce the railways to accept their stock sizes rather than those actually required by the roads. These conflicting viewpoints have tended to create a controversy in which the advantage has been first on one side and then the other. In revising the specifications for maintenance of way timber the committee has endeavored to present standards which all of the roads can adopt. If the roads will adopt these specifications and standards the criticisms of the manufacturers will have been removed in large measure and they will be able to proceed with the production of their materials,

knowing that they will comply with the requirements of many railroads. Once these specifications come into general use it becomes the duty of the lumber manufacturers so to cut their products as to meet the requirements of the railroads, since the railways, as purchasers, should be best qualified to pass upon the sizes and other conditions necessary to fill their requirements.

One of the tendencies which has been developing in the convention during recent years and which was particularly pronounced this year has been

Every Member Responsible for Discussion

the lack of interest in the discussion of many of the reports. This may be due in part to a feeling among the members that the conclusions of a committee have been so thoroughly considered that further discussion is unnecessary. It may be due in even greater measure to a natural hesitation on the part of many members to speak before a large audience, or to take issue with the committee. Regardless of the case it is an unfortunate tendency which should be corrected. Few committees contain within their membership all of the sources of knowledge on a particular subject. There are few reports on which further discussion and information will not contribute to the value and possibly lead to a modification of the recommendations and conclusions of the committee. The object of the Association is pointed towards the development of the best practices. Any member of the Association who withholds information which might add to the knowledge of a subject is depriving the entire railway industry of this help. Since the most accurate conclusions can only be drawn by incorporating all of the information available it is important that this information be drawn out in the discussion if it is not contained in the report itself. This entails an individual responsibility to the Association which every member assumes when he joins it.

The report of the Committee on Masonry contains a valuable suggestion for advancing the usefulness of the

A Field for Further Service

A. R. E. A. to the roads through the more intensive dissemination of information developed by the committees in the course of their work. The suggestion made by the Masonry committee relates to its own work, completed last year, namely, the Specifications for Concrete and Reinforced Concrete, but the same thought will apply to the work of other committees. It is proposed that these specifications be issued in pamphlet form in the same manner that the Specifications for Iron and Steel Structures have been published in various editions since they were first promulgated in 1906. The suggestion of the Masonry committee, however, goes further than this. In addition to the specifications *per se*, it is suggested that the pamphlet include a general fund of useful information on the subject of good practice in workmanship and material. In other words, it is proposed to prepare a fund

of data to support the requirements of the specifications couched in language that will appeal to the foremen and the inspector—the men who must be depended upon to secure the results. As pointed out by Mr. Robinson in his discussion, the real need is for simple statements of facts that the foreman can understand readily and put into use. Others may feel that a more comprehensive treatment would be preferable. Although there is thus an opportunity for a difference of opinion as to the character of information which should be included in such a pamphlet, it is believed that its publication will be an effective measure for the advancement in concrete practice on the railroads.

The reports of two committees presented yesterday bring out one of the most knotty problems now before the structural engineer. With all the scientific effort being directed at the perfection of concrete technology and for the improvement of timber treating practice, the use of both concrete and treated timber in sea water is attended with all too frequent failures. In neither case can the problem be said to have been solved satisfactorily. In each case there is a vast fund of conflicting data in which the results of imperfect practice are confused with conditions that indicate bona fide limitations of the present state of the art. Good results and long service records mingle with inexplicable cases of exceedingly short ones. The reports of these two committees presented yesterday were exceedingly frank in pointing out the limitations in the present use of the materials, one in the presentation of rules calling for very conservative use of concrete and the other in pointing out the shortcomings in the service secured from the creosoted piles exposed to the attacks of borers. In view of the fact that the constructor is practically limited to concrete and timber in his selection of materials for railroad works built at tidewater terminals, the presentation of the unvarnished facts concerning both of them is of inestimable value to the user and surely will accrue also to the ultimate advantage of those who supply the materials.

A Fair Presentation of the Facts

The reports of two committees presented yesterday bring out one of the most knotty problems now before the structural engineer. With all the scientific effort being directed at the perfection of concrete technology and for the improvement of timber treating practice, the use of both concrete and treated timber in sea water is attended with all too frequent failures. In neither case can the problem be said to have been solved satisfactorily. In each case there is a vast fund of conflicting data in which the results of imperfect practice are confused with conditions that indicate bona fide limitations of the present state of the art. Good results and long service records mingle with inexplicable cases of exceedingly short ones. The reports of these two committees presented yesterday were exceedingly frank in pointing out the limitations in the present use of the materials, one in the presentation of rules calling for very conservative use of concrete and the other in pointing out the shortcomings in the service secured from the creosoted piles exposed to the attacks of borers. In view of the fact that the constructor is practically limited to concrete and timber in his selection of materials for railroad works built at tidewater terminals, the presentation of the unvarnished facts concerning both of them is of inestimable value to the user and surely will accrue also to the ultimate advantage of those who supply the materials.

In its report presented yesterday morning the Committee on Wood Preservation called attention to the severity

The Ravages of Marine Borers

of the recent attacks of marine borers on exposed piling in coastal waters and described various means of arresting these attacks in their entirety or in part. While this subject has received considerable attention for a number of years because of the known attacks along the Atlantic Seaboard and the Gulf Coast, the recent unusually severe invasions in San Francisco Bay and along Puget Sound have directed increased attention to this subject. The depredations within the confines of San Francisco Bay alone are estimated to have caused damage exceeding \$15,000,000 within the last two years. In view of the decreased first cost of timber construction, it is important that means be discovered to overcome this trouble at the earliest possible date. The Committee on Wood Preservation has no more important work before it than to bring these investigations to a successful conclusion, for unless the proper precautions are discovered, the use of timber will of necessity be abandoned where marine borers exist. The present conclusions of the committee that the timber should receive a thorough treatment with creosote oil and that at points of particularly severe attack it should also be given mechanical protection as well,

should receive the serious consideration of all engineers charged with responsibility for the construction of docks and other structures in sea water.

Plan for the Future Now

THE MEASURE OF SUCCESS OR FAILURE achieved in business concerns, as in the lives of individual men, is mainly determined by whether they do or do not make thorough and intelligent plans for the future, and resolutely endeavor to carry them out regardless of the difficulties they meet. Often after plans are made it is necessary to modify them or carry them out less rapidly than was hoped, but it remains true that large success is almost universally the result of sound and thorough planning and of resolute endeavor regardless of obstacles.

There never were any concerns for whose future development and successful operation careful planning was more needed than it is now needed for the railways of the United States. Conditions of almost all kinds in the railroad field have undergone violent changes within the last four years. Furthermore, most plans for the development of the railways which were made prior to four years ago have had to be kept largely in abeyance since then. Consequently, there are few railways which would not benefit greatly by having a complete survey made of their present and probable future needs and definite plans made for their future development.

The present needs of most railroads are different from what they were a few years ago. This statement applies to their position both from the standpoint of their physical condition and their organizations. Never was there a time when the development of the railways and their organizations along lines which would enable them to reduce operating expenses and give better service was so imperatively required as at present.

In the making of any survey of a railway to determine its needs and the means which should be adopted to meet them, the engineering department necessarily will play an important part. The engineering officers should make every effort to equip themselves to do their part in solving the great problem presented and they should not hesitate to direct the attention of their superior officers to the necessity for beginning to plan now. The time to make plans is when business is bad. There is less time and opportunity to make them when business is good.

Of course, every suggestion for improvements which is offered will be met with the answer that the railway has not and cannot raise the needed capital, but every railway under anything like normal conditions has some money to invest, and the smaller the amount the more necessary it is to spend it where it will do the most good. Only by careful study and planning can every available dollar be invested at the time and in the place where it will contribute the most toward the improvements which will increase the net return required to enable larger improvements to be made.

The present is a time of severe retrenchment. This retrenchment is being carried out on most railways in a desperate effort to effect the greatest possible economies and largely regardless of future consequences. With so many railway companies threatened with disaster it is difficult to find fault with any immediate saving that may be made, however effected, but the very existence of present conditions is the strongest argument for careful planning for the future. It is a notable fact that in general the railways on which the most careful planning has been done in the past and the greatest efforts made year by year to carry out the plans made are those on which today the smallest number of the costly maintenance-deferring retrenchments are now necessary.



AS IT WAS
TOLD
TO US

S. L. Flen and F. Y. Hie, two representatives of the Chinese government sent to this country to study telephone apparatus, were visitors at the Coliseum Tuesday evening, taking special interest in the railway telephone equipment exhibits.

* * *

Judging from the frequency with which railway supply men are making trips to Cuba, the railways in that country must be in the market for tremendous quantities of material. Among those who have recently returned from business (?) trips to that island is F. L. Dodgson, consulting engineer of the General Railway Signal Company. Mr. Dodgson reports that the railway situation in Cuba looks very good.

* * *

W. P. Borland, chief, Bureau of Safety, Interstate Commerce Commission, came in on Tuesday to attend a meeting of the Joint Committee on Automatic Train Control. Mr. Borland left the following day with a subcommittee of the joint committee of the American Railway Association to make an inspection of the National Safety Appliance Company's intermittent induction type of train control which is in service on a short stretch of track on the Western Pacific.

* * *

One of the established customs of the convention is the assignment of Past President William McNabb to secure a prominent Canadian speaker at the annual dinner of the Association. The favor with which these speakers have been received by the Association is indicated by the fact that he has been requested to perform this duty year after year. Through his efforts the Association has been permitted to hear many of the most prominent men of Canada.

* * *

One of the interested visitors at the convention Wednesday was A. A. Potter, dean of engineering, Purdue University. Professor Potter is returning from a meeting of the Committee on Prime Movers of the National Electric Light Association, which committee has just completed an elaborate investigation, the results of which are contained in a 1,500-page report. Dean Potter has taken an unusual interest in the American Railway Engineering Association this year since the retiring president and the president-elect are both graduates of the College of Engineering at Purdue.

* * *

The memory of the late H. C. Cartlidge has recently been refreshed in the minds of many members of the American Railway Engineering Association through the receipt of copies of a bulletin of the International Railway Congress containing a review of the American railway practice in the use of concrete which Mr. Cartlidge prepared in 1914, but which was not published until again recently owing to the advent of the world war. A reading of this posthumous paper will impress one with the thorough grasp which this writer possessed in this branch

of engineering in which he had played so important a part. This fact was recently driven home to G. A. Haggander, Mr. Cartlidge's successor as bridge engineer of the Chicago, Burlington & Quincy. Mr. Haggander has had occasion to study the paper published by the International Railway Congress very carefully owing to the fact that the congress requested him to prepare an addendum to Mr. Cartlidge's report with a view to bringing the subject up to date. Mr. Haggander has just transmitted this to the congress.

The Latest Ford Story

Railway men were interested some months ago to learn that the man who put the "tow" in auto and who has since endeavored to remake many of our established institutions had also taken unto himself a railroad for the purpose of showing railway men how railroads should be run. We have learned in the course of the last two days that this successful American citizen is determined to reform the traffic and operating departments of the railroad. Indeed, he has even decided to show something to construction and maintenance of way. Recently while riding his pet hobby (in a physical sense) he inquired of the officer who accompanied him why the right-of-way was so wide and after this had been explained to him he inquired what was the minimum width that would suffice for operation. On being advised that 20 ft. could be made to serve the purpose he said: "Fine, we will use the rest of it for factories." But this is not all. He has also shown the bridge engineers a thing or two. Recently when designs were submitted to him in connection with a proposed bridge renewal, it was found impossible to convince him that any of the designs would serve his purpose. He did not want a swing span, but the bascule design submitted to him contained too many superfluous features. The counterweights particularly met with his severe disapproval with the result that he insisted on a design in which the span is lifted with a beautifully simple device consisting of two stiff leg derricks with fall lines of sufficient capacity to lift up the ends without the aid of any of those superfluous features such as were embodied in the designs which ordinary mortals had prepared.

Dr. Gunsaulus Dies

Those who were present at the annual dinner Wednesday evening and noted the absence of Dr. Frank W. Gunsaulus who was on the program to deliver the invocation, were shocked to learn yesterday morning that he had died suddenly at his home during the night previous. In addition to being pastor of one of the largest churches in Chicago for a number of years, he had been president of Armour Institute of Technology, Chicago, since its creation over 20 years ago. Dr. Gunsaulus was known internationally as an engineering educator. He resigned his pastorate in 1919 in order that he might give his entire time to the development of an enlarged institute of technology.

Statistics on Employees and Compensation

WASHINGTON, D. C., March 17, 1921.

The Interstate Commerce Commission has issued its quarterly report of statistics on employees and compensation for the third quarter of 1920. These are the first statistics showing the effect of the wage award of the Railroad Labor Board last July. It reveals a total payroll for that quarter of \$1,052,000,000 as compared with \$801,000,000 for the previous quarter, an increase of 31 per cent. This pay roll consumed 62 per cent of the total earnings of employees. The number of employees averaged 2,158,000. The total payroll for the three quarters of 1920 aggregated \$2,648,000,000.



An Interesting Type of a Double-Track Deck Girder Bridge on Steel Bents

Railway Engineering Association Proceedings

The Last Day's Session Included the Presentation of Reports by Nine Committees

IT WAS NOT UNTIL 4:30 yesterday afternoon that the twenty-second annual convention of the American Railway Engineering Association drew to a close with the installation of the officers elect for the coming year. Usually the discussion of the reports of the regular standing committees is completed by noon of the third day,

but owing to the fact that the report of one committee was held over from the preceding day and discussion of some of the reports proved somewhat more lengthy than usual, the convention occupied nearly the entire afternoon. Abstracts of the reports and the discussions which followed are given below.

Report of Committee on Masonry

A final report on disintegration of concrete in sea water reviews the available data on this subject and presents recommendations covering the preparation of concrete for use in sea water which will be effective in preventing or minimizing the disintegrating tendencies. The effects of age and condition of storage on the strength of concrete are outlined in seven conclusions. Similarly the effect of low temperature on concrete is stated, giving references to leading authorities. The slump test and the float table, two means for testing the plasticity of concrete, are also presented as affording new measures for obtaining a better quality of concrete.



J. J. Yates
Chairman

J. J. Yates, chairman of the committee, is completing his second year in this capacity and has been a member of the committee since 1912. During this long period of service he has played an important part in the work, having served as the representative of the Association on a Joint Committee on Cement Specifications and is now vice-chairman of the New Joint Committee on Concrete and Reinforced Concrete. His position as bridge engineer of the Central Railroad of New Jersey makes him particularly valuable to the committee, owing to his experience with important concrete structures in the salt water of New York harbor.

THE WORK OF THE COMMITTEE has been largely confined to joint committee on standard specifications on concrete and reinforced concrete, on which a report is expected in 1921. In Appendix A the committee presented a report on the disintegration of concrete and corrosion of reinforcing materials in connection with the use of concrete in sea water. In Appendix B it submitted its report on the effect upon the strength and durability of concrete not having a sufficiency of moisture present throughout the period of hardening as compared with concrete fully supplied with moisture.

Conclusions

The committee recommended the following action be taken on its report:

That conclusions 1, 2, 3, 4, 5 and 6 as given in Appendix A be approved and substituted in the Manual for conclusions 1, 2, 3 and 4 as they appear on page 294 of the 1915 Manual under Disintegration of Concrete and Corrosion of Reinforcing Metal.

That the report as given in Appendix B be accepted and printed in the Proceedings as information.

Committee: J. J. Yates (C. R. R. of N. J.), chairman; Job Tuthill (P. M.), vice-chairman; J. T. Andrews (B. & O.), R. Armour (G. T.), G. E. Boyd (D. L. & W.), T. L. Condon (Cons. Engr.), L. N. Edwards (Bur. of Pub. Roads), J. E. Freeman, T. L. D. Hadwen, Geo. T. Hand (L. V.), W. K. Hatt (Purdue Univ.), L. J. Hotchkiss (Foundation Co.), S. C. Hollister, R. L. Humphrey (Cons. Engr.), Noah Johnson (Wabash), M. S. Ketchum (Univ. of Colo.), W. S. Lacher (Railway Age), A. E. Owen (C. R. R. of N. J.), W. M. Ray (B. & O.), F. E. Schall (L. V.), Z. H. Sikes (N. Y. C.), F. P.

Sisson (G. T.), L. L. Tallyn (D. L. & W.), C. C. Westfall (I. C.).

Appendix A—Disintegration of Concrete and Corrosion of Reinforcing Material

A great deal of attention has been given in the past to this subject, not only in America, but also in Europe and other countries. Many of the investigations published, however, are based upon laboratory tests, which, while very interesting and valuable, do not furnish all the facts as to the action of sea water on concrete. Concrete placed in sea water is not only subject to a chemical action taking place in the transformation of some of the elements composing the concrete, but more particularly to the mechanical attacks due to the action of the tides, waves, ice, drift or accident, the variation of temperature, especially in the colder latitudes, all tending to injure the film of the exposed surface. When this film is once pierced or abraded, the aggregates and binding material offering less resistance, are exposed to these attacks, causing the more or less rapid destruction and failure of the concrete.

Engineering publications in the past record many failures of concrete placed in sea water; the causes are variously ascribed to the chemical effect of sea water on concrete, to the mechanical action of the tides and waves (largely aggravated in Northern latitudes by alternate freezing and thawing between high and low water level), poor selection of aggregates or lack of proper workmanship, etc.

Whether such failures were due to any one of the causes mentioned or to their combined action cannot be answered directly. It is known, however, that in the development of the various methods of proportioning, mixing and depositing of concrete during the past few years, much has been accomplished to make a concrete that will better serve the general requirements of good concrete construction. With proper study of all the conditions encountered in a particular piece of work, and with first-class material and workmanship, it is thought possible that concrete may be made that will withstand the action of sea water in warm climates, if guarded against abrasion, and by providing special face protection against the action of frost or floating objects, between low and high water, concrete may also withstand sea water in the colder climates.

PLAIN CONCRETE IN SEA WATER

For concrete structures in sea water particular attention is to be given to designing, to the avoidance of all sharp corners, offsets or pockets tending to obstruct the flow or gliding of waves and floating objects past the structure. The cement used in this class of work to be Portland cement, which must meet the requirements of the current specifications of the American Railway Engineering Association.

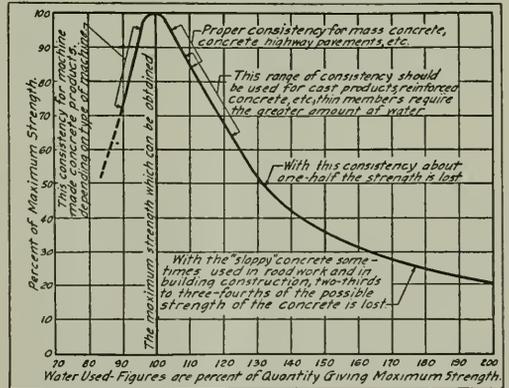
In the proportioning of fine and coarse aggregates, it is most important that a highly dense, impervious product be obtained. It is recommended that thorough tests be made to establish that mix which will result, with the aggregates used, in securing the greatest density of the concrete, and to continue these tests to maintain the proper mix at all times, until the completion of the work. Allowance should be made for the loss of cement when concrete is deposited into sea water. Special attention must be given to exposed surfaces to secure a hard, even and non-porous face of concrete. For pre-cast concrete blocks, piles, etc., placed in sea water, the foregoing requirements are equally important. Better results have generally been obtained heretofore with pre-cast blocks than with concrete deposited into sea water, but the

blocks must be well seasoned before being placed in position.

The sand must be free from clay or other foreign matter; clean, well-graded fine to coarse sand will produce the best results. The coarse aggregate should be carefully selected. It must be uniformly hard and durable. Non-porous, screened washed gravel is preferable for sea water work, especially in colder climates, although sound, hard, crushed stone may be used. Gravel affords better mixing and it settles more easily into place. Bank-run gravel, however, should not be used, since generally its quality is not uniform. Sea water has been used in the gaging of concrete, and it was found that the strength of the concrete is affected only to a small extent. Fresh water should be used when such can be obtained without unreasonable expense.

The gaging of the concrete is of great importance; the consistency should neither be too dry nor too wet. If deposited in air, a consistency that permits of light tamping and packing to bring water to the surface without much effort will generally be best; rodding, to secure greater density, may be employed to good advantage.

The time of mixing of the concrete for sea water construction must receive special attention, and should be tested out with the particular mix used, so that all par-



Effect of Quantity of Mixing Water on the Strength of Concrete

articles of the fine and coarse aggregates are thoroughly coated and the full strength of the cement used obtained. It is an established fact that the strength of the concrete increases, according to the time allowed for mixing, up to a certain point, and full advantage should be taken of this element; two minutes is considered a minimum.

In depositing concrete into sea water, continuous operations must be employed and the greatest care exercised if failure is to be avoided, either using a well-designed watertight tremie or a bottom drop bucket. It is important that the concrete be deposited systematically. If a charge is used, it must be kept filled at all times; when a charge is lost, the tremie must be withdrawn and refilled. If a drop bucket is used, the concrete is to be discharged from the bucket alongside the last previously placed; the whole of the surface should be kept as level as possible. In all cases, enclosed cofferdams should be used to prevent washing. In case of unavoidable interruption of the work, it is most important that the top surface be thoroughly cleaned of laitance after the stoppage of work before additional concrete is placed. The concrete above the low water line should be tamped and

compacted as it is placed and thoroughly worked next to the forms, to obtain a dense, smooth, non-porous surface.

If the foregoing is followed, a good and lasting plain concrete should be obtained, but this is only possible by constant vigilance, rigid supervision and care, in every detail of the process of construction. The least infraction on the established proportions or laxity in thorough workmanship may lead to failure.

REINFORCED CONCRETE IN SEA WATER

The protection of reinforcing steel in concrete placed in sea water is dependent upon the density, impermeability and lasting qualities of the concrete in which it is embedded, and the distance of the reinforcing steel from the surface of the concrete. When the surface film of the concrete is once abraded by mechanical or other action, the reinforcement may be reached by the sea water either through capillary attraction or exposure of the metal. The steel will then rust, causing its destruction, and also the spalling of the concrete by reason of the enlargement of the rusted steel. It is, therefore, imperative to construct a dense, impermeable concrete when steel reinforcement is employed.

Where possible, mass construction should be adopted for such part of concrete structures as will come in contact with sea water, between high and low water, and even for the parts above the high water line, steel reinforcement should be so placed that there is at least three inches dense concrete between the surface of concrete and the face of the steel to prevent moisture from the salt air penetrating to the metal.

CONCLUSIONS

1. Concrete for sea water work should be mixed in the proportions of one part Portland cement to not more than six parts of fine and coarse aggregates, measured separately and combined in such proportions as will produce a concrete of maximum density and impermeability. Only enough water should be added to secure plastic workability. The concrete shall be mixed in a batch mixer for not less than two minutes after all the materials are in the drum. Where concrete is deposited into sea water, the above proportions should be reduced to one part of cement to not more than five parts of separately measured aggregates. Tests should be made from time to time during the progress of the work to maintain the proper proportions of the aggregates throughout construction.

2. Concrete should be deposited in the air wherever practicable. When necessary to deposit concrete in water, it should be protected from currents by cofferdams or similar means.

3. The concrete, where practicable, should be deposited in a continuous operation to a point five feet above high water. In case of unavoidable stoppage of the work, the previously cast concrete should be thoroughly cleaned of all laitance.

4. From two feet below low water to two feet above high water, or from a plane below to a plane above water action, the face of the concrete should be adequately protected against mechanical abrasion and frost action. Construction or other joints should in every case be avoided within this zone. Sharp corners and projections should also be avoided, but where necessary they should be rounded to reduce abrasion to a minimum.

5. If reinforcement is used in concrete in sea water, special attention should be given in the design to the position of the reinforcement. In no case should the steel be nearer than three inches to any plain or curved sur-

face, and not less than four inches from any two adjacent surfaces.

6. The most rigid rules in regard to workmanship and inspection should be established and constantly enforced on all sea water work.

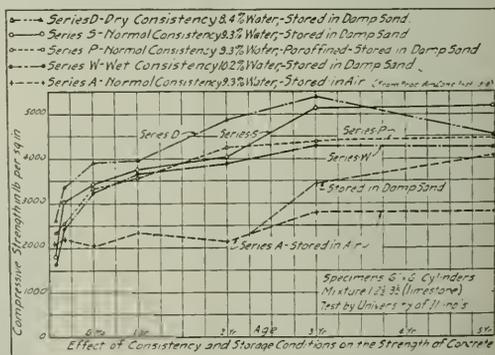
Appendix B—The Effect Upon the Strength and Durability of Concrete

A series of tests have been made at the University of Illinois supplemented by investigations made by the Chicago, Burlington & Quincy to determine the effect of age and condition of storage upon the strength of concrete. The results of the tests have been summarized as follows:

"1. The strength of the concrete which was stored in contact with moisture increased rapidly up to an age of one year; the increase in strength at ages greater than one year, although considerable, took place at a much less rapid rate.

2. The air-stored concrete attained nearly its final strength at a comparatively early age and gained little strength with the lapse of time.

3. The concrete which had been stored in air for a considerable time increased in strength greatly after it



Effect of Age on Compressive Strength of Concrete

had been stored in contact with moisture, so that further hydration of the cement could take place; the strength of the specimens stored in damp sand two years and eight months after they were two years and four months old was 1.46 times the strength of the specimens which remained stored in air for five years.

4. The strength of the concrete at an age of seven days for both damp sand storage and air storage was about 70 per cent of the strength at 28 days; at an age of one year the strength of the concrete stored in damp sand was about twice as strong as at 28 days and the air-stored concrete was only 10 per cent stronger than at 28 days. At an age of five years the strength of the concrete stored in damp sand was about 2.5 times the strength at 28 days and the strength of the air-stored concrete about 1.3 times the strength at 28 days.

5. At ages of three and five years the strength of the concrete stored in damp sand was about 1.9 times the strength of the air-stored concrete.

6. For the specimens stored in air the strength at an age of eight years was slightly more than that at six months.

7. The strength of the specimens stored in water for 10 months after they were seven years old was 1.3 times

the strength of the specimens which remained stored in air for eight years.

It seems apparent that concrete in structures exposed to air which is not damp will gain little strength beyond that attained at the earlier ages, in the portions where loss of moisture takes place, while concrete in contact with moisture or dampness will continue to gain in strength for some years."

Discussion

J. J. Yates (Chairman): The work of the Masonry committee this year has been largely confined to the work of the Joint Committee on Specifications on Concrete and Reinforced Concrete, and many of its reports are deferred pending the results of the final specification that is to be issued by that committee. I am pleased to announce that in accordance with the instructions of the joint committee, it is proposed to issue a tentative specification to the societies represented on the joint committee about May of this year, and I understand it will probably be published in July in our Bulletin. Under the rules of organization that discussion is to be open one year, and then it goes back to the joint committee for further consideration and preparation of the final specification.

The committee reports on two subjects, one a progress report, and one for insertion in the Manual. The first report for insertion in the Manual is report on disintegration of concrete and corrosion of reinforcing materials in connection with the use of concrete in sea water. This subject has been before the committee for several years and there have been several progress reports made. I will ask Mr. Schall, chairman of the sub-committee, to present the report.

F. E. Schall (L. V.): In presenting this report of sub-committee 2 of the Masonry committee it is well to state that we have found it difficult to find a common ground on account of the diversity of results obtained in using concrete in sea water. Ordinary concrete today used in sea water will not perform its duty. It requires the most careful attention in preparing the aggregates, grading them to the proper sizes, the mixing of the concrete, the placing of the concrete and working it in place, so as to obtain a dense impermeable product. The report has been published so there is no reason to go any further in regard to this matter, but I will read the conclusions.

(Mr. Schall read the conclusions.)

(*Moved that they be adopted by the Association and published in the Manual, and the motion was carried.*)

Chairman Yates: The next subject we want to present as information and we would like to have discussion. It is a very important subject, that is, the amount of consistency of concrete, and I am going to ask Mr. Freeman to discuss this.

J. E. Freeman (Port. Cement Assn.): The effect of the quantity of mixing water upon the strength and other properties of the concrete is a matter which has been brought out most forcibly by recent investigations. A chart shown illustrates the effect upon the strength, showing how, as the quantity of water increases, so the strength of the concrete that is produced decreases. In many cases in ordinary construction, the quantity of water that is used today is probably anywhere from 30 to 50 per cent in excess of the quantity needed for maximum strength. Now, of course, it is true that a concrete giving the maximum strength indicated on the chart would be rather too stiff to work readily in placing the concrete in structures, but at the same time a great deal can be done towards decreasing the quantity of water, and still have a plastic workable mixture that can be placed in forms without extra effort. By cutting down on the amount of water, which would bring up the

strength along the curve to a point between 110 and say 125, the strength of the concrete can be realized, which will be 70 to 90 per cent of that possible. The use of an excess quantity of water is bad from two standpoints. In one case it means waste of good material, and in another case it means a reduced factor of safety in the concrete that goes into the work. The excess water also means that other properties of the concrete are reduced in somewhat like proportion.

However, it is possible to control the quantity of water by means of a simple test which has been developed, called the slump test. The slump test can be used as a means of determining the slump of concrete that is produced with a given consistency, which has been selected on the basis of the mixture selected for work and the aggregates that are used as being the proper consistency for that particular class of work. This, then, can be transferred to the job and used as a control test for the maximum slump permissible. It is not necessarily an exact test. At the same time it is a good check to see that the consistency which has been selected for that particular job is not being exceeded by the use of more water than is really necessary.

A report which was presented in connection with the Masonry committee report for 1919 showed the results of some tests on the effect of moisture applied to the concrete while hardening and upon the compressive strength and the resistance to compression. Some of the tests now presented with this report as information carry this on further, covering a period from one year to seven years.

A. F. Robinson (A. T. & S. F.): I am one of the unfortunates who is not willing to accept the so-called slump test. It may be all right, and it doubtless is, but it is like some of those peculiar things which we can make mean almost anything. I feel a good deal as though the investigations thus far made, and while they were made on proper lines, have at the present time resulted in clouding the results. It does not seem to me that we ought to arrange our rules for making concrete in such a way that we have got to have a so-called concrete expert on every division of the road. We ought to be able to make our rules so that they are very clear and simple, and so that we can put them into the hands of any intelligent gang foreman and have the work carried out properly and get fine results.

I feel further that insufficient attention has been given to the question of the time the mixer is running. There is another very important feature, which does not seem to me the committee has even touched on, and that is the care of the concrete after it is placed. In this section of the country and east of here, there is usually a sufficient amount of moisture in the atmosphere to cure the concrete, but when you go west, we will say north and south of the line through Dodge City, every 10 miles you go west the quantity of moisture in the atmosphere is reduced, and I doubt if more than 70 per cent of the concrete that is built west of that line is anywhere near so good as it ought to be. This feature is one of the troublesome ones that I have to contend with. I am trying to find a method by which when concrete has been placed and the forms removed, we can coat it with something that is going to hold all of the moisture that has been put in the concrete in the mixing, and permit a complete hydration of the cement.

I have had several unfortunate cases in hand where we had failures of reinforced concrete girders. We have cut out pieces of the concrete that would break like a piece of half-dried clay. Afterwards these samples were put into water and left there for a week and we got a

fine ring to the pieces. In other words, the hydration of the cement was again started, even after it had stopped for several years.

Please do not understand from my remarks that I am attempting to ridicule or belittle this slump test and the test submitted by the Bureau of Standards. That is not my purpose. I am with you heart and soul in every kind of an investigation that can produce better concrete.

Chairman Yates: As to the mixing time, there has been considerable investigation on that point. I agree with Mr. Robinson there is a good deal of trouble now,

and we hope to join with the Concrete Institute this coming year in investigations of mixers. We do not know enough about mixers.

As for the care of concrete after seasoning, we had some reports last year but they were not satisfactory. We are not satisfied with the information we have for the Joint committee, and if any of the members have information with regard to failures of concrete and will send a written discussion on the subject, we will be only too pleased to put it before the committee.

(The committee was excused with thanks.)

Report of Committee on Buildings

A report on the classification of buildings for purposes of ascertaining the approximate cost of new construction shows that while detailed estimates are the most satisfactory, the amount of work entailed is too great where a number of structures are involved. Pricing curves are established by plotting known costs of actual building construction, using total cubical contents and the cost per cubic foot of a number of structures of one type. Sixteen separate classifications are submitted for the proposed final specifications of buildings. Results of studies presented in proposed specifications covering the first eight classifications.



W. T. Dorrance
Chairman

W. T. Dorrance, who is completing his first year as chairman, has been a member of the committee since 1915 and in this connection has participated in the extensive and constructive work which it has done in this period. The studies of this committee have done much to promote standardization of design and construction of the smaller railway buildings and have contributed thereby to economy of operation. The report this year is an important contribution to the knowledge of building classification. Mr. Dorrance is designing engineer of the New York, New Haven & Hartford and as such is brought into intimate contact with intensive maintenance problems.

IN APPENDIX A THE COMMITTEE submitted their report on the classification of buildings. In regard to specifications for buildings, specifications and methods in use were secured from various railroads covering various sections of this country and Canada. Careful study of the subject was made and decision reached that it was advisable to prepare separate specifications on the loose-leaf principle covering each class of work entering into railroad buildings. This would enable selecting the specifications required for any building desired and binding together to form a specification for that building. The subjects for these separate specifications are covered by the following list:

- (1) General conditions (to be attached to all specifications);
- (2) excavation, filling and back fill; (3) sewers and drains;
- (4) concrete; (5) brick work; (6) carpentry and millwork; (7) lathing and plastering; (8) hardware; (9) painting and glazing;
- (10) roofing; (11) plumbing; (12) lighting; (13) heating (steam); (14) heating (hot water); (15) heating (hot air);
- (16) scope of the work—In addition to the above specifications for the various trades, a specification should be drawn for each job defining definitely the scope of the work.

Eight of these were completed and presented as Appendix B.

The committee felt that it was practically impossible to write a specification that could be used without change by every railroad, but that the specifications submitted could be used as a guide, each road making slight modifications to fit local conditions.

Committee: W. T. Dorrance (N. Y. N. H. & H.), chairman; J. W. Orrock (C. P. R.), vice-chairman; F. L. Beal (St. L.-S. W.); G. A. Belden (C. of G.); Eli Christiansen; D. R. Collin (architect); W. H. Cookman (Penna.); A. Crable (H. V.); W. L. Darden (S. A. L.); K. B. Duncan (A. T. & S. F.); J. B. Gaut (G. T.); A. M. Griffin (A. C. L.); F. F. Harrington (Vir.); F. R. Judd (I. C.); G. A. Mitchell (G. T.); R. V. Reimer (C. R. R. of N. J.); C. W. Richey (Penna.); G. A. Rodman (N. Y. N. H. & H.).

Appendix A—Classification of Buildings and Methods for Ascertaining Approximate Cost

The subject assigned to the committee indicates that only a method be outlined and that no attempt be made to establish costs due to varying prices of labor and material, and differences in types of construction. The report included three different methods for estimating as follows: (A) Bill of particulars method; (B) square foot method, and (C) cubic foot method.

THE BILL OF PARTICULARS METHOD

The "Bill of Particulars" method calls for simply a detailed estimate as is now the common practice of engineers and contractors for arriving at cost of construction. This is the most accurate and is perhaps the most satisfactory method which can be devised where only one or a very few buildings are to be estimated. Where there are a number of structures similar in type the burden of making so many detailed estimates would be large and it is advisable to use some short cut of reasonable accuracy.

THE SQUARE FOOT METHOD

The "Square Foot" method necessitates first making up a series of bill of material estimates or applying known costs of existing buildings on the various types of buildings selected, and plotting these estimates and costs so that curves can be drawn establishing a square foot price. The application of it is very approximate due to the fact that buildings of the same type will vary in height and other particulars, but the "Square Foot" method is satisfactory for approximate estimates.

THE CUBIC FOOT METHOD

The "Cubic Foot" method must also be built up by first making bill of material estimates or plotting known costs

and establishing a price per cubic foot in the same way for the various types of buildings selected. The application of this method is more accurate, as it takes into account the different heights of buildings, varying cubage of roof construction, etc. The following method, which is based on specification type, is by no means perfect and is not the only one that can be used, but it has been used satisfactorily on a number of railroads in connection with government valuation with various modifications. Briefly the method is as follows:

First, set up certain types of buildings, based on specifications, separating the different types of construction and different utilities, giving for each type a specification sheet showing briefly the principal details of construction. It is advantageous to make as few types as possible, consistent with local conditions. Each type may cover the complete structure, including normal foundation, plumbing, heating and lighting, but for accurate results it is recommended that the building type cover only the shell, setting up the foundation as a separate type and adding plumbing, heating and lighting at a cost per unit.

Following this latter scheme, there would first be set up type standards to cover the following foundations—the type description to show the depth, general dimensions, class of masonry, etc., as follows:

- (1) Timber post, 8 in. x 8 in.—5 ft. C-C, 7 ft. long.
- (2) Masonry pier, 12 in. x 12 in., brick on concrete footings.
- (3) Trench walls, 20 in., rubble or concrete walls.
- (4) Trench walls, 30 in., rubble or concrete walls.
- (5) Cellar, 20 in., rubble or concrete walls, with 12 in. x 30 in. footing concrete floor; 1 flight plank stairs; coal bin—windows with aces and gratings.

The following types for superstructure are suggested and will probably answer the purpose on most roads:

Frame passenger station.....	3	types
Brick passenger station.....	3	types
Stone passenger station.....	1	type
Concrete passenger station.....	1	type
Frame freight house.....	3	types
Brick freight house.....	3	types
Concrete freight house.....	1	type
Frame shop, 1 and 2 story.....	2	types
Brick shop, 1 and 2 story.....	2	types
Frame engine house.....	1	type
Brick engine house.....	1	type
Concrete engine house.....	1	type
Frame section house.....	2	types
Frame yard buildings.....	3	types
Signal towers.....	4	types
Dwellings.....	5	types
Office buildings.....	3	types

The above schedule of types is suggested for use in connection with valuation of existing buildings. For new work it would probably be advisable for any one road to limit the number of types to a minimum.

Each superstructure type should show the kind and style of framing, size of principal members, description of flooring, wall covering ceiling, outside covering, roof, over-hang chimneys, and other building items, as per specimen type sheet as follows:

Specification for Building of Type No. 1

FRAME PASSENGER STATION—Type No. 1

- Frame:** Spruce sills, 6x8 in. Floor joist, 3x10—16 in. C-C. Posts, 4x6 in. Studs, 2x6 in. C-C. Plate, 4x6 in. Rafters, 2x10—20 in. C-C.
- Framing:** Full mortise and tenon.
- Exterior Walls:** Sheathed and clapboarded with paper between (or covered with wood shingles or tin shingles).
- Exterior Trim:** Cypress, corner boards, water table, belt course, fascia and cornice.
- Interior Walls:** No. 1 planed, matched and beaded Nor. Car. pine sheathing with wainscot 3 ft. 6 in. high.
- Ceiling:** No. 1 planed, matched and beaded Nor. Car. pine (or 2 coats plaster).
- Floors:** 1 in. Rift hd. pine on 1 in. under floor.
- Interior Trim:** Cypress, all stock shapes.
- Roof:** 1 in. boarding with building paper, tin, wood or asphalt shingles.
- Gutter:** Wood or galvanized iron.
- Conduction and Flashings:** Galvanized iron.

Overhang: 6 ft. wide on four sides, sheathed underneath, with brackets.

Doors and Windows: All stock shapes and sizes.

Hardware: Iron, bronzed finish or brass.

Painting: 3 coats lead and oil. Inside filled and varnished.

Interior Fittings: 1 ticket shelf, 1 telegraph shelf, 200 ft. b.m. of pine shelving; iron wire grill in ticket window.

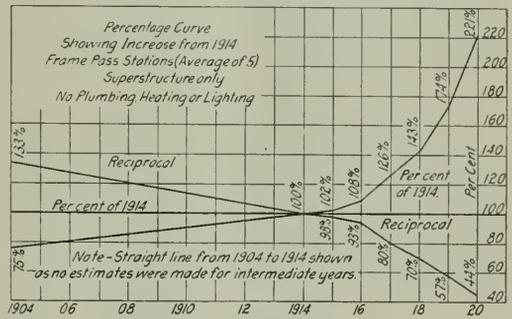
Chimney: Two 4 in. brick walls, 8x12 in. flue lining.

Additions should be made for slate or tile roof, concrete or terrazzo floor, special sizes and shapes of doors and windows, fireplace or mantel of elaborate design.

Plumbing: Various types should be set up to cover the principal classes of fixtures used by the carrier, and a price per fixture estimated for each type. This price is to include the proportional part of the total cost of such items as sewer and water connections, meters, soil pipe, etc. The following types for plumbing fixtures will answer most purposes:

- Closet with wood stall complete.
- Closet with slate stall complete.
- Urinal, flat back.
- Urinal, with slate stall.
- Urinal, full porcelain stall.
- Wash bowl.
- Sink, 18 in. x 30 in., cast iron with back, legs and fittings.

Heating: The best method of typing and pricing heating systems is on the basis of cubic foot of space heated—the



Trend Curve for Building Costs

system to be complete in itself, including boiler, radiators, and piping. Type to be set up to cover the following units:

- Hot air furnace.
- Steam—One- or two-pipe system. Cast iron radiators.
- Steam—One- or two-pipe systems. Pipe coils.
- Hot water—Two-pipe system. Cast iron radiators.
- Hot water—Two-pipe system. Pipe coils.

Lighting: This can be computed on either a cubic foot basis or price per fixture, but from experience we believe that the price per fixture is most accurate and easiest to apply. The price per fixture to include connection with city lines, meters, switches, and all wiring and fixtures inside the buildings, throwing everything into a type with the exception of very elaborate or expensive fixtures which should be priced separately. The following types are suggested:

- Electric lights with wall brackets—plug or drop.
- Electric light with chandelier, 2 to 4 lights.
- Gas—wall brackets.
- Gas—chandelier, 2 to 4 lights.

Furniture: The furniture in a building usually varies considerably even in buildings of the same general type, and we believe that a better method is to make a complete inventory and price each article separately, although such buildings as section houses and small railroad stations can be handled by assigning a typical outfit and putting one lump sum price on the whole outfit.

After setting up these various types, pricing curves should be plotted to cover foundation and superstructure, using the left-hand margin for the actual cubic contents of the building and the top and bottom margins for the price per cubic foot.

In order to establish the curve for any particular date, several structures conforming to the type are selected—taking the largest, the smallest and several intermediate sizes—a complete bill of material estimated and priced, and from this is computed the total estimated cost of the shell, and the cost per cubic foot. These points are plot-

ted on the sheet and in addition all available contract costs and costs of structures built by company forces, which conform to this type, also plotted. With these various points an average curve is drawn. These curves can be used for either pricing buildings for valuation purposes or for estimating the cost of new work, as of the one given date. Due to the rapidly changing labor and material prices, some method must be devised for modifying cost figures so that comparison can be made between similar types built at different dates. This can be done by a curve showing the cost of construction from 1904 to 1920, taking 1914 as normal and plotting the average for each year.

It is found that the pricing curves for the various types of buildings all follow the safe general shape and after establishing the form of the curve it is only necessary to figure about three buildings of any one type in order to give the curve the proper location on the pricing sheet. The method of applying this scheme in practice is to figure the cubic contents of the building—pick up the price per cubic foot from the curve sheet, and apply it to the cubage. In the same way figure the cost of foundation, then add the number of units of plumbing, heating and lighting at the type price, add such items as furniture, grading, outside drainage, platforms, etc.

Discussion

W. T. Dorrance (Chairman): The subjects assigned to the Committee on Buildings this year were five. (Read subjects.) A study of the Manual was made and the committee has no recommendations to make involving the subject matter; the conclusion on this subject merely refers to the editing and rearrangement of the subject matter now published.

Chairman Dorrance: Subject No. 2 on the Classifi-

cation of Buildings was given considerable study, and the committee presents as information the matter contained in Appendix A.

Chairman Dorrance: Subject No. 5 is to report on specifications for buildings for railroad purposes. The committee secured specifications from various railroads and made a careful study and analysis of the ones they were able to secure and from the data and information collected felt that the proper form for a general specification of this sort was in what might be termed the loose leaf form, whereby each general subject was given a specification by itself, so as to make possible the combining of any number of these into one specification for such buildings as might be under discussion. We selected 16 different subjects and were able to prepare specifications for 8 of these. The committee would like to have the approval of the Association for this general method of the work and would like to submit the 8 specifications which we have prepared for discussion, expecting them to lay over for a year before they are offered as final conclusions for insertion in the Manual.

O. E. Selby (C. C. C. & St. L.): I notice that carpentry and millwork are associated together. I have found that the practice in actual work is to separate these two subjects distinctly, the millwork is sublet usually and is a distinct classification. The carpentry work includes rough lumber and the placing of the mill work. The mill work includes all work that is dressed or framed in the mill before going to the site, and I think it will facilitate letting mill contracts if these two subjects are specified separately, and it can then be shown distinctly in the case of each building just what is included in the term mill work.

(The committee was excused with the thanks of the Association.)

Report of the Committee on Roadway

Some subsidence occurs under all embankments built on any ground except rock, the percentage being greater under small fills than under large ones. No fixed rule is possible for estimating the amount. Tests show that an average allowance of 10 per cent will cover shrinkage on earth removed from excavation. Local conditions must be studied in ascertaining subsidence or swell in rock. More consideration should be given drainage conditions when contemplating construction of long cuts on flat grades. Where such cuts are unavoidable good, wide, deep side ditches should be provided. If impracticable, sub-drainage should be provided.



J. R. W. Ambrose
Chairman

J. R. W. Ambrose has served as chairman for two years and as a member of the committee for eleven years. He has given much time to the work of the committee and has studied at length the problem of determining unit pressures allowable on roadbeds of different materials. He served as chairman of a sub-committee investigating this subject at one time, working in co-operation with the Committee on Stresses in Railroad Track. He is chief engineer of the Toronto Terminal Railway Co., a joint organization of the Canadian Pacific and the Canadian National which has under way the reconstruction of the terminals in Toronto.

THE COMMITTEE submitted (1) a few proposed changes and revisions of the definitions in the Manual. It also presented its findings and recommendations in regard to subjects (2-3) subsidence and shrinkage, in Appendix B; (4) metal culverts, in Appendix C; (5) sealing of cracks by cement gun, in Appendix D; and (7) drainage of long cuts. Progress reports were made on (5) sealing of cracks by cement gun and (6) standing water in borrow pits.

Conclusions

The committee recommended that the findings and conclusions on subjects 1, 2, 3 and 7 be adopted and

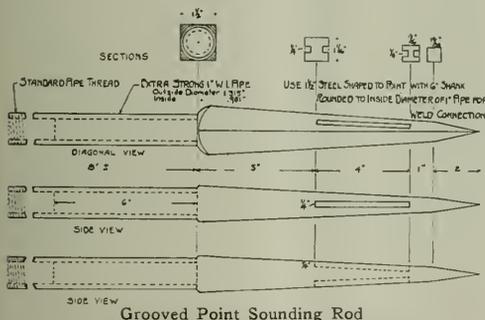
placed in the Manual and those on 4, 5 and 6 be accepted as information only and incorporated in the proceedings.

Committee: J. R. W. Ambrose (Tor. Term.), chairman; J. A. Spielmann (B. & O.), vice-chairman; E. J. Bayer (C. C. & St. L.), C. W. Brown (L. & N. E.), H. W. Brown (Penna.), C. C. Cunningham (C. R. I. & P.), W. C. Curd (Cons. Engr.), W. M. Dawley (Erie), Paul Didier (B. & O.), S. B. Fisher (M. K. & T.), R. D. Garner (S. N. E.), J. A. Lahmer (M. P.), J. G. Little (Railway Age), H. W. McLeod (C. P. R.), C. M. McVay (K. & M.), W. H. Penfield (C. M. & St. P.), P. Petri (B. & O.), J. W. Pfau (N. Y. C.), Frank Ringer (M. K. & T.), R. E. Robinson (U. P.), R. A. Rutledge (A. T. & S. F.), H. E. Tyrrell (Sou.), C. E. Weaver (L. I.), W. H. Woodbury (D. M. & N.).

Appendix B—Subsidence and Shrinkage of Embankments

Subsidence occurs principally and to the greatest extent in marshes, swamps, bogs and wet lands, the reason obviously being that the natural ground will not sustain the combined embankment, track and loads. In many cases the yardage below the original natural surface of the ground was found to be several times the quantity of that above it. In preliminary work there is no fixed rule for determining what amount of subsidence will occur. The engineer locating a new or additional line through bogs, swamps, marshes, etc., would do well to make allowance for considerable subsidence. In some cases, before building, soundings have been taken with a view to locating the hard surface under swamps, bogs, etc., and allowance made for the fill to subside to that level. This is not always possible, however, and it sometimes happens that this hard surface will break under the weight and subsidence continue indefinitely.

It was found that subsidence to some extent will invariably occur under embankments built through ordinary grazing or agricultural land. This applies to the greater percentage of embankments, as most of the land in the country comes under this class. This is due to the loose formation of the upper crust of the ground, which has not



Grooved Point Sounding Rod

the bond, weight or density of the lower beds due to the roots of grass and other vegetation, plowing and the action of frost keeping the bond continually broken up. The percentage of subsidence will be much greater on the small fills by reason of the smaller area of the base and the tamping action of trains. On the larger and higher fills the base is spread over a much greater area and the tamping action is not so pronounced at the base, consequently the subsidence is proportionately less.

The committee called attention to the good results secured in determining the extent of subsidence on small fills by means of a slotted and pointed bar, which, when driven to the bottom of a fill and turned leaves in the slot a specimen of the material at that point. For convenience of handling an extension may be put on the bar. This method, however, would not be practical on fills of over 10 ft. Great care should be taken in recording the measurements of the different depths.

Trenching is the most accurate method of determining subsidence. It is not, however, always practicable or possible to trench, in which case the boring methods must be used. Wash borings are more or less inaccurate and should be used with care. Several roads report they are unable to get any real results from their use, the holes filling with soupy, muddy water and the dividing lines of the strata impossible to determine. Dry borings protected by casing, if necessary, have given good results when proper care has been taken in making and record-

ing same. In determining the extent of subsidence, care should also be taken in locating the line of the natural surface at the toe of the embankment. On account of the earth often sliding or washing down and spreading out at the toe, a very gentle slope is left, which can easily be mistaken for the natural surface.

Subsidence occurs in two distinct ways. By compression and by displacement. On ordinary land the upper strata of earth being weakly bonded will tamp and compress, permitting the fill to subside. This will also occur in shallow swamps, such as muskeg, or where water standing on the ground will lessen its bearing power. Subsidence from this cause, as a rule, is not serious from an operating standpoint, as it will cease after the strata of soft material immediately under the fill is sufficiently compressed or tamped. Great and serious subsidence is caused by displacement. In deep, bottomless bogs and swamps, the embankment often continues to subside, displacing large quantities at the sides and requiring constant attention to prevent the interruption of traffic. In some such cases embankments have been known to reach a state of equilibrium without having reached a solid bottom, but this has taken a considerable time. Others are still subsiding after many remedies have been tried, and it seems probable will continue to do so indefinitely.

The effect of subsidence is to lower the base of the fill, causing a corresponding shrinkage of the track structure, involving heavy maintenance charges, and in some cases so large as to justify the abandonment and relocation of the line.

CONCLUSIONS

Some subsidence occurs under all embankments built on any ground except rock. It is very light in sand and gravel. The percentage of subsidence is greater under small fills than under larger ones.

Subsidence is due to compression or displacement of the strata of earth under the embankment.

Subsidence must always be anticipated in swamps, marshes and bogs, and any land on which there is standing water.

Serious subsidence is local and it is impossible to fix any rule as a guide in estimating or anticipating same.

The question has been raised as to whether shrinkage actually exists. It is felt by the committee that the existence of shrinkage is proved by every ditch or sewer line and every post hole. The Chicago, Burlington & Quincy, Duluth, Missabe & Northern and Duluth & Iron Range have made shrinkage tests by the density method, which may be briefly described as follows: Samples are taken from various points in embankments with an iron or steel cylinder of known cubical capacity, care being taken to neither compress nor expand the material. The same thing was done in adjacent excavation when it was quite certain that the embankment was built from this excavation. These samples were taken to the laboratory, where they were weighed and placed in a dry, warm or hot place. When samples were quite dry they were again weighed. The differences in weight is taken as measurement of change in volume. This method was described in detail on page 1573 of the June 4, 1920, issue of the *Railway Age*.

The results obtained indicate that the experiments should be carried on more extensively. Some remarkable ideas are developed, such as that the shrinkage of material is proportional to its weight, and weight depends on the depth in the natural bed. These subjects are capable of great and interesting development. From the results as obtained by this method it would seem the net shrinkage (making no allowance for subsidence) of common earth, would average close to 9.5 per cent and as 10 per cent is the commonly used allowance this would show it to be

away from the actual material and convey the water away as rapidly as possible; and, if then tile drains are still necessary, they should still be placed at satisfactory depth, and the cut ditches should still be kept open at all times; it being, of course, obvious that all ditches or drains must be kept open, as otherwise they defeat their own purpose. In hauling out cleanings from ditches or opening up new ditches, the material, if wasted, should be so placed that it cannot be washed back into the drain ditches or pipes in case of heavy storm.

Each year Drainage Districts are organized in territory adjoining railroads and where borrow pits exist are assessed exorbitant amounts for benefits assumed to accrue to embankments through drainage of the pits.

The report of the committee should be of value to the railroad by showing the effect of standing water, how best to overcome it, and whether or not drainage ditches will benefit track. If we should go on record with a report based upon replies received to date, which are to the effect that borrow pit drainage will relieve unstable track, we feel that the Association Proceedings will be in evidence at the trial of every Drainage District case and that the railroad companies will be further burdened by higher assessments.

The committee wishes to finally dispose of the subject, but it cannot do so without assistance. In view of its importance, we feel it would be unfortunate indeed if we had to recommend to the Association that the subject be withdrawn from further consideration.

There are very few railroads having no borrow pits, and it should be a comparatively easy matter to secure data as to their effect upon embankments under varying conditions. From many of the replies to our circular letter, it would appear that the effect of water in borrow pits is confused with that of water pockets.

The committee does not wish to prescribe any specific form of investigation that should be carried out, but rather that you follow your own ideas. What we are after is reliable data from which a conclusion may be reached.

Discussion

J. R. W. Ambrose (Chairman): This is one of the committees that believes in standardization, and where there are two or more ways of doing things, we believe that the A. R. E. A. way is the way it should be done.

In the absence of J. G. Little, the chairman of the sub-committee on the revision of the Manual, I will present that part of the report. We wish, in the first place, to standardize the spelling of the word "berm," at least for this Association. There is considerable difference in the pronunciation of the text word Subsidence. We propose the accent be placed in the "si."

The definition for shrinkage was criticized somewhat by Mr. Wendt last year, and through the efforts of Mr. McVay's committee on subsidence and shrinkage, this new definition was formulated. The definition for settlement is entirely new, and we wish to delete the table on page 28 of the Manual in connection with the allowance for shrinkage, as it differs somewhat from Mr. McVay's report which will follow. *I move that this part of the report be approved.*

(After extended discussion of the definition for "shrinkage" the motion was put and carried.)

Chairman Ambrose: The second subject is "Subsidence and Shrinkage of Embankments." That is handled by Mr. McVay.

C. M. McVay (K. & M.): The sub-committee and the committee in general has put in considerable time in going over the information that was received, and submits the conclusions given in its Appendix B.

Chairman Ambrose: *I move that the conclusions be approved and incorporated in the Manual.*

G. A. Mountain (Can. Ry. Com.): I would like to ask how the conclusion was reached of figuring a shrinkage of 10 per cent on earth moved from excavation to embankment?

Mr. McVay: We had cases cited where the shrinkage would run as high as 40 to 60 per cent, other cases were given where the shrinkage was 2 and 3 per cent. Practically the only comparison that could be made was the quantity in the excavation and the same quantity in the embankment. Quite a lot of the information that is available does not carry that out far enough to give much information, but we found that 10 per cent was what would be used generally all over the country in ordinary earth excavation by practically all engineers in anticipating shrinkage, and we also found that the average of figure taken after the jobs were completed, where the figure was prepared in a usable shape, was very close to 10 per cent. I am free to say that that appears to be the general practice. Almost every railroad replying stated that 10 per cent shrinkage was allowed.

J. B. Jenkins (B. & O.): I will ask the committee if it will accept an amendment to Conclusion 1, inserting "of quantities measured in excavation" after "per cent," making it read: "Figure a shrinkage of 10 per cent on earth removed from excavation to embankment."

The reason I suggest this is that the I. C. C., where it has been applying a shrinkage of 10 per cent has been adding 10 per cent to the shrunken embankment quantities in order to ascertain the quantity of excavation, which results in a shrinkage of 9 per cent instead of 10.

Chairman Ambrose: There has been, as I understand, some dissension about the way this is to be applied, as to whether this yardage is from the source or in the opposite way. We found that in some cases it was applied one way, and in others in another way in different cases that were brought to our attention, but we did not feel like saying that it must be applied from the source or that it must be applied from the final location. The percentage, I believe, runs about 9.1 one way and approximately 11 the other way. The way it is written here it implies excavation, and that is, I think, the way that it is generally applied by the chief engineers of the roads from whom we got replies.

Mr. Jenkins: *I move that the words "measured in excavation" be inserted after "per cent."*

(Motion carried.)

The Chairman: That places the submission of these questions before you in an amended form.

E. A. Frink (S. A. L.): *I move to amend Conclusion No. 1 in Appendix 8 by including the words "in general" after the word "is," so the last sentence will read: "The percentage of subsidence is greater under small fills than under larger ones."*

The Chairman: The committee will accept that suggestion.

(Motion carried.)

Chairman Ambrose: The next subject is "Corrugated Metal Culverts." Mr. W. H. Penfield (C. M. & St. P.), chairman of that sub-committee, was called away suddenly last night. The committee collected considerable data regarding the use of corrugated metal culverts. It does not recommend the use of them as a permanent proposition, but only as a temporary one.

Chairman Ambrose: "Sealing Bad Cracks in Rock Cuts with Cement Gun." The committee has received considerable information on this subject from a number of roads, but the work is not far enough along yet to furnish any definite conclusions.

Chairman Ambrose: Standing water in borrow pits is the next subject. This subject was handled by Mr. W. C. Curd, chairman of the sub-committee, who will present the report.

W. C. Curd (Consult. Engr.): There seems to be a confusion existing between the effect of standing water in borrow pits and the water remaining on the track, and we have not been successful in getting specific locations from which we could report anything definite.

Chairman Ambrose: "Drainage of Larger Cuts," which was the last subject, will be presented by Mr. Robinson. Chairman of that sub-committee.

R. B. Robinson (U. P.): The sub-committee on this

subject has thought that because of the drainage requirements, long soft cuts offered a condition that should be avoided in any reasonable way possible in the first place in not laying the line into such soft locations if it is reasonably possible to avoid it. After it may have been found necessary to lay a line into a condition of that kind, various methods have been used to carry off the water.

We are not attempting to say that any one method would solve every local condition that could arise.

Chairman Ambrose: *1 move that these conclusions 1, 2 and 3 be adopted.*

(Motion carried.)

(The committee was excused with thanks.)

Report on Wooden Bridges and Trestles

Various types of wooden trestles have been studied with a view toward standardization. An analysis of designs shows a wide variation in stresses from those adopted by the A. R. E. A. A revision of allowable stresses is recommended in order to take advantage of the increased knowledge regarding different woods. Cooper's E65 is considered the maximum loading for wooden trestles built with the timber now generally available, while the E-55 loading is considered sufficient at the present time. Complete specifications for lumber and timber to be used in the construction and maintenance of way departments are presented for adoption.



W. H. Hoyt
Chairman

W. H. Hoyt is rounding out his third year as chairman of the committee, after serving for four years as vice-chairman. He was first appointed a member of the committee in 1914. He is an active worker in association activities, having been prominent in the work of the Duluth Engineers' Club, the Federated Engineering Societies of Minnesota and the American Society of Civil Engineers. He has been connected with the railways on the Iron Range of Minnesota since their inception. As assistant chief engineer of the Duluth, Missabe & Northern for 19 years and chief engineer for the past year he has had charge of ore dock development.

THE COMMITTEE PRESENTED a number of revisions of the Manual covering changes in definitions and minor changes in the text of the sections on guard rails and guard timbers, lag screws and specifications of workmanship. In Appendix A the committee submitted a progress study of the various types of wooden trestles with a view to recommending two or three standards adaptable for general railway use. In Appendix B the committee presented its specifications, classification and grading rules for timber and lumber for railroad purposes.

Conclusions

The committee recommended the adoption of the suggested revisions of the Manual and the adoption and publication in the Manual of its report on specifications, classification and grading rules for timber and lumber as given in Appendix B.

Committee: W. H. Hoyt (D. M. & N.), chairman; A. O. Ridgway (D. & R. G.), vice-chairman; H. Austill (M. & O.), F. C. Baluss (D. M. & N.), C. H. Blackman (L. & N.), M. I. Connerton (Sou.), H. J. Hansen, H. T. Hazen (C. N. R.), C. S. Heritage (Wash. Term.), E. M. Lewis (C. G. W.), J. B. Maddock (C. of G.), L. A. Murr (S. A. L.), D. W. Smith (H. V.), L. L. Sparrow (A. C. L.), G. C. Tuthill (M. C.), A. M. Van Auker, S. L. Wanson (M. P.).

Appendix A—Study of Various Types of Wooden Trestles

Forestry Bureau places supply of old lumber, not once cut over, as follows:

Southern yellow pine.....	139 billion ft. b.m.
Douglas fir	560 billion ft. b.m.

The National Lumber Manufacturers' Association reports as follows:

Douglas fir	595 billion ft. b.m.
Southern yellow pine.....	258 billion ft. b.m.
Oak	157 billion ft. b.m.
Cypress	23 billion ft. b.m.

Advices from southern mills are that there will be no difficulty in securing sixteen-inch timber as long as yellow pine is sawed commercially, and that prices will continue to be fixed by the market price of commercial lumber into which it can be sawed.

The sub-committee was unable to agree upon loading classification of trestles and the matter was referred to the main committee, which approved the following:

Light loading	Cooper's E-45
Medium loading	Cooper's E-55
Heavy loading	Cooper's E-65

Another question leading to much discussion was that of allowable stress. The stresses shown in the table in the Manual were excellent when adopted, but with the more concise definitions of timber and the increased knowledge of its strength, it should be possible to improve it.

The table of comparisons of stringer designs for wooden trestles was made from the data furnished by the table compiled from the answers to the questionnaire sent to the various railroads. These designs display American railway practice quite completely. No data was available relative to the maximum engine loading allowed on these structures by the railroads using them.

Column No. 4 is a coefficient which when multiplied by the individual wheel load will give the maximum moment for the span. Coefficient is calculated on the assumption that axles are spaced five feet apart and positions chosen to give the maximum moment. Simple beam action for one span only is considered. Partial

continuity due to beams being two span lengths adds to the factor of safety where this construction is used. Column 5 is the similar coefficient for maximum shear.

Column 10 gives the total width of the timber and for any given cap dimension will indicate the relative end bearing stresses between the cap and stringers. Column 11 gives the total cross-section area, useful in comparing end shearing stresses under like loading.

Column 14 gives ratios of actual bearing width to span length. The larger values indicate the more favorable stresses between the cap and the stringers. This ratio is only useful in comparing stresses from uniform loads. With concentrated loads the end stresses vary with the position of the loads.

Column 15 gives ratio of cross-section to the span length. The larger values indicate the more favorable stresses of shear at end sections. This ratio serves for comparisons only for uniform loads. With concentrated loads the end shear stresses vary with the position of the loads.

Column 16 gives ratio of section modulus to span length. The larger values indicate more favorable bending stresses. This ratio is only accurate for comparison under uniform loading.

Column 17 gives the values of the cube of the span length divided by the product of the width and cube of the depth of the stringers. All formula for deflection have this factor in combination with a factor of distri-

signs than columns 16 and 15, because in a wooden trestle live loads are more important than uniform dead loads in determining the stresses.

Columns under fiber stresses give values based on 40,000, 50,000 and 60,000-lb. axle loadings on five-foot spacings with no impact or dead load of deck stresses added. As the basic data does not indicate the limits of loadings put on the various railroad trestles by the railroads using them, it was thought best to display the effect of all three classes of loadings on each of the three determining points of design. Doubtless many of these structures were never designed to carry E-50 and E-60 loadings and may now be protected by limitation of engines allowed to pass over them.

The question of proper impact percentage to be added to the live load for these short spans of timber construction is still believed to be unsettled. However, any value used will materially increase the unit stresses above those shown in the tabulation.

Columns 23, 27 and 31 give the equivalent Cooper's rating assuming the stresses be limited to the amounts given in the table of "Working Unit Stresses for Structural Timber" in the Manual. These ratings were computed with dead loads of actual decks deducted from total carrying capacity.

In the recommended standards for loading, your committee finds that in many cases the maximum on any one span of trestle will occur when two 70-ton coal cars,

COMPARISONS OF STRINGER DESIGNS FOR WOODEN TRESTLES

Table with columns: SPAN, DESIGN OF CHORD OF STRINGERS, RATIOS FOR COMPARISONS, FIBER STRESSES AND EQUIVALENT RATINGS. Includes sub-headers for BENDING, LONGITUDINAL SHEAR, and COMPRESSION ACROSS GRAIN.

bution of loading, weight of loading and the structure of elasticity. Assuming these and other factors constant, the factor — serves to show the relative deflections and hence the smaller values indicate small deflections and hence the more rigid chord.

Column 18 gives the ratio of the maximum moment coefficient for the span length to the section modulus of the chord used. The larger values indicate greater fiber stresses in bending. While the moment coefficients were calculated on wheel spacings of five feet, because modern locomotives rarely have spacings closer than five feet, this assumption will serve for the comparisons of spans up to include 16 feet.

Column 19 gives the ratio of maximum shear coefficient for the span length to the cross-section area. The larger values indicate greater shear unit stresses in both vertical and horizontal shear.

Columns 18 and 19 are better for comparisons of de-

fully loaded, and coupled, pass over the structure. Theoretically, this approximates Cooper's E-50 loading, but is thought to be no more severe on the structure than an engine of the E-45 class. It is believed E-55 will be sufficient for the present needs of nearly all the roads, as that load is exceeded as to its effect on trestles, by comparatively few engines now in service. In E-65, there is found the maximum load for which a practicable wooden trestle can be designed with the woods generally available for trestle construction.

As to the advisable length of panel, the committee agreed upon 12 ft. Yellow pine manufacturers have assured the committee that 16-in. stringers will be available without undue cost, as long as yellow pine lasts, but evaded promising an 18-in. stringer. Also, the 16-in. stringer is in general use at this time. With a 16-in. stringer agreed upon, the 12-ft. panel is very nearly a corollary.

Having fixed upon the panel length and loading, we proceed to the remaining factors. First comes the pile.

We will not discuss varieties of timber, believing the engineer will use the best available, and make up for any lack of structural strength by increasing the size. It is also thought a 14-in. butt will be the minimum size used. It was assumed that piles should be, if possible, be so driven as to be safe for a load of 15 tons plus impact.

Class	Rating	Load on Bent of Piles	No. on Pile	Load on Pile	Load Per Sq. In. Area Cap on Pile
Light	E45	56 tons	4	14 tons	210 lb.
Medium	E55	68 tons	5	13.6 tons	177 lb.
Heavy	E65	80 tons	6	13.3 tons	173 lb.

In the event it becomes necessary to strengthen E-45 to carry E-55 load, or E-55 to carry E-65 load, the weight would be 17 tons and 16 tons respectively on the piles, which would be permissible.

So many varieties of woods are used for caps that only a general rule applying to pine, cypress and fir can be used. It is recommended that the following be used:

Light	.....	12 in. x 14 in. x 14 ft.
Medium	.....	14 in. x 14 in. x 14 ft.
Heavy	.....	14 in. x 14 in. x 14 ft.

While more than 13 ft. in length may be unnecessary, since we must pay for even feet there is no cogent reason against using such length. Caps should be surfaced on one or two sides and not dapped over the pile. Dapping is expensive and weakens the cap.

Sway bracing should ordinarily be used on all bents over 10 ft. from surface of ground to base of rail. When this distance exceeds 18 ft. there should be two or more sash braces and corresponding sway braces. Bracing should be on both sides of the pile. The aim should be to so attach the braces as to enable them to give the bent the maximum strength. The bank bent should be the same as the intermediate bent, save that no bracing is required and that in the E-65 design only five piles are recommended for the bank bent.

For frame bents the committee's recommendations are:

Class	Cap	Posts	Sill
Light	.....12x12x14	4-12x12	12x12
Medium	.....14x14x14	5-12x12	12x12
Heavy	.....14x14x14	6-12x12	12x12

The committee asked further time for consideration of design of multiple story bents and their bracing. The batter to be used for piles and posts in trestle construction has been given consideration, but no recommendations are made at this time. No conclusion has been reached relative to details of fastenings to be used in securing the posts to sills or caps to posts. Sway bracing in single story bents should be the same size as in pile bents and similarly attached. In considering stringers, it was recognized that the two lighter types should be readily strengthened for the next higher loading and in our plans this can be accomplished by inserting an additional stringer under each rail. It is recommended:

Class	Size of Stringers	Fiber Stress, Lb. Per Sq. In.	Long Shear, Lb. Per Sq. In.	Compression on Cap, Lb. Per Sq. In.
Light	6-7x16	1422 lb.	168 lb.	221 lb.
Medium	6-8x16	1346 lb.	180 lb.	200 lb.
Heavy	8-8x16	1257 lb.	178 lb.	178 lb.

It will be noted that in longitudinal shear the stresses much exceed those given in either of the tables before referred to.

Ties should be 8 in. x 8 in. x 10 in. surfaced on one side, not dapped, 12-in. centers and attached to stringers in accordance with recommended practice of the A. R. E. A. Guard timbers should be 4 in. x 8 in. attached to ties according to recommended practice of the A. R. E. A.

Discussion

W. H. Hoyt (Chairman): The first subject, the revision of the Manual, was in charge of Mr. Ridgway, but in his absence Mr. Austill will present the matter.

(Mr. H. Austill (M. & O.)) presented the matter under "Revision of Manual."

Chairman Hoyt: *I move that the recommended changes of the committee be adopted and incorporated in the Manual.*

G. A. Mountain (Can. Ry. Com.): There is a term used by the committee under "Use of guard rails and guard timbers for wooden bridges and trestles." It is recommended that the inner guard rail, when used, shall be so spaced, etc. I think it is common practice to use an inner guard rail, and this expression would seem to convey the idea that the committee does not recommend it entirely.

Chairman Hoyt: That is in the present Manual, and the question is optional with the designing engineer as to whether to use guard timber or not. I am informed that that matter was up at a previous meeting, and a motion to make it standard practice to use an inner guard rail was not approved, and that is the reason that the committee left that clause "when used" in there. Of course, it is possible to bring the matter up at the present time to decide whether it shall remain or not.

Mr. Mountain: In our practice in Canada it is standard.

Chairman Hoyt: The practice is nearly so in the United States, but there may be a number of cases where it does not apply.

Motion carried.

Chairman Hoyt: The second subject assigned was "Specifications and Classification and Grading Rules for Lumber and Timber to Be Used in the Construction and Maintenance of Way Departments of Railroads." This subject has been before the committee for the past three years. It has again been gone over this year; a number of revisions and improvements made as we see it and it is now submitted with a view to final approval for printed as recommended practice.

The President: On the question of ties, something was said yesterday about the correlation between the recommendations of various committees as to ties and those of the Tie committee.

Chairman Hoyt: As we have taken up the question of ties, we only make recommendations for ties for wooden bridges and trestles. We do not deal with track ties as such.

The question arises as to switch ties, sawed. It was intended that this clause would apply only to structural oak for bridge purposes. If there seems to be any conflict with the report of the Tie committee, that particular paragraph can be omitted, but I see no reason why it should be.

F. R. Layng (B. & L. E.): I think that should be done. These specifications cover wooden bridges and trestles, and should not conflict with the specifications of the tie committee. I suggest the Board has been a little liberal in its assignment to this particular committee.

The President: I think that is true, it is a matter to be handled by the Board. This suggestion is noted and the committee on outline of work will take that out.

Chairman Hoyt: *I move the adoption of the specifications in the Manual as recommended practice.*

(A recess was taken for lunch.)

Chairman Hoyt: I want to bring up the matter of uniform sizes, which was one of our hard nuts to crack. This received endorsement of the largest number of consumers that have ever got together in a particular matter. They held a meeting in Chicago last year representing practically all of the retail lumber dealers of the country. This question was thoroughly gone over, and they favored and approved standard uniform sizes. To make anything of that kind effective it requires the backing of the consumers everywhere, and that is the

reason that we inserted and are in favor of definite uniform sizes for lumber.

(The pending motion carried.)

Chairman Hoyt: There is one other report that this committee offers for a progress report. This sub-committee's report is submitted in Appendix A. I would ask Mr. Van Auken to explain the features of the report as far as the work has progressed up to the present time.

A. M. Van Auken (Monon): Our report as you will see is only a progress report. There were five members on our sub-committee, and there were five opinions on nearly every subject that came up. We have tried to work out some of the bigger questions in this problem, and we put the results before you.

(Mr. Van Auken abstracted Appendix A), and said:

We corresponded with the mills and the Forestry Bureau about sizes. A good many of them did not give us very much of an answer, but the Forestry Bureau sent us a pamphlet and gave the sizes of standing timber in yellow pine which indicates that 26-ft. stringers, 16-in. in the largest dimension, could be sawed out of a very considerable portion of the standing yellow pine.

I made a rough estimate of the amount of wooden trestles on roads, and replying found that a very considerable majority still use yellow pine stringers; consequently it was necessary that we should not adopt a set of standard plans, that would eliminate the larger portion of the railroads.

The principal reason for adopting E-45 as the lightest loading was the fact that practically every road is liable to haul over it two heavy coal cars coupled, and that is practically an E-50 load; but due to conditions we all understand, the committee adopted E-45. With a 16-m. stringer we could not carry these loads on a longer

span than 12 ft. The recommendations agree with that.

E. A. Frink (S. A. L.): Some of you may remember that I objected very strongly last year to the loading adopted, and I think there is much more justification for the loading on trestles than there would be on bridges, because the margin of overstrain is not nearly as large. It does not seem to me, however, that we ought to use standard loading of E-45, 55 and 65 for timber trestles used in the same track with steel bridges, with a standard of E-60. It seems to me as though the loading of the trestle ought to correspond with the bridge that has to carry the same load. I think the committee would do well to revise those loadings and agree to load with steel bridge specifications.

I question the statement of the committee about paying for even feet, for stringers are universally ordered in double panel lengths, so that there is no objection to buying panel lengths in even feet. I do not say I advocate that. I am suggesting it for the consideration of the committee.

I also question the statement of the committee about the use of 16-in. stringers instead of perhaps 14. While it is perfectly possible to get 16-in. stringers from our southern mills, yet it has been my experience that you pay more per thousand feet for 16-in. than you do for 14-in., and more for 14-in. than you do for 12-in. Therefore, I think some method should be allowed to have the road use whatever size of stringers which best suits their practice. The road I represent has used 14-in. stringers for years and is using them now.

Chairman Hoyt: The discussion that has been brought out by Mr. Frink is just exactly what we want. The more data and the more information of that sort that we can get, the better we will be satisfied.

(Committee was excused with thanks.)

Report of Committee on Wood Preservation

Inspection of ties treated with water gas tar shows that good results may be obtained with this preservative. Tests on toxicity of sodium fluoride indicate it to be about double that of zinc chloride. To date it has only been used for experimental purposes. It is recommended that test sections of track be installed for the further study of this preservative. Attacks of marine borers on exposed piling are of late more extensive and severe than formerly. Creosoting, when properly carried out, will protect piling from attacks of teredo on the Atlantic coast, but on the Gulf coast it is often inadequate. Creosote has not been found to stop the attacks of linnoria.



C. Marshall Taylor
Chairman

C. Marshall Taylor, the chairman of this committee for the last three years, is now also the president of the American Wood Preservers' Association and, like a considerable number of others interested in that special branch of engineering, he has consistently divided his time and efforts between the Wood Preservers' Association and the committee on that subject in the A. R. E. A., of which he has been a member for 11 years. Mr. Taylor is the superintendent of the Port Reading Creosoting Plant of the Philadelphia & Reading and the Central Railroad of New Jersey, but has also had an opportunity to view timber treatment's commercial side.

IN APPENDIX A THE COMMITTEE submitted service test records covering two kinds of work, one on the service of ties in experimental tracks, which are covered by reports from the Baltimore & Ohio, St. Louis-San Francisco, Chicago, Indianapolis & Louisville, the Santa Fe, and the Chicago, Rock Island & Pacific, and the second class is by reports of the Cleveland, Cincinnati, Chicago & St. Louis, showing the total number of ties they have put in track and taken out from the year 1905 until 1919, inclusive.

In Appendix B the committee reported on the subject

of water gas tar as a preservative. The use of sodium fluoride as a preservative for cross-ties is covered by the report of committee as given in Appendix C, while in Appendix D the committee reported on the protection of piles in water infested by marine borers.

Conclusions

1. The committee recommended that further reports on indicators for determining burnetting of ties and timbers be eliminated, as this matter seems to have been covered fully in previous reports.

2. The committee recommended that the question of the comparative values of Grades 1, 2 and 3 creosote oil and creosote coal-tar solution is one that is not definable in any way so that conclusions can be considered for adoption as recommended practice.

3. The committee recommended that no further consideration be given to the proposition of trying to develop comparative values of Grades 1, 2 and 3 creosote oil and creosote coal-tar solution.

Appendix A—Service Test Records

The reports submitted by the Chicago, Rock Island & Pacific, the St. Louis-San Francisco, the Baltimore & Ohio, the Santa Fe System and the Chicago, Indianapolis & Louisville, are made up from test sections. In adopting this method much more reliable data is obtained, for the reason that a record of each particular tie in these sections is kept, and, furthermore, a close supervision is kept over these sections enabling those responsible of keeping a close supervision, both in tie renewals and tie removals. It is a distinct advantage to keep each class of wood used in these sections separately in reporting, as by so doing the average life of each kind of wood may be easily determined.

While it is possible that the form used might be improved upon, it is suggested that the next committee be instructed to follow up this question with the view of having this form, or one similar, adopted by all roads as standard, which would result in making the reports of more value to all concerned.

Appendix B—Merits of Water-Gas-Tar as a Preservative

The report of the committee in 1917 contained an account of the ties treated by the United Gas Improvement Company of Philadelphia and placed in the track of the Public Service Company of New Jersey. They were treated in 1911 with the full-cell treatment of 10 lb. per cubic foot. The manner in which these ties were treated, together with the analysis of the oil used and their location, was given in detail in that report. On December 1, 1919, the ties were again inspected and were apparently in excellent condition, none having been removed on account of decay. They are mostly Florida pine 6x8 in. by 8 ft. and have now given approximately 9 years' life.

In November, 1914, the Baltimore & Ohio placed 600 red oak ties in a test track at Herring Run, Md. They were treated by the United Gas Improvement Company at Philadelphia with water-gas-tar. An inspection of these ties was made on September 16, 1920, with the result that after six years no signs of decay were found, while 63 per cent of the untreated red oak ties placed in the same track have been removed account of decay. Two of the ties were taken out of this track for test. Each tie was sawed in two and one-half of each sent to the Baltimore & Ohio laboratory at Baltimore; half of one tie to the laboratory of the Port Reading Creosoting Plant at Port Reading, N. J., and half of one tie to the laboratory of the United Gas Improvement Company at Philadelphia. The oil was extracted and analyzed with the following results:

	Tie No. 1805 B. & O. Analysis	Tie No. 1960 B. & O. Analysis
Specific gravity, 38°/15° C.	1.085	1.108
Distilling below 205° C. ....	.6	4.2
205° to 235° C.	2.6	...
235° to 245° C.	2.8	3.1
245° to 275° C.	7.4	4.1
275° to 315° C.	7.4	14.7
315° to 330° C.	9.7	10.6
Residue	69.1	63.2
Loss .....	.4	.1

The ties appeared to be in good condition, although in several sections rails had been respiked and the old spike

holes were not plugged. No treated ties have been removed except those for the purpose of test. In view of the good results so far obtained in the treatment of cross-ties with water-gas-tar, it is suggested that other railroads install test tracks, and keep a careful record of the comparative life of cross-ties treated with water-gas-tar alone, or combined with coal-tar-creosote, zinc chloride, or other preservatives.

Appendix C—Availability and Use of Sodium Fluoride as a Preservative

Sodium fluoride has been used only in very small amounts for the preservation of ties, and that only for experimental purposes, and comparatively little is available for the preservation of ties at this time. Lack of a demand and an immediate shortage of high-grade fluor spar has deterred manufacturers in increasing their facilities for its preparation. Its recovery as a by-product from the manufacture of phosphate fertilizer is not being carried out because of the high initial outlay in plant construction under present conditions of labor and material shortages.

Tests on the toxicity of sodium fluoride as made by the Forest Products Laboratory, Madison, Wis., indicate it to be about double that of zinc chloride. Service tests on ties treated with this salt have not been carried on over a period sufficiently long to determine if this same ratio holds true in practice. Until this information is at hand, it appears that no railroad going into the extensive use of sodium fluoride for the treatment of ties would be warranted at this time, in using an amount much less than is customary when treating with zinc chloride, i. e., ½ lb. per cu. ft. of wood. Under the circumstances, the comparative prices of zinc chloride and sodium fluoride will determine whether or not the former will be supplanted by the latter, wholly or in part.

Recent developments indicate that there is a possibility that sodium fluoride will be obtainable at a price very nearly that of zinc chloride. This situation, therefore, causes the committee to suggest that any railroad maintaining experimental tracks should arrange to install a sufficient number of ties treated with sodium fluoride to obtain test records from which definite conclusions may be drawn.

Appendix D—Protection of Piles in Water Infested by Marine Borers

There are many varieties of borers present in the coast waters bordering the United States, but as far as protecting against them is concerned there are only two that need be considered, viz., the mollusk, represented by the various species of teredo, and the crustacean, represented by the limnoria and to some extent the sphaeroma. Protection that is effective against these is also effective against any others so far encountered. The borers breed faster and their attack is more severe in warm than in cold water, in clean water than dirty water, and in salty than brackish water. The action of limnoria is affected by the velocity of the current so that each location presents a problem in protection by itself, and a method that is effective in one location may be ineffective in another.

The activity of these borers is as a rule affected by the same conditions; however, their simultaneous presence is not always the rule nor is their activity necessarily the same, although found in the same location; as an example, the teredo is active in Norfolk harbor, but there are very few, if any, limnoria. The range of action of the teredo is from a point above low water mark to a depth of 25 to 30 ft., or to mud line. The attack of the limnoria is most severe between high and low water, but extends down to about the same depth as that of the teredo. In

Charleston harbor, where limnoria is particularly active, there are creosoted piles which are badly eaten at low water mark, but which have been attacked only to a slight extent in patches below low water. Untreated piles in these waters are quickly attacked by the limnoria at all depths to the mud line.

Creosoting has been relied upon to a great extent for protection against the attacks of marine borers and experience has shown that where properly carried out, from the selection of the timber to the driving in the structure, creosoting will generally stop the teredo at points on the Atlantic coast north of Florida, but that at points on the Gulf and Pacific coasts where the teredo is more active creosote treatment is often inadequate.

On the Atlantic and Gulf coasts the piling treated for marine use is usually pine and on the Pacific coast Douglas fir. The piling should be free from knots or other imperfections that will interfere with the creosoting. The inner bark should be completely removed and as much creosote oil should be injected as the wood is capable of taking up. After treatment the piles should be handled in such a manner as to avoid tearing the wood or abrading it in any way that will weaken or break through the treated area, and they should not be cut or bored below high water mark, the idea being to present to the teredo a perfect and impervious armor of creosoted material without holes or weak spots. As it is impossible to secure perfect material, perfect treatment and perfect handling the creosoting process as ordinarily applied can be considered as effective only in greatly retarding the action of the teredo.

Creosote so far has not been found to stop the attacks of limnoria. On the most carefully treated specimens of pile south of Norfolk on the Atlantic coast, the Gulf coast and on the Pacific coast their action is noticed after three to six years, probably as soon as the creosote has lost some of its toxic properties through leaching, and when once started their action progresses rapidly. In view of this experience, at points where the borers are very active, it is the practice of many who desire to insure a greater permanence of protection to piles in important structures to apply mechanical protection to the piles in addition to creosoting. Piles that receive mechanical protection are creosoted in addition in order to prevent decay above the water and also retard the attacks of borers until repairs can be made in case the mechanical protection becomes damaged.

CAST IRON CASES

These cases are made in halves so that they can be placed in position after the piles have been driven and capped. As the castings are bolted together the casing is lowered to the mud line and forced down into the mud. The space between the case and pile is usually filled with sand and capped with cement mortar to prevent the sand being washed out by the waves. This protection is entirely efficient as long as the jacket remains intact. Cast iron corrodes very slowly in sea water and if made thick enough will resist corrosion a great many years. Some of these cases at points on the Gulf have been in position about 30 years. Care must be observed that the cases go far enough into the mud so that the piles will not be uncovered by the washing away of the mud, or by dredging operation. In this event the sand escapes and the entire pile is exposed to a current of sea water and then to attack by the borers.

VITRIFIED PIPE CASES

In locations not exposed to wave action and the pounding of drift, vitrified pipe can be substituted for cast iron. It does not corrode, but is easily broken. The pipe sec-

tions are preferably in one piece and placed over the pile before it is capped. The sections are cemented together, lowered to the bottom and forced into the mud. The space between the case and the pile is filled with sand and capped with cement mortar.

This protection has been much used along the Gulf and Pacific coast, where full length protection is necessary, and is entirely efficient as long as it remains intact. Any defects in the case below the water will be shown by the escaping sand and any broken pipe sections can be easily replaced. It is the custom in maintaining these cases to make inspections and repairs about once a year. For protecting piles after they have been capped, or for making renewals, the pipe sections are made in halves and are joined together with some form of lock or copper wire, or treated wooden plugs.

REINFORCED CONCRETE CASES

Cases less fragile than vitrified pipe and less expensive than cast iron can be made of reinforced concrete.

The sections can be made in one piece for placing before the pile is capped, or in halves for placing afterward. One design provides for a lock by leaving some of the reinforcing wires projecting so that they can be twisted together and covered with cement mortar after the halves have been joined. For these cases the concrete casing over the reinforcement is rather thin, and there is some question whether the reinforcement will corrode and the cases go to pieces under the action of sea water. Service tests are needed to develop this point.

CONCRETE JACKETS CAST IN PLACE

Considerable protection work has been done of late in Charleston, S. C., waters by casting concrete jackets in place about the piles. In these waters the teredo is less active than at points on the gulf, and is successfully controlled by careful creosoting. The limnoria is very active and will finally cut off creosoted piles at about low water mark. It does not seem to work progressively on treated piles at depth greater than two feet below low water mark, although piles that have been pulled show traces of attack in isolated patches all the way to the mud line. Under these conditions, protection for a length of about 10 ft., extending from about three feet below low water to about two feet above high water, is efficient. Some of these jackets are plain concrete and some are reinforced.

Casting the concrete jacket in place has the advantage of restoring in a measure the strength of the pile, even though its section may have been reduced materially. On a protecting job now going on in Charleston jackets of plain concrete are being used. These are about 3 in. thick and the concrete is 1-2-4 mix with fine aggregate. The forms are No. 24 gage galvanized iron, the sheet being wide enough to form a complete section. The two edges are nailed to wooden strips about 2½ in. square, one of which has a tongue and the other a groove. The sheets are placed around the pile and the wooden strips clamped together. A tight, smooth concrete form is obtained. By using forms made in this way concrete jackets have been carried as much as 12 ft. below low water, and good results obtained.

NAILS, SHEET METAL, TAR, ETC.

The oldest method of protection of which we have knowledge is studding the exposed surface with nail heads. Its virtue does not seem to lie entirely in covering the exposed surface with nail heads, but is still effective when not more than one-fourth the surface is covered by the heads. Several plain piles studded with nails were driven about 2½ years ago in Charleston harbor. The nails have heads about ¼ in. in diameter and were driven

$\frac{1}{2}$ in. to $\frac{3}{4}$ in. apart. The piles are entirely free from attacks by borers, whereas a plain pile without the nails driven at the same time has been reduced at low water line by the action of the limnoria from about 10 in. to about 5 in. in diameter.

Sheets of copper and zinc have been used with success in many places for protection against marine borers. This protection is entirely efficient as long as it remains intact. However, full length protection must be applied before the pile is driven and it is likely to be broken in handling. Copper is not affected by salt water, but zinc soon corrodes. It is stated that some of the brands of rust-resisting sheet iron will withstand the action of sea water for several years, and it is possible that that material could be used to advantage under some conditions rather than copper, which is too expensive. Many attempts have been made to provide a durable protection by applying coatings of tar or asphalt either alone or combined with some fabrics. These coatings are efficient as long as they can be kept intact, but they are likely to be broken by handling, or by the pounding of drift, and they have in general proved unreliable. Bark left on piles will protect against marine borers, therefore, when plain piles are used in infested waters their life can generally be strengthened by leaving the bark on.

Discussion

C. M. Taylor (P. & R.): Chairman. The report on wood preservation this year is full of information without any definite recommendations for the Manual. A part of the report that should appeal to each and every maintenance engineer is given in Appendix A on service test records. These records have resulted from experimental track in most cases on the Rock Island, the St. Louis-San Francisco, the Baltimore & Ohio, the Santa Fe, and Monon and the Big Four. In all cases except the Big Four their result is obtained through the insertion of experimental track sections. The first report will be the results obtained on the Rock Island, which will be presented to you by Mr. Ford.

(C. F. Ford (C. R. I. & P.) presented his report.)

Chairman Taylor: Are there any comments to be made on the result of the tests on the Rock Island? You will note that they cover three different treatments, and are giving very satisfactory records.

Mr. O. C. Steinmayer (St. L.-S. F.) is not present, but I would call your attention to the report of the Frisco. It is very interesting to note that the white oak, the basis for comparison in most tie work, does not show up as well as a great many people think it should.

F. J. Angier (B. & O.): The tests on the Baltimore & Ohio are in test tracks. We are not trying to keep a record of ties. We have 8 or 10 test tracks, the most important is the one that is just east of Baltimore—Herring Run. We put in 3,300 red oak ties in this test track. They all were put in under the same ballast conditions with screw spikes and tie plates and treated in 10 different ways. Three hundred ties were put in untreated. The others were treated with zinc chloride, with sodium fluoride, water gas tar, coal tar, creosote, mixtures of coal tar, creosote and zinc chloride.

The statement of the report is a little misleading. It shows the percentage of ties removed from all causes, and in this particular test track at Herring Run it shows that 300 ties treated with zinc chloride, 42 per cent have been removed, but not a single tie has been removed for decay. Those ties were removed on account of putting in a switch, and on account of a derailment on this track. It seems to me that it would be better if we could use two columns, one showing the number of ties taken out on account of decay, and the other for other causes.

Chairman Taylor: The result of the A. T. & S. F. test will be given by Mr. R. S. Belcher.

R. S. Belcher (A. T. & S. F.): The only difference between the test sections and the ordinary sections is that an individual record of each tie is kept. We have one or two special tests where ties were put in out of place, and possibly our oldest test of this kind and the most remarkable is the one made on the "Ottawa Cut-off." This represents about 24,000 ties that were put in in 1906, ordinary hewn Lobolly pine, which our reports show were treated with creosote, and although these ties have been in more than 14 years, only 357 have been taken out to date, and none because of decay. The principal reason for removing the 357 ties is derailments and breakage.

Chairman Taylor: The next report will be that of the Big Four, which is along entirely different lines. It is a history of their treated tie work from the time they started until the end of 1919. In other words, it is the whole story, and I will ask Dr. von Schrenk to explain the report.

Dr. Von Schrenk (Cons. Timber Engr.): Without going into the details of the interesting phases which have developed through a recent study of the tie record, the point I wish to call particular attention to is that these figures represent as nearly as possible an actual count of every tie, both treated and untreated, inserted on the Big Four System since 1905. The Big Four adopted the practice of putting a date nail into both treated and untreated ties. As careful a record as possible has been kept of all removals by years. You will note that the tie insertions have dropped from 369 ties to the mile to 201 in 1919, or a reduction of 168 ties in the mile. This record shows in a striking way that the probable life that we are attaining from these early ties give every indication that every tie in the railroad should be a treated tie.

Chairman Taylor: The next portion of the report is shown in Appendix B, Merits of Water-Gas as a Preservative. This portion of the report will be presented by Mr. Angier.

(Mr. Angier then presented Appendix B.)

Chairman Taylor: The next subject reported on is Availability and Use of Sodium Fluoride as a Preservative for Cross-ties. Sodium fluoride has certain apparent advantages in the treatment of cross-ties, and the committee suggests that any railroad maintaining experimental tracks should install a certain number of ties treated with sodium fluoride and maintain records from which conclusions may be drawn.

On Subject 8, Comparative Values of Grades 1, 2 and 3 Creosote Oil and Creosote Coal-Tar Solution, the committee feels that the report as given last year covers the situation as well as it is able to put it in writing, and in connection with Subject 9, Accelerated Tests of Grades 1, 2 and 3 Creosote Oil and Creosote Coal-Tar Solution, the committee has unfortunately not been able to develop reliable methods for making any such accelerated tests.

With reference to Conclusion 2, the committee felt that the data it has in hand at the present time does not enable it to give you something you can put in the Manual. The committee does feel, however, as time goes on that it may have something on the comparative values of Grades 1, 2 and 3, but it also wishes to say it is not something that can be decided immediately, because it is interwoven with so many other problems in connection with the committee work. It is difficult for the committee to formulate any definite conclusion that it would dare ask to be put in the Manual. The committee feels that this subject is one that all future committees should

consider, and if at some time they are able to give you something that is worthy of insertion in the Manual, they feel that such will be done.

With reference to Conclusion 3, Chairman Taylor said: It was the thought of the Committee of Direction that this committee could develop something that would determine this matter very quickly, and they suggested ac-

celerating tests to show this differentiation in values. The committee is very frank in saying that it is an absolute impossibility, and for that reason it recommends that no further consideration be given to the subject. It is one of those things which cannot be done quickly.

(The committee was then excused with the thanks of the Association.)

Report on Rules and Organization

In the manual of instructions for the guidance of engineering field parties the committee submitted an abstract of H. H. Edgerton's monograph. The subject matter, revised, is submitted for inclusion in the Manual. The chief work submitted is a manual of rules for the guidance of maintenance of way employees. While presented for inclusion in the Manual, it is recommended that it be considered as a live document to which additions or changes can be made as railway practices change. Safety rules affecting the different classes of employees are incorporated as a part of the regular rules governing employees working on or about the track.



W. C. Barrett
Chairman

W. C. Barrett is now completing his first year as chairman of the committee and his third year as a member. He has been able, through his experience first as division engineer on the Lehigh Valley and more recently as trainmaster, to learn and appreciate the importance of well-thought-out practical rules for the guidance of those employees concerned with engineering and maintenance of way and also with the operating departments as well. Mr. Barrett is a conscientious and interested student in the fundamental problems of railroad organization and operation which are so pressing today, and in any development that will help solve these problems.

THE COMMITTEE, IN APPENDIX A, presented its report on instructions for the guidance of engineering field parties; in Appendix B its rules for the guidance of employees of the maintenance of way department and in Appendix C its report on the science of organization.

In Appendix B the committee endeavored to make the rules general rather than special, and to so frame them that any road could use the work as a foundation for a book of rules and insert special rules as desired. The "General Notice" covers rules found in the standard code under the same heading. Under "General Rules" the committee placed rules applicable to all employees, so as to avoid, as far as possible, repetitions under each class. Under "Operating Rules" the committee placed those rules taken from the standard code and a few special rules which it is thought necessary and desirable for maintenance of way employees to know. Under "Rules for the Government of Employees Working on or about the Track" was placed what are usually called "Safety Rules." The committee also included "Rules for the Operation of Motor, Hand, Velocipede and Push Cars."

Under "Divisional Maintenance Officers" it was the endeavor to cover the positions common to most railroads and the usual duties of each. Individual roads may not have all the positions mentioned, or may have others not mentioned, or may not use the same titles for the positions. Under "Conduct of Work" the committee submitted "Rules for the Conduct of Track Work," or work to be performed by the forces under the supervisors of track only. The committee requested that it be permitted to submit "Rules for the Conduct of Bridge and Building, Signal and Telegraph and Telephone Work" next year.

The committee asked that the Association consider the "Manual of Rules for the Guidance of Employees of the Maintenance of Way Department" as a live document to be added to or changed in some details each year, as new methods or practices are developed, or present methods or practices become obsolete and better ones replace them.

Conclusions

(1) The committee recommended the adoption of the "Manual of Instructions for the Guidance of Engineering

Field Parties" and the "Manual of Rules for the Guidance of Employees of the Maintenance of Way Department" and that these be substituted for all of the matter now appearing in the Association Manual under "Rules and Organization."

(2) The committee recommended that the "Manual of Instructions for the Guidance of Engineering Field Parties," as submitted in Appendix A, be approved for publication in the Manual.

(3) The committee recommended that the "Manual of Rules for the Guidance of Employees of the Maintenance of Way Department," as submitted in Appendix B, be approved for publication in the Manual.

(4) The committee recommended that the report on "The Science of Organization," as submitted in Appendix C, be approved for publication in the Manual.

Committee: W. C. Barrett (L. V.), chairman; H. H. Edgerton (C. G. W.), vice-chairman; F. D. Anthony (D. & H.); E. H. Barnhart (B. & O.); H. L. Browne (C. B. & O.); J. B. Carothers (B. & O.); S. E. Coombs (N. Y. C.); R. H. Gaines (T. & P.); R. H. Hallsted, H. H. Marsh (B. & O.); B. Herman (Sou.); F. D. Lakin (Erie); E. L. Martin (M. K. & T.); Jos. Mullen, W. H. Rupp, P. T. Simons, H. E. Stansbury (E. P. & S. W.); R. E. Warden (M. P.); A. A. Woods (Sou.)

Appendix C—The Science of Organization

Up to the present, organization has developed as an art rather than a science and has brought out two general types, viz., the *line* type and the *staff* type. Line type is exemplified in the army, in which there is a direct connection from the head through each subordinate to the next lower until the worker, if we may so call him, is reached. The staff type is exemplified in manufacturing concerns, where there are specialists who may direct the worker in any part of his work that may be of a nature to be covered by the specialist's knowledge or authority.

The fundamentals of organization are as follows:

1. An organization must have its object clearly defined.
2. In its simplest form organization consists of head and working force.
3. Subdivisions, combinations, extensions and modifications of this form may be made to any extent and may be

- most readily shown and understood by means of charts.
4. The head or executive must (a) understand his objective; (b) plan and direct all activities; (c) select and educate working force; and (d) receive results.
 5. Executive must have complete authority over working force.
 6. Executive may subdivide or delegate his authority, in which case each sub-head must know exactly his duties and responsibilities and there must be an invariable sequence without any conflict in, nor division of, authority and responsibility.
 7. There must be harmony in all relations of different sub-heads.
 8. There must be interchange of ideas and information between all types of executives.
 9. Working force consists of equipment, tools and men, and the economic relations between these must be balanced.
 10. Correct discipline is an essential feature of organization.
 11. Compensation must follow the human effort in just proportion.
 12. Not only physical force is available in any human organization but proper results from item 10, 11 and 4c should develop in such a body an esprit de corps.
 13. Co-ordination and correlation of work as to time, place and materials must not only be planned by executive, but he must know that it is accomplished.
 14. Sub-heads in the smaller spheres must apply all principles used by the higher executives.
 15. Standardization of methods and means must be intelligently applied.
 16. Organization charts give the simplest and most readily comprehended means of expressing the system in use.

Discussion

W. C. Barrett (Chairman): The committee was given four subjects on which to make a study and report.

Inasmuch as the action to be taken on subjects 2 and 3 will determine what action will be taken on subject 1, they will be presented first. Mr. Harsh will outline the matter under subject 2.

(H. H. Harsh (B. & O.) presented the report on instructions for the guidance of engineering field parties.)

Chairman Barrett: *I move the adoption of conclusion 2.*

(Motion carried.)

Chairman Barrett: While I believe this is the first time subject No. 3 has been presented formally to the Association for approval, it has been before the committee and the Association for a number of years, so that in presenting the Manual of rules for the guidance of employees of the Maintenance of Way Department, the committee is not presenting an entirely new subject. Mr. Barnhart will present this part of the report.

E. H. Barnhart (B. & O.): I will abstract Appendix B.

Chairman Barrett: *I move the adoption of conclusion 3.*

C. W. Baldrige (A. T. & S. F.): I believe I will have to take exception to rule No. 1 to start with. I do not believe it should be the duty of any employee to provide himself with a book of rules. The rules should be altered to read that the employing officer shall provide each new employee with a book of rules and that the employee then should familiarize himself with the rules.

I also notice in reading over the report of this committee, in a great many cases it duplicates the work of other committees already in the Manual and in a few cases conflicts with such work, and I move that *this portion be referred back to the committee, with instructions to co-ordinate the matter on the conduct of work with the work of the other committees, and that the report be brought in next year.*

H. L. Ripley (N. Y. C.): I second the motion and endorse what Mr. Baldrige has said without any intent to criticize the work of the committee. As he has already pointed out, there is conflict in this section on conduct of work with the work of the Ballast committee.

Chairman Barrett: The committee went very carefully over everything that was in the Manual, and so far as we could ascertain, there was no conflict with any other committee's report.

Maurice Coburn (Penna.): I agree with Mr. Baldrige's motion, and there are one or two other portions which should have some consideration. The instructions about "line and surface" seem to be misleading. Under "joint bars" it is said "Rail joints should be as simple and of as few parts as possible to be effective." These instructions, as I understand it, are for the trackmen with relation to the actual operation and are not for such items as that.

A. S. Baldwin (I. C.): I think it would be a mistake to refer these rules back to the committee. A great deal of excellent work has been done on them and what they are intended for is to be used as a general compendium of rules for the maintenance of way department. It would not be possible for this committee to get up a set of rules that would agree with everything that might be done in the convention after they came in. These rules will be adapted to the special conditions of every railroad, and it will be understood that they are for general use and will be very useful.

I believe it should be the duty of the superior officer to supply the men with a copy of the rules, but the employee should not be able to offer an excuse that he did not carry out the rules because he had not been supplied with a copy, and I think it should be one of his very first duties to supply himself with a copy and then leave it to his superior officer to do likewise.

J. B. Carothers (B. & O.): On behalf of the committee I wish to say that the first question was brought up about the employee providing himself with a book of rules, that is not our thought, we copied that from the American Railway Association standard code. They have been practicing that for a good many years. I do not believe it is necessary to raise that question at this particular time.

C. F. Loweth (C. M. & St. P.): These rules seem to contain a good many duplications. There are five or six rules for bridge and building foremen, mason foremen, painter foremen, that are almost identically the same rules, perhaps in one or two cases there is a change of a word. On many roads the foremen have to do with bridge and building work, and water station work, and are also painter foremen, and plumber foremen, and I am wondering if these rules would not be more effective if they were more simple. Say if we had the various rules I have referred to combined together, and then a paragraph for the particular duties of the particular foreman.

Chairman Barrett: The committee was cognizant of the fact that in preparing rules for these different foremen they would be more or less the same in their reading. We thought it proper to make the rules correspond to one another so that they would be in somewhat the same form, and while there is, perhaps, as indicated, some repetitions, these rules were intended as the groundwork for perhaps very much more extended rules that particular railroads would want, and we thought each one should be complete in itself.

Mr. Baldrige: I will call attention to Rule 274 with reference to broken rails. The rule is very good as far as it goes but it does not go quite far enough, in that a broken rail under present-day conditions should be removed from the track as soon as possible. The committee has finished this rule by saying, "The broken ends of the rail should be connected by joint bars, the rail drilled, and the joint bars full bolted, after which the resumption of traffic may be permitted," but they do not go on to say that the rail should be taken out of the track at the earliest moment. I think we should add a little more

to that rule, and provide that a broken rail must not be left in the track longer than is necessary.

Chairman Barrett: The committee accepts the criticism and will ask permission to add to that paragraph to make it read like this—"After which the resumption of traffic may be permitted with reduced speed. The rail should be removed from the track as quickly as possible."

Mr. Coburn: Will the committee be willing to omit Rule 275?

Chairman Barrett: We will eliminate Rule 275.

The President: If there is no further discussion, a motion to adopt this section of the report as amended, is in order.

Chairman Barrett: *I move the adoption of the report as amended.*

(Motion carried.)

Mr. Carothers: The revision of the Manual has been taken care of by the adoption of the other portions of the report, and we have nothing further to offer.

I move the adoption of conclusion number 1.

Chairman Barrett: Subject No. 4 is covered in Appendix C.

(R. H. Gaines (T. & P.) presented an abstract of the report.)

(The committee was excused with the thanks of the Association.)

Report on Records and Accounts

In addition to a number of definitions, Form 501, or monthly track material report, was revised and is presented for inclusion in the Manual. The revised form is the result of a study of forms used on a number of different roads. It is to be 11 in. by 16 in. so as to fold letter size with a one-inch margin for binding. In accordance with Valuation Order No. 3, second revised issue, three additional forms covering estimate sheets, register of authority for expenditure and equipment completion report are submitted for adoption. They are primarily for the carriers, but the requirements of the Interstate Commerce Commission have been kept in mind.



H. M. Stout
Chairman

H. M. Stout is rounding out his first year as chairman and is completing his seventh year as a member of the committee. He is record engineer of the Northern Pacific at St. Paul. He is therefore in intimate daily contact with the work under consideration by the committee and in a particularly favorable position to direct its studies along practical lines. The need for complete and accurate records is being realized more fully now than ever before as the valuation work and the more detailed information required by regulating authorities are extending. The committee is in a position to render a real service to the roads in developing standards to meet these demands.

IN APPENDIX A THE COMMITTEE submitted a number of proposed changes in the Manual.

Three additional forms for recording data for keeping up-to-date valuation of property of railways as required by Valuation Order No. 3, second revised issue, were presented in Appendix B.

Conclusions

1. The committee recommended that the changes in the Manual as given in Appendix A be approved and the revised matter be substituted for the present recommendations in the Manual.

2. The committee recommended that the three additional forms shown in Appendix B, for keeping up records under Valuation Order No. 3, second revised issue, be approved and published in the Manual.

3. The committee recommended that subject (3) in Appendix B be continued as a part of next year's work.

4. The committee recommended that the reports relating to subjects 2, 4 and 5 be received as information and the subjects continued.

Committee: H. M. Stout (N. P.), chairman; Henry Lehn (N. Y. C.), vice-chairman; A. M. Blanchard (G. T.), H. Bortin (Con. Engr.), W. A. Christian (I. C. C.), R. A. Cook (C. & A.), W. F. Cronican (I. C. C.), E. B. Fithian (M. P.), L. B. Lincoln (B. & A.), J. H. Milburn (B. & O.), A. W. Neel, H. J. Sargent (Wabash). *R. C. Sattley (C. R. I. & St. P.), C. W. Simpson (D. L. & W.), T. H. Strate (C. M. & St. P.), V. R. Walling (C. & W. I.), W. D. Wiggins (Penna.).

Appendix A—Revision of Manual

The committee recommended changes in the Manual shown below. Under definitions the new or added letters

and words are underscored and the old or omitted letters and words are enclosed in parentheses.

DEFINITIONS, PAGE 339

Account(s).—A statement(s) required to enable payment(s) to be made for labor performed and material furnished, or to establish the detail, total and comparative cost of work and various classes of expenses.

Conventional sign(s).—A symbol(s), such as a mark, character, abbreviation or letter, selected or sanctioned by general agreement or common use (and) to indicate upon a map or plan certain forms, conditions (and) or objects, both natural and structural.

Ledger accounts (for individual pieces of work).—Statements kept in ledger form in order to establish the detail, total and comparative cost of (any particular) individual pieces of work or classes of expenses.

Progress profile.—A graphical record (of the progress) showing status of work (prepared) at stated periods.

Record(s).—Authenticated information or data in graphical, tabular or statement form relating to physical characteristics, conditions, cost and such other information as may seem desirable for (record) preservation.

Report(s).—The medium through which information is transmitted (from one to another official) and from which records and accounts are prepared or compiled (in the filing office).

Right-of-way map.—A plat representing the actual location and dimensions of the property, (right or) franchises or other rights (that are) owned or controlled by a railway company.

Track chart.—A diagram showing the physical characteristics (of track and roadbed) roadway and track.

Track map.—A (map used primarily for) plat showing existing physical (conditions) plant, including tracks, bridges, buildings, water service and mains, leases, station facilities

*Died December 31, 1920.

and all (of the) other physical and operating (features) property.

FORM 501, MONTHLY TRACK MATERIAL REPORT

The forms in use on the 23 railroads have been examined to determine what, if any, changes should be made in the form as published in the Manual. Eleven of these reports were bound in book form, in some cases being combined with time books and tool reports. The principal features in which these forms differ from the form in the Manual are as follows:

Four roads use separate forms for recording ties, rail, and miscellaneous track material; three roads divide the columns showing material received from track into fit and scrap; the Norfolk Southern and Bessemer & Lake Erie have a simplified form using only five columns. Some roads use an alphabetical arrangement of the material in the left-hand column, and one road prints the material in columns reversing the use of the lines and columns. Pittsburgh & Lake Erie prints a list of 232 items on four sheets, and furnishes a blank sheet for additional items; the Pennsylvania has a form with 40 columns. The form in the Manual is followed closely by the Chicago & Western Indiana, the Chicago, Rock Island & Pacific, the Missouri, Oklahoma & Gulf, and the Minnesota, Dakota & Western railroads.

The list of materials in the left-hand column will vary on different railroads and should be omitted entirely, and left to be filled in by printing or in pencil, according to requirements of individual railroads. The headings of the columns on Form 501 in the Manual seem to meet the requirements of a form of this kind, except that we suggest dividing column five (5), showing material received from track, into two columns, showing main tracks and side tracks; changing columns 10 and 11 to three columns, in order to itemize material used on different construction jobs, and divide column 12 into three columns in order to report material shipped to various divisions or destinations.

On the back of Form 501 are instructions, daily record of material received and shipped, and switch tie data. The instructions should be printed on the face of the form. The daily record of material received and shipped does not seem to be necessarily a part of this blank. The switch ties might be included in the items on the face of the sheet, with details in a separate table, if desired. It was recommended that the form be revised to be made 11 by 16 in., so as to fold once to lettersize with a one-inch margin for binding. The form to be printed in black with horizontal lines, 6 per inch. Instructions to be printed at the bottom of the sheet as shown.

Discussion

(Chairman Stout read the subjects assigned to the committee), and said:

The form in Appendix A, which is being proposed now to be substituted for that previously submitted and published in the Manual follows the practice which we have adopted of having forms as far as possible printed on one side only. Any descriptive matter or instructions to be shown on the face of the form.

I move the approval of the committee's recommendations for changes in the form and that the matter submitted in Appendix A be substituted for similar matter now in the Manual.

(Motion Carried.)

Chairman Stout: With reference to subject No. 2, as stated, the sub-committee which has been handling this subject has continued their work, but do not have the matter in shape for presentation at this time, so that no conclusions are offered.

We will pass to subject No. 3. Last year you will recall there were some four or five blanks submitted,

some of them directly bearing upon the order itself, and some of them requiring supporting data. This year we are submitting three additional forms.

H. L. Ripley (N. Y. H. & H.): Since the first days of December I have been spending much of my time in connection with this matter, which has to do with the I. C. C. Order No. 3. It may be the intention of the committee to present these forms and collect certain data, but I believe there will be a circular issued soon by the I. C. C. to cover that subject. It may not be known to the committee that new forms have been prepared illustrating what is required under that order of the Commission. The joint standing committee composed of three representatives of the carriers and two or three representatives of the Bureau of Valuation have been appointed to consider this matter, and I would question the expediency and perhaps the propriety at this time of adopting this Appendix B for inclusion in the Manual.

O. E. Selby (C. C. & St. L.): I want to call attention to the Register of Authorities for Expenditure. It carries under the third column a D. C. E. reference. That refers to the period of federal control and is not necessary now.

Chairman Stout: The column carrying the D. C. E. reference is only inserted there to continue matters which are not yet closed out, some of which were initiated under government control, and it is not the intention to perpetuate that. As soon as we entirely get away from that period the D. C. E. reference will automatically drop out.

In answer to Mr. Ripley's suggestion, we recognized at the time that Order No. 3 may be in a somewhat tentative condition, still it does to some extent become fixed, and we felt that these forms were so nearly like those prescribed in Order No. 3, and since these particular forms were not specified by the I. C. C. Bureau of Valuation, that considerable leeway was given for additional information. They specify only the minimum amount of information required, and we thought we were justified in presenting the forms at this time.

Mr. Ripley: I really feel I would be embarrassed rather than helped by the adoption of this Appendix B as it is presented, still what the chairman has said is true. There was prepared and handled by the secretary of the President's Conference Committee a new series of forms arranged in considerable detail and differing substantially from the old forms, and I may say if it had not been for the intervention of the carrier's committee, these forms would probably be before you in mandatory form. We ask for an opportunity to suggest modifications in these forms. I do not know how much consideration the committee has given to it, but we spent weeks on this thing and these forms do not go far enough and I would like to make the suggestion that this Appendix B be received for information, rather than for adoption and printing in the Manual.

The President: The committee desires to change its recommendation that this subject be continued and that neutralizes the motion made for adoption. The motion for adoption has been withdrawn by the mover.

Chairman Stout: Subject No. 4 is under consideration and no conclusions are presented at this time. Subject No. 5 is also under consideration and definite conclusions have not been prepared. In Appendix C in connection with that study will be found a very valuable bibliography covering the subject assigned. This has been prepared in large part by the Bureau of Railway Economics, and we feel we are fortunate in getting their assistance in this manner.

Mr. President, this matter is presented for information. (The committee was excused with the thanks of the Association.)

Report on Conservation of Natural Resources

The results of the reclamation of scrap and material on the Wabash, the Santa Fe and the Baltimore & Ohio are presented with the idea that the information will be not only of value, but that it will stimulate still further interest and thus effect greater economies. The Wabash shows a saving by reclamation of approximately \$17,000 in about one year. Railways should encourage every method to maintain and increase forest growth, as they are directly benefitted by the increased revenue as carriers of timber and by the increased supply for their own needs. The roads should plant trees along the right-of-way to eliminate snow fences, and promote tree planting.



W. F. Ogle
Chairman

W. F. Ogle is completing his first year as chairman and his third year as a member of the committee. In directing the work of this committee, it is necessary for the chairman to differentiate between the theoretical or intangible and that of immediate practical application. In these days of intensive search for the elimination of waste of every character as opportunity is offered for constructive work by this committee. Mr. Ogle is a relatively recent member of the Association. He is chief draftsman in the office of the chief engineer of the Chicago, Rock Island & Pacific at Chicago.

IN APPENDIX A THE COMMITTEE submitted its report on the reclamation of materials. In Appendix B the committee submitted its study of the subject of tree planting and reforestation. It is the judgment of the committee that greater interest should be manifested by both state and federal governments in this subject, by enacting more lenient tax laws on growing timbers, and making appropriations for acquiring denuded lands, unsuitable for agricultural purposes, which should be reforested. A report on the conservation of human life and energy was presented in Appendix C.

Committee: W. Forrest Ogle (C. R. I. & P.), chairman; E. E. King (Univ. of Ill), vice-chairman; F. T. Beckett (C. R. I. & P.), C. M. Buck (A. T. & S. F.), Moses Burpee (B. & A.), J. R. Caswell (C. P.), O. P. Chamberlain (C. & I. W.), J. B. Dawson (S. P.), W. A. Duff (Can. Nat.), C. H. Fisk, F. A. Gaby, R. H. Howard (Wabash), William McNab (G. T.), J. B. Myers (B. & O.), J. L. Pickles (D. W. & P.), S. N. Williams (Cornell College), R. C. Young (L. & N.).

Appendix A—Reclamation of Material

On the Wabash, during a period from August 19, 1919, to July, 1920, inclusive, new material costing \$24,702.73 was reclaimed at an expense of \$7,396.45, effecting a saving of \$17,306.28.

These figures cover such track material as clawbars, lining bars, pinch bars, track chisels, track spikes, guard rail clamps, head rods, connecting rods, switch stands and targets, derails, etc.

The following is an illustration as to the accounting procedure:

- (1) All material delivered to reclamation plant is accepted as miscellaneous scrap, whether it be tools, couplers, bolsters, switch stands, etc.
- (2) Material in some cases is worked over into other items from its originality or it is repaired, or rebuilt by applying to new parts, etc.
- (3) The cost of labor in repairing and assembling is charged direct to the particular item or material that has been handled.
- (4) To the cost of labor is added the price of miscellaneous scrap used.
- (5) To the cost of labor, new material and scrap also a pro rata charge is applied to the various items on percentage basis. This pro rata represents overhead charges, i. e., supervision, oil, power, light, telephone, and water. In other words, covering such expenses that cannot be accurately charged direct to any one item of material.
- (6) Recapitulations of all charges are brought forward, which makes the total cost of reclaiming, we being allowed

either current or contract prices for all material or, in other words, new value.

(7) The total cost of reclaiming any one item is deducted from the new value, which leaves the net saving as compared with new value.

On the Santa Fe if a switch stand can be repaired credit is allowed to the division from which it came at the price of the new stand, giving the stand a symbol, and when it arrives on the dock after going through the shop it has been charged with the time of each man's work and with the material used; then the office charges the division from which the stand comes with the actual cost of repairs, and by this method the division receives credit for the true value of the stand. All materials received are handled in this manner. If a frog is received that is good for nothing more than scrap, credit is allowed for any parts that are serviceable, such as clamps, fillers and rods. Clamps at \$3 each, cast fillers at \$1.50, steel fillers at \$3, and 25 cents each for the rods. The Santa Fe has repaired:

31 box stands at a cost of.....	\$4.13 each.	Total,	\$128.19.
6 low star stands at a cost of....	\$3.31 each.	Total,	\$19.87.
1 high star stand at a cost of....	\$6.84 each.		
32 switch stands at a cost of.....	\$3.05 each.	Total,	\$97.95.

RECLAIMING REPAIR RAIL BY RESAWING

It has been the policy of the Baltimore & Ohio to lay new rail out of face on important high speed passenger divisions and those carrying heavy traffic, renewing the worn rail, which is often of lighter weight, and relay the repair rail on branch lines where the passenger movement is less frequent and speed considerably lower, or on such branch lines where the traffic consists almost entirely of slow heavy freight trains. Therefore, in the relaying of these four different weights and sections, each has been assigned to some one branch line, consideration being given to the traffic over that line. In relaying this sawed-end rail on branch lines, it is laid with new bolts and bars. In resawing the rail, 15 inches is cut off each end of the rail. After the rail is sawed it is 30 ft. 6 in. long and is redrilled. When this sawed-end rail is laid on branch lines, as above detailed, the bad features of worn surface and line bent at ends and worn angle bars, which were always objectionable features to relaying rail, are entirely eliminated.

When relay rail arrives at the plant it is unloaded on skids, where it is handled by a stiff leg derrick, with the assistance of four laborers, to the saw table. The rail is

then sawed by friction saw, one end at a time. After both ends are sawed it is moved on rollers by hand to the double drill presses, where it is drilled. In drilling, the ends of four rails are drilled at one operation. The burrs are knocked off by the men handling the rail on its way from the saw to the drill presses and at the drill presses.

During the calendar year reported on there has been sawed a total of 499,137 ft. of the four different sections, representing the total number of feet of rail after it is sawed and drilled equivalent to a tonnage of 7,192. In the sawing of the rail there was about 8 per cent lost which will be sold as scrap. The average cost of sawing this rail during the year was \$1.27 per ton. This cost includes all labor for unloading the rail at the saw; the labor and other direct costs incident to the actual operation of sawing the rail, and the labor cost of loading the rail into cars. This cost does not include the labor costs of loading the rail for shipment to the saw or the unloading of the sawed-end rail on the ground for laying. The loss on account of sawing off the ends of the rail or its credit when sold as scrap is not considered in the average cost previously given.

Appendix B—Tree Planting from Railway Standpoint

But few roads own land on which to carry out any experiments in this line, but many roads traverse tracts of country which are not productive of any crop, and which, even where soil is unfit for agriculture, might support a fair forest growth.

Railways are not only vitally interested in the timber supply for their own maintenance, but also in a very great degree in the amount of traffic which timber furnishes to them as carriers. It is fitting, therefore, that they should encourage and originate all possible means to maintain or increase forest growth. In the majority of cases, however, railway companies have no authority in forestry matters. It is time, and we are glad to know it, that the owners of wood lands are becoming more careful and more enlightened as to conservation of their properties, yet the problem of reforestation is scarcely getting the attention it deserves.

The railways, together with state and federal governments, should urge farmers and other land owners to utilize their waste, burnt over and cut over lands by planting trees. Co-operation in this way would furnish a large part of the timber required for buildings and roadway maintenance, for car construction and repairs, for paper used in various forms, and will materially aid in solving the fuel supply. Since they are such extensive users of forest products, the railways could well afford to have a sufficient forestry staff to help in carrying out a comprehensive planting program. The different states through their forestry officers could be called upon to assist in this work. By a series of demonstration lectures, newspaper articles and other publications, the land owners could be shown the benefits of such an undertaking, and could be taught the best methods of planting, growing and cutting timber and of protecting it against fire, insects and diseases.

Rough lands where the timber has been removed are being denuded of their soil by rainfall and their productivity is being decreased. This is of vital interest to the railways, for most of them derive their incomes from the products along their lines. Many of the excessive floods that have brought much damage to railway property in recent years were aggravated by the lack of growing timber. Most of the trees that formerly grew along the streams and that checked the flow of water before it

reached the streams and prevented much of it from getting to them at all, have been cut away. Wherever possible, these lands should be reforested to save the soil, to conserve the rainfall and to eliminate some of the damage from the floods.

The railways should plant trees along the right-of-way where there is difficulty with drifting snow, to eliminate snow fences. They should encourage land owners to plant trees for shelter belts where it is apparently not possible to get other plantings started at the present time. This would demonstrate what could be done in raising timber and would furnish for them a fuel supply.

Discussion

W. F. Ogle (Chairman): The committee had no recommendations to make in regard to what had previously been published in the Manual. Under Appendix A we have shown a few examples of how reclamation of materials could be practiced. I think it is needless to say that most engineers today realize that there is great saving to be made through reclamation of materials, and the field is so large that it is really up to the individual to practice it as he can do best on his own lines.

Tree planting and reforestation is an old subject. It has been gone over and over, and there is little left to be said. I think the thing that we should do is to encourage proper legislation to regulate tree planting and reforestation.

In Appendix C we have attempted to show under several headings a few of the methods which should be followed in the conservation of human life and energy. That also is quite a large field. Under Appendix D we have shown some of the progress in reforestation and conservation in Canada, which is very similar to conditions in this country.

(After brief discussion the committee was dismissed with the thanks of the Association.)



A Notable Bridge on the Bessemer & Lake Erie

Report on Yards and Terminals

Typical plans for tracks and ladders leading to stub-end and through passenger stations are submitted for inclusion in the Manual. In transfer of lading of bad-order cars, hand labor is without real justification. Locomotive cranes can generally be used with economy. Intensified use of property is secured by multiple story freight houses. Two-track level freight house design is attracting increased attention. For the mechanical handling of freight in freight house work the most extensive and successful development has been that of small tractors and trailers. Automatic elevators have been applied with success at railway, commercial and army warehouses.



B. H. Mann
Chairman

B. H. Mann has been chairman of the committee for three years. Prior to that time he was vice-chairman for four years. He has therefore held a position of responsibility for 7 of the 11 years he has been a member. The fact that he is signal engineer of the Missouri Pacific system is an indication of the increasingly close relation which signal engineering bears to the solution of operating problems. The experience which he has gained in his regular work is of particular value to the committee which has for its goal the development of the principles of economical terminal operation and the presentation of plans and methods for this object.

IN APPENDIX A THE COMMITTEE submitted the results of its study of the subject of handling of freight on two-track level freight houses and team tracks, including multiple-storied freight houses and handling of freight by mechanical means. In Appendix B the committee reported its continued study of the subject of typical and actual situation plans for passenger stations and methods of their operation showing plans and photographs of the St. Paul Union Station at St. Paul, Minn., and the passenger terminal at Richmond, Va. It also reported on the subject of economic transfer of lading of bad-order cars in large terminals by the introduction of mechanical means or otherwise. Progress was reported on the study of subject (2) Unit operation of railroad terminals in large cities; on subject (5) Classification yards, including methods of switching; on subject (6) Advantages of small sorting yards and gravity switching for switching trains into station order and in Appendix C, the compiling of specifications for passenger, freight house and grain weighing scales.

Conclusions

1. The committee recommended that the following plans, taken from the Proceedings and revised, be approved for publication in the Manual:

Typical and actual situation plans for passenger stations and methods of their operation:

- Plan showing a typical track layout at a dead-end passenger terminal station.
- Plan showing a typical track layout at a through passenger terminal station.
- Plans Nos. 20 to 26, showing types of ladders for passenger stations.

2. The committee recommended the following for approval and publication in the Manual:

Methods of economic transfer of lading of bad-order cars in large terminals by the introduction of mechanical means or otherwise:

- Hand labor for transferring freight from cars in most cases is slow and expensive and without real justification.
- The employment of a locomotive crane is generally justified in any case where the transfer of freight from open-top cars otherwise requires the equivalent of the constant daily service of six or more men, or the intermittent service of six men where the machine may be economically employed in the interim.
- A study of each situation may develop extensive means of economy out of all proportion to the cost and such study is justified in each case.

3. The committee recommended that its report on the

subject of handling freight in two-track level freight houses and team tracks be received as information.

Committee: B. H. Mann (M. P.), chairman; A. Montzheimer (E. J. & E.), vice-chairman; J. E. Armstrong (C. P. R.), Hadley Baldwin (C. C. C. & St. L.), C. A. Briggs, J. H. Brinkerhoff, Miles Bronson (N. Y. C.), A. E. Clift (I. C.), L. G. Curtis (B. & O.), H. T. Douglas, Jr. (C. & A.), A. W. Epright, E. M. Hastings (R. F. & P.), Reuben Hayes (Sou.), L. J. F. Hughes, J. B. Hunley, (C. C. C. & St. L.), D. B. Johnston (P. L. W.), H. A. Lane (B. & O.), R. J. Middleton (C. M. & St. P.), O. Maxey (C. R. I. & P.), F. E. Morrow (C. & W. I.), H. J. Pfeifer (T. R. R. of St. L.), S. S. Roberts, C. H. Spencer (I. C. C.), E. B. Temple (Penna.), E. E. R. Tratman (Engr. News), J. G. Wishart (C. R. I. & P.).

Appendix A—Multiple-Storied Freight Houses

The subject of multiple-storied freight houses divides itself into four parts:

- Two-track-level freight houses as compared with single-level freight houses.
- Two-track-level team tracks.
- Multiple-storied freight houses, or the operation of storage warehouses in connection with freight houses.
- Handling freight by mechanical means.

The committee has been unable to find any installations of two-track-level freight stations. Assuming that a two-level design is adopted, one of the first considerations is adequate provision for handling freight between the two levels. Elevators are the principal means employed, handling both freight packages and freight trucks, although inclined conveyors or escalators have been proposed in some cases.

As to the general plan, the almost universal arrangement is to have both tracks and driveways run longitudinally with the building, with the platforms on the upper level directly above those on the lower level. In a design made in 1912 by the Pennsylvania for a large freight terminal at Chicago the freight house was to cover an entire block and to have transverse driveways connecting the two streets on the longer sides, thus increasing the length of frontage for teams. This project was abandoned, however, in favor of the present terminal with longitudinal driveways.

TWO-TRACK-LEVEL FREIGHT HOUSES

Double-deck freight house design is attracting increased attention in connection with railway terminal facilities in large cities, especially where separation of grades of tracks and streets involve steep grade approaches for single-story freight houses. The floor area of many single-

level freight stations is inadequate for their business, but expansion is either impossible or is practicable only at great expense for additional land. In such cases the introduction of the two-level type of station may furnish a satisfactory solution of the problem, also being adapted to separation of grades, reducing congestion of vehicles, avoiding steep driveways and shortening trucking distance, the latter being one of the principal factors in the expense of freight house operation.

Two-level stations have been and are being built under governing conditions such as are imposed by topography, grade separation or the necessity of intensified use resulting from restricted area or high value of land. Where conditions permit of choice between single or multiple level designs, selection should be based upon these considerations: (1) Value of land; (2) construction costs; (3) present and future business; (4) operating costs, and (5) operating capacity.

MULTIPLE-STORIED FREIGHT HOUSES

This subject relates to the provision of upper stories for holding of inbound freight until delivered or for warehouse purposes. Some railway officers do not favor going into the warehouse business; the committee held, however, that where the freight house occupies land of high value it is desirable to develop revenue from the area occupied, increase traffic, and offer economy to shipper, providing that this can be done without interfering with the normal business of the railway.

One objection that has been made is the possible confusion between teams for freight house and warehouse business, and confusion in the elevator service handling both kinds of business. In this connection reference may be made to the combined freight station and warehouse of the Central Manufacturing Company at Thirty-ninth and Robey streets, Chicago. The tracks are at the first-floor level, and two outside tracks along one side are for the carload business of the warehouse. Along the other side is a double deck driveway, the lower deck serving the freight house platform and the upper deck serving the warehouse. Access to the upper deck is by two large elevators for wagons and motor trucks. Some of the interior elevators serve the warehouse floors only, and others serve both the warehouse and the freight station.

The new five-story freight terminal of the Pennsylvania at Chicago has tracks at the basement level and team driveways on the first floor, with the three upper stories designed for warehouse purposes. The new Chicago freight stations of the Chicago & Alton and Chicago, Burlington & Quincy will have a similar arrangement, the Chicago & Alton having one warehouse floor, the Chicago, Burlington & Quincy four. The Orange Street freight station of the New York Central Lines at Cleveland, Ohio, is of the single-floor type with provision for future upper floors for warehouse purposes.

MECHANICAL HANDLING OF FREIGHT

Two difficult conditions are involved in attempts to simplify the operation and to introduce mechanical methods of handling. In the first place, there is the network of movements. Outbound freight from each doorway must go to a scale and checker's desk and then to any one of the cars which stand alongside the house. In the second place, the freight to be handled is of bewildering variety in material, size and weight.

Hand trucking has met the requirement of flexibility of movement fairly well, but it is slow and expensive, and involves considerable confusion, with liability of numerous errors. Overhead cranes, trolley hoists and conveyor equipment has been used very little in freight house work. In fact, it has been difficult to adapt such appliances to

this work, since their operations are limited to fixed routes and directions and cannot generally be adapted to the irregular and changing directions of movements on a freight house floor. In warehouse work, however, such mechanical equipment finds numerous applications.

For the mechanical handling of freight in freight house work the most extensive and successful development has been the introduction of small tractors to haul trucks or trailers in trains. The tractor taking a train of loaded trucks drops them at their destined cars and collects empty trucks for delivery to loading points.

This system is in operation at a number of freight houses and also at warehouses. To enable the truck trains to cross the tracks between station platforms, light bascule bridges are employed in the Orange Street freight house of the New York Central Lines at Cleveland, Ohio. In settling cars on the house tracks they are spotted to clear these bridges. In the U. S. Army warehouse at Brooklyn, N. Y., the truck and tractor system is operated in combination with an automatic elevator service.

Automatic elevator service is a development of elevator equipment which has been applied with marked success in some of the busiest railway, commercial and army warehouses. It requires no operators on the elevator cars, in ordinary railway installations the elevators being operated by the freight handlers by means of push buttons at the elevator doors. As applied at the Brooklyn Army warehouse, however, one dispatcher at a desk equipped with a battery of signal lights controls all movements and has before him the record of movements and location of all elevator cars. In any case the operation of the doors and the leveling of the cars at the landings are effected automatically. The Pennsylvania freight station at Chicago has 16 of these automatic elevators of three to five tons capacity, and the new Chicago & Alton station at Chicago will have 17 five-ton and two ten-ton automatic elevators.

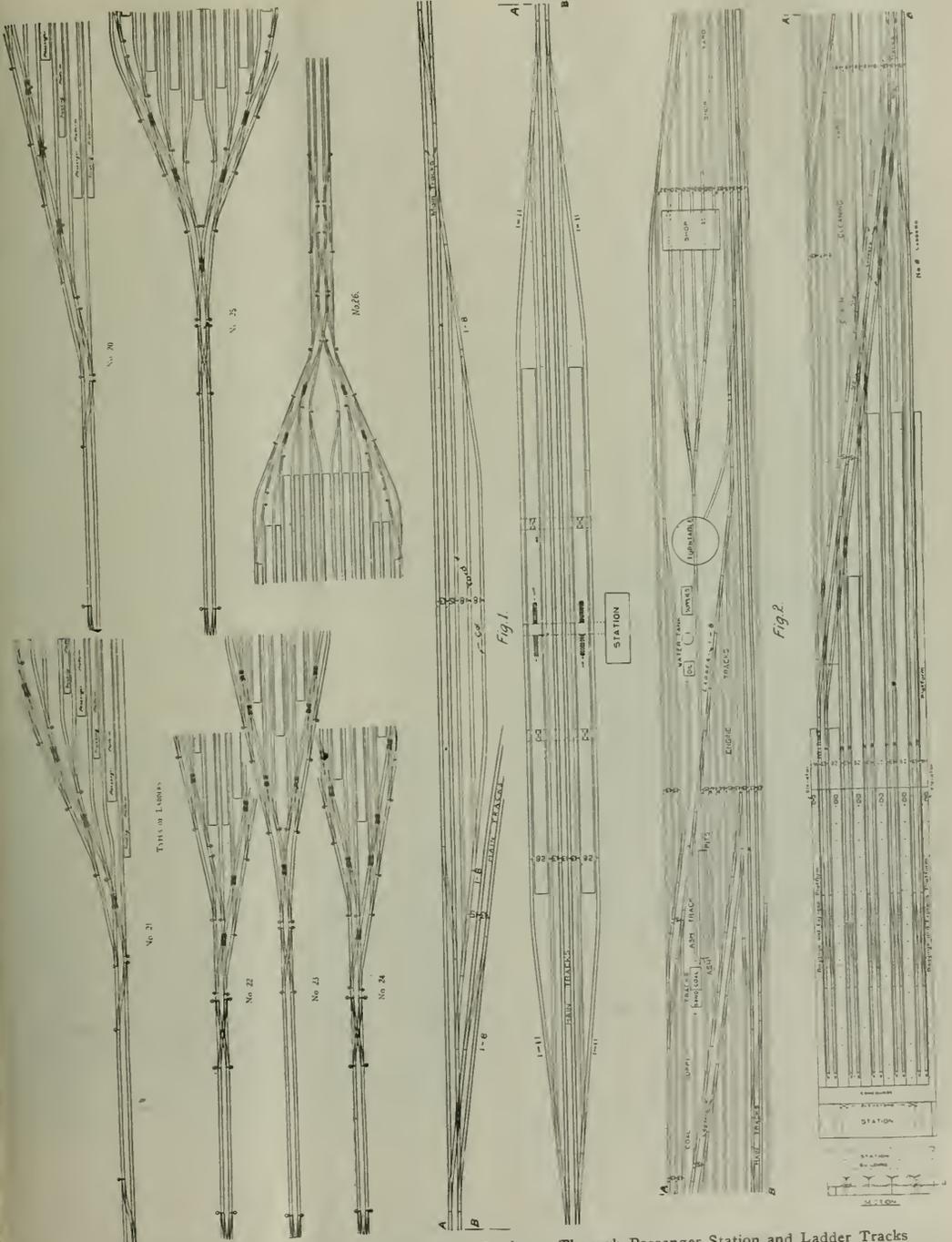
Discussion

B. H. Mann (Chairman): We will take up the report as shown under conclusions. The first two conclusions call for action by the Association. The rest are presented as information. Conclusion (1) will be handled by Mr. Hastings, chairman of the sub-committee.

E. M. Hastings (R. F. & P.): We were charged with the making of a final report, if practicable, on typical situation plans for passenger stations and the methods of their operation. The committee, however, feels that it was not advisable to make a final report, as this is a subject which covers a large field and a work which is consequently in the process of development, consequently it followed out the idea of reporting passenger terminals of interest that have been recently constructed.

We present as information the plans of the union passenger terminal at St. Paul, built by the St. Paul Union Depot Company, and also the plans and photographs of the Richmond, Va., terminal, which has been in operation about two years. We ask you to study these two situations, as they present some very unique ideas.

We present to the Association for approval and publication in the Manual a typical track layout of a dead-end passenger station, which was published in the proceedings of the Association in 1911. This has been slightly revised. Also a typical track layout for a through passenger station, published some time ago. These two plans, slightly revised, are now presented to the Association for adoption and inclusion in the Manual, as are also the types of ladders particularly applicable to passenger stations, which were originally prepared by Mr. Roberts, presented to the Association and printed as in-



Typical Track Layouts for a Dead-End Passenger Station, a Through Passenger Station and Ladder Tracks

formation in 1917. These types of ladders have been slightly revised.

Chairman Mann: *I move that these situation plans be adopted and approved for publication in the Manual.*

(*Motion carried.*)

Chairman Mann: Conclusion 2 covers subject 8. *I move the adoption of the conclusions for insertion in the Manual.*

(*Motion carried.*)

Chairman Mann: Subject 3 will be presented by H. T. Douglas, chairman of the sub-committee.

(H. T. Douglas, Jr., (C. & A.) presented Appendix A.)

Chairman Mann: The next subject, on scales, will be presented by Mr. J. B. Hunley.

(J. B. Hunley (Big Four) abstracted the report), and said:

We decided first that grain-weighing scales could not be considered along with the others. At that time we started to adopt a specification for a portable type of scales, of the self-contained and of the built-in type, and the motor truck scales. We found a good many complications. In the first place, the manufacturers, while they manufacture railroad scales and many other classes of scales, find that the railroads are small consumers. We realize that it would be better, if possible, to recommend certain sizes and capacity of scales which will meet practically all conditions, and accordingly a questionnaire was sent to all the railroads. We found that they were using various sizes and capacities of scales, and while we could have adopted certain of these sizes and capacities which the manufacturers were making at that time, we realized that the situation might bring out different classes of scales, and the manufacturer naturally objected to scrapping the old patterns and designs. We found there was but little information as to the weight of motor trucks. However, a great deal of information was collected, and afterward we could not always agree with the manufacturers, and many times the committee could not agree. We hope to have a tentative specification to submit at the next convention. I understand that the A. R. A. has adopted a specification for grain-weighing scales recently.

Chairman Mann: We had hoped to submit a completed report of subject 2, but it has not been possible to do that. Mr. Montzheimer will give details.

A. Montzheimer (E. J. & E.): Last year this committee made a progress report on the unit operation of railway terminals in large cities. It was hoped that we could make a final report on that subject this year, as well as revise the catechism on the operation of terminals as a statement of principles. On account of the change from government operation to private operation it was impossible for us to make a final report on this subject, and we would like to have the matter carried over another year with the hope that we can make the final report at that time.

(The committee was then excused with the thanks of the Association.)

Closing Business

The Chairman: I will ask Mr. Morse and Mr. Baldwin if they will be good enough to escort the incoming chairman to the platform.

(President-elect L. A. Downs was escorted to the platform.)

The Chairman: Mr. Downs, you have been unanimously elected president by this Association for the coming year. You may take that to be a recognition of good service. You may take it also to be an expression of

confidence in your ability to direct the work of this body in a successful manner, about which there could be no doubt. It is a pleasure to me to turn over to you the symbol of your office, and in doing so I want to say to you that your success is going to depend a great deal upon your own efforts, true, but it depends a great deal upon the support of your associates, and I can assure you from an experience of one year that that support is always to be had, and it has been helpful in this, the most successful meeting we have ever had. I am glad to present you with the symbol of your office and to say that I am at your service at any time.

President Downs: I appreciate more than I can tell you the honor conferred upon me in electing me president of this Association. I cannot let the opportunity go by without mentioning how closely Mr. Safford's and my life has been associated. We were born in the same state, less than a hundred miles apart, less than two years apart. We were college boys together, we were roadmen together; transit men together; assistant engineers together. We were roadmasters together for a number of years on the same railroad, and neither one of us thought we would ever get away from it. We finally got to the head of the maintenance of way department on the Illinois Central. I say "we." Mr. Safford was chief engineer and I was top sergeant. We then separated in 1910, and for four years now we have both been directors of this Association.

I mention all these things from the fact that now we have passed through the best year the Association has ever had, with the peak reached in attendance. I feel that during the coming year, with the inspiration of the long history behind the Association, I will do nearly as well as my predecessor. I assure you that I will serve you to the best of my ability.

If there is no further business the 22nd annual meeting of the American Railway Engineering Association has now come to a close.

A. R. E. A. Registration

THE REGISTRATION at the closing session of the convention yesterday totaled 31 members and 19 guests, making a total registration for the three days of the convention of 650 members and 165 guests, or a combined total of 815. This total of 815 members and guests compares more than favorably with the attendance of 759 of last year.

Bachelor, F. J., Consulting Engineer, Chicago.
 Bainbridge, C. N., Engr. Design, C. M. & St. P., Chicago.
 Bakshji, S. R., Asst. Ch. Draftsman, C. B. & Q., Chicago.
 Bayer, E. J., Engr. M. of W., Big Four, Galion, Ohio.
 Carroll, G. A., Div. Engr., C. R. I. & P., Eldon, Mo.
 Cheney, B. M., Gen. Insp. Per. Way, C. B. & Q., Chicago.
 Coons, P. D., Asst. Val. Engr., C. B. & Q., Chicago.
 Copeland, R. D., Asst. Engr., Wabash, Moberly, Mo.
 Dick, H. B., Dist. Val. Engr., B. & O., Cincinnati, Ohio.
 Ellis, P. O., Accounting Engr., M. K. & T., St. Louis, Mo.
 Gelvix, D. E., Dist. Engr., St. L.-S. F., Springfield, Mo.
 Haggander, G. A., Bridge Engr., C. B. & Q., Chicago.
 Heggie, W. G., Office Engr., G. T., Detroit, Mich.
 Hobbs, W. H., Asst. Engr., M. P., St. Louis, Mo.
 Howard, R. H., Ch. Engr. M. W., Wabash, St. Louis, Mo.
 Irwin, A. Chas., LaGrange, Ill.
 Keough, R. E., Asst. Engr. M. W., C. P., Montreal, Canada.
 Kern, J. W., Jr., Roadmaster, I. C. B. Water Valley, Miss.
 Lewis, E. M., Engr. M. W., C. G. W., Des Moines, Ia.
 Lynch, H. A., Asst. Engr., B. & O., Wheeling, W. Va.
 Metcalf, J. M., Prin. Asst. Engr., M. K. & T., St. Louis, Mo.
 Paul, C. E., Prof. of Mech., Armour Inst. of Technology, Chicago.
 Penfield, W. H., E. M. Way, C. M. & St. P., Chicago.
 Poland, W. B., Manager European Technical Advisers, New York City.
 Robinson, R. B., Engr. M. W., Sante Fe, Chicago.

Rohbock, W. L., Ch. Engr., W. & L. E., Cleveland, Ohio.
 Snyder, H. G., Asst. Div. Engr., B. & O., Garrett, Ind.
 Tuthill, Job, Ch. Engr., P. M., Detroit, Mich.
 Wardle, J. D., Ch. Engr., C. R. & I., Cedar Rapids, Iowa.
 White, R. C., Gen. Supt., M. P., St. Louis, Mo.
 Wilbur, O. G., Pilot Engr., B. & O., Baltimore, Md.

Guests

Baker, Charles, Asst. Engr., M. K. & T., St. Louis, Mo.
 Breed, C. W., Office Engr., C. B. & O., Western Springs, Ill.
 Brown, N. W., Draftsman, M. K. & T., St. Louis, Mo.
 Elmore, P. W., Asst. Div. Engr., B. & O., Dayton, Ohio.
 Fisher, H. L., Sales Mgr., A. C. Horn Co., Chicago.
 Fox, M. P., Supervisor, B. & O., Washington, Pa.
 Gillen, M. E., Field Act., G. T., Detroit, Mich.
 Hershey, Q. W., Heavy Traction Representative, W. E. & M. Co., East Pittsburgh, Pa.
 Kellenberger, K. E., Railway Age, Chicago.
 Lichtenwalner, Glen, Instrumentman, G. T., Battle Creek, Mich.
 Lillie, J. S., Land & Tax Agent, G. T., Detroit, Mich.
 Montz, J. M., 1st Asst. on Corp., B. & O., Seymour, Ind.
 Pease, B. S., Manager Concrete Reinforcement Department American Steel & Wire Co., Chicago.
 Powell, A. T., Engineer, G. T., Detroit, Mich.
 Reinere, W. A., Asst. Prof. Civil Engr., Armour Institute, Chicago.
 Staley, G. L., Asst. Bridge Engr., M. K. & T., St. Louis, Mo.
 Van Antwerp, E. J., Real Estate Inspector, G. T., Detroit, Mich.
 White, S. A., Engr. Act., G. T., Detroit, Mich.
 Wilkinson, J. F., Field Act., Detroit, Mich.

to another section of the warehouse, the tail board of a wagon, or into a freight car, and deposit them on end or side. It is said that the truck will pick up two 36-in. rolls from a horizontal position and stack them vertically, two rolls high, at the rate of 80 per hour.

In this machine the hoisting of the packages is accomplished by means of a single cable from a separate motor-driven hoist, the operator's hook providing the means of holding the material in place during the operation. For purposes of safety such devices are incorporated in the design as will prevent the truck from being started until the operator is on the platform and as will stop the machine immediately upon his stepping off. No fuses are used on the truck, the motor absorbing all the power which the battery is capable of delivering, and accommodation is provided for sufficient battery to carry the machine through the day. The machine is a product of the Elwell-Parker Electric Company, Cleveland, Ohio.

A New Material Handling Device for Warehouse Use

RAILROADS ACCUSTOMED TO RECEIVE for shipment, transfer or company use, large quantities of roll materials such as newsprint, felt, book paper, sacked wool, baled waste and cotton, barrels of oil, and similar packages which, because of their bulkiness and weight are often hazardous and expensive to handle without special equipment, will be interested in a truck recently developed with special reference to this work. This machine is a combination tractor and truck which is mounted



Karry Lode Truck Handling Print Paper

on rubber tired wheels and arranged so that one man, without leaving the platform on the rear of the machine, can load, transport, unload, and even stack such packages. In the case of print paper it is said that the operator can pick up one 72-in. roll or two 36-in. rolls from a prostrate position on the floor of a warehouse or freight car, revolve the load into an upright position, transport them

A Track Mower Attachment for Motor Cars

AMONG THE DEVICES now on the market for removing obnoxious vegetation from the vicinity of railway tracks is a mower attachment for motor cars, which has recently been installed on certain large roads. Being a mower, the machine is designed for use particularly in those sections of the country where dense



Motor Car With Mower Attached

growths of rapidly growing weeds are encountered, presenting one means of handling what is generally recognized to be an annoying and frequently quite an expensive problem.

The Rawls Trackmower, as it is called, consists of a meadow-mower type of sickle, attached to and extending directly out from one side of the car, and arranged so that it can be raised or lowered between the bank slopes and a vertical position by means of a hand lever on the floor of the car. The sickle is driven from a gear on one of the car axles, this gear being thrown in or out of engagement by means of a clutch operated by a foot control below the operator's seat, and the ratio of the gears being such that the mower will cut grass, it is said, with the car traveling at speeds as high as 7 or 8 miles per hour. The sickles can be furnished in 5, 6, or 7 ft. lengths, as desired, and are provided with an

automatic feature capable of protecting the blades from damage should they strike an obstruction. The entire outfit weighs about 300 lb. and can be fitted to any hand, push, or motor car. Its mechanism is simple, is said to be very substantial, and is arranged so that the sickle can be detached or replaced quickly. All movable shafts are fitted with renewable brass bushings, and all like parts are made interchangeable.

It is claimed that with no more equipment than the attachment itself, a convenient means is afforded of keeping the track clean throughout the season without requiring the services of extra labor or, where the mower can be operated while the car is making its regular trips over the section, without even diverting the attention of the regular force from other work. It is further claimed that the machine will not only do the weed cutting work far more rapidly than can be done by hand, but will do it more thoroughly. The machine is manufactured by S. E. Rawls of Chicago.

A New Type of Small Pocket Calculator

A NEW POCKET CALCULATOR intended primarily to be used in performing the calculations ordinarily done on a slide rule has been placed on the market by Small, Small & Co., Waltham, Mass. The device consists essentially of a six-inch logarithmic slide rule, bent in a circle so as to be compact and easily operated. The instrument is made up of a base plate carrying a continuous scale on its periphery and upper face; a movable top plate or rotor arranged to turn on the hub of the first member and carrying a similar scale on its periphery and upper face; a slotted hub nut to keep the rotor in place and adjust the friction, and a runner with a cross hair and pointer for reading the scales.

The scales give the function of the angles as well as the logarithmic reciprocals and square roots.

These scales are continuous, insuring that the results are always ready, and never off the scale, as often occurs with a straight slide rule. The graduations on the continuous six-inch rim scales are 20 per cent larger than on the double five-inch scales generally used in the ten-inch slide rule. The accuracy is equivalent to a three-place logarithmic table giving three significant figures. The device is made in two models, No. 1 having the ordinary slide rule scales, and No. 2, intended for architects and structural designers, with scales for determining the strength of steel and wooden beams. The scale on the periphery may be used as a map measure for straight or curved lines.

The instrument is made chiefly of hard non-corrosive metals, the runner being oxidized German silver. The main bearing is tapered slightly with a spring washer to take up the end shake and insure uniform friction. It is claimed that the mechanical construction is such that the



The "Small" Pocket Calculator

changes in temperature and humidity will not affect its operation.

A New Fire Alarm

A NEW DEPARTURE IN FIRE ALARMS has been placed on the market under the name "Fireklok," which is designed to offer a solution for a number of fire alarm problems. The device is automatic in its operation and consists of a bell with a self-contained system of clock-work, controlled by a fusible link.

The principle of its operation is that of a clanging of the bell, once the mechanism is released by the melting of the fusible link at a temperature of 160 deg. F., the idea being to have the device spread the alarm while the fire is in its incipency and before it has progressed beyond control by hand extinguishers. Once the alarm starts it rings incessantly for five minutes, after which it may be made ready for use again by inserting a new fusible link and winding up the mechanism.

These alarms occupy a space only five inches in diameter and are intended to be placed in locations where a fire is liable to occur, as in freight rooms, warehouses, paint and oil rooms, etc. This alarm is manufactured by the Pyrene Manufacturing Company, Chicago.



Fireklok Fire Alarm

A New Rivet Set

COINCIDENT WITH THE DEVELOPMENT of a reversing type of close quarters drill described in the *Daily Railway Age* of yesterday, the Chicago Pneumatic Tool Company, New York, has introduced a new rivet set for pneumatic hammers. This set, the Boyer name, is said to be a successful culmination of efforts directed for some time by the company to the manufacture of a tool capable of affording a more uniform and greater resistance to the stress of riveting service than had been obtained in its earlier types. Those recognizing the influence which the rivet set has upon the character and quantity of work and even on the lasting qualities of the hammer, and familiar with the trouble which often attends the use of low grade sets will be interested in the new device, particularly for the possibilities it presents of withstanding service conditions. In this connection it is said that in a series of recent tests, different sets were



Boyer Rivet Set

found to permit the driving of from 12,000 to 20,000 rivets before requiring renewal, all of them displaying great uniformity in performance. Aside from using raw materials subject to rigid specifications, the secret of the success in the manufacture of these tools appears to lie in an accurate control of the forging and subsequent heat-treating processes.

EDITORIAL

Railway Age

The Table of Contents Will Be Found on Page 5 of the Advertising Section

"An engineman going forty miles an hour can attend to and understand one signal when he might be confused by two."

Potential Danger Points

This statement, although made on October 17, 1866, by Ashbel Welch, general president and chief engineer of the United Companies of New Jersey, is equally true today. With this

thought in mind it would be well for railway managements to require a survey to be made to determine just how many potential danger points may exist where there is a possibility of a clear signal of one type being confused with a stop signal of another type located in line with or near the first. For example, many places exist where a train order signal is in line with a home signal at an interlocking plant, or an automatic signal governing in the same direction as the home signal is located in advance of the home signal a short distance beyond the crossing or junction point at an interlocking plant. Locations such as these are potential danger points and steps should be taken to correct them. This may be accomplished by interlocking the train order signal with the home signal or making other provision to remove the possibility of its light being mistaken for the home signal indication. When an automatic signal is located a short distance in advance of a home interlocking signal it would appear advisable to have the automatic signal indicate stop at all times when the home signal governing across the plant indicates stop. While it may never be known definitely that the train order signal at Porter, Ind., contributed to the accident it was a potential danger point that existed and still exists, not only there but at many other places.

The Pennsylvania Railroad has begun publishing a bulletin, entitled "Pennsylvania Standard," which is being circulated among its employees, telling the facts

Telling Employees the Facts

about the railroad situation in general and that of the Pennsylvania in particular. One of the main reasons for the strained relations now existing between most railways and their employees is that for years large quantities of literature mis-stating the facts about private railroad management and the railroad situation have been circulated among employees. The Pennsylvania and other railways which are beginning to send out literature of their own, telling the employees the real facts and giving them the point of view of the managements, are acting wisely. The loyalty and morale of railway employees will never be fully restored until they have been given opportunity to know the true policies of the managements and the reasons for them. They must be given the truth regarding the actual earnings of the companies, the amounts paid out in wages and in interest and dividends, the effects of working rules that destroy efficiency, and all those other matters regarding which the Plumb Plan League and other organizations are making persistent and successful efforts to mislead the employees. The employees will soon detect a wide discrepancy between the statements of their officers and those of the Plumb Plan League, for example. The more intelligent of them will be sure to investigate and find out who is telling the truth. When every railway company makes the same effort to educate and win the loyalty of its employees that

other organizations are making to mislead them and destroy their loyalty, the relations between the companies and their men will speedily begin to improve.

With the present high labor costs and the necessity of rigid economy in every department the matter of increasing the

Investigating Office Efficiency

efficiency of railroad offices is one of great importance. The constant difficulty in improving conditions is the determination of just what methods in the office are susceptible of profitable change and whether proposed changes in methods or equipment will effect economies sufficient to justify the innovations. The problem is one of securing authoritative information concerning (1) the effectiveness of the system in use, (2) the performance which can be expected of changed methods or the introduction of new devices, and (3) the cost of the change. To assist in obtaining this information the New York Central has appointed an investigating committee of officers who have had long experience in office management. This committee is empowered to make whatever investigations it may desire in any office and to report its findings. With this full authoritative information at hand the probable effect of proposed modifications in method or appliances can be accurately estimated. After the several months of its existence the committee, whose activities are described in more detail elsewhere in this issue, has already given valuable service in determining the savings to be effected by the installation of dictating machines in the accounting offices of the company at Grand Central station. Greater economies are of pressing necessity to the railroads today and it may be expected that the activities of this committee in bringing about increased efficiency, which is measurable before the changes are made, will be followed with considerable interest.

What is the average time between heavy repairs or rebuilding of freight cars on your road? Suppose it is seven years

Car Repairs on a Business Basis

for wooden cars. Then 14.3 per cent of these cars should be put through the shops for such repairs each year. If a lesser number is repaired some cars must lie idle, or if temporarily patched up so as to get over the road without falling apart, they are "living on their vitals"; this in the last analysis is a mighty expensive proposition and one which cannot possibly be justified in these days when every cent must be made to count. Unfortunately, even railroads which had a well-defined, business-like policy of maintenance of their freight cars before this country entered the war, found it necessary to depart from such programs to a greater or less extent. This means that the programs for the next few years must be speeded up—possibly to the extent of making heavy repairs to 28 per cent of the cars each year instead of 14 per cent in the example noted above. What will happen if the roads generally do not do this? Considering the small number of new cars which are being added this year, the deferred maintenance which has already accumulated and the intensive use which has been made of the cars, it would appear that real disaster lies ahead unless some such policy

as that above suggested is adopted promptly. Figure it out in your own case. Can you afford not to have such a policy put into immediate effect?

Glenn E. Plumb is using a characteristic argument in his effort to demonstrate that high wages are not responsible for the high freight rates. In a speech before the conference of shippers at Chicago recently—and he has used the same fallacious reasoning elsewhere—he said that the railroads have nullified the effect of the wage increase of last summer by laying off 30 per cent of their employees, thus reducing the payroll by more than the wage advance, but that they are still collecting the “rates” raised in part to meet the wage advance. Mr. Plumb’s figure of 30 per cent for the number of men laid off seems rather high but at any rate there is no dispute about the fact that the shippers have “laid off” over 30 per cent of their shipments and that the revenues produced by the rates have, therefore, been reduced by more than 30 per cent. The rates of wages have not been reduced, although less men are receiving them, any more than the rates for transportation have been reduced, because they are paid on a smaller volume of traffic.

Railroad executives are exceedingly busy men. Their time and energy should be conserved wherever possible and yet

A Graphic Portrayal

they must have always in mind an accurate and vivid picture of exact conditions and tendencies in their departments or on their properties. Graphic charts have come into more and more extensive use in recent years for interpreting at a glance facts which would require pages and pages of figures and explanations. Still greater use, however, can be made of graphics. Subordinate officers can oftentimes get their arguments over and make their cases clear if instead of voluminous reports of words and figures—not always logically assembled—they will present the facts in the form of charts or diagrams. Sometimes, indeed, if they tried to do this they would decide not to go ahead with their recommendations. Waste, lost motion and useless expense must be eliminated from railroad operations. Officers and foremen must think straight and their decisions must be based upon facts as to actual conditions. Masses of undigested figures and data mean nothing, or less than nothing. Why not apply common sense and science to the problem of digesting them so that they will talk for themselves? Possibly some of our readers would like to send in examples of applications of graphics which have been helpful to them.

“In developing a new practice or a new design on our road it is first submitted to one searching question—Will it make money, directly or indirectly, for our company? If it will not, it is immediately dropped.” Thus spoke a mechanical department officer of a large road—a man, by the way, who has

made good in no small degree. He has a keen analytical mind, is a good engineer, and deals in facts. Such a man must of necessity have a good imagination in order to look ahead and get out of the rut which is often so deeply worn in railroad work. When it comes to applying the above test, it is not done in a guesswork or haphazard manner. Rather, the facts are marshaled in such a way as to present the results naked and free from any fads or fancies. If a new practice or design can fully justify itself it is adopted; it

is not dismissed from mind, however, when adopted, but checks are made from time to time to be sure that it justifies itself on the larger scale. If the so-called improvement is not reflected in the financial balance sheets somebody has made a mistake. After all, this is the acid test to which every railroad department and operation should be subjected. It eliminates the useless tinsel and furbelows. It gets work out of many deeply worn ruts—often so deeply worn as greatly to hamper and restrict progress.

The incentives which induce men to labor in railroad shops, or any branch of railroad or industrial service, may

Incentives for Greater Shop Production

be summed up as wages, opportunity for training and advancement, and confidence in the security of their positions. Under present conditions, the third of these factors has little effect on the personal efficiency and output of workmen, since it is practically impossible to discharge a man as long as he reports for work and does not absolutely refuse to obey orders. The first two incentives mentioned, however, may or may not provide increased shop production, depending upon conditions. It is only human to expect a special reward for unusual endeavor, and production managers throughout the country have found the installation of bonus or piecework systems, whereby wages are proportional to the work done, an effective method of increasing the personal efficiency and output of workmen. While there is no pressing need at present for greater railroad shop output, it is undoubtedly true that within a few months at the most the railroads will once more be working to capacity, and will want to install every possible capacity and efficiency-increasing method in railroad shops. One of the strongest arguments against the continuance of the national agreements is the fact that they prohibit piecework and eliminate the incentive for greater individual output. Ordinarily, the opportunity for securing training and advancement impels ambitious workmen to strive for higher positions, but railroad shop managers are denied the benefit of this incentive also, since, under the national agreements, promotion must be made in accordance with seniority rules and length of service. It is time that the capacity decreasing rules and regulations, promulgated by the national agreements, be revoked and railroad shops brought up to the same standard of efficient, economical operation as other industrial plants.

There never was a better example of men being “hoist with their own petar” than has been afforded within the last few days before the Railroad Labor Board at Chicago. The labor leaders got the Labor Board to subpoena

“Hoist with Their Own Petar”

Thomas DeWitt Cuyler, chairman of the Association of Railway Executives; C. R. Gray, president of the Union Pacific; General W. W. Atterbury, vice-president of the Pennsylvania Railroad, and Robert S. Binker, assistant to the chairman of the Association of Railway Executives. Their purpose was to try to give the Labor Board and the public, through the testimony of these railway officers, the impression that a majority of the railway executives originally favored the national agreements. The records of the association and the testimony of the witnesses proved beyond question that while a minority of the executives at one time, as a matter of expediency, favored acting with the labor unions in establishing national boards of adjustment, they have throughout unanimously opposed continuing the national agreements, with their effect of establishing the same rules and working conditions for employees on all railroads. Mr. Gray had been among those who favored national boards of adjustment,

but his testimony, based upon his experience as director of operation of the Railroad Administration, and also as a railway executive having charge at different times of railroads in almost every part of the country, was one of the most crushing attacks ever made upon national agreements. There can be no defense for the policy of delay after delay which has prevailed in the hearings on national agreements. The labor leaders have had ample opportunity to present their case, and they ought to be required briefly to make their rebuttal to the evidence and arguments offered on behalf of the railroads and quit. In calling the railway officers mentioned, however, the labor leaders certainly gained nothing but delay. They did not strengthen, but greatly weakened, their case.

Increased activity on the part of the railroad clubs has been most noticeable during the present season. This is probably largely due to the fact that they have quite generally broadened their programs. For some reason, most of these clubs formerly devoted the greater part of their attention to highly technical subjects, largely mechanical. The tendency during recent years has been to present better balanced programs, either for single meetings or for all of the meetings of the season, those appealing to larger groups. The educational value has thus been greatly increased. Instead of a handful of men at a meeting most of the clubs now have average attendances of 300 or more. Grant Hall, vice-president of the Canadian Pacific, at a recent meeting of the Canadian Railway Club, emphasized the value of this tendency and spoke for the presentation of subjects which would be of general interest and would help the members to get a better idea of railroad operation as a whole. It has been suggested also from several quarters that the clubs should give more attention to drawing out the younger men. Not a few instances can be cited of men who are now at the head of the railroad and railroad supply professions who got their first real start upward because of the attention which they attracted to themselves in reading papers before railroad clubs or taking part in the discussions. It is the younger members also who will profit most by the broadening out of the programs, since it will give them a better idea of the work of the other departments and as to how the various departments should co-operate and work together for the only purpose for which the railroads exist (although some departments and employees do not always seem to realize it)—to furnish transportation.

The Panama Canal Again a Factor

IN THE maze of labor, financial and other problems confronting the railroads, a development of another character is now taking place concerning which few railway men are informed, but which would attract marked attention in normal times. This is the increasing tendency of traffic between the eastern and western coasts of the United States to move through the Panama Canal. Particular interest is attached to this tendency because of the recent experimental shipment of citrus fruit by this route, a boat arriving in Philadelphia on February 2 with 800 cases of oranges and 1,200 cases of lemons from Los Angeles. This shipment required 21 days and the fruit is reported to have shown a considerably smaller loss than is normally experienced in rail movement. In view of the marked reduction in transportation cost by this route and the demonstration of ability to deliver this fruit at distant ports in a comparatively favorable condition, the experiment is of great interest to railway men. Already a number of the large boat owners are planning to enter into

an aggressive campaign for this business and they have promised to cut their schedule to as low as 17 to 19 days between southern California and north Atlantic coast points, as compared with a minimum of 10 to 12 days by rail schedule.

At the time when the Panama Canal was completed, much attention was given to the possibility of the movement of a large part of the coast-to-coast freight by water. Boat lines were established and rates were so adjusted that freight from points as far removed from the Atlantic seaboard as Wisconsin, the Ohio valley and the Pittsburgh district was moving by rail to the Atlantic seaboard and then through the canal to Los Angeles, San Francisco and Puget Sound ports. This traffic was developing rapidly when this country entered the war, and it became necessary to take the boats out of this service. The boats are only now returning, and railway men may therefore expect to see the full effects of water competition as they have not before observed them.

That the stake is a large one is indicated by the fact that the citrus fruit movement from southern California alone aggregates over 50,000 cars annually. This fruit is delivered to the roads in large quantities so that it is handled in train load lots. It carries a high rate and demands expedited movement. It is long-haul traffic, practically all of it moving to points east of the Missouri river and much of it to the Atlantic seaboard. It and similar traffic from the west coast and the corresponding merchandise movement westbound constitute a large part of the business which the railways haul across the long mileage of intervening desert. With the increased freight rates now in effect, the competition has become all the more difficult for the railways to meet, for the cost of transportation by water has not risen to the same extent as by rail.

The Public's Representation on the Labor Board

THE AMERICAN public may well soon begin to question whether it has adequate and competent representation upon the Railroad Labor Board. The railway companies have three representatives on the board and the employees three. The other three members were appointed to represent the public, and they hold the balance of power.

The board's handling of the question of national agreements thus far has afforded a striking contrast to the way it handled the wage case a little over a year ago. When it was appointed on April 13, 1920, demands of the employees for advances of \$1,000,000,000 a year in wages were pending. It commenced hearings on April 19 and closed them on June 4. The board was new to its task and the amount of money involved was enormous. Nevertheless, on July 13, exactly three months after it was appointed, the labor brotherhoods got President Wilson to send it a telegram saying an emergency existed, and urging it to make an early decision. That emergency was created by the fact that the labor leaders were threatening the country with strikes unless an award was quickly made. The board on July 20, just three months after it began hearings, awarded the largest advance in wages ever given to one class of workmen at one time in the history of the world.

In its wage award on July 20, 1920, the Labor Board took jurisdiction of the subject of national agreements. In announcing on December 18 that hearings regarding national agreements would be resumed on January 10, it notified the labor leaders of its understanding that they had presented their case in favor of national agreements in the wage hearings. They had had five months to get ready any additional evidence they might want to introduce. On January 10 the labor leaders, after making a general and indiscriminate attack upon railway management, said they rested

their case. The railways took less than a month to present their case against national agreements. Over a month has now elapsed since they finished, and the labor leaders have not even begun to present their rebuttal regarding the shop crafts agreement, the most important one under consideration.

Last week the labor leaders had four railway officers called as witnesses in an attempt to show, not that national agreements are reasonable or desirable, but that the railway executives had differed regarding their desirability—a point not remotely germane to the matters in issue. They completely failed in this. The testimony of the railway officers showed that the railway executives had differed upon the expediency of establishing national boards of adjustment, but always had been unanimously opposed to national agreements.

The labor leaders having failed to find in their fishing expedition among the files of the Association of Railway Executives the evidence for which they were looking, it is high time to ask when the Railroad Labor Board intends to require them to introduce any evidence they have in defense of the shop crafts agreement. They have not yet introduced a scintilla of evidence actually bearing on that subject. The game they are playing has long been perfectly plain to others. It must now be plain to the Labor Board. They are trying to add delay to delay, because every day's delay means another day in which the national agreements are kept in effect, and because apparently they hope that something ultimately will turn up which will save them the necessity of squarely meeting the issue presented in the controversy.

It took the Railroad Labor Board only three months to hold hearings and reach a decision awarding an advance in wages which statistics of the Interstate Commerce Commission now show amounted in July to \$59,946,608, or at the annual rate, not of \$625,000,000, as originally estimated, but as we have said, of almost \$712,000,000. Since it took only three months to ascertain it was reasonable to add \$712,000,000 a year to what the public must pay in freight and passenger rates, why should it take any longer to settle the question of national agreements, which, important as it is, does not directly involve anywhere near as much as did the advance in wages? If, however, the Labor Board continues to permit the labor leaders to carry out their policy of adding delay to delay, it will take not merely three months, but twice or three times three months, to settle the question of national agreements.

Settlement of the wage question was expedited because an emergency existed. A much greater emergency exists now. The entire railroad system of the United States is threatened with bankruptcy because of grossly excessive operating expenses. The Railroad Labor Board, by its control over wages and working conditions, controls 65 per cent of all railroad expenses. It must determine the question of solvency or bankruptcy for many railroads. The national agreements alone may mean the difference between solvency and ruin to many. Bankruptcy of a large number of railroads would not only bring disaster to many thousands of individual railroad security owners, but would pull down many life insurance companies, trust companies and banks, with disastrous effects to the holders of life insurance policies, to investors and depositors in the trust companies and banks, and to the entire public.

The public has a direct and vital interest in the work of the Railroad Labor Board. It has a right to expect and demand that the public members of the board will energetically and faithfully represent, protect and promote its interests. In the hearings upon national agreements, however, the public members, or a majority of them, have yielded to almost every demand of the labor leaders, however un-

reasonable. They have agreed to almost every delay the labor leaders have asked, and, with the railway situation the most critical ever known, have allowed them to take weeks of time loading up the record with testimony having no bearing whatever on the reasonableness of national agreements. More time has elapsed since the hearings were resumed on January 10 than the entire time taken in the wage hearings.

Spokesmen for the railways have claimed that the national agreements are causing inefficiency and waste, that they add approximately \$300,000,000 a year to railway operating expenses, or over \$820,000 a day. No wonder the labor leaders desire to protract the hearings! They would be glad to have them continue forever. The public, which, directly or indirectly, is paying the bill, has not the same reason for desiring them to be protracted indefinitely.

The determination of whether the indefensible delays shall be stopped and a reasonable decision speedily reached is entirely in the hands of the public members of the board; and the time has arrived when the public may well ask whether the public members feel the same solicitude for its interests which they displayed for the interests of labor when eight months ago they expedited the decision granting advances in wages.

Standardize the Classification of Old Bridges

ANY RESTRICTION placed on the use of a railroad bridge is a matter of serious import to the traffic, operating and maintenance of way departments. The responsibility for such restriction rests with the engineering department, or, more correctly, with the bridge engineer. Apparently few people outside of the offices of the latter appreciate the complex nature of the calculations necessary to determine what stresses are set up in a bridge structure by a given locomotive or car. There is no satisfactory short cut by which approximate results may be obtained on the spur of the moment. By the same token a mere statement of the weight of the locomotive and maximum axle concentration do not provide the bridge engineer with the information he requires to make his decision. This is particularly true in those critical cases where the capacity of the bridge is being extended to the limit and it becomes a close question whether or not the load may be allowed on the structure. Another complication imposed in the work of the bridge engineer arises from the fact that he is frequently called upon to pass judgment on bridge loadings on very short notice, when it becomes, as a consequence, almost physically impossible to complete the necessary computations in the time available for the work.

Because of these considerations it seems highly desirable that some plan be promulgated, whereby the load-carrying capacity of all bridges and the bridge-stressing effects of all equipment could be reduced to some common standard and simple comparisons could be made which would give the bridge engineer immediately all the information he requires in passing judgment on the handling of a given piece of equipment over a bridge. Fortunately, such a standard measure of bridge stressing effect is available in the hypothetical Cooper "Class E" locomotive and train loadings. While these have been applied almost universally for the last 20 years or more in the design of railroad bridges, they have had but limited application in the investigation of old structures. Certain roads, however, have had this system in effect for some time and the manner of its use is described in a paper by C. F. Loweth, chief engineer of the Chicago, Milwaukee & St. Paul, an abstract of which appears elsewhere in this issue. This system is now under consideration by

the Committee on Iron and Steel Structures of the American Railway Engineering Association and it is expected that the next report of this committee will have something to offer with respect to its application.

As already stated, the question is of importance to many departments of a railroad. It has a particular bearing on the interchange of equipment between roads such as arises in the dead-heading of new locomotives on their delivery from the manufacturer, the detouring of foreign trains in the case of wrecks or washouts or the handling of heavy machinery, War department ordnance or other unusual loading. It is to be hoped that the steel structures committee will be able to formulate a plan whereby some such common standard of bridge classification may be adopted.

The New England Situation

THE SITUATION confronting the New England railroads has been given so much publicity of late that there is probably no student of railway affairs who does not realize that these carriers are in a most precarious position. They are meeting all the difficulties resulting from the 26 months of federal control and the aftermath thereof. They are equally subjected to the inequitable rules of the national agreements and to the handicaps resulting from the present high wages of railway employees. Besides, they have some severe problems of their own. These several matters have been brought out in the hearings in the case on rate divisions. They are now again being brought to the fore in the hearings before the governors' committee of the New England states at Boston.

Briefly, the problems confronting the New England roads, which are additional to those confronting all the railroads, may be said to lie in the facts that the New England roads are terminal carriers and that they have to pay very high prices for fuel. Because of the nature of their territory they render a service very much in the nature of a switching service. As terminal roads they are subjected to large payments in the form of per diem and it is generally accepted that terminal labor costs have risen out of proportion to other increases in labor costs. The prices they have been paying for coal have increased 164 per cent over the test period. The Maine Central, whose annual report is reviewed elsewhere in these columns, has been subjected to an increase of 238 per cent in its fuel costs; coal which cost about \$3.60 a ton at Portland, Me., before federal control cost during 1920, \$10.00 or more a ton.

The New England roads have sought in the divisions case to secure what they believe to be more equitable divisions on through traffic exchanged with the trunk lines, and this case is now pending. In the meantime they have also sought to secure from the trunk lines cash payments to compensate for the too low divisions of the past. The sum of \$25,000,000 was suggested at first, but with the falling off in business another agreement has been suggested on the basis of \$15,000,000 annually to February 28, 1922, to be prorated among the carriers west of the Hudson. Even this part of the program seems to have met a snag, and it seems to be making little progress. The latest proposal for relief has been put in the form of a suggested 10 per cent increase in freight rates and passenger fares to continue in effect concurrently with the payment to be made by the trunk lines, or until February 28, 1922. This increase is to apply on local traffic and on the New England proportion in the case of through traffic. Coal and coke are excepted because of being raw materials, and export and import traffic is also not included where it comes in competition with other ports. It is hoped that this increase may permit increased revenues of \$23,000,-

000 yearly for the New England roads as a group: \$9,000,000 from passenger revenues, \$8,000,000 from freight within New England and \$6,000,000 on freight crossing the Hudson river.

The governors of New England have turned this proposal over to an advisory committee which is to investigate and to report back to the governors for action. This committee of 30 members has been in session at Boston and it has already developed some interesting facts. The most important of these is that the shippers of New England are up in arms. Their spokesmen have pointed out that New England industry cannot stand this increase; they show that even the present high rates are driving traffic to the motor trucks which are now in a position to compete at many points, even on the basis of rates and cost of service. At the same time there has been evidenced a rather derogatory attitude towards the most important carrier, the New Haven. Edgar J. Rich, counsel for the Associated Industries of Massachusetts, has gone so far as to say that he doubted if anything could save the New Haven from receivership and that a receivership would not be deplored. William H. Chandler, transportation expert of the Boston Chamber of Commerce who incidentally is also president of the National Industrial Traffic League, has similarly criticised the New Haven. He has complained that the New England roads are not efficiently managed and he declares that the case should go to the Interstate Commerce Commission for the purpose of a thorough investigation of operation. His remarks about the lack of co-operation on the part of the New York, New Haven & Hartford were especially caustic, although he did speak well of the other New England carriers.

Mr. Rich, who was formerly counsel for the Boston & Maine, is a man who speaks with authority, but we are not among those who agree with him that a receivership is necessary for the New Haven. As far as Mr. Chandler is concerned, the comment might be made that it is most unfortunate that the New Haven should not have the regard of the shippers in New England in greater degree than it has. No one can deny that the larger share of reforming the present difficult situation in New England is in the hands of the shippers and people in general of New England. It is true that under the old Mellen regime, the New Haven was not noted as worrying particularly about the regard in which the railroad was held by the shippers around Boston. Mr. Pearson, the present president of the New Haven, has worked some revolutionary changes in the operation of the New Haven. Presumably Mr. Chandler realizes this fact; he should also realize that the organization of a railroad is so large and complex that it cannot be changed completely in but four or five years.

As far as the charge that the New England roads are inefficiently operated is concerned, an investigation would without doubt show the opposite of what the shippers have in mind. The New England roads are naturally not as efficiently operated possibly as the Lackawanna or the Illinois Central. The improvements that have been made in the operations of the Boston & Maine under President Hustis and in those of the New Haven under Mr. Pearson are, however, noteworthy and there is no question but what their efficiency in management has increased markedly in the past several years.

Those who read these comments may contend that they but touch on the edge of this big question. That is all they are intended to do. The condition in which the New England carriers find themselves is a serious one and it is not yet near solution—and it needs the proper solution because on the welfare of the New England carriers depends the welfare of one of the leading centers of industry and population of the nation.

Maine Central

IN THE OLD DAYS, prior to the time that Wilhelm Hohenzollern announced his intention of trying to run the whole world, it used to be one of the features of government ownership and operation of the Prussian State Railways that these lines returned a large profit which was applied toward the expenses of the state. It may surprise some of our readers to learn that a condition somewhat similar—though, of course, in different degree—exists in one of the states of our own United States. That state is Maine and the railroad system is the Maine Central. In the year 1920 this railroad returned to the state an income of no less than \$795,907 in the form of an excise tax based on $5\frac{1}{2}$ per cent of the gross transportation receipts within the state. This is a handicap which the company has to meet besides those other difficulties attendant upon the aftermath of federal control and those characteristic of the recent railway developments in the New England section.

The total amount paid in taxes by the Maine Central in 1920 was \$1,163,289, of which \$795,907 was for the excise tax mentioned; \$101,767 for city and town taxes; \$201,194 for federal taxes, etc. The total mentioned was in excess of the \$1,014,423 paid as interest on funded debt, in excess of the \$905,591 paid as rent for leased roads or of the \$653,166

ever, well wooded and watered and the soil is well adapted to agricultural development. Products of forests constitute over one-fourth the total tonnage carried. The total tons of all traffic moved in 1919 were 8,753,065. The largest single item was pulpwood, 1,269,963 tons, with lumber second, 1,216,352 tons. Other commodities carried in volume included bituminous coal, 907,741 tons; paper, 710,972 tons; potatoes, 602,606 tons.

The Maine Central, up to the period of federal control, was considered the only prosperous road in New England. It was conservatively capitalized and well managed and it had paid regular dividends of 6 per cent or more without fail. The road is still conservatively capitalized and its management has not changed, but the conditions accompanying the return of the roads to private control have prevented the continuance of this enviable dividend record. Three quarterly dividends were declared in 1920 on both the common and the preferred, but the directors did not feel that the operations subsequent to the guaranty period ending August 31, 1920, warranted further payment of dividends so neither dividend was declared. The Maine Central is, therefore, properly one of the roads that were parties in the New England divisions case and the reports of its operations are properly included as exhibits in the hearings before the governors' committee which is now investigating the feasibility of a 10 per cent increase in rates in New England.

The operations of the road in 1920, including the two months of federal control, the six months of the guaranty period and the four months subsequent thereto, showed an operating deficit for the year of \$2,340,030 as compared with a similar deficit in 1919 of \$1,231,426. The corporate income account in 1919 showed a surplus income balance of \$185,884 after the payment of \$1,050,888 in dividends. In 1920 the dividends totaled only \$653,166 and there was a deficit of \$367,871.

The Maine Central is confronted with the same handicaps which are presented to the other New England lines. Its operating expenses in 1920 were nearly three times as great as during the test period and since 1917 its wage bill has increased nearly \$9,000,000 yearly. Coal for the Maine Central is received principally at Portland, Me., by water from Port Richmond and Curtis Bay. Coal which formerly cost \$3.60 per ton, in 1920 cost nearly \$10.00 a ton. The total tonnage used is about 432,000 tons yearly so that the increase in cost since 1916 has been nearly \$3,000,000.

The total freight revenue of the Maine Central in 1920 was \$14,312,998 as compared with \$11,268,063 in 1919. The ton-mileage was 948,186,188, an increase of 51,535,770 over 1919. The average haul was 108 miles and the average revenue per ton per mile 1.51 cents. The passenger revenue totaled \$5,360,708 in 1920 as compared with \$4,906,039 in 1919. The number of passengers carried in 1920 totaled 4,099,701; the average journey was 41 miles and the average revenue per passenger per mile was 3.188 cents.

The figures of operation as between 1920 and 1919 are as follows:

	1920	1919
Mileage operated.....	1,215	1,215
Freight revenue.....	\$14,312,999	\$11,268,063
Passenger revenue.....	5,360,708	4,906,039
Total operating revenue.....	21,357,908	17,375,178
Maintenance of way and structures.....	4,040,659	3,086,323
Maintenance of equipment.....	5,053,469	4,143,196
Traffic expenses.....	173,783	146,411
Transportation expenses.....	12,626,609	9,571,955
General expenses.....	611,651	525,880
Total operating expenses.....	22,675,123	17,611,806
Taxes.....	1,163,289	1,098,313
Net railway operating income.....	Def. 2,485,331	Def. 1,185,835

The following gives in brief the corporate income account:

	1920	1919
Gross income.....	\$3,766,934	\$3,222,968
Total deductions from gross income.....	2,462,291	2,136,997
Net income.....	304,443	1,085,971
Dividends.....	653,166	870,888
Income balance.....	Def. 367,871	Sur. 185,884



The Maine Central

paid in dividends on the common and preferred stocks. It would be difficult to find a tax of any kind that would work more inequitably under the conditions of railroad operation which existed in 1920 than an excise tax on gross receipts. The year just past has been characterized by great increases in gross income and decreases in net. The excise tax by expanding with the gross, increases to that extent the decrease in net income. In the case of the Maine Central the result was that despite the fact that the property was operated at a deficit for the year, the amount paid under the excise tax was considerably greater than in 1919; it was nearly 50 per cent greater than in 1917. Conditions in 1921 will probably present no improvement. The legislature of Maine has been asked to grant relief to the extent that for the years 1921, 1922 and 1923 the state excise tax should not exceed that assessed in 1917. Hearings were held in February, but the railroad's proposals were rejected.

The Maine Central operates 1,215 miles of line, the greater part of which is in Maine. Of this line, it owns 654 miles, including the main lines from Portland to Bangor and Waterville; it leases 546 miles and operates 15 under trackage rights. It is an independent property and is owned principally in Maine. On January 25, 1921, of its 2,247 common stockholders, 1,644 were residents of that state and owned 80,415 of the total of 120,069 shares. Of the 30,000 shares of preferred stock, 27,362 shares were held in Maine.

The territory served by the Maine Central is rather sparsely settled and lacking in density of traffic. It is, how-

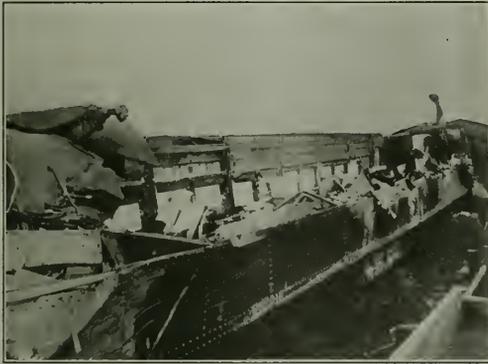
The Safety of Passengers in Steel Railway Cars*

A Discussion of the Action of Cars in Accidents and Methods of Avoiding Telescoping

By Frank M. Brinckerhoff

THE GENERAL ADOPTION of steel in place of wood in the construction of passenger train cars some 15 years ago marked a distinct advance in the art of car building. Various problems arose during the change, and many have been successfully met. The two most important problems to be solved were and still are: safety of passengers and weight of complete car.

That some steel passenger cars are heavier than the wooden ones which they displace in service, seems to be indicated by the significant fact that the adoption of steel pass-



Wreck of a Derailed Chair Car Which Side Wiped a Standing Locomotive

To successfully defend the passenger space against invasion in side wiping collisions and derailments, strong sideposts must extend from side sill to roof and all the side frame members must be co-ordinated to ward off the colliding body.

enger train cars was frequently accompanied or closely followed by the purchase of heavier locomotives to handle the new passenger equipment.

It is not the intention at this time to discuss the economic consequences of the increased weight of steel passenger train cars, though that aspect is, of course, very important.

With regard to the problem of safety of passengers, I wish to present in a condensed form the results of an extended investigation of the behavior of passenger train cars when derailed or in collision and to point out, that, while the steel structure affords much greater safety to passengers than did wooden car bodies, modifications can be made in the superstructures of steel cars which will greatly increase their ability to resist destructive shock.

The data and some of the illustrations from which this paper is compiled can be found in the printed reports of accidents investigated by the Bureau of Safety, Interstate Commerce Commission, which are available to all; other illustrations are from photographs taken by various pictorial news bureaus and have appeared in the daily press, a few are from our office files.

In making our collection many hundred prints were examined and only these were selected which are of interest

*From a paper presented before the New York Railroad Club, March 28, 1921.

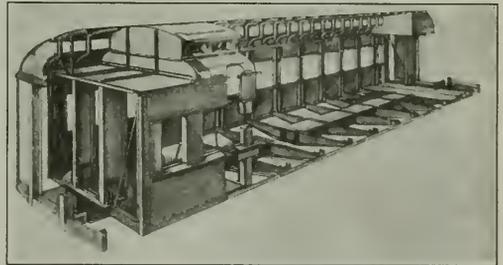
to car designers. It is greatly to be regretted that frequently the only available photographs of a wreck were taken as general views of the accident. Many valuable photographic studies of structural failures could have been made by an expert on the spot.

It was natural that the early designs of steel car structures should follow conventional lines and that the evolution from the all-wood car to the all-steel car should be gradual. It is now possible, however, to examine the photographic records of typical accidents to passenger trains and profit by past experience when designing and building new equipment.

For the purpose of analysis the illustrations have been divided into two groups: derailments and collisions. The records of the Bureau of Safety show that by far the greater number of accidents are in the derailment class though the loss of life and injury to passengers and equipment is greatest in the collisions.

Derailments

Examining first the large derailment class it is found that a considerable portion of the momentum of the train is gradually expended in plowing up the roadbed and in tossing about the car bodies, therefore the violence of impact between the individual derailed cars is not comparable to the shock experienced in a rear end collision between a moving and a standing train wherein the momentum of the combined units



Framework of Passenger Car

Showing collision diaphragm and bulkhead with high-girder side walls.

of the moving mass, led by the locomotive, is concentrated in an impact upon the rear units of the standing train. This reduction in the degree of violence of impact is, however, somewhat offset by the fact that when cars are derailed the heavy underframe of one car is frequently projected against the relatively weak superstructure of an adjoining car with more or less disastrous results. Furthermore in derailments the cars are sometimes overturned or fall upon a neighboring car; in such cases the superstructure of the car is subjected to extremely severe stresses.

Examination of many illustrations of accidents of the derailment and side wiping class, led us to the conclusion that distribution of metal which would strengthen the superstructure of the car as compared to the strength of the underframe was highly desirable. During the last 10 years or more, 315 cars have been built according to a system evolved, with the purpose constantly in mind, to produce a car body

structure of great strength, but still of a weight not in excess of wooden car bodies of similar size and equipment. I wish to introduce at this point a short description of this system which affords unusual protection to the passenger space when cars are derailed or side wiped.

A Car Body Structure of Greater Strength

The sideframe members of these cars are organized in the form of a girder extending from the side sill to the side plate at the roof line, a height of 7 ft. 6 in. or more. The underframe of this system includes centersills adequate to sustain the shocks of collision, draft, etc., but instead of being of the fish belly type, designed to be self-supporting between truck centers, as is the usual custom, the centersills of this system are uniform in section throughout their length and are supported approximately every six feet by heavy cross bearers between the high girder side frames. The centersills, being thus supported, have no measurable deflection and are, therefore, superior in capacity to resist end shock to those of much greater weight and depth which are self-supporting between bolsters. By this co-operation between side frames and centersills a great reduction in weight per car is accomplished and yet a much stronger body structure results.

The ends of the bodies of these cars are reinforced against the stresses of impact to an extent considered appropriate to the service in which the cars are employed, some of these cars being electrically operated in tunnel service, others in suburban steam and suburban electric service, others in through line steam service at high speeds and in heavy trains. The system of end reinforcement is, of course, carried to the greatest extent in the cars in the latter service where the greatest momentum is to be dealt with in case of accident.

This system of reinforcement of the ends of the car body co-ordinates the body end walls with the members of the high girder side frame and roof in the form of a rectangular tube with ends barred to prevent penetration by an impacting body. This is accomplished in the through line cars by the introduction of two new members:

1. An anti-telescoping tie plate extending across the car from side plate to side plate and lengthwise of the car for about six feet forming a flat ceiling for the lavatory, passageway and saloon and being securely riveted to the plate of the high girder side frame.

2. Special deep piers forming the posts for the door in the end of the car body. These piers are approximately 21 in. deep and as in some classes of accident they may be subjected to tension, the web plates of these piers pass through the upper tie plate and also through to the underframe and are, together with their flanges, securely riveted to each of these members. The corner posts and the adjacent side posts of the car body are also specially designed to withstand the shock of cornering collision.

The car structure thus formed is illustrated in the perspective drawing shown, from examination of which it will be seen that the compression member of the high girder side frame effectively braces this reinforced body end at the roof line.

The extent to which the high girder side frame and body end reinforcement of passenger car bodies will protect the passenger space when in collision or derailment can be somewhat gaged by examination of the damage to steel baggage cars after being involved in accidents of these classes. Baggage cars, because of the typical arrangement of their side doors, windows, etc., have in effect high side frames, with the elements of plate girders, extending from side sills to roof line at the car body ends. The high girder side frame and body end reinforcement of passenger cars, above described, co-ordinates all the strength elements of the car structure even more effectively than does the form of plate girder side walls of the usual baggage car, and in addition the body of the passenger car will be protected to a certain degree by the

wreckage of its vestibule which, when in collision, will be forced back against the reinforced body end. Comparatively little damage results to baggage cars with high side walls when colliding with coaches of the usual low frame construction, thus demonstrating the advantage of the high structure when subjected to end shock.

Rear Collisions

Considering next the illustrations of typical rear collisions, it is interesting to note that, where cars with steel underframes are involved, the penetration by the locomotive into the rear car seldom exceeds the depth of the vestibule and that the greatest damage occurs where one car overrides another. The pilot of the locomotive usually underruns the rear car until



First Stage of Telescoping of Steel Cars

The body of the chair car has overridden the buffer sill of the coach.

the buffer sills of the car come in contact with the heavy frame of the locomotive, where further progress is arrested and the penetration of the vestibule structure by the locomotive boiler or smoke box ceases.

When one car overrides another the penetration is in some instances complete, the entire length of the invaded car being practically destroyed. Careful analysis of typical photographic records of railway wrecks will lead to the following conclusions:

1. The underframe of the modern steel passenger car is adequate to withstand the shock of the most violent collision.
2. The underframe of the invading car overrides the underframe of the invaded car and wedges its side walls apart, the

point of impact being a foot or more above the floor according to the upward angle assumed by the overriding underframe.

3. The superstructures of steel cars fail to protect the passenger space, when overridden in collision by a car having a steel underframe, because of the relative weakness of the invaded superstructure as compared with the heavy underframe of the invading body.

4. The joints connecting the side walls, hood and roof are subjected to tension because the invading body having penetrated between the side walls, exerts a bursting stress on the invaded structure. The members composing the roof are always light in section and the joints connecting them to the

The essence of this problem is the element of *time*. The structure best adapted to solve the problem must contain members which will act to resist penetration at the vestibule end and interpose a rapidly increasing resistance to the progress of the invading car.

The essential characteristics of a member best suited to accomplish the above ends are: *Flexibility* to avoid shearing; *elasticity* to avoid abrupt stressing; *high ultimate strength* in tension to resist the bursting stress exerted by an invading car.

Use of Wire Cable Proposed as Remedy

Manifestly the material best adapted to meet the above requirements is *wire cable*. The manner of introducing the wire cable in a car structure may vary considerably. One form may be described as follows:

A wire cable anchored to the underframe of the car, passing through the vestibule buffer sill, up through the vestibule corner post, across the hood, down the opposite corner post, through the buffer sill to the anchorage point at the underframe.

The loop is thus distended in such a manner that the vestibule end of an invading car will penetrate within the loop. The initial shock of collision will be met as now by the vestibule end posts. When the resistance of these end posts is overcome and as the invading body progresses, the cable loop, together with the members of the invaded vestibule will be



End View of Coach Shown in Previous Illustration

The chair car has commenced to exert a bursting stress upon the body of the coach.

side walls equally inadequate to resist the heavy tension stress of collision.

5. The structure of the invading car is subjected to compression, and as the joints connecting its members are better able to resist compression, than the invaded car structure is to resist tension, the invading car body is seldom seriously damaged.

Accurate computation of the force expended in a collision between trains is practically impossible. Two reactions, however, occur in all rear end collisions, which can be used to roughly gage the violence of the shock, namely:

1. Depth of penetration by the invading car, and

2. The distance the standing train is driven ahead by the force of the collision.

These reactions are complements of each other and roughly indicate the energy expended.

With these reactions in mind it seems highly desirable that the invading car be restrained from penetration by some device which will cushion the impact shock and impart motion to the standing train, thus diverting the force from the work of destruction to the work of moving the mass.

It is obvious that in a train collision the points of impact will be more or less damaged. It is impossible to build a car structure that will successfully resist all damage by an overriding car. The problem is to provide means to arrest the progress of an invading car before it penetrates deep into the invaded structure, meantime transmitting the force of the collision to the standing train to set it in motion.



The Second Stage of Telescoping

When telescoping has reached this stage the structure can offer but little resistance to further penetration by the invading body.

drawn in and down against the vestibule of the invading body crushing both within the confines of the loop.

The more resistant the structures thus crushed, the greater will be the energy absorbed and the greater will be the pull exerted by the cable, through its anchorage in the underframe, to impart motion to the mass.

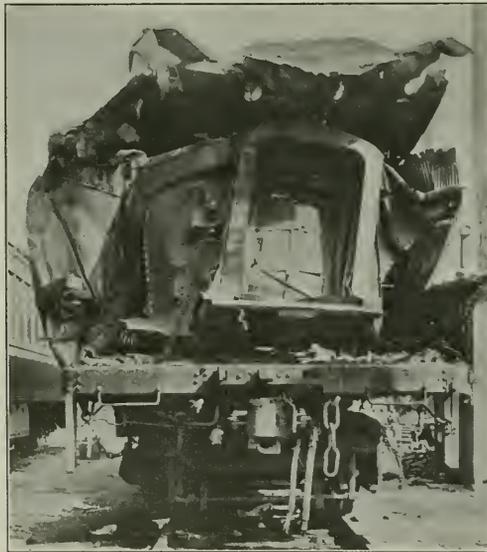
The design further provides for a second group of cables, imbedded in the body corner posts and body end frame, to act as a second line of defence against the invading car. Should the force of the collision be not completely dissipated through the resistance of the vestibule end posts and the cable in the vestibule end, the invading car body will next encounter the

high resistance of the body end wall, and the second group of cables will come into action upon being encountered by the invader. The second group of cables being also anchored to the underframe and distended in loop form will also draw the structure of the invaded car down and in upon the invader and similarly impart motion to the mass. This second group of cables will also act to draw downward and inward the roof and sides of the invader.

The size and number of the cables and the number of groups or lines of defence can be increased until all reasonable doubt of their collective ability to arrest an invading car disappears.

In the absence of the wire cables, a corresponding collision would result in wedging apart the invaded structure with comparatively little dissipation of energy and imparting but little motion to the standing cars, because the energy expended in wedging aside the members of the structure is exerted at almost right angles to the direction of the invading body and consequently, results in but little forward thrust.

The arrangement of the cables is purposely such that it is impossible to bring an abrupt stress on them. They are distended in an approximately rectangular loop by members which, when subjected to collision shock, are bent and distorted by the cable which is of superior strength to any member with which it is associated except only the centersill to which it is anchored. For example the combined tensile strength of the cable loops shown in the illustration is 2,000,-



End View of the Car Shown in the Last Illustration

000 lb., and therefore equivalent to the ultimate strength of centersills having a cross section of approximately 50 sq. in. Consequently when a car body protected by cables is invaded, the vestibule of the invader will be crushed down and the zone of destruction in the invaded car will be limited to the area enclosed by the cable loops engaged.

Length of Path of Resistance

Thrust will be imparted to the centersills of the car in which the cables are incorporated, from the moment of impact upon the vestibule end and in a gradually increasing degree until all the cable loops are drawn in and down to a position of rest against the crumpled structure of the invading car.

This prolonged and steep path of resistance is of the utmost importance.

In the illustration the cable loops are shown in combination with a high girder side frame and body end reinforcement as first described. This we consider the strongest form of car body construction in use today. When completely equipped with cable loops, this design provides the following path of resistance to penetration by an invading body:

1. A rigid vestibule end wall having as high initial resistance as practicable.
2. Cable loop, enclosing the vestibule end wall and acting to retain the structural members in the path of the invading



The Final Stage of Telescoping

The complete separation of the side walls of the invaded car indicates the desirability of incorporating strong tension members in the superstructure.

body, upon the failure of the initial resistance of the vestibule end wall.

3. A rigid body end wall including the strong piers at the doorway and the deep body end reinforcing plate, collectively over five times the section of the vestibule end.
4. The second group of cables which will act to prevent disruption of the body end wall structure and any further penetration.

The resistance effected by the cable loops is accumulative and the ultimate resistance will not be reached until the wreckage of both vestibules is compressed in a tangled mass within the confines of the loops engaged. The crumpling of the structural members within the cable loops will act to cushion the shock. The resistance will increase rapidly in a series of steps beginning with the resistance afforded by the rigid vestibule end posts and reaching a peak equal to the accumulated resistance of the four stages in the path of resistance above described. The body end structure being of much greater strength than the vestibule end structure will insure that the vestibule structure must be practically destroyed before the initial resistance of the body end structure is overcome, and the second group of cables called upon to resist further penetration. I believe that only in cases of the utmost violence will the body end of the invaded car be crushed in and the ultimate resistance of the main cables be developed. For example in some of the complete telescoping cases illustrated the initial resistance offered by the vestibule and the body end construction of the invaded car was inadequate to prevent penetration. The secondary resistance offered by the roof structure and the interior fittings was negligible as compared to that which would have been afforded by wire cables of 2,000,000 lb. (1000 tons) capacity which would have checked the invader at or near the point of entrance. It is my opinion, that in cases of extreme violence, and before the vestibule structures have been completely compressed, the

thrust transmitted to the underframe of the invaded car, through the medium of the cables, will be sufficient to impart motion to the standing train and thus dissipate a large proportion of the energy of the collision.

We are all familiar with shock absorbers in daily use, such as rubber heels, pneumatic tires, truck springs, buffing devices, draft gear, etc. All these devices introduce a time element, or path of resistance, commencing at the instant of impact and increasing in resistance until the shock is absorbed or the device becomes solid. The introduction of the strong cable loops in the car structure, produces a collision shock absorber which may be compared to a buffing device in which the maximum length of path of resistance, or travel, is only limited to the confines of the loops engaged instead of limited to a few inches travel. Time will not permit of entering into details of the method of incorporating the cable loops in the car structure. It is the intention, however, that all the structural members be retained by the cable loops within the path of the invading body to make resistance to penetration as great as possible.

In the foregoing description of a car adapted to resist the shocks experienced in sidwiping, derailments and collisions

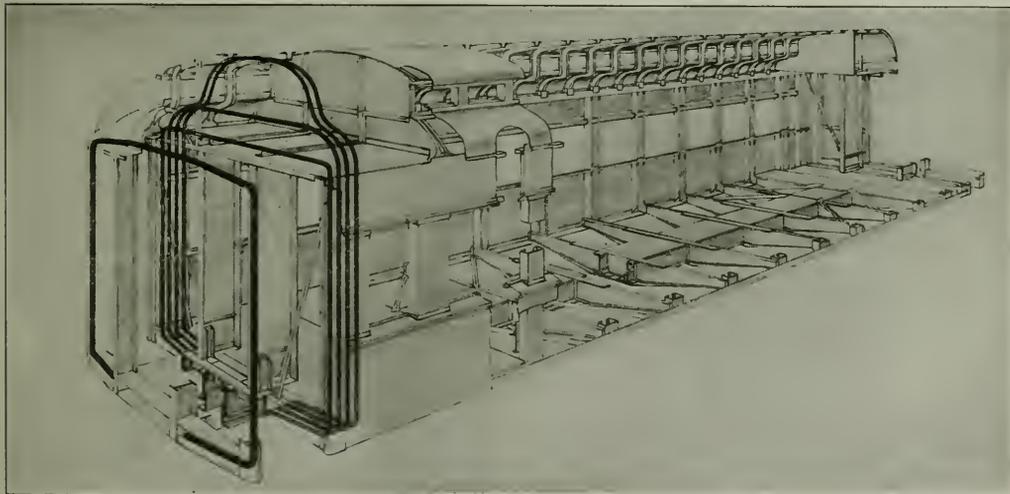
Senator Cummins Discusses Railroad Conditions

WASHINGTON, D. C.

SOME OF THE REASONS for the proposed Congressional investigation into the operation of the railroads since they were returned to private operation a year ago are set forth in "The Nation's Business" by Senator Albert B. Cummins. Senator Cummins plans to ask the new Congress to authorize this inquiry.

"Present operating expenses are too high," declares Senator Cummins, "and both Congress and the public are interested in knowing the reason. Giving all the weight which can be given to the diminished traffic, it will not account for the negligible net income which the year will show. Neither will it suffice to say that critical comparison of the railway performance for the year just closing, with the railway performance under Federal control, is exceedingly favorable to private management. That comparison, however satisfactory to those who believe in private ownership under public control, does not solve the problem.

"Obviously the conclusion to be deduced is that it is costing



Reinforced Body End with Cable Loops

we have naturally illustrated and described the design of car which we have ourselves evolved while guided by a close study of the collection of photographic records of accidents which we have been accumulating for a number of years. Manifestly the cable system of reinforcement can be incorporated in any adequate design of vestibule end and body end construction. I, however, believe that a car embodying the strong superstructure, with strong vestibule and body end construction as outlined above is particularly well protected against damage in accidents of the derailment and sidwiping class and further that such a car fitted with the limiting loop of wire cables as described will be as safe against invasion by a telescoping body as now seems possible.

THE ATLANTA PASSENGER TRAFFIC CLUB, the activities of which were suspended during Government operation of the railroads, was reorganized at a meeting in the Healy building, Atlanta, on Tuesday evening, March 15, with a membership of 144. Joseph P. Billups, general passenger agent of the Atlanta & West Point, was elected president of the club.

the railroads too much to earn the money which they are earning. This may be due, of course, to mismanagement, or to inefficiency, or it may be due to the excessive cost of material and supplies, or to unreasonable compensation paid to those, from President down, whose labor operates these railroads.

"If the railroads are to survive and render the service which the people of the country must have, the question I have proposed must be answered. It must be answered speedily, wisely and justly. It will be found, I think, that the answer does not lie in the main with additional legislation, but in the prompt and fair administration of existing law. However that may be, the people have a right to know all the facts and make up their own minds after an intelligent consideration of the entire subject. To that end the investigation I have suggested ought to be made, and, so far as I can influence the matter, it will be made."

Senator Cummins points out that "notwithstanding the increase of something like 35 per cent in railroad rates, which became effective about the first of last September, the rail-

roads, as a whole, show a very small net operating income, while many of them have not earned the cost of maintenance and operation.

"There seems to be a widespread misapprehension with regard to the causes for this lamentable result; or, if not misapprehension, at least a failure to understand a situation which threatens the solvency of many of the best railways of the country. I find among those who have given some study to the prevailing conditions radical differences of opinion, both as to the cause and the remedy. This conflict of opinion arises, in my judgment, from a misunderstanding of the facts which have transpired in the last year, and it seems to me that there ought to be an immediate inquiry, attended with the utmost publicity, into the operation and management of the railroads since they were returned to their owners. With this in view, I intend at the opening of the next session of Congress to submit to the Senate a resolution proposing the broadest sort of investigation into the subject. The people want to know just what has happened during the past year; why existing railroad rates have not accomplished the purpose of the act which returned the roads to their owners, and especially why the cost of maintenance and operation has not been reduced.

"It is obvious that rates should not be increased, if for no other reason than that another general advance in rates would probably diminish rather than enlarge the net railway income. There are, therefore, but two ways in which the net income can be advanced:

"First, by an increase in the volume of traffic without a corresponding increase in the cost of maintenance and operation.

"Second, by a reduction in the cost of maintenance and operation.

"In considering the statistics which I am about to present, it must be remembered that they do not embrace and have no reference to expenditures for construction or equipment chargeable to capital account. Under the system of railway reporting required by the Interstate Commerce Commission the net railway operating income of any given railroad is the amount which remains after payment of the cost of maintenance, operation and taxes, with the proper adjustment of equipment and joint facility rents. In other words, it is the amount which the railway company may use for the payment of interest upon its obligations, dividends, upon its capital stock, for adding to its surplus, or investment in any lawful way as capital is invested.

"It is generally believed that during the latter part of the year 1920 the volume of traffic was materially less than for corresponding periods in former years, and, if this be true, it would tend to explain the decrease in net operating income, for the cost of maintenance and operation does not diminish in the exact proportion of a lessening traffic.

"The aggregate net ton-miles carried from March 1, 1920, to December 31, 1920, was 381,482,259,000. For the same period in 1919 the aggregate was 340,425,083,000. The number of passenger-miles during the same time in 1920 was 39,959,099,000, while for 1919 it was 39,528,264,000. Measured by this standard the volume of traffic upon all the railroads of the country was greater in 1920 than in 1919. In round numbers, figures for the entire year 1918 are 360,000,000,000 and for 1917, 350,000,000,000, with passenger-miles for those two years 35,000,000,000 and 34,000,000,000, respectively.

"Toward the latter part of the year and continuing up to this time, there was, and still is, a remarkable decrease in the number of cars of revenue freight loaded. The (ton-mile) reports for January of this year are not compiled, and the reports for February have not been made, but I have advance information upon one point, namely, the number of cars of

revenue freight loaded. The following table discloses that information and the comparison with 1920.

		Cars of Revenue Freight Loaded.	
		1920	1921
January	1	745,446	598,905
January	8	830,673	706,413
January	15	840,524	709,888
January	22	804,866	703,115
January	29	803,332	699,936
February	5	762,680	696,997
February	12	786,633	681,627
February	19	772,102	695,506

"Another indication of a condition which began in November, 1920, and which has progressed steadily up to the present time, is a surplus of freight cars; that is to say, the number of cars for which there is no present use. On December 21, 1920, the number of such cars was 204,608. The number rose during January, 1921, and at the close of that month was 324,186, and the last report, on February 14, 1921, the number was 290,550.

"These statistics very clearly show that while the volume of traffic for the last 10 months of 1920, taken as a whole, was greater than during the same period in 1919, or indeed at any former similar period, yet beginning as early as November and proceeding rapidly to the present moment, there has been a tremendous diminution in traffic. These statistics accord with our observation with respect to the decline in business during the latter part of 1920 and the early part of 1921.

"I direct attention now to the operating revenues and operating expenses from March 1, 1920, to December 31, 1920. The operating revenues of all class roads amounted to \$5,299,654,454. Operating expenses, including taxes and the adjustment of equipment and joint facility rents, amounted to \$5,289,348,937, leaving a net operating income for these 10 months of \$10,305,517, and if we assume that the remaining two months of the year, from March 1, 1920, to March 1, 1921, show no better results, then for the whole period the net operating income will amount to no more than one-fiftieth of 1 per cent of the value of the railroads as estimated by the Interstate Commerce Commission.

"It is interesting and instructive to know that the net operating income for March, 1920, was \$14,320,571. In April there was a net deficit of \$29,604,417, in May of \$13,455,871, in June of \$16,284,900, in July of \$10,427,989 and in August of \$155,227,617. The great deficit of August is probably accounted for by the back compensation ordered paid to the employees by the Railroad Labor Board in July, 1920.

"In September, that being the first month under the increased rates which were established by the Interstate Commerce Commission, there was a net operating income of \$75,310,311, in October a net operating income of \$86,455,487, in November of \$54,343,793, and in December of \$10,225,583. The decreasing net income in November and December seems coincident with the decreasing volume of traffic which began in November and which is still in progress.

"It may be helpful to institute a comparison here and there. For January, 1915, considering only Class I roads, railway operating expenses were \$163,654,452. In December, 1915, these expenses were \$184,510,067; in January, 1916, \$183,702,959, and in December of that year, \$209,615,966; in January, 1917, \$215,496,356, and in December of that year \$251,302,146; in January, 1918, \$271,521,592, and in December of that year \$396,468,865; in January, 1919, \$360,465,815, and in December of that year \$414,615,756.

"The expenses I have just given do not include taxes or the adjustment of equipment and joint facility rents. In March, 1920, these expenses had arisen to \$421,713,184, in July to \$511,773,300, in August to \$678,728,682, and in December, 1920, they had fallen to \$523,206,889."

Present Wages and Rules Ruining Canadian Railways

Reflex of "McAdoo Award" and Other Changes in United States Disastrous in Dominion—Chairman of Railway Com- mission Speaks Out Frankly

By J. L. Payne

Former Comptroller of Statistics, Departments of Railways and Cars, Ottawa, Can.

THE PEOPLE OF CANADA are awakening to the importance of the railway issue. After years of indifference on the part of the vast majority, and a settled attitude of hostility to all corporate interests on the part of a small but articulate minority, the truth is being generally accepted that a vital relationship exists between transportation and the life-giving commerce of the country. If the service which the railways are providing is crippled, a steadily swelling number of reading and thinking men are realizing that the whole community must suffer too, and suffer directly and acutely. If the railways should break down there would be universal stagnation. The actual conditions today suggest that as a possibility.

There has never been a time when all the leading newspapers were giving up so much space to carefully digested articles on the railway situation. Heretofore, references to transportation problems were incidental and spasmodic. They were not always based on accurate information. Today such references are frequent, and represent studious attention to fundamental conditions. Slowly, but nevertheless surely, the truth is being accepted that (1) the railways are in very grave trouble, (2) that this trouble has its foundation in the rising ratio of operating cost to gross earnings, (3) that higher operating cost is due in large measure to the scale of pay to railway employees, (4) that that scale is unreasonably high, and (5) that wages might be reduced to the rates paid to other skilled and unskilled workers without injustice to railway men.

Here, for example, is a paragraph from an editorial in the Ottawa Journal, one of the prominent newspapers of the Dominion, of March 17:

"The Chairman of the Railway Commission finds the salient cause of high operating cost to be the present scale and conditions of pay to employees, in which respect he gives direct corroboration to the judgment of the Deputy Minister of Railways. He declares the scale to be unreasonable, and backs up his statement by an array of facts showing that men in the railway service are receiving wages far above those paid to other workers. In support of Mr. Carvell's contention, here are a few specimen payments for a recent month by one of our leading Canadian roads:—Train conductor, \$434.23; locomotive engineer, \$425.33; telegraph operator, \$268.64; station agent and operator, \$254.34; yardman, \$237.84; train dispatcher, \$257; blacksmith, \$227.69; coach painter, \$208.12; machinist, \$220.71. These sums are purely typical of many, and were earned under a scale which Mr. Carvell refers to as 'ingenious.' He said: 'The straight pay looks reasonable and moderate, but the 'conditions' enable an employee to get time and a half while loafing.'"

Among the influences which have contributed to public enlightenment on this important subject have been the recent public addresses of Hon. F. B. Carvell, chairman of the Dominion Board of Railway Commissioners. It is unusual for one occupying such a high position to speak at all in public on matters associated with his judicial functions. All British traditions are more or less against it. That intense conservatism which clings to judges under the British system

has made for reserve. For that very reason, therefore, everybody in Canada understands that only the most extraordinary circumstances, only the utmost gravity of the case, could justify the chairman of a lofty tribunal like the Railway Commission in breaking the traditional bonds which hold him in large degree to silence off the bench.

Hon. Mr. Carvell has not only broken away from the reserve which has characterized him thus far, as well as that of his predecessors, but he has spoken with the utmost frankness on at least two occasions. The first was at Montreal on January 30 last, when he addressed the Canadian Railway Club. In that address, he referred in forceful language to the great part which the railways had played in developing the Dominion, especially the vast prairie provinces of the west. To the agreeable surprise of his audience he stepped aside from the beaten path usually followed on such occasions, when pleasant generalities are uttered rather than anything of real public interest, and "spoke his mind," as men would say. He said:

"During the past two years I have had much reason to change my ideas regarding our railways. Without the railways Canada cannot progress. These railways must go on no matter what happens."

Commission Chairman Denounces "McAdoo Award"

With that start off the common road of men in places of responsibility, he plunged into the question of rates. In that relation he said:

"Whether a railway is owned by a corporation or by government I consider that it should be granted rates sufficient to allow it, if efficiently and honestly administered, to pay maintenance, interest on investment, and something besides that. Whether it is a government or privately owned road the rates should be sufficient to meet cost of administration and pay interest on investment; and so long as I occupy my present position I shall hold to that idea as my guiding principle in dealing with all questions as to rates.

"Wages is a matter which does not particularly concern the Commission, but when the present rates expire a year and a half hence the public and the employees must realize that an adjustment will be necessary.

"I am not discussing wages but a bigger question, that of the service employees are giving their employers on the railways. It has been stated that the Canadian people are receiving the cheapest railway service in the world, but if we are paying too much for that service there is cause for complaint. I believe that in some classes of railway work we have not been getting the returns we should for the wages paid."

He made an appeal to the employees on government lines to give as efficient and loyal service as, for example, the employees of the Canadian Pacific gave to that road; and in this there was a clear implication of something wrong along that line. Naturally these observations, terse and broad as they were, were given considerable publicity, and Mr. Carvell seems to have thought it necessary to be more specific. Hence, when he spoke to the Rotary Club of Ottawa on March 14 he threw all reserve to the winds. He said:

"Canada cannot continue with the railway situation as it

is. There must be an early conference of representatives of industry, business, the railways, labor and the government to discuss developments and bring about a change. If business keeps dropping off as it has during the past two months, I am afraid that the Canadian Pacific will not be able to pay dividends this year. It would be a calamity if that took place, because the Canadian Pacific has been one of the bulwarks of Canada and has grown to be an institution of the country.

"There is need for a new relation between labor and capital. The thought has been inculcated in the minds of laboring men that they are not to give service for money received. The working man has been advised to give the least that is in him. I do not want to see wages go back to the scale of 1914, but I want a man to give value for pay received. I believe a plan can be worked out to get railways back to normal.

"Railway employees are good citizens, and I consider that they are the aristocrats of the labor world in Canada. They are not crooks and should not be blamed for the cause of present conditions. The McAdoo award is more directly responsible. That award was not based on good judgment, on railway economics, nor on good business principles. It was merely offered and adopted as a vote catcher.

"The McAdoo award is one of the most iniquitous pieces of legislation ever foisted on the United States.

High Labor Costs Cause High Rates

"Proof that it was not a proper measure is found in the fact that it was followed by many amendments, adjustments and changes. It affected the Canadian railway situation because the railway employees of Canada threatened a general strike unless they benefited to the same extent as did railway men in the United States. The first McAdoo award meant an increase in wages to the extent of \$8,000,000 for employees of the Canadian National Railways alone, and this was followed by another increase amounting to \$13,000,000. Last July wages to railway employees in Canada were increased about \$50,000,000, the Canadian Pacific being called upon to pay \$21,000,000 more. The fact that the increases were made retroactive to May, 1920, meant a difference of \$20,000,000 in back pay which was not earned.

"That is the reason you are paying higher freight rates."

Hon. Mr. Carvell gave a few instances of high earnings by railway employees. Among them were payments of upwards of \$120 per week to conductors, and one extraordinary instance of a woman station agent who drew down \$202 every two weeks. This arose from a strict legal interpretation of the classification and regulations attaching thereto, under which the woman was paid an enormous allowance for overtime. How she spent the overtime does not appear to have been a factor. She was technically on duty, and, as the post was occupied by a woman, it is obvious that it was of minor importance. Probably her wages exceeded the total receipts of the station.

I had a talk with Mr. Carvell and asked him if he cared to add anything for the *Railway Age* to what he had said either at Montreal or at Ottawa, and his answer was in the negative. His reasons were good. "I have already exposed myself," he said "to criticism for having spoken at all. My motive may be misunderstood by many; but I have been so deeply impressed by the importance of the railway situation as it has developed during recent years, and the apparent apathy of the public, that I took the risk of departing from what might be regarded as a strictly proper attitude on the part of one in my position to sound a note of warning. I have gone as far as I could, and perhaps further than some will be disposed to approve. I regard the railway problem, however, as it exists today as the most serious thing which has happened in the whole history of the Dominion, and I simply could not be silent."

Losses of Government Railways

The allusion of Hon. Mr. Carvell to the serious results on the Canadian National system brought about by the McAdoo award is corroborated by an important report just made by Major Graham A. Bell, Deputy Minister of Railways. He deals elaborately with the facts of the case, and most convincingly, too. It is the first report of that nature ever published by the department, and emphasizes the serious view that is taken in official circles of the present scale of wages in its relation to the whole problem of rising operating cost. After announcing a deficit for the year ended December 31, 1919, of upward of \$50,000,000, including a considerable volume of fixed charges, he says:

"The great single factor contributing to the exceptional increase in expenditure during the year, and in fact during the past several years, has been the heavy increase in the wages of railway workers without commensurate increase in the rates or volume of business. These increases for the Canadian National are shown in the following table of wages paid:

1917-18	\$40,606,170
1918-19	57,252,095
1919-20	73,567,036

"Out of every dollar earned in 1917-18, 59 cents were paid in wages. In 1918-19 the proportion was 67 cents, and in 1919-20 it had grown to 76 cents."

In continuing Major Bell points out that during the past year \$16,314,941 was absorbed by wages out of an increase of \$20,220,432 in operating expenses, or 80 per cent. The increases in wages during the past three years was 82.29 per cent of the increase in operating cost and 125 per cent of the increase in operating revenue. Bearing in mind the relationship of wages to this matter, the situation on the government system is further accentuated by the fact that operating expenses increased on the Canadian Northern unit from \$4,662 in 1918-19 per mile of line to \$6,230 in 1919-20. Per train mile for the same road the advance was from \$1.98 in 1917-18 to \$3.36 in 1919-20. Railway operators need not be told of the frightful significance of these figures, and they are due almost wholly to the McAdoo award and the succeeding increases.

D. B. Hanna, president of the Canadian National Railways, puts the case even more directly in a report incorporated with that of the Deputy Minister. He says, in alluding to the Canadian Northern unit:

"The increase of \$15,971,074 in operating expenses is nearly all due to higher wages. The general large increases in rates of pay granted during 1918 under the McAdoo series of advances, which were reflected only in part in the operating expenses for the year ended December 31, 1918, show their full effect in this year's figures, and the total is increased by the effect of additional supplements issued during 1919 by the United States Railroad Administration and which, under arrangement between the Canadian Railway War Board and the Dominion government, have been applied to the wages of railway employees in Canada.

"Under these conditions, and with less than one per cent increase in train service, the net result for the past two years has been to convert net earnings of \$789.08 per mile of line in 1917, and \$343.53 in 1918, to a deficit of \$671.63 per mile for the year ended December 31, 1919."

It is characteristic of President Hanna that he is not overwhelmed by his own picture of disaster, but ends his report with a fine show of optimism. He is sure all these obstacles to satisfactory progress will be removed, that the sun will shine again, and that all will go smoothly toward a day of ultimate triumph. This is somewhat exceptional for a Scotchman; but Mr. Hanna claims to have seen worse days.

What of the people? Upon them falls this heavy burden of deposit; for the Dominion treasury must pay it. It would

be hard to say at this moment what is the state of public feeling. A few warning voices were heard in Parliament and in the press during recent years, but they did not appear to touch the public conscience; and, of course, during the progress of the war everything was pushed aside for the supreme issue. Now, as was said at the outset, there are signs of an aroused interest in the troubles of the railways, and people are commencing definitely to realize that those troubles are also theirs. With over 52 per cent of all railway mileage in the Dominion owned and operated by government, they see, or are commencing to see, that a very large proportion of the railway losses must be paid out of their pockets. This irritating fact has at the same time brought them into contact with the international jurisdiction of the railway brotherhoods, and with the further startling fact that when General Director McAdoo was fastening a ruinous scale of wages on American railways he was automatically fastening that same scale on Canadian roads.

If Hon. Mr. Carvell has in mind a government commission, composed of representatives of the classes he specifies, he may find that the people have lost the robust confidence which they at one time reposed in the dignity and usefulness of such inquisitorial boards. It has almost come to be an axiom in Canada that if you want to smother any matter as to which inquiry has been provoked, all you have to do is to get it referred to a royal commission. There must be in the public archives a fine collection of still-born reports from such august bodies—and excellent reports some of them were. But if the people should become really aroused, that would be an entirely different matter. And that is precisely what is likely to happen. Those who have pushed up railway wages did not have to contend against public opinion, and if public opinion decides that wages are unreasonably high they will come down. That looks like the one thing that would start the railways back to solvency and safety. But it will be a momentous struggle.

Getting the Maximum Service Out of Old Bridges*

Systematic Classification of Structures Insures Accurate Capacity Rating in Shortest Time

By C. F. Loweth

Chief Engineer, Chicago, Milwaukee & St. Paul, Chicago

THE TERM CLASSIFICATION of bridge, is here used to describe the systematic investigation of old bridges with a view of determining the maximum loads which they can safely carry. In order to conduct a systematic investigation of the carrying capacity of bridges, it is necessary to adopt a standard measure. Most any assumed train load might be used for this purpose, but on account of the universal use of Cooper's class E loading, the Chicago, Milwaukee & St. Paul has adopted this loading as the standard unit of comparison.

In order to obtain direct comparison between the structure and the power to be operated, it is, of course, also necessary to obtain the effect of the various locomotives and train loadings in actual use, on the various members and details of each structure in terms of the same standard as that used for rating the bridges.

The present practice on the Chicago, Milwaukee & St. Paul is to make an investigation or "classification" of all bridges subject to loadings much in excess of those for which they were designed. The carrying capacity is determined in terms of the standard series of train loadings. New engine and car loadings that come up for consideration are classified in that same series of standard loadings, and it is then a matter of direct comparison to tell whether or not such proposed loadings can be handled safely over the various bridges.

Unit Stresses

The classification is based upon maximum unit stresses which are considered proper for the various materials as used in the structures under consideration; these unit stresses are nearer the limit of useful strength of the material than in those used in designs. The maximum unit stresses permissible in old structures cannot be arbitrarily determined for universal application. There is perhaps no greater responsibility placed on a bridge engineer than in determining the safe rating of an old bridge; the work

involves far more than the mere calculation of stresses and the arbitrary assumption of safe unit stresses. In order to decide intelligently upon the limiting unit stresses, the following should be given full and careful consideration:

The design—whether the details are well proportioned and direct in action, the degree of ambiguity or uncertainty as to distribution of stresses and of secondary stresses.

The character of workmanship and material entering into the structure as indicated by the reputation of the shop at which the bridge was built and the thoroughness of the inspection as disclosed by inspection reports of material and shop manufacture. Deterioration and wear.

Action under load, such as rigidity and freedom from excessive vibration.

The speeds likely to obtain over the structure and confidence as to the observance of such speed restrictions as may be imposed. The certainty as to the assumed loading being the maximum to which the bridge will be subjected.

Importance of the traffic and the hardship which might result from temporary disablement of the structure.

The reliability of the data upon which the investigation of the structure is based.

In general the exercise of good judgment and experience based upon all of the factors surrounding the bridge, its location, service and condition.

Coming now to unit stresses: Axial stresses in tension per square inch may generally be taken as follows:

	Wrought iron	Steel
In flanges, beams and girders.....	20,000 lb.	24,000 lb.
In truss members.....	18,000 lb.	22,000 lb.

Stresses of other kinds should generally be proportional to these, the same as in the design of new structures.

To the designer of new structures these unit stresses seem large; in the case of old bridges they frequently seem small, especially in the case of the structure subject within regular service to stresses of such intensity and at the same time indicating little or no evidence of distress.

There may be at times conditions which may require, and at the same time justify increasing the limiting axial tension stresses to a maximum of 22,000 lb. for wrought iron and 26,000 for steel. It does not seem wise, however, to permit these higher stresses except in the case of structures which

*Abstracted from a paper and discussion presented before the Western Society of Engineers at Chicago on March 17.

are to be removed or strengthened at an early date, or where the traffic over them is relatively unimportant. It sometimes happens that a bridge must be kept in service longer than would otherwise be necessary because of pending improvements, such as double tracking, revision of grades or alignment, etc., which delay its replacement. The higher unit stresses may be necessary to meet emergencies of this or other nature.

It is desired to call attention again to the fact that the stresses mentioned are not to be applied indiscriminately. There may be cases where the limiting stresses should be less than those mentioned, and the writer has had cases in his own practice where the stresses have been even higher. It is obvious that the higher the stresses, the more care and discrimination necessary for intelligent and safe application. It must not be overlooked that increasing the loading with consequent increase in unit stresses will materially increase the vibration of the structure and the wear and tear on the details of connections, will lower the margin of safety, will materially shorten the useful life of the structure, and will render it more liable to injury.

There are some details of construction in which it appears that the limiting stresses might safely be increased at a larger ratio over the axial stresses heretofore indicated.

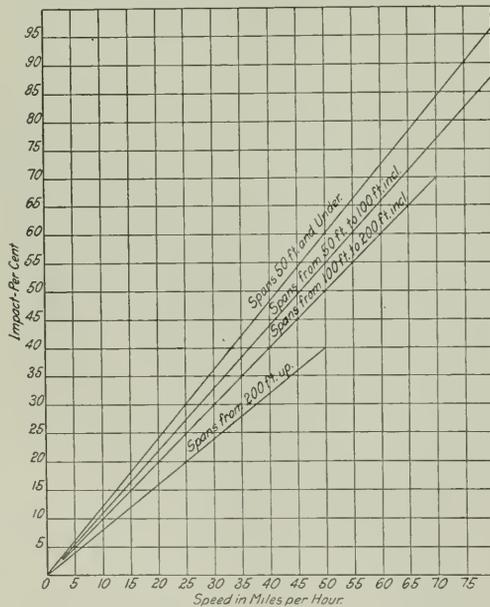


Fig. 1—Percentage of Impact for Various Speeds and Span Lengths

This, for instance, is true of stresses on the flange rivets in plate girders, stringers and floor beams. The failure of a girder in the flange riveting could not take place before ample warning of distress would be evident in the way of loose rivets, in this case the riveting could be strengthened before further failure could occur. It is, however, very seldom that flange rivets shows signs of overstress, in fact. I am unable to recall a single instance where our bridge inspectors have reported loose flange rivets. I see no reason, however, for changing the general practice in designing new girders on this account.

Impact

The impact for designing new bridges is taken as the maximum obtainable at unrestricted and very often at a very high speed, not usually obtained under ordinary conditions. In rating old bridges as to their maximum capacity, the impact allowance should be based on the probable maximum speed obtained. The speed is frequently known, and it can be restricted arbitrarily or it may be restricted due to the conditions surrounding the location of the bridges or the character of the traffic. It is desirable, therefore, for the purpose of rating old bridges, to determine not the impact for maximum speeds, but for such restricted speeds as the

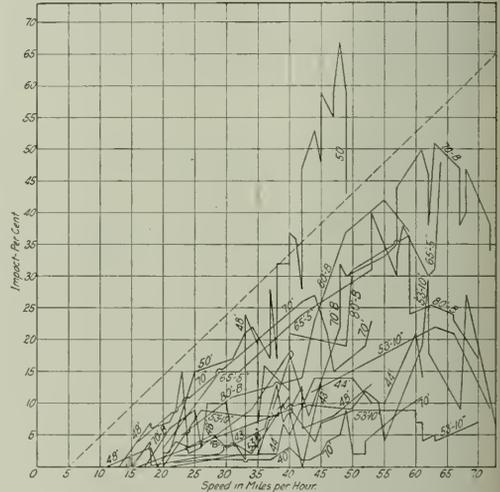


Fig. 2—Composite Chart of the Results of Impact Tests on Deck Plate Girders

structure may be subject to, either by reason of arbitrary ruling or speed limitations brought about by the location of the structure as to proximity of stations, ruling gradients, etc.

The impact per cent for various speeds and for spans of different lengths are shown in Fig. 1. This compact diagram has been evolved from several diagrams upon which have been plotted the results of the impact tests made by the A. R. E. A., classified as to speed of train and length of structures. One of these diagrams, Fig. 2, shows the impact observed for various speeds on deck plate girders from 43 to 80 ft. in length. This diagram includes a total of 14 spans, all of which have open timber floors except three.

These diagrams indicate that for all practical purposes the impact is directly proportional to the speed. The similar diagrams for truss spans show a similar condition, and on the basis of this practical information, the curves in Fig. 1 were drawn to cover the probable maximum impact for various speeds and different span lengths represented by the curves.

General Methods

In general, the investigation for any part of a bridge would be as follows:

1. The maximum allowable stress is determined which, in the simpler cases, is the cross sectional area of the member times the limiting unit stress allowed.
2. Deduct from this the stress due to "dead load" and

"wind load." The remainder gives the allowable stress for the "live load" effect.

3. Divide this by the stress for unit "live load" (Class E-1), which gives the classification for allowed "live load," if at rest.

4. Divide this classification by the term which takes into account the extra effect of the "live load," due to impact and centrifugal force, the result being the classification of the allowed "live load" at full speed.

As an illustration of this general method, the example of the hip vertical member known as U-L1 of a truss. Assume that this consists of two steel bars, 4 in. wide by 1 in. thick, giving 8 sq. in. of cross section. If we assume that in this case the circumstances warrant the limiting unit stress of 24,000 lb. per sq. in., the total allowed stress is 192,000 lb. Assume that the dead load stress is 17,000 lb. and that the wind load is so small that it may be neglected. The total allowed stress available for live load is then 192,000 lb. - 17,000 lb. = 175,000 lb. The live load stress in the member for Class "E1" loading as determined by the usual methods of computing stresses in bridges, is 1,890 lb. The total allowed live load classification, if at rest, is therefore, $\frac{175,000}{1,890} = E 92.1$. Impact if taken by the ordinary formula $\frac{300 + L}{300} = \frac{300}{300 + 50} = 0.865$ of the live load. Considering the bridge on straight track, the centrifugal force stress is zero. Therefore, if LL represents the net live load at full speed $LL + 0.856 LL = E 92.1$

$$LL + 0.856 LL = E 92.1$$

$$\frac{LL}{1.865} = E 52.2$$

which represents the "Classification" of the member at the assumed unit stress. That is: An engine with wheels spaced as in the Cooper loading having 55,200 lb. on the driving axles and the other axle loads in proportion, will produce the assumed stress of 24,000 lb. per sq. in. if taken in connection with the other forces which are assumed to be acting.

Classification of Loadings

It is surprising to observe the extent to which it is generally assumed that the effect of various train loadings on

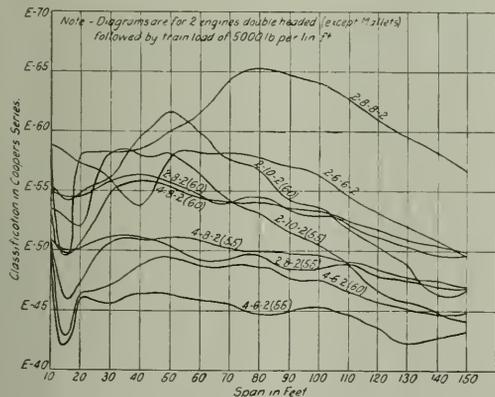


Fig. 3—Diagram Showing the Comparative Bridge Stressing Effect of 10 U. S. R. A. Standard Locomotives on the Basis of Bending Moments

bridges is in direct proportion to the aggregate weight of the locomotives and cars. This, of course, is far from the truth and no approximation by such a method should be used to determine the safety of any bridge.

The Fig. 3 shows the classification of several types of United States Railroad Administration standard locomotives for various span lengths compared with the standard Cooper's Class E loading. The diagram shows for each of the loco-

motives the relation between the effect of the given engines on bridges as compared with the standard Cooper's loadings, which are used as a basis for the classification of bridges. The locomotives classified in Fig. 3 are listed in the following table:

LOADING CHARACTERISTICS OF SOME U. S. R. A. LOCOMOTIVES

Type	Weight		Wheel Base			
	On Driver Axle	Total Engine	Engine and Tender	Driving Engine	Engine	Engine and Tender
Pacific (4-6-2).....	55,000	270,000	414,000	13' 0"	34' 9"	67' 6 1/2"
Pacific.....	60,000	300,000	444,000	14' 0"	36' 2"	70' 8 1/2"
Mountain (4-8-2).....	55,000	320,000	492,000	18' 3"	40' 0"	75' 8 1/2"
Mountain.....	60,000	350,000	522,000	18' 3"	40' 0"	75' 8 1/2"
Mikado (2-8-2).....	55,000	290,000	466,000	16' 9"	36' 1"	71' 5 1/2"
Mikado.....	60,000	325,000	497,000	16' 9"	36' 1"	71' 9 1/2"
Santa Fe (2-10-2).....	55,000	360,000	532,000	21' 0"	40' 4"	76' 0 1/2"
Santa Fe.....	60,000	390,000	596,000	22' 4"	42' 2"	82' 10 1/2"
Mallet (2-6-6-2).....	60,000	440,000	646,000	10' 4"	50' 2"	88' 10"
Mallet (2-8-8-2).....	60,000	540,000	746,000	15' 5"	57' 4"	93' 3"

Points of Low Classification

In old structures, it is generally found that the floor systems are comparatively lighter than the girders in plate girder bridges and chord members of truss bridges. The point of low classification in stringer, floor beam and plate girder flanges is generally found at the point of maximum moment, except that where cover plates are used the low classification in the flanges may be found at a point where a cover plate terminates. The flange riveting near the ends of these members very often falls below that required by modern practice. The webs at the point of maximum shear and web splices near the ends of plate girders and the connection of floor beams to the gusset plates, frequently requires strengthening in order to produce a structure of uniform strength.

Members of low classification in truss bridges may be looked for in posts and diagonals near the center. The hip verticals very often are out of proportion to other members of the bridge. The end posts and top chords generally show up poorly on account of eccentricity with respect to pins. If the pins of a truss bridge should be calculated according to the accepted practice for designing truss pins, these pins would, almost without exception, show an extremely low rating.

In addition to the weak points in the design, the top flanges of stringers, deck girders and floor beams very often suffer from corrosion due to brine dripping and in bridges where the ties are supported on shelves, the shelf angles frequently are considerably weakened from corrosion. Overhead bridges are subject to excessive corrosion, due to smoke and gases, and this condition is further aggravated where these structures are covered with a solid floor, which prevents the smoke and gases from escaping, and also prevents the steel from drying out quickly; in cases of scant clearance, metal bridges may show excessive deterioration from the sand-blasting effects of cinders. This is especially the case where overhead bridges are located on an ascending gradient.

The Economics of Reinforcing

With the maintenance of old bridges, the question arises whether it is more economical to strengthen the structure than to renew it. This to a great extent depends on whether the old structure can be used to advantage on a branch line or is relegated to the scrap pile. On most large railroads there are branch lines carrying lighter traffic and requiring much lighter locomotives than on main lines; this condition makes it possible to remove bridges too light for main lines and use them on branch lines. Frequently the bridge will be quite suitable for branch line service without strengthening, although it will at times be found desirable to strengthen the bridge before it is re-erected in its new location, when this can be done more economically than while in service. Bridges which are too light for branch line service or which

for other reasons cannot be so disposed of, can frequently be used in highway overhead structures.

As a general proposition, the yearly amount of money that it would be permissible to spend for strengthening would be equal to the interest on the investment in a new bridge less the cost of additional maintenance required by the old bridge on account of the greater attention it receives.

For illustration, consider a few lengths of through spans designed for E-55 loading, replacing similar spans designed in the early nineties, the new steel work being taken at 5 cents per pound erected, falsework at \$10 per lineal foot, removal of the old structure at \$10 per ton, salvage on old span at 2½ cents per pound, additional cost of maintenance of the old span on account of additional inspection, classification and supervision required, \$1 per foot of span per year. The last column of the following table shows the amount which we could afford to spend per year in strengthening old spans rather than to renew them. The costs shown in this table are for illustration only. As they fluctuate from time to time, the resulting economies will vary accordingly.

RELATIVE ECONOMY OF REPLACEMENT AND STRENGTHENING

Span	New Steel		Salvage	Net Cost	Interest on Net Cost at 5 per cent	Available for strengthening each year
	Weight Pounds	Cost Erected				
50 ft. ...	60,000	\$4,330	\$1,130	\$3,200	\$160.00	\$110.00
100 ft. ...	218,000	13,390	3,700	9,690	480.00	380.00
200 ft. ...	830,000	46,800	12,500	34,300	1,715.00	1,515.00
300 ft. ...	1,600,000	92,200	25,000	67,200	3,360.00	3,060.00

With old and light bridges a limit is reached beyond which it is not economical to strengthen them, and replacement then becomes necessary. It must be recognized, of course, that a newly designed and heavy structure is preferable to a lighter one. It is possibly true that in case of a train accident on a bridge, a lighter structure might be destroyed while a heavy new structure might withstand the same treatment without being seriously disabled. Such considerations must be taken into account in shaping the general policy of keeping lighter bridges in service. Acknowledgment is made of valuable assistance in the preparation of this paper to H. J. Hansen, office engineer, Chicago, Milwaukee & St. Paul.

Discussion

O. E. Selby (C., C. & St. L.) said that the views expressed by Mr. Loweth in his paper indicated that the latter was much nearer in accord with the views of the committee on iron and steel structures of the American Railway Engineering Association than was presumed to be the case from Mr. Loweth's discussion before the A. R. E. A. convention of the committee's rules for the investigation of old bridges. Mr. Selby was particularly impressed by Fig. 2, accompanying Mr. Loweth's paper, which presented impact effects in an entirely different light. The plotting of the results of tests on individual bridges had seemed to indicate that there was a critical speed for each structure for which the impact effect was the greatest, but when all the results are assembled in one chart, as in Fig. 2, a direct relation between speed and impact seems to be brought out. The classification of bridges according to the Cooper-E loading bears directly on the work of the iron and steel structures committee for the coming year, and this will unquestionably be the basis of recommendations made by the committee before the next convention. A number of roads are now following this same system.

G. A. Haggander (C., B. & Q.) stated that his department on the Burlington did not classify the bridges for the Cooper-E loading direct, but by means of a comparison between the effects of the various locomotives on that system it was found possible to use the results of calculations made for the effect of one locomotive when it was necessary to consider other power.

W. S. Lacher (*Railway Age*) raised the question as to the relative amount of time and labor required to investigate a bridge in accordance to the Cooper classification as compared with that required to determine the effect of some individual locomotive direct. It was his opinion, based on conversations with a considerable number of bridge engineers on various railroads that very few of them had carried out the classification according to the Cooper loading in anywhere near as complete a form as that described by Mr. Loweth. Obviously, any ruling by the bridge engineer on the effect of some particular piece of equipment could be made very quickly if all the bridges had been previously classified according to the Cooper loading. The question arises as to when the bridge engineer and his staff would find time to do this in the face of more urgent work. It would seem that the most workable plan would be to carry out the classification of the bridge according to the Cooper loadings each time that a call was made on the bridge engineer concerning some particular structure, and that by keeping up this practice systematically, eventually the record would be complete for all the structures on that particular line.

C. N. Bainbridge (C., M. & St. P.) emphasized the importance of permitting the office man who carries out the classification calculations to inspect the bridge so that he may have a definite knowledge of the condition of those portions of the structure which prove critical under the investigation. In his experience the inspector cannot relay this information to the office man with sufficient accuracy. Based on his experience with the investigation of a large number of old bridges, it was his opinion that much more balanced designs would be obtained if the new bridges were designed for limiting loadings and limiting stresses. With structures designed for prevailing loadings and ordinary unit stresses, the heavier loadings too often result in greatly overloading a few members, which are disproportionately weak under these heavy loadings, as compared with the rest of the structure.

Mr. Bainbridge also called attention to the one important advantage of a uniform system of classifying both bridges and locomotives through the facility this would give for the exchange of information between roads when it became desirable to detour trains or to haul foreign locomotives over the line. There is a prevailing lack of appreciation of the character of information which the bridge engineer must have if he is to pass on the loading effect of a locomotive or some other equipment. The officers of some railroads seem to think that a statement as to the total weight of the engine and maximum axle load is all that is necessary, but this will not suffice.

C. F. W. Felt (A., T. & S. F.) said that the practice of re-erecting old bridges on branch lines of light traffic did not always work out economically, owing to the fact that it was found desirable to use heavier power on these branch lines sooner than had been expected. The presence of these light capacity bridges on the branch lines is often found objectionable in the case of temporary shortages of power, making it desirable to use the heavy locomotives on branch lines temporarily, while changes in traffic routes sometimes result in greatly increasing the train movement over what had been considered a light traffic line.

THE COLORADO SUPREME COURT on March 14, ordered the Denver, Boulder & Western to resume operation. The court decision held that the order of the Colorado Utilities Commission, which led to the scrapping of the equipment of this road, was unwarranted, as the road had performed a necessary service and must resume operation in the interest of public policy. The line extends from Boulder, Colo., to Eldora, and from Sunset, Colo., to Ward; total length operated. 53 miles.

Railroad Plan Proposed by S. Davies Warfield

National Railway Service Organization Suggested in Modification of Plans Presented to Congress in 1919

WASHINGTON, D. C.

vice Corporation will serve as the Finance and Administrative Division of the National Railway Service Board.)

Railroads Already Divided in Groups

A PLAN OF RAILROAD ADMINISTRATION described in a statement to the press as one which "will produce far-reaching results, will ensure annual savings of millions of dollars, increase facilities and service, and lower railroad fares and rates," has been filed with Senator A. B. Cummins, chairman of the Senate Committee on Interstate Commerce, by S. Davies Warfield, president of the National Association of Owners of Railroad Securities, accompanied by numerous exhibits, including a bill to carry out the proposed plan. In a separate letter to Senator Cummins, Mr. Warfield says that "unless intensive economical methods in railroad administration are adopted there is no alternative but government operation, followed by government ownership, although the country has given overwhelming evidence of being opposed to it." Representatives of the association will later appear before the Senate committee to formally present the plan in further detail in connection with the proposed investigation into the causes of the unsatisfactory condition of the railroads.

It is pointed out that the commission has already divided the country into four territories within which the respective railroads are grouped, and that rates are adjusted to meet the varying conditions of the respective territories. These and other conditions obtaining in each territory and the vast area covered are declared to necessitate the organization of the carriers constituting each group under a Group Railway Board to effectively dispose of matters affecting the roads of each group. These four group railway organizations would be made obligatory by act of Congress, with power to organize committees from each group to bring about the co-ordination and economies in facilities and service now or hereafter considered necessary and essential to the public welfare.

The plan is a modification of that advocated by the association before the committees of Congress in 1919. It provides that the existing machinery of transportation, as far as practicable, shall be co-ordinated through the organization, by act of Congress, of the National Railway Service; as an agency, first, to purchase cars and other equipment to be furnished to the railroads on an economical basis, without profit; and, second, to afford the means for co-ordinating facilities and service.

The National Railway Service Corporation (superseded by the National Railway Service), which was organized by the association of security owners under state laws, has sold trust certificates, and with the assistance of loans made to the corporation by the government, is supplying equipment to certain railroads. It is proposed that the excess earnings created under the transportation act shall be used in connection with the sale of trust certificates of the National Railway Service to provide for the purchase of equipment for the railroads. Equipment would be leased by the service to the roads to meet seasonal requirements, and thus be used at different times on different railroads. "The savings in this method of handling equipment would be very great," says the statement, "the rental cost to the railroads would be gradually cut down and railroad rates correspondingly lowered."

The plan as briefly summarized in the press statement provides:

(a) The Interstate Commerce Commission to select five from among its members to constitute the Service Division. This division to have supervision and initiatory and regulatory powers to be exercised through the board or staff of the National Railway Service.

Congress is asked to provide that in the event of default by a carrier purchasing equipment, the receiver be required to carry out the contract made by the defaulting carrier and continue payments as a first charge against operations. It is stated that "this will place the equipment obligations of the National Railway Service on an investment basis of pronounced safety and assure the securing of money on especially favorable terms."

(b) A board of 40 members subdivided into two divisions—Finance and Administrative, and Railroad officials, 20 members each. A chairman, four vice-chairmen, treasurer, secretary and other officials. An executive committee of 11 members.

(c) Four group railway boards each organized and selected from and by each group of railroads as now constituted by the commission in each of the four rate territories into which the commission has divided the country. Four boards in all, each to consist of seven members, five selected by the railroads of each group and two from the shippers located in each group territory. (The 20 officials forming these four boards will serve as the Railway Officials Division of the National Railway Service Board.)

Great Problem of American Transportation

"The great problem of American transportation," the statement continues, "has been to find the means to co-ordinate the natural advantages of individual railroad management and operation without destroying initiative and incentive." Certain consolidations of railroads are necessary, it is stated, but an emergency now exists and the public is entitled to more immediate and substantial benefits than can be derived from the great physical consolidations of railroad properties, by immediate provision for the co-ordination as far as practicable of the facilities and service of the existing railroads and systems.

(d) Ten committees of five members each to co-operate with each of the four group boards, and selected from the railroads of each group. This means four group railway boards, and 40 committees in all. These committees will cover a large range of investigation and report.

(Included in which are: Normal equipment requirements of each railroad; additional equipment to be leased from the National Railway Service; standardization of equipment; useless expenditures incident to wasteful competition; a study of joint use of terminals, yards and shop facilities; surplus property not required in legitimate transportation—cost of carrying; purchases of fuel and supplies; application of a standard of efficiency in railroad operations; working conditions—wages, etc.)

Present Methods That Are Available

(e) The National Railway Service Corporation, recently organized by the association of security owners to furnish equipment to the carriers by conditional sale or lease, is superseded by the National Railway Service with extended powers for financing and leasing equipment under plans it is said will save many million dollars in preventing duplication of equipment by the carriers, now necessary when each carrier is required to buy its maximum equipment requirements. (The 20 trustees of the Ser-

"Before a decision is reached in respect to the suggestion herein contained," the statement continues, "which means the solution of the greatest remaining transportation problem yet unsolved, it becomes necessary for the Congress to consider the conditions under which the transportation system is now required to function, as a whole—what have been

and are at present the methods employed. Two methods have thus far been available":

(1) The voluntary action of an association composed of railroad executives, each representing distinctly conflicting interests, which has been tried; the results speak for themselves. In the nature of things voluntary action must fail in the effort to deal with the inherent complexity and difficulties of transportation in its national aspect. Prior consideration has been and must necessarily, under voluntary action, continue to be given to the interests of the individual railroads by those who represent them, and individual points of view which are not consistent with the broader interests of the public have always controlled and must continue to control.

(2) The other method is through the enlargement or extension of the regulatory powers of the Interstate Commerce Commission—the government authority—into those of operations, now properly employed as emergency powers. This extension of these powers, made permanent, would mean government operation.

The latter method is declared to be inconsistent with the continuance of initiative and eventually of private operation because it throws upon the commission an already over-taxed regulatory body, the responsibilities of railroad operation; the statement also says that the commission would likely rather not be thus burdened but would prefer that its duties continue to be regulatory and confined to the supervision of the organization or agency suggested.

The first named method is therefore asserted to be the only present means at command to bring about economies by the co-ordination of facilities and service essential in the public interest.

Shall Government Regulation Extend to Operation

"The question now to be decided—and its decision is of most vital concern," the statement continues, "is whether the powers necessary to the co-ordination of facilities and service do not extend beyond those of *regulation* and into the field of railroad *operation*; and whether these powers shall be performed by the governmental *regulatory* agency alone, or whether Congress shall enable and *compel* the railroads themselves to bring about such co-ordination of facilities and service, under the *supervision* of the commission. This is essential if incentive and initiative are to be preserved and private ownership survive."

"We have always favored extended regulatory powers being given the commission," says Mr. Warfield, "but should government regulation be extended to the point of operation with the tremendous indebtedness of approximately \$1,300,000,000 of the carriers to the government with their great financial necessities, the distance from private to government ownership of the railroads is indeed narrow.

Railroad Men and Public Service

"The suggestions herein are based on the belief that only under private operation fully regulated by the commission can transportation facilities and service be supplied adequate to the full development of agricultural and business pursuits, and that the railroads have among them able and competent men of large experience who should be subject to call to perform service of public concern in addition to their duties on the particular railroads by which they are employed. This would give a staff, free from political influences, to aid and co-operate with the commission in carrying out such instructions as Congress, by act, may deem necessary.

Inherent Weakness of Present System

"These statements of fact are not in criticism, but disclose a weakness inherent in the prevailing voluntary system which Congress must consider in deciding the necessity for the establishment of a comprehensive means to ensure economy in railroad operation which the public asks and later will demand. The employees are concerned, for

economical methods of railroad operation are essential to steady employment at fair wages."

Insurmountable difficulties are said to prevent the bringing about of the readjustment, which is now indispensable, by the voluntary action of an association of executives of railroads, which "necessarily represents the views of a small controlling group. Continued evidence is given of these difficulties," the statement says, "in the hasty and ill-considered action as expressed in the recent application before the Railroad Labor Board at Chicago to annul the so-called national agreements with employees during federal control, which left no alternative to the board, but to dismiss the demands as presented.

"The methods adopted have unnecessarily arrayed the employees against the railroads, and deferred the rehabilitation of the properties which depend upon the re-establishment of their credit and the good will of the men identified with them. That adjustments are essential in respect to working conditions and amounts paid many of the employees of railroads is generally recognized, but it should be made plain that these adjustments are a part of a general system of economies which must be instituted if adequate transportation is to be supplied at reasonable rates. The transportation act is definite in requiring orderly procedure for the adjustment of wages, which was not followed.

An Underlying Difficulty

"There are two distinct departments in the conduct of the affairs of a railroad, each requiring talents widely differing; one, administration, the other, operation. Questions of business and public policy have often been decided by those whose training has not been along those lines. This has been the underlying difficulty and has led to the positions taken by some of the controlling factors in the railroad world which have caused unfortunate results.

"The prohibitive features of the Clayton act now in effect make this situation more acute. The act requires that officials of financial and other institutions shall resign as directors of railroads with which their institution may have relations. This deprives the roads of the advice and service only obtainable from men of broad and varied experience acquired from the environment that now disqualifies them. Railroad directorates will be composed largely of men with little or no business experience or financial interest in the properties they manage, or of what are known as 'dummy directors' or of both. The proposed bill provides safeguards in respect to railroad directorates to protect the public and the roads, while providing a broad and effective management.

A Crisis Exists

"A crisis exists, culminating from a combination of conditions. The railroads were not returned to their owners in the condition required by Congress under the federal control act. The act called for the return of each railroad '*in substantially as good repair and in substantially as complete equipment as it was in at the beginning of federal control.*' The service of the carriers had become demoralized and their business and organizations disrupted. No cash was turned back upon their return.

"An increase in rates of 25 per cent only was made during federal control by the director general of railroads. This it has been estimated yielded approximately \$1,113,000,000 to pay \$2,750,000,000 (estimated) increase in operations. Had rates been advanced proportionately as expenses were increased, they would have been absorbed in general business activities and profits of the war period and not appreciably felt. This was not done, and the commission was faced with the necessity of meeting these extraordinary and unprecedented conditions.

"The commission, basing its calculations on a normal

increase in the gross revenues of the railroads, adjusted rates to yield the return called for by the transportation act. Then rapidly came violent after-war readjustment. The gross revenues of the railroads, instead of increasing, declined 21 per cent from the average of the period, March 1 to September 1, 1920, and a falling off of 31 per cent from what had reasonably been expected. The selling prices of commodities—such as cotton, grain, lumber, general merchandise, perishable fruits, vegetables, etc.—have fallen with such unprecedented rapidity that freight rates necessarily show a disproportionate ratio to the selling price of the products transported. Low prices for commodities have slowed down shipments, causing the equally unprecedented drop in railroad revenue, and the expected return has not materialized, which would have resulted under normal conditions.

Conclusion

“The questions involved require prompt decision. The railroads must recognize that only drastic measures on their part will save them from being swallowed up in the demoralization that government operation and after-war readjustment has brought upon them. It may be that a different result could not be expected. There is a point beyond which

rates and fares cannot be advanced because of the conditions the war has forced upon the country, although more revenue is necessary because of the conditions government operation has forced upon the railroads.

“This situation may well be seriously considered by the executives of the railroads. The questions now at issue are not how much authority can continue to be exercised by a railroad executive; not how far a railroad can hold on to the single use of a terminal or other facility that by joint use would institute a saving and fix a policy to save all, but whether the railroads will recognize that the crisis has been reached which will decide the fate of private ownership and operation and that all must submit to a readjustment of methods which perhaps few would desire could it be avoided. This is the situation we face, it cannot be ignored. The employees should bear their part in meeting the present emergency, the railroads should bear theirs through advanced methods of economy.

“Whatever is stated seemingly of criticism is not so intended; it is a system that is under discussion. American transportation has outgrown it; facts are necessary, the Congress cannot be expected to deal with the serious problems it is now called upon to solve unless in possession of every phase of transportation having a bearing thereon.”

Railway Employees and Their Compensation

Interstate Commerce Commission Issues Report Showing Payroll and Average Earnings Under Wage Award Now in Effect

WASHINGTON, D. C.

AS BRIEFLY REPORTED in last week's issue, the Interstate Commerce Commission has issued its quarterly statistical report on employees, their compensation and service for the third quarter of 1920, giving the first official statistics showing the effect of the wage award of the Railroad Labor Board of July 20, 1920.

In this and the reports for the first and second quarters of the year the number of employees of Class I roads by months is shown as follows:

January	2,000,105	June	2,056,381
February	1,970,525	July	2,111,286
March	2,609,948	August	2,197,824
April	1,932,446	September	2,164,889
May	2,605,483		

The average number of employees for each quarter and the total payroll as shown in the reports, with the average compensation per employee per month deductible therefrom, are as follows:

	Number employees	Total compensation	Average per month
First quarter.....	1,993,525	\$795,616,330	\$133
Second quarter.....	2,604,760	801,063,938	133
Third quarter.....	2,157,989	1,052,109,451	162

The commission has also issued another report compiled by its Bureau of Statistics on the increase in compensation resulting from the wage board award. The compilation relates to the single month of July, 1920, and as switching and terminal companies are not included, the number of employees reported as in the service at the middle of the month, 2,080,687, is somewhat below the corresponding figure shown in the quarterly report. The number reported as receiving additional pay from the wage decision is 1,987,658. The payroll basis immediately prior to the wage decision is given as \$285,778,515, and the increase resulting from the award as \$59,946,608 for the month, but because employees whose names appeared in the payroll had not all remained in the service, the amount of the increase

reported as payable is given as \$58,855,968. The report includes a table giving the total increase in compensation for each class of employees and the percentage of increase. This table has been combined herewith with some of the tables of the quarterly report referred to, but the percentages of increase are based on the total compensation for the employees of the class and not upon the average compensation per day or hour, which is given in another column.

It will be noted that the increases in compensation are those resulting from Decision No. 2, regardless of whether or not they were specifically covered thereby. Some persons, for example, classed as general officers or their assistants, received advances in salary to maintain a relation between their salaries and those of other employees.

The average number of employees and their total and average compensation and average hours or days per month during the quarter are shown in the table on the following page, with comparisons with the average compensation during the preceding quarter before the wage advance.

The average monthly compensation paid during the quarter, as computed from the above table, for some of the principal classes of employees was as follows:

Section foremen	\$169.10
Section men	112.52
Other unskilled laborers	118.14
Clerks below \$900 per annum, averaging 2,703 persons per month..	68.73
Clerks \$900 per. and upwards averaging 244,854 persons per month	146.37
Messengers and attendants	90.96
Nachinists	195.11
Boiler makers	202.02
Blacksmiths	186.10
Masons and bricklayers	161.70
Structural iron workers	174.78
Carpenters	168.95
Electricians	184.44
Car inspectors	233.25
Car repairers	183.74
Other skilled laborers	185.20
Mechanics' helpers and apprentices	139.06
Train dispatchers and directors	266.10
Telegraph and telephoners and block men	153.46
Levermen (non telegraphers)	152.79
Yard engineers and motormen	237.56
Yard firemen and helpers	181.30

Yard conductors (or foremen)	228.85	Road pass. eng. and motormen	238.61
Yard switchtenders	157.37	Road pass. firemen and helpers	218.59
Hostlers	182.02	Road pass. conductors	261.42
Road freight firemen and helpers	219.27	Road pass. brakemen and flagmen	186.52
Road freight engineers and motormen	303.80	Crossing flagmen and gatemen	97.05
Road freight conductors	266.20	Drawbridge operators	122.19
Road freight brakemen and flagmen	209.82	Policemen and watchmen	154.13

SUMMARY OF EMPLOYEES, SERVICE AND COMPENSATION: CLASS I ROADS (INCLUDING SWITCHING AND TERMINAL COMPANIES), QUARTER ENDED SEPTEMBER 30, 1920

(CLASS I ROADS ARE THOSE HAVING ANNUAL OPERATING REVENUES ABOVE \$1,000,000)

Class of employees	Average number of employees in service	Total compensation	Average compensation per day or hour	Average number of hours or days per month per employee	Average compensation per day or hour in previous quarter	Increase in compensation resulting from wage award	Per cent of increase
General officers, \$3,000 p. a. and upwards.....	7,237	\$11,614,393	\$7,088	*26.0	*\$18,987	\$11,733	3.41
General officers, below \$3,000 per annum.....	1,809	1,035,369	7,088	*27.4	6,734	40,703	17.79
Division officers, \$3,000 p. a. and upwards.....	1,935	7,986,870	11,102	*29.2	10,771	232,842	11.51
Division officers, below \$3,000 per annum.....	5,892	3,970,850	7,683	*29.2	7,005	191,843	13.85
Clerks, \$900 p. a. and upwards.....	244,854	107,749,643	697	210.	573	6,515,205	22.25
Clerks, below \$900 per annum.....	2,703	1,557,647	353	192.	325	31,782	23.86
Messengers and attendants.....	11,735	3,206,341	3,332	*27.3	*2,750	190,209	21.73
Assistant engineers and draftsmen.....	11,000	6,105,510	6,958	*26.6	*5,980	283,985	16.94
M. W. and S. foremen.....	8,784	5,419,246	7,385	*27.8	*6,130	304,937	19.89
Section foremen.....	43,776	2,586,777	5,837	*25.8	*4,537	1,632,873	35.33
General foremen—M. E. department.....	1,930	1,674,099	9,941	*29.1	*8,556	73,109	14.47
General foremen—M. E. department.....	25,909	18,765,269	8,429	*28.6	*7,167	889,165	16.86
Machinists.....	65,364	38,290,703	895	212.	764	1,968,495	18.13
Boiler makers.....	20,888	12,657,241	910	212.	776	644,549	17.92
Blacksmiths.....	11,241	6,283,327	553	211.	482	345,444	19.60
Masons and bricklayers.....	1,253	608,391	736	214.	627	37,710	22.27
Structural ironworkers.....	791	415,364	861	203.	711	17,235	18.38
Carpenters.....	55,727	28,255,362	775	218.	643	1,671,717	21.61
Painters and upholsterers.....	15,572	8,088,829	808	219.	682	447,759	20.31
Air-brake men.....	15,469	8,865,241	*7,094	*26.09	*6,068	449,749	18.51
Car inspectors.....	8,160	4,668,978	852	224.	724	250,756	19.13
Car repairers.....	27,041	16,510,906	858	238.	722	892,618	19.23
Other skilled laborers.....	93,478	51,457,672	839	219.	704	2,766,849	19.79
Mechanics' helpers and apprentices.....	61,850	34,314,995	834	211.	712	1,827,085	19.10
Section men.....	138,153	57,589,979	635	219.	511	3,924,457	25.97
Other unskilled laborers.....	341,560	115,548,100	425	232.	360	6,723,809	21.66
Foremen of const. gangs and work trains.....	129,093	45,720,691	537	230.	450	2,563,835	20.63
Other men in const. gangs and work trains.....	1,934	1,132,458	770	255.	622	54,390	24.39
Traveling agents and solicitors.....	32,184	11,976,037	518	239.	430	625,704	20.31
Employees in outside agencies.....	3,865	2,557,651	*8,096	*27.2	*7,224	86,174	11.83
Other traffic employees.....	1,272	700,331	7,193	*25.5	*6,047	30,273	16.09
Train dispatchers and directors.....	7,483	27,583	*7,811	*26.81	*7,235	11,901	13.91
Telegraphers, telephoners and block operators.....	6,256	4,988,827	1,162	229.	1,031	192,503	13.16
Telegraphers and telephoners operating interlockers.....	22,380	10,447,267	673	231.	579	531,687	17.84
Levermen (non-telegraphers).....	8,264	4,019,119	683	237.	585	200,797	17.63
Telegrapher-clerks.....	12,686	5,995,256	634	241.	541	94,881	18.98
Agent-telegraphers.....	12,686	5,924,900	664	235.	564	306,862	18.01
Station agents (non-telegraphers).....	19,866	9,824,552	689	239.	586	562,915	17.80
Station masters and assistants.....	13,844	7,162,714	*3,978	*28.8	*3,198	317,254	15.33
Station service employees.....	16,635	5,389,115	*6,791	*30.1	*5,783	22,629	20.32
Yardmasters.....	126,963	48,347,779	570	233.	464	3,068,925	23.65
Yardmasters' assistants.....	4,841	3,914,241	*9,625	*30.3	*8,317	167,522	15.71
Yard engineers and motormen.....	3,867	2,995,036	*8,745	*29.5	*7,400	138,245	17.49
Yard firemen and helpers.....	23,226	15,565,136	653	241.	530	951,223	22.72
Yard conductors (or foremen).....	23,608	12,865,136	939	241.	704	484,530	29.17
Yard brakemen (switchmen or helpers).....	23,335	15,484,526	901	254.	706	1,024,897	27.57
Yard switch tenders.....	56,523	34,803,177	845	243.	666	2,343,179	27.51
Other yard employees.....	6,401	3,021,387	653	241.	530	191,364	25.32
Hostlers.....	3,051	1,872,017	632	236.	519	279,739	29.79
Enginehouse-men.....	12,995	6,721,995	731	249.	581	499,282	25.25
Road freight engineers and motormen.....	75,640	31,304,511	551	250.	452	2,000,043	23.73
Road freight engineers and helpers.....	34,542	31,525,448	1,173	259.	1,017	1,445,334	16.28
Road freight conductors.....	36,914	24,291,968	895	245.	743	1,388,208	21.19
Road freight brakemen and flagmen.....	28,165	22,502,162	968	275.	830	1,170,017	18.95
Road passenger engineers and motormen.....	69,491	43,805,186	780	269.	641	2,734,922	23.90
Road passenger firemen and helpers.....	13,439	11,627,729	1,330	217.	1,193	490,108	14.23
Road passenger conductors.....	12,973	8,519,533	1,036	211.	881	447,221	13.31
Road passenger brakemen and flagmen.....	11,169	8,764,427	1,122	233.	975	429,689	15.90
Road passenger baggage-men.....	5,919	3,511,938	840	235.	689	211,660	21.66
Road passenger brakemen and flagmen.....	16,547	9,269,288	890	225.	672	611,076	24.07
Other road train employees.....	3,637	1,741,094	669	239.	569	96,526	19.77
Crossing flagmen and gatemen.....	23,635	6,856,955	*3,203	*30.3	*2,683	426,119	22.66
Drawbridge operators.....	1,742	639,384	*4,046	*30.2	*3,424	34,560	19.11
Floating equipment employees.....	11,407	5,469,724	609	262.	548	197,899	12.59
Express service employees.....	13,145	6,058,989	*5,057	*30.3	.....	350,014	20.12
Policemen and watchmen.....	13,145	6,058,989	*5,057	*30.3	.....	350,014	20.12
Other transportation employees.....	3,562	2,356,462	*4,043	*28.6	*4,179	105,236	15.98
All other employees.....	23,282	7,205,244	*3,675	*28.1	*3,332	355,566	16.70
Total.....	2,157,989	\$1,052,109,451	.....	.....	.....	\$59,946,608	20.98

SCHEDULE B—SERVICE AND COMPENSATION OF ENGINEMEN AND TRAINMEN*

Class of employees	Number of hours en duty	Number of miles actually run	Total compensation	Average compensation per mile run
Road freight engineers and motormen.....	26,313,914	212,933,767	\$30,736,013	\$0.144
Road freight firemen and helpers.....	26,528,212	214,653,823	23,658,391	.110
Road freight conductors.....	22,907,734	188,495,553	21,989,968	.117
Road freight brakemen and flagmen.....	55,130,489	454,665,413	42,962,283	.097
Road passenger engineers and motormen.....	8,648,485	150,880,441	11,580,815	.076
Road passenger firemen and helpers.....	8,179,682	146,542,177	8,466,498	.058
Road passenger conductors.....	7,729,039	148,212,464	8,668,356	.058
Road passenger baggage-men.....	4,820,963	80,068,541	3,420,963	.043
Road passenger brakemen and flagmen.....	11,031,110	212,226,148	11,343,345	.043
Other road train employees.....	2,398,885	44,079,580	1,578,159	.036

*Represents average computed on a daily basis.

†The number of hours and compensation shown in Schedule B do not agree with the corresponding items in Schedule A for the reason that carriers were instructed to omit from Schedule B the time and compensation against which no mileage was recorded.

Note—This statement is on the new basis of wages resulting from Decision No. 2 of U. S. Railroad Labor Board, and does not include any back pay retroactively attributable to the months of May and June.



Dictating Machines in Use in the Office of the Auditor of Revenue

Securing Increased Efficiency in Railway Offices

New York Central Adopts Investigating Committee Plan—
Findings in Case of Dictating Machines

AS THE FIRST STEP in its program of increasing efficiency in its offices the management of the New York Central realized that a thorough investigation of the methods and appliances in use in the office in question was the first essential. This matter involved seeking out wastes of time, effort and space. The next step to be taken was the adoption of a means of conducting this investigation,

the company's accounting departments and reporting in full on its findings.

The managers of each such department have been acquainted with the company's policy in this matter and have been requested that, should their department be selected for investigation, they permit perfect freedom to the committee in its work and co-operate fully with it. In other words, the

STENOGRAPHIC DAILY PERFORMANCE - MONTH OF NOVEMBER 1920												
DEPARTMENT _____			STENOGRAPHER _____			DATE NOV. _____ 1920						
ON DUTY		TIME TAKING DICTATION		NAME OF DICTATOR	TRANSCRIBED FROM SHORTHAND NOTES			TIME OF STATEMENT AND OTHER WORK		TIME DISENGAGED AWAITING ASSIGNMENT OF WORK		REMARKS
Hours	Min.	Hours	Min.		No. of Lines	Hours	Min.	Hours	Min.	Hours	Minutes	
Total												

Chart 1

which would, in the first place, secure accurate information concerning actual conditions in the office and, in the second place, interfere as little as possible with the detail work going on in the office.

To secure a report on the performance of an office which would be known to be accurate and inclusive of all details, it was decided that the investigation should be conducted not by one man but by a committee of two or three officers who by their long experience in railroad office work were eminently qualified to undertake the task at hand. Such a committee was accordingly appointed some months ago and charged with the duty of making investigations in any of

committee has been given a free hand in its work and has the right to examine the employees in their work, to ask any questions deemed necessary, to study all the office records and, in short, to do everything necessary in order to secure accurate information concerning the functioning of the office from a standpoint of economy and efficiency.

Already this committee, working with the department managers, has rendered valuable service, particularly in solving problems in connection with the employment of office appliances which save time and money in certain departments, the work of which is adaptable to the use of these appliances. Under the present plan the company, before

making any changes in methods, systems or appliances, conduct an investigation which will give authoritative information concerning the probable savings to be effected by such changes. The element of chance ordinarily involved in such changes, due either to indifference or the lack of exact knowledge, is thus entirely eliminated.

The committee has recently conducted an investigation

CORRESPONDENCE PERFORMANCE OF STENOGRAPHERS							
DATE	Number of stenographers on duty (Dict Secretary or personal steno.)	# Lines Written		Taking Dictation		Time on statements, bills, or other work	
				Time		Time	
		Number	Hours	Min.	Hours	Min.	Hours	Min.
Nov. 1							
3							
4							
5							
29							
30							
Total							

Each writing of letters or copies of letters, memorandums and telegrams shall be counted as a letter. *Hours of original must not be counted.

Chart 2

relative to the use of dictating machines in the accounting department offices at Grand Central Terminal which has resulted in demonstrating that an investment of \$5,400 in these machines would save approximately \$20,000 per annum in the payroll in addition to a saving of 560 sq. ft. of office

performance report on a form shown herewith in chart No. 1. These reports were summarized for the month on chart No. 2. A similar report was compiled in offices already equipped with dictating machines, and the two were summarized side by side on a study form, as shown in chart No. 3. The hours were reduced to clerks where necessary by dividing the total hours worked by the number of hours assigned to an average employee. The other calculations shown in the chart are self-explanatory.

The lowest stenographic production in any office was 56 lines per hour and the highest was 83 lines per hour. The performance of the dictating machines on the New York Central was compared with similar records of certain other companies and the figure of 137 lines per hour was decided upon as being a reasonable production per operator when these machines were used. This estimated production was used in determining the force of operators required to care for the correspondence of the offices to be equipped.

It was found that the best results were obtained by equipping each office with the number of machines required to care for the entire correspondence of the office. All the stenographers were temporarily retained and each supplied with a machine. In this manner all the stenographers were given instruction concerning the operation of the machines at the same time, and no correspondence was delayed. At the end of about thirty days the employees who showed the greatest proficiency in their work were retained and the

DEPARTMENT	- STENOGRAPHERS -										
	- Number -				- Hours -				LINES WRITTEN		
	Super-visor	Stencs	Total	On State-ment & other work	Avail-able for trans-cribing	Taking Dicta-tion	Trans-cribing	Idle	Total	Number	Average per hour

Chart 3.—Left Hand Half

Statement showing estimated saving by use of dictating machines in each office of the New York Central accounting department—secretaries, super-visor and personal stenographers omitted—month of November, 1920.

space, 14 desks, 14 chairs and 14 typewriters, all of which were thus made available for productive use elsewhere. It was learned that 17 girls could perform the services which before the introduction of these machines required 31 stenographers. With proper usage the life of the machines is at least seven years, and during this period the company

remainder were either dismissed or assigned to other duties where vacancies permitted.

Experience in installing these machines leads to certain conclusions concerning them. In the first place, it is well to bear in mind that the value of the dictator's time ranges from two cents to ten cents a minute, while a dictating

DICTATING MACHINE TRANSCRIBERS			- ESTIMATED SAVING -						
Average Number of lines per hour	TO DO REQUIRED WORK		MONTHLY		NUMBER			Office Space Square Feet	Annual payroll Amount
	Hours	Number	No. Oper-ators	Amount	Type-writers	Desks	Chairs		

Chart 3.—Right Hand Half

estimates its savings at \$134,600 (the annual saving for seven years, less the cost of the machines).

In arriving at this conclusion the committee first caused a record of stenographic performances to be kept in each of the offices of the accounting department during the entire month of November, 1920. Each stenographer made a daily

machine will cost about ten cents a day, including interest and depreciation. The number of machines required is determined with regard to the organization and methods of conducting correspondence, which differ in the various offices. In some offices the practice is to have all correspondence handled by correspondence clerks. In other cases, each clerk

dictates his own correspondence. In the case of the former, it is advisable to assign a sufficient number of machines to the correspondence clerks so that dictating machines are always available and thereby cause no delay in handling correspondence. In the latter case, where clerks have only a comparatively small amount of dictating to do, one machine might take care of the correspondence of several, but this must be determined by careful study of the actual requirements. An important factor in efficient management is to have



The Transcribing Department in the Office of the Auditor of Freight Accounts

machines available always for the convenience of those who used them and at the required time, so that matters in hand can be disposed of without delay. Perhaps the greatest advantage of complete equipment is that it enables the dictator to attend to his correspondence at first reading instead of the usual procedure of reading his papers, piling them on his desk, and then rereading them when the machine is available.

The saving in the dictator's time, while important, is not



Dictating Machines at Work in the Office of the Auditor of Passenger Accounts

so easily measured as the pay roll saving effected by reducing by a half the time required for transcribing. The machine operators are segregated from the clerical force and placed together, where freedom from interruption and the force of example make for the highest production.

It is best to locate the machine for shaving the records in a well-lighted place, so that the boy in charge of the work may see that each record gets a perfect surface. The same boy, or boys, also acts as a messenger, making regular trips throughout the office to deliver clean records to the dictator.

taking the dictated records to the transcribing bureau and returning the finished letters to the dictators. The transcribing bureau should be on the same floor as the dictators where this is possible.

From the experience of the New York Central, it would appear that the installation of these machines has effected real economies. The committee will continue its work in investigating other time-saving appliances which it is proposed to install, and in a similar manner some authoritative information upon the saving to be effected can be secured before money is expended for new devices.

Freight Car Loading

FREIGHT CAR LOADING during the week ended March 12 failed to maintain the gain shown during the preceding week and fell again to 702,068 cars, as compared with 712,822 during the preceding week. This, however, represented a gain over any week of this year since January 22 and for the last two weeks the loading has been in excess of that for the corresponding weeks during the business depression in the early part of 1919, following the armistice. The loading, however, has been very much below that for the corresponding weeks of last year, or 1918. For 1920 it was 819,329 cars, for 1919 it was 701,266 cars, and for 1918, 850,701 cars, for the weeks corresponding with that of March 12 this year.

The loading of grain and grain products was 4,000 cars less than for the week before and the coal loading was not only 7,000 cars less but was less than for any week this year, but the combined merchandise and miscellaneous loading was slightly greater than for the preceding week.

The volume of freight traffic during February, 1921, as measured by the cars loaded with revenue freight, was at a lower ebb than for any month since the combined car loading figures for all the railroads have been recorded, that is, since January, 1918, according to a compilation of the car loading by months made by the Car Service Division of the American Railway Association. In February only 2,732,352 cars were loaded, as compared with 3,108,680 in February, 1920, 2,747,363 in 1919 and 3,012,286 in 1918. Of course, February is a short month and includes a holiday on Washington's birthday but the lowest previous month was February, 1919. The highest total car loading for a month as shown by the report was October, 1920, when 4,975,477 cars were loaded, as compared with 4,824,375 in 1919 and 4,671,254 in 1918. In January, 1921, the loading was 3,418,257.

The freight car surplus continues to increase. For the week ending March 15 it was 424,409, as compared with 422,207 the week before. Of the total 158,110 were box cars and 202,267 were coal cars. The increase in the surplus is entirely due to the reduction in coal loading.

The number of bad order cars has increased rapidly during the winter. On March 1, 67 per cent of the freight cars were on home roads, as compared with 21.9 per cent a year before, but 10.7 per cent, or 243,586 were in bad order. Of these 167,909 were awaiting heavy repairs.

ECONOMY OF FUEL OIL is the subject of an efficiency campaign on the Southern Pacific, began on March 16. Employees have been notified that prizes will be awarded for the best efforts. The engineman and fireman on each division who operate their locomotive with the least consumption of fuel oil will be rewarded with a trip to Chicago as the company's representatives at the annual convention of the International Railway Fuel Association, with all expenses paid, including pay for working time lost. The division making the best showing in fuel economy will receive a banner.

Wible L. Mapother

WIBLE L. MAPOTHER, first vice-president of the Louisville & Nashville since 1905, was elected president of the road at a meeting of the directors in New York on March 17, succeeding the late Milton H. Smith. For some time Mr. Mapother, as chief executive officer, had been relieving Mr. Smith of most of his duties, and in consequence his election as president was expected. Although he is well known among railroad executives, he has always avoided publicity, and his desire to escape it was illustrated by his recent wish that an editorial recently prepared for a Louisville newspaper, and paying him tribute, should not be published.

As president of the Louisville & Nashville, Mr. Mapother becomes notable at once as a veteran in point of years of service on his own railroad, and as one of the younger generation of presidents of great transportation systems. He has been in the service of the Louisville & Nashville continuously for 33 years, his entire railroad career having been with that company. His story is that of success achieved through ability and indefatigable industry and application. His loyalty to the Louisville & Nashville and to Mr. Smith, his former chief, is well known. A year ago, in fact, Mr. Smith wished to resign so as to permit Mr. Mapother to succeed him as president in name, as well as in fact. Mr. Mapother, however, used his influence to prevent this step, and stated at the time that he intended to do all in his power to induce Mr. Smith to remain as president as long as he lived, although the latter's resignation would have meant his own immediate advancement. Such traits of character have won for him the confidence of the owners of the property and the unswerving loyalty of his organization.

It is interesting to note that not only has Mr. Mapother been in the employ of the Louisville & Nashville Railroad throughout his business career, but he is a native son of Louisville. He was born in that city on September 28, 1872. At the age of 16, after a grade school education, he entered the service of the company which he now heads as an errand boy and file clerk in the office of the secretary. He early exhibited keen interest in his work and from the start set out to fill his mind with facts and figures pertaining to the Louisville & Nashville system.

In August, 1889, less than a year after he had started to work, his unusual talents attracted the attention of Mr. Smith, who was then vice-president, and who at once transferred him to the clerical force in the executive department. This step marked the beginning of a long and intimate association which ended only with Mr. Smith's death. The closeness of their friendship is well illustrated by the fact that Mr. Smith, in one of his last requests, asked that Mr. Mapother direct the continuance of service on all Louisville & Nashville lines and in all departmental offices of

the road without a moment's interruption in any detail.

In November, 1891, he was advanced to assistant clerk, and in May, 1902, he was made chief clerk in the executive offices. His next promotion, on July 16, 1904, made him assistant to the president. In this capacity his thorough knowledge of the affairs of the road, and his ability to lift burdens of administration from the shoulders of the president were so outstanding that on February 16, 1905, he was elected first vice-president. He was elected a director of the Louisville & Nashville on October 7, 1914. In November, 1915, he also became vice-president of the Lexington & Eastern, a road which had been acquired by the Louisville & Nashville in 1912.

These positions he was holding when federal control was adopted and, in June, 1918, he was appointed federal manager of the Louisville & Nashville and the Louisville, Henderson & St. Louis. A week later his jurisdiction was extended over the Nashville, Chattanooga & St. Louis, and the Tennessee Central, and in August of the same year he was appointed federal manager of a fifth subsidiary, the Birmingham & Northwestern. In this work Mr. Mapother made a fine record, becoming more widely known than formerly, and doing his full share not only toward conserving the property for the time when it would be returned to the owners, but in giving his first attention to the war needs of the government.

On February 28, 1920, when the Louisville & Nashville system was turned back to private control, Mr. Mapother resumed his position as first vice-president. As chief executive officer, he relieved Mr. Smith of many of his duties.

As aid to Mr. Smith, who has been ranked as among the greatest railroad builders and managers of his time, Mr. Mapother has witnessed and played an important part in the development of the Louisville & Nashville from a small, poorly equipped

property, to a great railway system. That his efforts toward building up the railroad are appreciated by the public it serves is evidenced by the editorial comment called forth by his election as president.

"It is especially gratifying to Louisville," says one newspaper published in that city, "to know that this great railroad property, upon whose proper management the prosperity of our city and state so largely depends, will be managed in the future by a man who has grown up in Louisville, who knows the interests of this state and who may be relied upon to advance the interest of this railroad property by helping to build up the state and section it serves."

THE CHAMBER OF COMMERCE of the United States has established a Department of Transportation and Communication the manager of which will be J. R. Bibbins, late with the Arnold Company, Chicago. Mr. Bibbins is a man of long experience. He has studied terminal problems in New York, Chicago, Baltimore, New Orleans and other cities.



W. L. Mapother

Hearings by New England Governors' Committee

Shippers' Interests Desire to Appeal to Congress—Comprehensive

Review by President J. H. Hustis

THE COMMITTEE of thirty representative citizens, appointed by the governors of the six New England states to inquire into the railroad situation and to consider the request of the railroads for approval of their proposed general increase in rates, held hearings in Boston on Tuesday and Wednesday of last week; and the committee members of the different states are holding hearings in various cities this week.

Mercantile interests appear to have quite generally come to appreciate the importance of the question of employees' wages and it was proposed to the committee that if the United States Railroad Labor Board should not settle this matter very soon, it should be laid before Congress at Washington. William F. Garcelon, representing the textile interests, presented a statement at the first hearing. He said that the textile interests had in the past consented to freight rate increases, but that the limit had been reached. The textile interests would consent to a temporary increase if there could be adequate assurance that when the emergency was passed the rates would come down to earth again. One danger in advancing freight rates is that it would encourage the Labor Board to defer action concerning wages.

A. H. Ferguson, representing the New England Traffic League, presented a statement accusing the New England railroads of inefficient management. They have been too slow in readjusting wages. An increase in freight or passenger rates would not yield additional revenue.

William H. Chandler, speaking for the Boston Chamber of Commerce, declared that the railroads are not efficiently managed and that the whole case should go before the Interstate Commerce Commission. The Commission has in past years investigated the financial condition of the roads, but not until 1920 did it have authority to investigate operation. An advance in rates is a serious matter and should be made with extreme care. If the railroads have one foot in the grave and the other on the banana peel, it would be better to let them slip into the grave and start over again. The Boston & Albany is operated efficiently and there is no kicking about the service on that road, but on the New Haven road it is different; there is no co-operation among the officers. Criticisms of the Boston & Maine are comparatively mild. It is doubtful whether, with present wages, present prices of coal and present freight rates the roads can continue to operate, even with good management.

Several speakers emphasized the point that to increase rates would drive freight to motor trucks, which would, of course, further injure the railroads; but many merchants and manufacturers who are using motor trucks would gladly go back to the railroads if they could have efficient service. On Wednesday forenoon the committee listened to one spokesman for railroad labor, who declared that a reduction in wages could not be accepted; and to arguments for and against forcing the New York, New Haven & Hartford and the Boston & Maine into receiverships. The committee sought to get information also from the larger labor groups but were notified that the labor representatives would not appear. Only one witness spoke for labor, and he appeared in behalf of the unskilled labor in the maintenance of way department.

The Railroad's Problems

James H. Hustis, president of the Boston & Maine, on Wednesday presented a statement outlining the financial condition of his company and reviewing the general situation.

Omitting details referring to the Boston & Maine's financial affairs and omitting also references to the doings of the Railroad Labor Board, with which the reader is already familiar, the substance of the address was as follows:

"The public has received all that has been possible both in rates and service, to the limit of the capacity of the railroad. The employees have also been recognized to the limit. The stockholders whose money has been invested should be recognized. All that we are now asking is an amount sufficient to bridge us over until more normal conditions return. Increased passenger fares and freight rates do not offer a permanent solution of the New England railroad question. These are already high and the tendency of a further increase may be to turn additional local freight traffic over to the motor trucks, and to some extent, to restrict travel. When conditions justify such action, some existing freight rates should be reduced and there should be a horizontal reduction in the present standard passenger fares. On the other hand there are freight rates in New England that do not yield the railroads the out of pocket cost of handling.

"It has always been the policy of the New England roads, to the greatest extent possible, to place the New England manufacturers on a parity in the common markets of the country with their competitors west of the Hudson river. There is no disposition to make a permanent change in this policy.

"In agreeing that the New England roads should be included in the Eastern group in the recent application to the Interstate Commerce Commission for increased freight rates, and in subsequently pressing the divisions case, the New England roads had this policy in mind and relieved their shippers of such portion of the burden of increased rates as is represented by the proposed settlement of that case. It was recognized that an average rate increase which would meet the needs of the Eastern group as a whole would not be adequate for us, but it was felt that it was desirable to keep New England in the Eastern group and not be forced to establish a separate New England rate group with a much higher scale of rates.

"It was expected that the disproportionate needs of the Boston & Maine would be equalized to a considerable extent by a revision of the division of through rates, but this has not yet been accomplished. The conditions which have developed since the presentation of the rate case was begun early in 1920 have tended to increase further the disproportionate needs of the Boston & Maine, and it is apparent that any settlement of the divisions case which can be reached within a reasonable time will not fully meet these disproportionate needs.

"The decision that the temporary increase in rates should include those between New England and territory west of the Hudson river has been reached with reluctance and is proposed because it seems to be the only way to meet the emergency. It is important to New England industries to be able to meet their competitors on equal terms, if the railroads can live under such rates, but it is equally important that their transportation machine should not be impaired.

"We are losing short-haul traffic to the motor truck, and there has been no compensating saving in our operating costs. Within certain limits, the natural operations of economic law will result in permanently turning over to the trucks a large amount of short-haul traffic which the railroads have handled in the past; but it is undeniably true that the rates

charged by the motor trucks are not yet on a proper basis. The trucks enjoy unlimited use of the highways and the rapidly mounting cost of maintaining these highways is borne largely by the taxpayers. Before motors came into general use the average maintenance cost of 700 miles of state highway was about \$100 per mile per year but in 1918, on sections much used by trucks, the cost was averaging \$1,500 per mile. Resurfacing was costing between \$20,000 and \$25,000 per mile on an eighteen foot road. State authorities then declared that heavy truck traffic was undoubtedly going to require city pavements on what were formerly county roads, and that this would easily double the expense compared to old times before the truck came.

"* * * Making due allowance for any falling off in freight or passenger traffic, we believe that the proposed temporary rates, together with what benefit may accrue as a result of the divisions case, will yield the Boston & Maine an amount sufficient to at least meet its fixed charges. That there should be a readjustment of both wages and working conditions has been recognized by the railroad managers from the beginning, and they have taken every possible and proper course to bring about such changes within the limitations placed upon them by law.

"The Boston & Maine system consists of 2,484 miles of road. During the past ten years \$52,000,000 has been placed on the property for improvements and additions of traffic. The company has put into its track 20,000 tons of new—and much of it heavier—rail each year, which constitutes the renewal of only about 5 per cent a year. The renewals should be even larger. During the ten years charges to capital account for rails have amounted to \$1,200,000.

"The charges to capital account for equipment renewals have amounted to \$21,800,000, and during this same period the equipment retirements have amounted to \$7,500,000, leaving a net additional capital charge for equipment during that period of \$14,300,000. Of the passenger-train cars on the Boston & Maine, one-fifth are more than 30 and one-half more than 20 years old. The Interstate Commerce Commission has again recommended the substitution of steel for wooden cars. To replace wooden with steel cars would mean at present prices a capital expenditure of approximately \$50,000,000, and the substitution of steel for wooden cars carries with it collateral expenses for heavier locomotives to haul the heavier cars, and for yard and shop facilities for taking care of such equipment, all running into large capital investment. Bridges must be renewed from time to time to carry the heavier equipment. Capital expenditures during the past ten years chargeable to the bridge account have amounted to about \$5,000,000 and there is no reason to expect that this expenditure will be materially reduced. It should rather be increased.

"* * * One recent requirement of the Interstate Commerce Commission substituting electric headlights on locomotives required a capital expenditure of \$300,000, and an annual increased operating cost of about \$30,000. Improvements in signalling and interlocking, looking toward safety in operation, are being adopted and extended generally as funds are available, and large sums annually should be spent in the installation of these devices, although the Boston & Maine, so far as road signalling is concerned, has maintained a high standard in this respect.

"In the test period, or three-year period prior to federal control, the Boston & Maine's average surplus over and above fixed charges was \$2,074,034. At that time fixed charges included approximately \$2,500,000 of guaranteed rentals on leased lines, which have since been converted into dividends on first preferred stock which are paid only when earned. On the basis of the present financial structure, therefore, the average surplus for the test period would have been over \$4,500,000. * * * In 1920, if there had been no

Government guarantee during the first eight months, the deficit for the year would have exceeded \$17,000,000.

"In order to instal a normal amount of ties during the coming year at present prices, a further expense of about \$1,000,000 will be required which has not been reflected in the estimate. Even allowing for the fact that the past few months may have been somewhat abnormal, the present deficit is more nearly at the rate of \$10,000,000 per year than \$6,700,000.

"The war affected the labor situation on the railroads more adversely than in outside industry largely because the railroads, with their transportation charges fixed, were unable to compete with outside industry in wage scales. And before the government took over the railroads, an increase of wages in one department on the Boston & Maine after a strike in 1917, followed by an arbitration in which officers appointed by the Federal Government participated, added to the annual cost of operation about \$500,000 at a time when the railroad was unable to meet fixed charges. It resulted in a wage scale not only higher than was paid by any other railroad in New England, but generally higher than on other railroads in eastern territory.

"There are evidences of impatience on the part of the public everywhere as to the action or non-action on the part of the railroads in reducing wages as promptly as is being done in industry. * * * Let us inquire who or what organized railroad labor is. Here in New England its membership is composed of men who are known to many of you. They are citizens in the communities in which we live, many of them holding offices in the town government and in the social and fraternal organizations which abound throughout the New England States; their families likewise participate in the community life, and their children attend the public schools and many of them the higher educational institutions. In dealing with organized labor, therefore, we are not dealing with some intangible, far-off thing, but with individuals who with their families form an integral part of our citizenship. I have talked with many of them, as most of you have talked with them, and you know their views on this subject of organized labor, and the extent to which many of them sympathize or do not sympathize with the extremists on the subject. They know, most of them, that readjustments must take place; but all experience indicates that when the call of their leaders comes, most of them will respond.

"In fairness we should not forget the other side of the picture, and that when the outlaw strikes on the railroads were so prevalent throughout the country a year ago, the New England railroads were practically free of interruption. Those of us familiar with the situation know of the great difficulties of the leaders of organized labor in preventing the spread of the strikes at that time * * *"

Edward G. Buckland, vice president of the New York, New Haven & Hartford, at a hearing in Boston on March 23, told the committee that the movement for the increase was the result of a study of conditions by all the roads of this section. Referring to a statement that the Boston & Maine could rub along without increasing freight rates, he quoted figures to show that it was no more necessary for the New Haven to get increased rates than for any of the New England companies. The New Haven could "get along" if it could reduce wages covering the period of financial difficulties; a reduction of 15 per cent would give that road \$11,000,000 annually. Presenting a list of securities of the road's leased lines aggregating approximately \$30,000,000, he said that he was endeavoring to borrow money from New York bankers to help the road in its present situation with these securities as collateral, but the bankers were unwilling to lend on the security offered, because it did not represent an investment which was making money. He had been able to borrow \$2,000,000 from Boston bankers, however.

Cross Examination on National Agreements Fails

Testimony of Railway Executives Before Labor Board Proves Boomerang to Employees

THE WIDELY-HERALDED plan of labor leaders, headed by Frank P. Walsh, their counsel, and B. M. Jewell, president of the railway employees' department of the American Federation of Labor, to develop startling facts pertinent to their demand for perpetuation of National Agreements from the cross examination of railway executives has so far fallen flat. Thomas DeWitt Cuyler, chairman; Robert S. Binkerd, assistant to the chairman, of the Association; Carl R. Gray, president of the Union Pacific and formerly chairman of the Association's labor committee, and General W. W. Atterbury, vice-president of the Pennsylvania and chairman of the labor committee before its recent abolition, have all been on the stand during the past week, and their testimony under questioning by Mr. Walsh has served only to bring out more clearly than ever before the executives' united stand for their abrogation in the interests of economical and efficient operation.

By the testimony of these witnesses Mr. Walsh attempted to prove:

1—That national boards of adjustment and National Agreements are inseparable.

2—That railway executives are divided on the question of national boards of adjustment and therefore on National Agreements.

3—That Mr. Cuyler and General Atterbury, alleged representatives of capital, have exerted a powerful influence in opposition to National Agreements as part of a general attack upon labor organizations.

4—That the carriers are organized nationally to treat labor and other problems and they therefore should treat with the employees nationally.

5—That the basic principles of the National Agreements are just and reasonable even when applied nationally.

6—That the railroads are unfairly moulding public opinion to influence the Labor Board.

7—That the labor policy of the railroads is dictated by a handful of executives.

8—That the Association of Railway Executives and its officers wield more than an advisory power.

In every instance the attempt has failed. On the other hand, the cross examination has developed anew that the universal application of rules regarding working conditions is impossible without a loss of economy and efficiency. Every tack taken by Mr. Walsh in his examination of the witnesses regarding rules and working conditions was finally reduced to a lowest common denominator—the only agreements which are practicable are those made between the men who work under them and the men who are responsible for the management of the railroads.

The witnesses named above appeared before the Board in response to its summons outlined in the *Railway Age* of March 18 (page 723). From Mr. Binkerd, Mr. Walsh elicited information regarding the history, purposes, organization and powers of the Association of Railway Executives and detailed information regarding the files of that organization which he presented in accord with the order of the Board. From Mr. Cuyler, Mr. Walsh obtained information regarding his position and influence in the Association and the extent to which publicity work has been carried and by whom. Mr. Gray proved a distinct disappointment to the labor leaders, for he outlined in unmistakable terms the opposition of the executives toward continuation of National Agreements, and met every attack on their position with opinion and evidence gained through many years of railroad

experience in every part of the country. Mr. Walsh retired from the examination after a short time, leaving the interrogation of Mr. Gray to counsel for the carriers.

General Atterbury completed the wreck of the hypothetical case as envisioned by Mr. Walsh. He was not only not content to take the defensive, but at times took a hand in the questioning and backed up his contentions with definite proof.

As a result of these developments the case which has been before the Labor Board practically since its inception, and upon which hearings have been held since January 10, has assumed the importance in the public mind which it deserves. The awakening of the public is expected to lead to a demand for an expeditious settlement of the controversy, which would be exactly contrary to the plans of the labor leaders, who, since the beginning of the present case, have been more interested in prolonging than in settling the dispute.

B. M. Jewell Presents a "Bill of Rights"

When this part of the hearings opened on March 18, Mr. Jewell read a "bill of rights," outlining the basic principles upon which he said the National Agreements are founded and for which the employees' representatives are fighting. This statement outlined in general the plan of attack later followed by Mr. Walsh in his examination of the various witnesses.

After stating that representatives of the employees have repeatedly attempted to have this controversy remanded to joint conferences and that "an aggressive and misguided minority of railroad executives has seized upon the question of National Agreements as the means of misrepresentation of the railway employees before the public and as the occasion for an attack on labor organizations," Mr. Jewell said:

"The fundamentals which are the basis of the National Agreement are as follows:

Eight hours as the recognized measure of the standard work day with an adequate hourly wage.

Payment for time worked in excess of the regular eight hours at proper over-time rates for the various characters of service required.

The beginning and ending of working shifts to be so arranged as to permit of reasonable living arrangements by employees and their families.

Reasonable rules for the protection of health and safety of employees.

Clear and concise definition of the work of each craft to be performed by mechanics and helpers.

The formulation of apprenticeship rules so as to develop sufficient, competent and efficient mechanics.

Applicants for employment as mechanics to be required to show that they have served an apprenticeship of four years or performed mechanics' work for a similar period and they not to be denied employment, when their services are needed, for any reason other than their inability to perform the work for which they are making application for employment.

The right of majority in each craft to determine what organization shall represent them. This organization to have the right to make an agreement which shall apply to all workers in each craft.

The right of the majority of each craft on each railroad to select a committee or representatives who shall handle all grievances which may arise affecting all employees of the craft in accordance with the provisions of the agreement.

Craft, point seniority, limiting seniority to the local shops or points and not permitting interchange of seniority with other shops, crafts, or departments of railroads.

The right to organize and the protection of employees against discrimination because of membership in labor organizations or for any other reason.

"These fundamentals constitute the irreducible minimum in labor's bill of rights," he continued. "If machinery is to

be successfully established for the peaceable settlement of the disputes between management and employees on the railroads these fundamental principles are an absolutely necessary preliminary."

As a result of the carriers' recognition of these principles, Mr. Jewell said that "well rounded and smooth running machinery would now be in operation and peace on railroads and good-will between management and employees would prevail where now exists, growing distrust, dissension, dissatisfaction, and increasing rumblings of a fast approaching, costly and vicious conflict, such as existed in the railroad industry prior to December 31, 1917.

"If it is proper, and we admit it is," he continued, "for railroad management of all railroads to have a national union of management, then, by the same line of reasoning, it must be admitted that the employees are entitled to the same. Railroad management is willingly accepting all the benefits of the Transportation Act, and just as willingly and determinedly it is endeavoring to escape its burdens. The law itself is not being given the fair test which it should be given.

"The facts are, there is at present and for years past there has been, no individual and independent railroad management with which the employees could bargain collectively. Railroad managements' labor policy is practically dictated by and through a small committee. Railroad managements' policy thus dictated is then sought to be imposed upon a local railroad craft organization of employees by and through the national union of railroad management. Railroad labor's organizations and policy are formulated in order that it may hope to successfully cope with the compactly and nationally organized union of railroad management."

Attacking "the tendencies of railroad management" as "deplorable," Mr. Jewell said, "the effort to misrepresent the employees to the public, and hold up faithful and efficient railroad employees as inefficient has steadily gone forward, until now, in their desperation, representatives of management are holding out to the public as a danger signal. 'Labor's policy of centralization and nationalization dictated by a few at the top in order that the few may retain and extend their control of the railroad industry.' This last desperate effort is a gross misrepresentation."

In support of this contention, Mr. Jewell said that the Board is deluged by inspired resolutions from railroad managements through commercial organizations and others who do not understand the National Agreements, the railroad industry and the present deplorable situation and have not taken time, nor do not care to investigate the facts."

Mr. Jewell closed his statement with the charge that the appearance of General Atterbury before the Board on January 31 indicated that "the railroad executives were doubtful as to the justness and reasonableness of their request for abrogation of the National Agreements." "When Mr. Atterbury failed so completely in his effort to stampede the Board into accepting as just and reasonable the never-to-be-remembered conditions of 1917, they then directed their efforts towards trying to secure the elimination of as many rules of the National Agreements as possible," he added.

Further Cross Examination

Following the presentation of this statement, Mr. Walsh called Mr. Binkerd to the stand. After interrogating the latter as to the organization, history, functions, etc., of the Association of Railway Executives, Mr. Walsh started to develop facts regarding the extent of the executives' opposition to the perpetuation of National Agreements and the extent to which E. T. Whiter, chairman of the Conference Committee of Managers, has voiced this opposition in his presentation. To this Mr. Binkerd laconically replied that "the executives are unanimous in their opposition to National Agreements and Mr. Whiter's presentation speaks for itself." Shifting his attack, Mr. Walsh then attempted to prove by

Mr. Binkerd that if the Association has but advisory powers, Mr. Whiter and his committee were in reality unauthorized to represent the carriers before the Board. In answer to this, Mr. Binkerd showed that this committee was acting for a short time under the general policy which had already been adopted by the roads which constitute the Association and that specific authorization was made as soon as possible thereafter. After answering numerous questions regarding the files of the Association which had been submitted to the Board, Mr. Binkerd was excused.

Mr. Cuyler was called next and both he and Mr. Binkerd asked to identify numerous papers and reports taken from the files. Among these were the majority report of the labor committee of the Association, submitted to the member-roads by Mr. Gray and the minority report submitted by General Atterbury. The majority report recommended that negotiations be held with the labor organizations and that national boards of adjustment be established as a result of these negotiations. The minority report of General Atterbury, on the other hand, strongly recommended that the proposition of national boards of adjustment be definitely turned down. At a subsequent meeting of the member roads of the Association General Atterbury's minority report was adopted and immediately thereafter Mr. Gray resigned and the former was appointed chairman of the Labor Committee by Mr. Cuyler.

Turning again to Mr. Binkerd, Mr. Walsh endeavored by a series of questions to bring out the relation in time between the presentation of the majority and minority reports, Mr. Gray's resignation and Mr. Atterbury's appointment, in a fruitless effort to establish the fact that undue influence was exerted to bring about this action. Upon questioning, Mr. Cuyler stated that Mr. Gray had resigned because General Atterbury's minority report had been adopted, and he felt it would accordingly be better to step aside. When Mr. Cuyler stated that he had appointed General Atterbury chairman of the Labor Committee, Mr. Walsh began a new line of examination to develop the position and influence of Mr. Cuyler in the Association and its labor committee.

Several statements and publicity matter accredited to Mr. Cuyler were then introduced by Mr. Walsh, whose questions thereon elicited the fact that several of these statements were not written by Mr. Cuyler but by the Association's publicity organization. Mr. Cuyler, however, pointed out that nothing had been sent out in his name which had not first received his careful analysis and approval. These statements led to a direct attack upon the competency of the Association's publicity organization. This attack was directed particularly at Ivy L. Lee, publicity adviser in the East, Mr. Walsh establishing by testimony his connection with other large industries. In addition, Mr. Walsh charged that these publicity statements were sent out in Mr. Cuyler's name because of his connection with several large banking organizations, the names of which, he said, would carry great weight with commercial organizations, etc., the voice of which was taken by many to be that of the public.

The same line of attack was followed when the examination continued on March 19, with Mr. Cuyler still on the stand and Mr. Walsh attempting to prove that the information regarding National Agreements being circulated by the railway executives is unfair and inaccurate. Mr. Lee was again attacked by Mr. Walsh in the latter's examination of Mr. Cuyler. As an example of the alleged unfairness of this publicity work, Mr. Jewell produced a copy of "Railroad Information," issued by the Association of Railway Executives. This bulletin cited that \$52 punitive overtime had been paid to each of five machinists on the Norfolk & Western under Rule 12 of the Shop Crafts agreement. Mr. Jewell's contention was that these payments were not made in accordance with Rule 12 and this contention was upheld by Messrs. Forrester, Hunt and Wharton of the Board on the assump-

tion that the rule quoted is in reality a rule in the so-called "southeastern agreement" and would still be in effect even if the National Agreements were abrogated. As another instance of this alleged unfairness and inaccuracy, Mr. Jewell read affidavits of employees which refuted a case outlined in Mr. Whiter's presentation and used in a press statement.

Throughout the examination so far there was an admitted effort on the part of Mr. Walsh to make National Agreements and national boards of adjustment inseparable. In support of this, the contention of General Atterbury as expressed in his minority report—that the establishment of national boards of adjustment means the continuation of National Agreements—was cited. This opinion, Mr. Walsh endeavored to establish, was known to the members of the labor committee when they adopted the majority report recommending negotiations toward the establishment of such boards.

Subsequently Mr. Walsh shifted his attack and endeavored to bring out in Mr. Cuyler's answers the fact that the outcome of the vote of member roads on the minority and majority reports—the latter was adopted by a vote of 60 to 41—was controlled largely by the votes of the New York Central and Pennsylvania. These two systems, Mr. Walsh showed, combined had a voting power of 15 and that if they had voted for Mr. Gray's report the entire situation would have been changed.

After thus pointing out the manner in which the railroads have organized to deal with matters common to all the carriers, Mr. Walsh asked Mr. Cuyler if he could consistently object to negotiating National Agreements with the representatives of national labor organizations. To this Mr. Cuyler replied that in his opinion the employees are much better protected by agreements between individual roads and their own employees.

Just prior to the end of this session Mr. Cuyler attempted to show the interest of shareholders in the question of National Agreements. This produced an avalanche of threats from Mr. Walsh, warnings from Judge R. M. Barton, chairman of the Board, and explanations from J. M. Shean, counsel of the Conference Committee of Managers. It was finally agreed to expunge Mr. Cuyler's statement from the records, although Mr. Walsh announced his intention of going into financial matters later.

Mr. Gray took the witness stand at the beginning of the afternoon session on March 1, and after outlining his experience in railroad work and in the Association's activities, the history and organization of the labor committee and its functions, and the developments leading up to the majority and minority reports, Mr. Gray nullified the attack which it was assumed Mr. Walsh would make by stating that, in his opinion, the establishment of national boards of adjustment does not mean necessarily that these boards would consider only disputes arising from the application of National Agreements. Mr. Gray further pointed out that both he, personally, and the majority report recommended conferences with the employees and not the establishment of any particular form of adjustment boards. He termed his majority report a "call to a conference."

It had been confidently expected by the labor leaders that, through the testimony of Mr. Gray, it would be possible to establish the existence of a difference of opinion among railway executives as to the justness and reasonableness of National Agreements, and thus materially weaken the carriers' case. However, the dispatch with which Mr. Gray killed this plan led Mr. Walsh, after a short time, to retire from the examination. Counsel for the railroads, however, asked Mr. Gray to present testimony as to the reasonableness or unreasonableness of National Agreements. To this Mr. Gray stated that the varied conditions existing in different parts of the country makes it practically impossible to devise rules which

can be applied justly and reasonably over the whole country.

"My conclusions are reached," Mr. Gray said, "as a result of my experience as an operating officer on various railroads and as an operating officer of the Railroad Administration. I have operated railroads in many different parts of the country and I am, therefore, in a position to state that the universal application of even 'fair' rules would, in some parts of the country, produce unfair results."

The "bill of rights," previously presented to the board by Mr. Jewell, was then brought to Mr. Gray's attention, and the manner in which these rules worked out in actual practice when applied universally, was quickly pointed out.

Cross Examination of General Atterbury

On March 21 General Atterbury took the witness stand, and, in response to questioning, outlined his connection with the Pennsylvania, the Association, its Labor Committee and other railroad organizations. This led Mr. Walsh to submit a long list of organizations of executives and subordinate officials, which, he maintained, treated railroad problems nationally, and from this inferred that it was only fair that questions in which the employees as a whole were interested be treated on the same scale.

In answer to a question regarding the importance of the abrogation of National Agreements, General Atterbury said: "The abrogation of National Agreements is the most important thing before the country today."

During the progress of the examination, Mr. Walsh attempted to point out a difference in the positions taken by General Atterbury and Mr. Whiter's committee. This effort, however, failed, inasmuch as General Atterbury reiterated that he was not, and had not been, opposed to agreements negotiated between the men who are to work under them and the officers who are responsible for their application, and this, he pointed out, was a fundamental principle in Mr. Whiter's presentation.

In reply to Mr. Walsh's request that he add something to Mr. Whiter's presentation, General Atterbury read a statement which said in part:

"No more serious question (National Agreements) confronts the American people today. We have come to a parting of the ways. One road leads to government ownership, nationalization, Plumb Plan-ism, and Syndicalism,—the other road, to industrial peace, and the continuation of that individual initiative, energy and responsibility which is peculiarly American. The issue is in your hands. The sign board on one road is: National Agreements. The sign board on the other is: Negotiate directly with your own employees.

"The following quotations from the Official Circular No. 107 of the Railway Employees Department of the American Federation of Labor, which circular as an interesting coincidence, is headed 'Years for Government Ownership of Railroads'—are illuminating.

We are the first class of railway employees to force the understanding that the Railway Administration would negotiate and sign a National Agreement.

* * * it was up to him, the Director General, to settle with us and further * * * the entire proposition would be submitted to our membership at once for a strike vote.

"The other road I have indicated leads to industrial peace. I can quote no better testimony advocating following the sign board—'Negotiate with your own employees' than the following, taken from the Report of Industrial Conference called by the President, of which William B. Wilson, Secretary of Labor, was chairman, and Herbert Hoover, vice-chairman.

The right relationship between employer and employee can be best promoted by the deliberate organization of that relationship. That organization should begin with the plaintiff itself. * * *

Industrial problems vary not only with each industry, but in each establishment. Therefore, the strategic place to begin battle with misunderstanding is within the industrial plant itself. Primarily the settlement must come from the bottom, not from the top.

"My views as to what the employee should not do, are as follows: (1) undermine discipline; (2) limit production; (3) demand pay for which there is no equivalent production; and (4) force the 'closed union shop.'

"I have no fight with organized labor as such. I have every desire to see its existence healthy and normal. Within reason-

able limits, it is a healthy spur to bring about fair conditions as between employer and employee.

"My views as to what the employee has the right to expect and the employer should provide, are as follows: (1) as steady employment as possible; (2) a good wage; (3) time for recreation; (4) opportunity to elevate himself in his employment; (5) a voice in determining the rules and regulations under which he should work; and (6) the right to be, or not to be, a union man. But to apply these principles, the 'dog collar' of National Agreements must be removed.

"An agreement to be properly binding must be equitable, and entered into freely by both parties; and in order that it may be intelligible and properly carried out, it is necessary that there be a common understanding. But a common understanding can only come from free discussion and negotiation.

"The so-called National Agreements were put in force on the Pennsylvania by order of the Director General. No discussion whatever was held between the employees who would work under these agreements, and the officers who necessarily would have to administer them. Nor have the employees who work under these agreements been permitted by their leaders to discuss them with their own railroad officers, or modify them as a result of such discussion."

After calling attention to the hurried effort on the part of the leaders of the shop crafts to make the question of National Agreements an issue before the Board, General Atterbury continued: "Confusion, misunderstanding and bitterness between the officers and the employees were bound to, and did follow, and are bound to continue until the so-called National Agreements are wiped out, and the officers and employees now working under them on the Pennsylvania sit down together and work out their own set of working rules to meet their own conditions. You may fairly ask what justification I may have for this statement I have just made. Your Board some time ago very wisely decided that it had no jurisdiction over the question of national boards of adjustment. That decision took that 'dog collar' off. What followed on the Pennsylvania with our men in train and engine service is typical and convinces me of the possibilities in this direction with all classes of employees. There are no cases before the Labor Board from our men in train and engine service involving grievances as a result of the train and engine service rules and working conditions on the Pennsylvania. Our men and our officers are settling them between themselves. Understand that there were in existence seven separate schedules, covering different parts of the system and you must recognize that we have varying conditions incident to serving a territory with agricultural, industrial, and climatic differences, that stretches from the straits of Mackinaw to the Chesapeake Bay, and from the Atlantic Ocean to the Mississippi river and the waters of Lake Michigan.

"Each railroad negotiating its schedules with its own employees is the road to industrial peace."

There followed an interesting controversy between General Atterbury and Mr. Walsh as to the formation of the various National Agreements. General Atterbury vigorously maintained that these agreements were obtained from the Director General by coercion and stated, in support of this contention, that Director General Hines "took strike threats too seriously; his experience in handling labor matters had been too limited." This brought forth another interesting but irrelevant discussion as to whether or not the agreements in effect prior to Federal control had been obtained by coercion, a charge which General Atterbury would not make despite attempts to lead the discussion to that end.

The next move in the examination was openly announced by Mr. Walsh when he said: "I will now try to prove that some universal rules are necessary." Following this he introduced considerable evidence regarding the legislation designed to safeguard railroad workers, various uniform rules promulgated by the Interstate Commerce Commission, etc. He then took up the rules contained in the National Agreements, and immediately found that, instead of examining the witness and directing the trend of the testimony, he was in turn being examined, and that the trend of testimony was being directed by General Atterbury. The first rule of the Shop Crafts Agreement was presented for General Atterbury's approval. Instead of approval, however, it brought forth the vigorous reply:

"The eight-hour day is a perfect farce. It is merely a means for getting more money. The rule typifies the whole

business. Why doesn't the rule say 'eight hours' work shall constitute a day,' instead of 'eight hours shall constitute a day's work.'"

General Atterbury then continued to bring out defects in the universal application of rules, stating again and again in discussing the applicability of the eight-hour day to railroad service that "the length of the working day should be gaged by the character of the service rendered." The remainder of the morning session was devoted to efforts on the part of Mr. Walsh and Mr. Wharton of the board to get General Atterbury to commit himself against the basic eight-hour day, but these efforts were without avail.

The discussion over the eight-hour day continued during the afternoon session with practically no change in the character of the evidence presented. General Atterbury reiterated his assertion that the character of the service should determine the length of the working day, and all efforts to dislodge him from this position were fruitless. Again in discussing other rules of National Agreements, General Atterbury took and consistently maintained the position that "no rule is a good rule unless it is agreed to by the officers who apply it and men who work under it."

Inadvertently, perhaps, Mr. Walsh then mentioned the relative merits of piecework as compared with the hourly wage system. This led to vigorous defence of piecework by General Atterbury, who said: "The abolition of piecework has been made a bone of contention by men who would level all good Americans." Once more Mr. Walsh found himself losing control of the situation and listening to a vigorous denunciation of the policy of the employees' representatives in carrying on this fight for the perpetuation of war-time rules.

General Atterbury said: "I would negotiate agreements with our men right now if their leaders would let go." To this Mr. Walsh replied that he, General Atterbury, could legally negotiate agreements with his own men at the present time. The latter was evidently waiting for this opportunity, for he immediately produced two communications from the Railway Employees' Department of the American Federation of Labor to members of the shop crafts, telling them, in substance, not to negotiate any agreements except the complete National Agreement. Furthermore, General Atterbury took this opportunity to substantiate his term for the National Agreement—"dog collars." This expression, he said, originated in a cartoon contained in a bulletin issued by the Railway Employees' Department of the American Federation of Labor, portraying labor handling railroad management a small dog collar labeled "National Agreement." Railroad management is saying, "It won't fit." Labor is replying, "We'll make it fit." How the "dog collar" was made to fit was explained by General Atterbury by reading portions of the communication below the cartoon.

The result was both serious and amusing. Mr. Walsh, aided by Mr. Wharton, attempted to draw different conclusions from labor's statement, "We'll make it fit," but their attempts were not successful, and the course of the examination was quietly but quickly changed; however, not before General Atterbury had vigorously stated, "The leaders of the American Federation of Labor are throttling the employees and the National Agreements are throttling both the employees and the management. I don't want to take anything from the employee. I want only a fair day's work for a fair day's pay." In answer to a question by Mr. H. T. Hunt, a public member of the board, Mr. Atterbury said: "You cut the 'dog collar' off and see how quickly the Pennsylvania will negotiate agreements with its men."

On continuing this line of examination, General Atterbury exclaimed that the "whole object of National Agreements is to employ more men." Objections to this statement elicited the reply: "I am a better friend of the men than their own representatives at this table. I maintain, in fact, that the men are not being represented."

The remainder of the day's testimony was of a similar character, Mr. Walsh endeavoring to obtain General Atterbury's approval of the principles of various rules of the Shop Crafts Agreement, and General Atterbury consistently maintaining his position as has already been outlined.

The morning session on March 22 found General Atterbury still on the stand with the cross examination proceeding without results for the employees' case. The necessity for classification rules was first brought up by Mr. Walsh only to be denied in substance. Regarding this, General Atterbury testified: "I take it that this board is to quiet, not foment trouble. If it were to write standard rules instead of pouring oil on the waters it would be throwing rocks into it. The Board can't write standard rules."

Mr. Walsh stated that there have been but 175 disputes in a year under the National Agreements, and upon asking General Atterbury if that would not indicate harmony under these rules, the latter replied: "No. The boards at Washington have already given the men everything they have asked for. There is nothing more to request."

The apprentice rules in the Shop Crafts Agreement were next taken up, Mr. Walsh attempting to justify their existence by reference to so-called "abuses" which took place prior to their creation. This discussion ended when General Atterbury said: "I can find restricted production under every rule of the National Agreement, and this rule is no exception. You men are trying to get more money for the men; I am trying to get an honest day's work for that pay."

Regarding the representation of employees, General Atterbury maintained through a long series of questions that the principle of representation by men elected by the majority is not fair to the minority who have a right to be represented by men of their own choosing. Following this, General Atterbury outlined his definition of and views upon the "closed shop," stating in substance that he deprecates the closed non-union shop as well as the closed union shop. Furthermore, he read a circular issued by the Railway Employees' Department of the American Federation of Labor showing conclusively that that department has issued orders which establish closed shops.

The testimony during the afternoon session of the same day continued the same. Various of the rules were brought up by Mr. Walsh, and General Atterbury as strenuously objected to their application nationally.

Mr. Walsh attempted to capitalize the evidence that the Pennsylvania had maintained prior to General Atterbury's departure for France "an extensive espionage system among its employees" and had "little arsenals" at various plants. After lengthy discussion of the charges of coercion on the part of both the Pennsylvania and the employees, the subject finally dropped upon a promise by Mr. Hunt to read General Atterbury's complete report from which the charges were taken. Just prior to the closing of the morning session, Mr. Walsh produced a letter alleged to have been written by I. W. Geer, general manager of the Pennsylvania, southwestern region, to supervisory employees, in which he charged the supervisory employees to defame the labor organizations if necessary to obtain certain information. This letter was later declared to be a fake by General Atterbury and Mr. Whiter after they had communicated with Mr. Geer.

The session on March 23 opened with Mr. Walsh still trying to picture conditions on the Pennsylvania prior to December 31, 1917, by reading extracts from industrial conference records. After continued effort to get General Atterbury to approve the principle of some rules in effect or recommended as the basis for proper relations between employer and employee, General Atterbury pointed out that principles could be agreed upon, but that rules could not unless negotiated by employer and employee. He finally stated to the Board: "You give us principles; we will work out rules." He later

qualified this by stating that rules so worked out would not be national rules.

Mr. Walsh then turned to apparent discrepancies in statements as to the cost of the National Agreements. General Atterbury immediately produced a statement which Mr. Walsh tried to keep from the record. This statement, which was filed with the board, showed by figures of the Interstate Commerce Commission that the estimated saving of \$300,000,000 was far below the actual saving possible.

A long series of questions regarding Master Car Builders' rules, etc., and their necessity followed, but throughout the session General Atterbury maintained consistently the stand which he had already taken on this subject. This completed the examination of witnesses summoned so far, and the board adjourned until March 24, when Mr. Jewell began presentation of a long statement in reply to General Atterbury's stand before the Board.

Developments so far have not indicated when or how the labor leaders will attempt to answer Mr. Whiter's presentation, but from their present tactics it is assumed that this will not be presented until the Board has decided that the case has been delayed long enough.

Whiter's Statement

Mr. Whiter, in commenting on the progress of the case, said in part:

Five days of questioning railway officers by counsel of labor unions has failed to bring forth a single fact supporting the charges that have been made by spokesmen of labor unions against the railways and in our judgment has strengthened a case against the National Agreements.

Spokesmen of the labor unions repeatedly have charged that there is a gigantic plot to break down the labor unions, and that the efforts of the railways to set aside the National Agreements were in pursuance of this plot. They have claimed that small coteries of railway officers had got the railways to oppose National Agreements and national conferences with labor unions contrary to the views and wishes of the majority of the railway executives.

Records of the Association of Railway Executives which were put in evidence and the testimony of Messrs. Cuyler, Binkerd, Gray and Atterbury have shown that these charges are without foundation and that the railway executives always were unanimously opposed to the so-called National Agreements to which the railway companies themselves never agreed.

There was not found nor introduced nor could there have been found any evidence indicating that the railways are engaged in any attack upon the labor organizations, but much evidence showing that what they have been trying to do throughout has been to bring about negotiations between each individual railway and its own employees which would result in the establishment of rules and working conditions that would make it possible to meet varying conditions throughout the country and increase efficiency and economy of operation.

Distribution of the Railway Dollar

THE FOLLOWING FIGURES compiled by the Bureau of Railway Economics show the distribution of railway income of Class I roads in the calendar years 1917 and 1920:

ITEM	1917	1920
Total operating revenues	100.0	100.0
Charges against operations:	Percentages of Revenue	
Labor	43.3	57.8
Fuel for locomotives	10.0	10.4
Other expenses, materials and supplies, etc.	17.2	25.3
Railway tax accrual	5.3	4.6
Equipment and joint facilities—net rents	0.9	0.9
Net railway operating income	23.3	1.0
Deficit to be made up by Government, March-September, 1920		12.1
Net income from other sources than railway operation	5.8	4.7
Gross income available for capital	29.1	17.8
Capital charges:		
Rents for lease of road	3.3	2.0
Interest	10.4	7.6
Other deductions	0.6	3.6
Dividends declared (from income and surplus)	8.0	4.5
Remainder of gross income available for betterments, reserves, and surplus	6.5	0.1

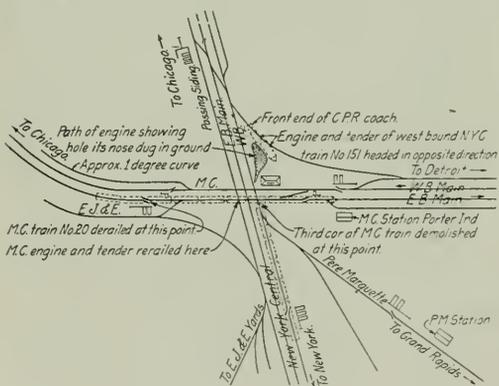
Bureau of Safety Reports on Porter Collision

Engineman's Fault Clearly Set Forth—Speed Was About 50 Miles an Hour—Fireman Also Culpable

THE INTERSTATE COMMERCE COMMISSION has issued a report, dated March 14, and signed by W. P. Borland, chief of the Bureau of Safety, on the crossing collision at Porter, Indiana, on February 27, when westbound passenger train No. 151 of the New York Central ran into the side of eastbound passenger No. 20 of the Michigan Central, completely demolishing one coach. Thirty-five passengers and two employees were killed and eleven passengers, two employees and seven other persons were injured.

This collision was reported in the *Railway Age* of March 4, page 495, and there is reproduced here the drawing which was given with that report showing the approximate location of the tracks at the crossing. The present report says that the Michigan Central crosses the New York Central at an angle of about 45 deg.; and that the train-order signal (not shown in the drawing) is 57 ft. north of the New York Central tracks and nine feet east of the Michigan Central.

Approaching on the Michigan Central from the west (southwest) the line, beginning at the distant signal, is



Scene of Collision at Porter, Ind.

tangent for 500 ft.; then a curve of 33 minutes, to the left, or 3,960 ft.; then tangent 600 ft. to the crossing. The home signal, No. 35, is on this tangent 366 ft. before reaching the crossing. The derail is in the south rail, 55 ft. east of signal 35. The Michigan Central siding, on which a freight train was standing, is at the right of the main track (not on the north side as shown in the drawing). The grade is slightly descending eastward.

On the New York Central the distant signal is about 4,500 ft. east of the crossing and the home signal is 600 ft. and the derail about 500 ft. from the crossing. At the time of the collision it was dark, and the weather was clear.

The conclusion of the report is that the engineman of Michigan Central No. 20 saw and heeded the cautionary indication; reduced speed from 60 miles an hour to perhaps 50 miles; took the word of the fireman that the home signal indication was clear; and did not look for the home signal himself, although by leaning out of the car window he should have seen it about 1,980 ft. before coming to it. The New York Central train was moving at about 50 miles an hour.

The interlocking is Saxby & Farmer, 54 levers; electric

locks on all home signal levers; screw releases on the New York Central, requiring two minutes to operate, and clock-work release on the Michigan Central, set to operate in one minute. Approach annunciators are in use on both roads; the New York Central sounds when any part of the track is occupied for a distance of about two miles before coming to the crossing; and the eastbound Michigan Central annunciator operates when the track is occupied for about one mile before reaching the distant signal.

The Michigan Central distant signal is three-position, upper quadrant. The home signal is the same, but with a two-position, upper quadrant, calling-on signal below the main signal. The train order signal, 57 ft. beyond the crossing, is on a mast 29 ft. high. There is no train order signal for the New York Central.

Tower operator Whitehead said that prior to the entry of either train on the annunciator circuits, all levers were in normal position; the New York Central buzzer sounded first, and the signals were set for it before the other train announced itself, which was about 20 or 30 seconds after the N. Y. C. Whitehead, and Cook, the leverman, when they saw that No. 20 was not going to stop, started for the door; but the collision occurred before they reached it. Cook was a temporary man, his regular position being assistant signal maintainer at this tower. He said that after seeing the danger there was not time to set the home signal against No. 151; and that on account of the time release it would have taken about three minutes to change the routes.

Engineman Long, of No. 20, said that fireman Block called the home signal when at about the middle of the curve—that is to say, about 2,500 ft. from the crossing. He said "all the way," meaning that the home signal indication was clear. Long then released the brakes. Continuing Engineman Long's testimony the report says:

When the engine reached the tangent he looked for the home signal and thought he saw a green light above a red one; as he got close to the home signal he looked for the signal again, but it was hidden by smoke and steam; at that time he thought the speed of his train was between 35 and 40 miles an hour; he did not see the train order signal on account of the smoke and steam, neither did he see any hand signals. In discussing the indication of the home signal, in response to the inquiry: "What do you think caused those indications that you received?" Engineman Long replied: "The only thing that could be, if I did not have them, is that I mistook the order board for the green light." Long further stated that he does not depend entirely upon the fireman when he calls a signal and that he has never before had any trouble in distinguishing the signals at this point.

Fireman Block said that when about a mile from the home signal he observed the indication of that and the train order signal; two green lights and a red light. There was some steam or white smoke escaping from the freight engine standing on the side track, but he could see the signal lights notwithstanding. When he called "all the way" to Long, the engineman answered, after about 30 seconds, "all right." At that time, said Block, the speed was between 35 and 40 miles an hour. After the engineman answered him he got down and began to work on the fire. He did not see any hand signals given from the track.

Engineman Curtis, of the freight standing on the siding, testified that the home signal and the other blade on the same post were in the stop position when he arrived there;

and that he looked again when he saw the light of the headlight of train No. 20, and both blades were still in the stop position; he also noted that the train order signal displayed proceed. Some smoke or steam from his engine was blown across the main track. He said that it had never appeared to him that the train order signal could be confused with the home signal at this point.

Fireman Arthur, of the freight, also saw the signal blades at stop; and he observed two brakemen of his train, standing on the track, giving stop signals with their lanterns to No. 20. These two brakemen testified that they were west of the home signal; that they gave "ease off" signals with their white lights, but receiving no acknowledgment they began to give violent stop signals. One of these men was on the fireman's side and one on the engineman's side of the track; no response was received to the signals. They stated that there was no reason why their signals could not have been seen from the cab of No. 20.

The rule on the Michigan Central allows a passenger train to pass this interlocking at 40 miles an hour; that of the New York Central says 50 miles an hour. The report says:

"The speed of train No. 20 is variously estimated to have been from 35 to 55 miles an hour. There is no variation in the estimates of the speed of train No. 151; about 50 miles an hour. . . . The lapse of time between the announcement of train No. 151 and train No. 20 was 20 or 30 seconds, and as the distance between the announcing points on the two roads and the crossing is about 1,000 ft. longer on the New York Central, this time interval would place train No. 151 about the same distance from the tower as was train No. 20 when it was announced. Therefore, if train No. 151 was running at 50 miles an hour it is obvious that train No. 20 was running at a still higher rate of speed, as it arrived at the crossing before train No. 151."

No fault was found in the interlocking plant or signals. The electric circuits could not be tested on account of the destruction of a large amount of wires and trunking, but a careful check of the circuit plans, locking sheets and dog charts indicates a satisfactory condition. As the signal system was operating properly a detailed description of the circuits is deemed unnecessary. Observations made after the investigation disclosed that from the fireman's side of the engine the home signal could be seen from a point about 4,000 ft. back, and by leaning out of the window on the engineman's side at about 1,980 ft. back.

Conclusions

"The direct cause of this accident was the failure of Engineman Long to observe and obey the signal indication of the home signal. . . . A contributing cause was the failure of Fireman Block properly to observe the home signal indication and convey the correct information to Engineman Long. The evidence indicates that Long relied practically if not entirely upon the announcement by Block of the indication of the home signal instead of observing it himself. The location of the signals is such that it was both possible and convenient for him to observe the signals personally, and for his failure to do so there is no excuse. Even if he did confuse the train order signal with the top blade of the home signal, he still did not receive a proper indication to proceed at normal speed, as his movement was also governed by the train order signal, the indication of which he was required to observe before passing it.

"According to his own statement, Engineman Long received a caution indication at the distant signal; this informed him that the home signal governing the crossing was then in the stop position, and required him to proceed under such control as to be able to stop before reaching the next signal. The evidence discloses that Engineman Long observed and heeded this caution indication, as he made a brake applica-

tion and slightly reduced the speed of his train. It was then necessary for him to ascertain the indication of the home signal and be governed by that signal.

"Under these circumstances, knowing the arrangement of signals at this point, Long should have exercised particular care, after having received a caution indication at the distant signal, to see that the signals governing his train were clear . . . before passing the home signal and starting over the crossing at high speed. In addition to his failure to observe and obey the stop indication of the home signal, Long failed to see and be governed by stop signals given with lanterns by two trainmen of the freight train standing on the siding. . . .

"The failure of Engineman Long in this case . . . together with the appalling loss of life resulting therefrom, adds another to the already long list of accidents resulting from the fallibility of enginemen, upon whom the safety of passengers depends. . . .

"This accident again calls attention to the necessity for an automatic train control device to be used in connection with existing signal equipment. . . .

"A signal should not be called by a fireman until he is absolutely certain of its indication. In this case Block called the signal when, according to his own statement, it was nearly a mile away and partially obscured by smoke. . . . If the home signal was in this instance obscured, it was the engineman's duty to reduce speed, or to stop if necessary, and determine its indication before passing it; nevertheless, every effort should be made to so locate signals that they are not likely to become obscured by steam or smoke from engines or to be confusing. . . . It is believed the location of both the eastbound home signal and the train order signal on the Michigan Central at this point should be improved.

"It is believed that with a train running at the maximum prescribed speed limit of 40 miles an hour, the derail located 311 feet from the crossing does not afford the protection intended, and that in order actually to provide the protection intended the maximum speed limit at this point should accordingly be reduced or the location of the derail changed.

"It is noted that the coach which was struck by the locomotive was of wooden construction, with steel center-sills, and that it was demolished by the impact. While steel passenger cars generally are safer than wooden cars, nevertheless, with the tremendous impact in this case, which was applied to the center of the side of the car, it is doubtful whether greater protection would have been furnished the occupants had the car been of all-steel construction.

"Engineman Long entered the service of the Michigan Central as a fireman in 1890, was promoted to yard engineman in 1900 and to road engineman in 1901. His service record contains the following entries:

October, 1901, suspended 10 days for running off interlocking signals against him.
 Sept., 1907, suspended 10 days for failure to stop for telegraph signal not burning.
 Dec., 1907, suspended 30 days for failure to stop for block signal not burning.
 Feb., 1909, taken out of service on account of defective vision.
 June, 1909, restored to service on account of improved vision.
 April 1, 1914, observed surprise test; light out on telegraph signal.
 April 23, 1918, record suspension 30 days; collided with caboose car, flag out.

"Fireman Block entered the service of the Michigan Central as a fireman in December, 1915, was promoted to road fireman in February, 1916; in military service from May, 1916, to January, 1919; promoted to switch engineman in March, 1920; April, 1919, given suspended sentence of 30 days, which was later modified to reprimand, for disregarding fixed signal in stop indication.

"At the time of the accident Engineman Long and Fireman Block had been on duty 1 hour and 47 minutes, prior to which they had been off duty 7 hours and 50 minutes."

Railroads Continue Conferences With Employees

Few Indications of Early Agreement—Some Appeal to Labor Board—More Conferences Scheduled

THE CONFERENCES of many railroads with their employees during the past week have, in most cases, made it increasingly clear that the men are not disposed to accept any decreases in their wage scales without action by the Labor Board. The New York Central has asked the Labor Board to act in the case of its unskilled laborers who have refused to accept a decreased rate. Several other roads are contemplating similar action. The marine workers of some of the roads around New York are said to be favorably disposed to accept certain changes in their rates, but this is almost the only instance so far which promises a settlement without an appeal to the Labor Board.

Statement to Pennsylvania Employees

The Pennsylvania has announced reductions in the wages and salaries of many classifications of officers and employees, as was noted in the *Railway Age* of last week. On March 22, Samuel Rea, president of the road, issued a statement to the employees of the company which explained in some detail the absolute necessity of operating economies to be effected by lowering the wage rates and gave his word that the employees would receive justice and fair play in any changes made. He asked for the co-operation of the men in solving the present difficulties. The statement in full follows:

If every man on this railroad could come into my office and see for himself the facts that confront us, I would not be addressing you this way.

We have come to the necessity of reducing salaries and wages. Drastic economies have been made in every other way possible. Working forces have been reduced more than 70,000 men. With less business to handle, and wages taking the abnormal sum of nearly 70 cents out of every dollar the railroad earns, the remaining 30 cents is not sufficient to buy fuel and other materials and supplies, and pay our taxes and other obligations. There is only one way left to keep our expenses within our income, and that is to lower salaries and wages. Under such circumstances as these it is necessary to ask for your co-operation, and I have known Pennsylvania men so long that I do so without hesitation.

The directors of this company have given their word that justice and fair play will be accorded to all. I promise you that policy will be scrupulously followed.

You have been asked to send representatives to meet the general managers to discuss what are just and reasonable wages in the light of present conditions. Committees are now at work preparing new schedules of rates to submit for your consideration. It is our purpose to tell you exactly what are the facts so that all may know and understand.

All I want to ask of you is one thing; Be open-minded. We have no intention or desire to reduce wages to unfair levels.

There is no conspiracy to disrupt your national organizations.

We are simply face to face with conditions that force the steps we are taking.

You men have assisted in making this the greatest railroad in the country. It is our job, yours and mine, to serve the public as economically and as efficiently as possible.

The railroad is opposed to the national agreements because they make it impossible to operate the road for the interest of the public as well as for the interest of the employees. One of the most unfortunate features of the present situation is the fact that these national agreements make it impossible for us to retain the most efficient employees and to pay them for the work they do and the energy, initiative and loyalty they put into the job.

We have succeeded in the past by working together with mutual good-will and co-operation. In that way alone we can succeed now, and I want to feel that I can continue to count on your spirit of fair play, common sense and whole-hearted service.

Long Island Calls Conferences

The Long Island on March 19 announced that, effective April 20, decreases in wages of certain employees would be put into effect. The statement of the company says in part:

The relation between wages of railroad employees and the cost of living, and the scale of wages paid for similar classes of work in other industries, have materially changed since the present rates of pay and working conditions became effective, and the situation imperatively demands readjustment.

In the year 1920, with only eight months of the 1920 wage award charged to operating expenses, more than sixty cents out of every dollar received by the company for transportation and other services was absorbed by wages. In the year 1917, the payrolls absorbed only forty-one cents out of each dollar received, while the relation between the payrolls and the total operating expenses was the same for the two years named. The payrolls during the period 1917-1920, inclusive, therefore absorbed all increased revenues and benefits from increased rates, increased volume of traffic, and increased capital invested.

This company cannot, by any process of rate increase for passenger and freight traffic, make ends meet, pay taxes and interest, while such a relation exists between payrolls and gross revenues.

Accordingly conferences have been called with the employees affected as follows: March 30, signal department employees except foremen and inspectors, shop employees except supervisory forces, stationary engine and boiler room forces, telegraph and telephone operators and levermen, clerical and station forces; March 31, engine and train service employees and shop and signal supervisory forces.

Reading Plans a Decrease

The Philadelphia & Reading has announced sweeping decreases in wages and salaries which will be put into effect on April 26. In the meantime conferences will be held with the employees affected in order, if possible, to arrive at an amicable agreement. The conferences are scheduled as follows: April 4, maintenance of way and structures employees; April 6, signal department employees; April 11, stationary engine and boiler room forces except coal passers; April 13, clerical and station forces; April 15, telegraph and telephone operators; April 18, engine service employees; April 19, marine employees; April 20, train service employees; April 22, train dispatchers, yardmasters and assistants; April 25, shop and signal supervisory forces.

The Situation on Other Roads

The Central of New Jersey has announced that it will hold conferences with its unskilled laborers on March 24 and with its clerks, station employees, mechanics and other skilled laborers other than train and engine service employees on March 25. At these conferences the management will endeavor to arrive at an agreement with the men with regard to reductions in wage rates which have been announced to take effect on April 16.

The Delaware, Lackawanna & Western, which has announced a reduction in the wages of unskilled labor, marine department employees, clerks, station employees, mechanics and other skilled laborers excepting train and engine service employees, to take effect April 16, has held conferences with the unskilled laborers and the marine department employees. No agreement has been reached with the representatives of unskilled labor and the negotiations with the marine department employees are still under way. The dates for the con-

ferences with the other employees have not been announced as yet.

The Erie which held conferences with various classes of skilled and unskilled employees at Hornell, N. Y., on March 17 and 18, was not able to arrive at an agreement with the men regarding wage reductions and the management is considering asking the Labor Board to decide the controversy. The company is now conferring with its marine employees.

The Nashville, Chattanooga & St. Louis has announced that on April 16 a decrease in wage rates of certain unskilled and semi-skilled classes of employees will be put into effect. Conferences with the employees will be held in the meantime.

The New York Central, which was unable to reach an agreement in its conferences with its unskilled employees, has petitioned the Labor Board to put into effect the reductions in wages asked. It is understood that some of the marine employees of this company will accept a reduction and conferences are still in progress.

The Central of Georgia has already held conferences with its unskilled employees but as yet no agreement has been reached.

Conferences with unskilled laborers on the Lehigh Valley, having failed to produce terms acceptable to the employees and the management, the company is considering submitting its case to the Labor Board.

It was announced on March 22 that the employees of the Boston, Revere Beach & Lynn have agreed to a reduction in their wages averaging about 12 per cent.

The Bangor & Aroostook has announced that on April 16 it will put into effect reductions in the rates of pay of foremen, clerks, station and yard employees, office boys and other office assistants, maintenance of way and structures department labor, both skilled and unskilled, shop craftsmen and laborers, dining car and restaurant workers, stationary enginemen and firemen, coal passers and all other employees whose wages were adjusted under decision No. 5 of the Labor Board. Conferences with the employees affected will be arranged later.

Conditions Improve on A. B. & A.

The Atlanta, Birmingham & Atlantic has resumed local passenger and freight service on all parts of its line, according to an announcement made on March 21. The company expects to resume the operation of through freight and passenger trains shortly. The organized employees of this company went out on a strike on March 5 following a reduction in wages by the receiver acting under orders of the court. The places of the striking employees are being filled as rapidly as possible by new men. The representatives of some of the unions have attacked the scale of salaries of the company's officers and have suggested an investigation by the Interstate Commerce Commission. To this Receiver Bugg replied in part:

The total payroll of the executive officers, according to the statement, amounts to less than \$105,000 a year, and if it should all be cut off, it would pay the deficit for only one month. The total payroll is more than \$4,000,000 per year, and less than \$105,000 goes to the executive officers, counsel and surgeon.

The total salaries paid amounts to less than 2 3/4 per cent of the total pay roll. The officers employed and the salaries paid them are small for a railroad of the length and of the difficulty of operation of the A., B. & A. The A., B. & A. meets keen competition everywhere, and its successful operation requires skillful men of much experience, who are willing to devote their entire time, without regard to the number of hours that may be involved in a day's work. None of them draws the line at eight hours per day.

Some of the engineers and conductors are paid, for five and six hours per day, about as much as some of the executive officers are paid, who work from ten to twelve hours per day, and on holidays, besides.

The executive officers have all very cheerfully accepted the proposed reduction. The appeal to the Interstate Commerce

Commission strikes me as being for advertising purposes only. At the same time any investigation the Interstate Commerce Commission wishes to make will be welcomed by me.

Representatives of the employees have maintained that the wage reduction, put into effect immediately upon the order of the court, violated a section of the Newlands Act of July 15, 1913, regarding receiverships which requires a 20-day notice and a hearing prior to a reduction in wages. It is understood that the federal Department of Justice will endeavor to uphold the Act in this regard.

Missouri & North Arkansas Suspends Services

The Missouri & North Arkansas has been compelled to suspend service, according to a statement by C. A. Phelan, receiver and general manager, because "the depredations which have been committed would endanger the lives of passengers and employees." The statement of Mr. Phelan follows in part:

The railroad, on receipt of the Labor Board's Decision, advised the Labor Board on February 24 that it was ready to confer with the former employees involved and consider the subject of whether the present wages are just and reasonable as outlined in the Board's decision; and the railroad being aware of the fact that the dispute had been carried to the Labor Board by the representatives of the former employees, assumed that the former employees would abide by the decision of the Labor Board and join the railroad in conference as required by the decision.

An ultimatum from the representatives of the former employees was delivered to the general manager at 5 o'clock p. m., February 25, advising the railroad that unless the wage reduction order was rescinded and the rates of pay in effect prior to February 1, 1921, restored that the men employed on the Missouri & North Arkansas in the capacity of engineers, firemen, hostlers, conductors, trainmen, yardmen, agents, telegraphers, train dispatchers and maintenance of way men would withdraw from the service at 3 o'clock a. m. February 26, 1921, or ten hours after presentation of the ultimatum to the railroad.

When the former employees quit the service of the railroad at 3 o'clock on the morning of February 26 as they said they would do unless the wage reduction order was rescinded, new men were employed to fill the places of those who had quit and little difficulty was encountered in obtaining experienced and qualified railroad men. The new employees are entirely satisfied with the reduced scale of wages and it has been clearly demonstrated that the new organization can operate the railroad efficiently and take care of public convenience and necessity; but since February 26 we have encountered lawlessness and interference in the way of intimidations and threats against the new employees, the new employees and their families have been insulted by former employees, the new employees have been assaulted by former employees, and obstructions have been placed on the railroad track and trains bridges have been burned.

The people and the authorities along this railroad are familiar with conditions and while the railroad has used every means at its command to protect trains and property, that has been impossible. To attempt to continue train operation in the face of the depredations which have been committed would endanger the lives of passengers and employees, and until federal and state authorities provide adequate protection to trains and property of this railroad between Neosho, Missouri, and Helena, Arkansas, we must in the interest of safety discontinue the operation of this railroad.

Conference with "Big Four" to Be

Reported to Committee

T. De Witt Cuyler, chairman of the Association of Railway Executives, announced on March 23 that the result of his conferences with the leaders of the train and engine brotherhoods would be reported to the standing committee of the Association at its next meeting. These conferences were held in Philadelphia on March 14. Mr. Cuyler said further that in his opinion the slump in traffic which has so seriously affected the earnings of the railroads has reached the bottom and that a gradual improvement may be expected from now on. This prospective improvement in traffic, however, will probably not be sufficient to offset the deficits already accrued and readjustments in wage rates and other economies will be necessary, he added.

General News Department

The Atlanta Passenger Traffic Club, the activities of which were suspended during government operation of the railroads, was reorganized at a meeting in the Healy building, Atlanta, on Tuesday evening, March 15, with a membership of 144. Joseph P. Billups, general passenger agent of the Atlanta & West Point, was elected president of the club, and George F. Grafton secretary. Meetings will be held once a month.

Eastern railroad executives, Daniel Willard of the Baltimore & Ohio, F. D. Underwood of the Erie, A. T. Dice of the Philadelphia & Reading, A. H. Smith of the New York Central and Elisha Lee of the Pennsylvania, had a long conference with Chairman Clark and other members of the Interstate Commerce Commission at Washington on March 24. It was stated that the possibility of operating economies was under discussion.

Five passengers were killed from suffocation by gas, smoke, and other causes not known, when a Pullman car on train No. 115, on the Denver & Rio Grande, caught fire, enroute, on the morning of March 15. The train left Denver at 7:10 p. m. and picked up the sleeper at Pueblo, Col., for Alamosa, N. M. The fire was discovered at the head end of the car as the train neared Walsenburg, Col., about 1:30 a. m. Among the dead was F. S. Steelman, traveling passenger agent of the Missouri Pacific.

Two masked men held up and robbed passengers in the three rear sleepers on the Texas Special, northbound, on the Missouri, Kansas & Texas, between Chockie and McAlester, Oklahoma, about nine o'clock on the night of March 22. The robbers boarded the train at Dennison, Texas, and proceeded to line up the passengers and rifle their pockets, systematically locking each coach when they had finished with the passengers in it. When the train reached McAlester the robbers stopped it and made their escape with approximately \$2,000.

The Tax Bureau of New York State estimates that the State income tax yield for 1920 from railroad employees, who were exempt from payment of tax in 1919 on account of government operation of the railroads will amount to \$1,000,000. Careful estimates place the total number of railroad employees in New York State during 1920 at over 130,000. The railroads were not turned back to private ownership until March 1, 1920, but the additional revenue is expected from the remaining 10 months. An examination of Federal income tax returns shows that hundreds of thousands of persons are paying federal taxes for the first time and a large percentage in New York State are railroad men. The largest increases in the number of employees on New York railroads took place among machinists, boilermakers, blacksmiths, electricians, air-brake men, car inspectors, car repairers, helpers and apprentices, hostlers and enginehouse men.

Rock Island War Gardens Continued

A total of 1,078 acres of ground were leased for "Right-of-Way Gardens" by employees on 15 divisions of the Chicago, Rock Island & Pacific during 1920, the individual lease averaging 2.65 acres. This plan has been continued on the Rock Island despite the cessation of war pressure which created the war garden plan of food production. While no data are obtainable as to the value of the products raised, it ran into thousands of dollars and is estimated at half a million for the whole system. This amount of money does not represent produce alone, for many of the lessees went in for hog and chicken raising, while one employee had a record yield of hay.

Of the divisions reporting, the St. Louis division heads the list in the matter of leases and acreage, with 136 leases for a total of 260 acres; the Indian Territory division, which comes second, had 41 leases with a total of 225 acres. That

the acreage was well distributed is shown by the fact that the Chicago Terminal division had a total of 2 leases and 1 acre cultivated.

Railway Returns for January

Later returns of the railroads to the Interstate Commerce Commission for January show a slightly better result than on the earlier returns. One hundred and eighty-two Class I roads, operating 228,000 miles, had a net operating income of \$142,000 as compared with \$59,593,000 in January, 1920. The returns for 166 roads had shown a deficit of \$1,289,000. The 182 roads had freight revenues of \$318,000,000, an increase of 4.3 per cent as compared with January, 1920, and passenger revenues of \$104,000,000, an increase of 14.7 per cent. The total operating revenues were \$461,000,000, a decrease of 6.2 per cent, while the total operating expenses, \$432,000,000, represented an increase of 6½ per cent.

Certificates Issued for Railroad Guaranty

The Interstate Commerce Commission has issued additional certificates since those reported in last week's issue for partial payments to railroads on account of their guaranty for the six months following the period of federal control in accordance with the provisions of the Winslow law as follows:

		Previously advanced
Boston & Maine.....	\$6,500,000	\$4,000,000
Baltimore & Ohio.....	6,400,000	14,000,000
Delaware, Lackawanna & Western.....	2,000,000	6,569,500
Alabama, Tennessee & Northern.....	40,000	.....
Atchison, Topeka & Santa Fe.....	5,425,000	.....
Central New York Southern.....	27,000	.....
Gulf, Colorado & Santa Fe.....	1,575,000	.....
Minneapolis & St. Louis.....	100,000	2,250,000
Maine Central.....	300,000	1,350,000

The certificates which had been paid by the Treasury Department up to March 22 under the Winslow law, amounted to \$64,719,990.

Compensation of Employees

The Interstate Commerce Commission has issued a summary of statistics covering employees and their service and compensation for Class I roads for the quarter ending June 30, 1920. This statement indicates the conditions that prevailed before the increase in wages awarded by the Railroad Labor Board on July 20, 1920. The award was retroactive to May 1 but the carriers were instructed in rendering returns not to include any of the back pay for May and June resulting from the decision. The number of employees in service at the middle of the month was 1,952,446 for April, 2,005,483 for May and 2,056,381 for June, or an average of 2,004,760. The total compensation for the quarter was \$801,063,938. For the first quarter of 1920 the average number of employees in service was 1,993,524 and the total compensation was \$795,616,330.

The report gives some indication of the number of yard employees that were out of service during the strikes which were at their height in April. The average number of yard engineers during the first quarter of 1920 was 23,545. During April the number was 20,805 and by June it had increased to 22,471. The average number of yard firemen and helpers during the first quarter was 23,821, for April it was 20,771 and by June it had increased to 22,746. The number of yard conductors or foremen for the first quarter was 23,146, for April it was 17,294 and for June it was 20,562. The number of yard brakemen (switchmen or helpers) during the first quarter was 56,767, for April it was 42,368 and for June it was 51,573.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JANUARY, 1921

Table with columns: Name of road, Average mileage operated during period, Freight, Passenger, Operating revenues (inc. misc.), Total, Maintenance of way and equipment, Trans. portation, T.F. fee, General, Total, Operating ratio, Net from operation, Operating (or loss), Net from operation, Net from operation, Net from operation, Increase (or decrease) last year.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JANUARY, 1921 (CONTINUED)

Table with columns: Name of road, Average mileage operated during period, Freight, Passenger, Operating revenues (Total, (inc. misc.), Maintenance of Way and structures, Equipment, Traffic, Trains per position, General, Total, Operating ratio, Net from operations (or loss), Net (or decr.) comp. with other lines, Increase (or decr.) in net operating ratio. Rows list various railroads such as Grand Trunk System, Great Northern, Gulf Coast, etc.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JANUARY, 1921—(CONTINUED)

Name of road.	Average mileage operated during period.	Operating revenues—				Operating expenses—			Total.	Operating ratio.	Net from railway operation.	Operating income (or loss).	Net after rentals.	Increase (or decrease) comp. with last year.
		Freight.	Passenger.	(Inc. or dec.)	Operating revenues—	Traffic.	Trans- portation.	General.						
Seaboard Air Line.....	3,543	\$2,470,861	\$1,235,847	\$4,335,146	\$558,123	\$34,319	\$2,049,252	\$1,848,648	\$8,472,962	80.10	\$892,784	\$712,159	\$556,486	\$288,139
Southern Railway.....	6,971	2,966,691	1,666,619	10,692,929	1,068,401	21,684	7,609,222	7,030,821	19,322,922	70.30	3,093,108	2,786,999	2,729,699	512,854
Alabama Great Southern.....	3,181	611,828	192,282	1,419,181	133,664	23,684	468,324	37,897	833,276	111.34	35,640	35,564	71,477	11,778
Ch. N. W. Orleans & Tex. Pacifc.....	338	1,069,761	410,999	1,564,889	487,197	744,080	433,988	33,988	1,553,875	99.39	11,007	35,564	101,778	512,854
Georgia Southern & Florida.....	1,062	728,599	106,177	429,076	90,198	8,995	249,238	13,721	466,242	108.66	37,165	84,265	85,876	210,209
Illinois Central.....	1,015	1,490,365	998,803	1,589,483	126,672	43,282	727,558	55,651	1,604,796	92.02	139,199	78,253	105,143	80,815
New Orleans & Northeastern.....	407	399,492	98,803	1,559,227	159,999	2,019	615,623	3,367	904,466	81.00	21,216	16,011	235,964	235,964
Northern Alabama.....	1,119	1,185,866	17,442	1,118,682	1,133,838	2,019	6,004,629	446,339	12,502,097	85.117	2,185,982	1,271,587	1,231,524	2,079,089
Southern Pacific.....	7,110	8,866,326	4,536,361	14,688,081	2,876,176	227,134	6,504,629	1,905,957	12,502,097	76.30	620,311	576,689	469,219	90,097
Gatvoston, Harrisburg & S. Antonio.....	1,381	1,490,365	495,676	2,617,569	330,448	48,106	1,065,957	85,723	1,997,254	85.03	165,690	121,673	92,242	170,622
Houston & Texas Central.....	901	1,790,492	445,548	1,350,269	218,717	21,987	473,860	33,347	940,510	85.03	121,673	92,242	170,622	170,622
Illinois & Eastern.....	1,001	1,790,492	445,548	1,350,269	218,717	21,987	473,860	33,347	940,510	85.03	121,673	92,242	170,622	170,622
Illinois & Southern.....	1,001	1,790,492	445,548	1,350,269	218,717	21,987	473,860	33,347	940,510	85.03	121,673	92,242	170,622	170,622
Louisiana.....	207	558,240	184,616	1,146,616	609,956	55,817	308,134	8,381	398,287	45.79	12,679	4,844	16,517	21,243
Morgan's L. & T. R. R. & S. C. Co.....	400	531,817	184,616	1,146,616	609,956	55,817	308,134	8,381	398,287	45.79	12,679	4,844	16,517	21,243
Texas & New Orleans.....	165	579,989	174,191	801,281	160,369	248,238	121,000	344,612	25,200	797,115	99.48	4,166	16,477	68,260
Spokane International.....	469	857,888	19,971	110,851	14,820	7,634	3,201	39,072	6,596	71,331	64.34	39,530	34,405	28,046
Tennessee Central.....	292	116,989	27,793	184,151	40,184	4,896	133,049	11,497	234,833	128.92	52,682	57,347	78,199	103,012
Union Pacific.....	1,015	1,490,365	998,803	1,589,483	126,672	43,282	727,558	55,651	1,604,796	92.02	139,199	78,253	105,143	80,815
Toledo, Peoria & Western.....	247	1,017,079	58,579	3,158,399	316,640	2,884	104,313	4,016	977,919	128.95	4,843	30,451	182,175	30,312
Tulsa.....	454	683,553	33,808	755,852	119,316	5,759	301,051	15,615	657,444	86.98	98,408	67,600	52,073	5,112
Trinity & Brazos Valley.....	368	217,958	22,345	247,958	59,659	3,452	121,771	10,471	282,465	101.82	-1,507	-11,206	-25,833	20,814
Union & Delaware.....	448	43,316	82,182	15,999	23,957	2,174	67,246	8,391	118,663	144.39	42,732	34,221	43,221	34,221
Union & Kentucky.....	368	217,958	22,345	247,958	59,659	3,452	121,771	10,471	282,465	101.82	-1,507	-11,206	-25,833	20,814
Union & Tennessee.....	368	217,958	22,345	247,958	59,659	3,452	121,771	10,471	282,465	101.82	-1,507	-11,206	-25,833	20,814
Union Pacific.....	3,614	5,936,843	1,651,552	8,489,103	872,703	2,338,639	1,374,525	3,509,959	7,627,657	88.54	1,327,491	1,258,348	175,028	215,866
Utah.....	446	114,879	12,415	400,751	47,030	301,156	3,695	1,871,290	71,331	27,199	33,063	39,976	37,038	37,038
Virginian.....	526	1,822,241	85,869	1,693,135	228,744	379,025	116,627	559,976	34,667	216,284	47,645	382,203	430,918	450,909
Wabash.....	247	1,514,679	800,962	4,217,017	625,060	1,082,621	1,082,621	1,082,621	4,316,142	98.74	200,871	164,365	145,114	180,393
Western Maryland.....	797	1,514,679	101,356	1,700,281	218,632	479,646	266,935	702,321	1,806,352	88.54	194,929	114,929	236,603	317,228
Whiting & Lake Erie.....	311	852,021	84,550	1,694,936	145,073	207,391	59,036	431,442	47,036	870,681	101.50	80,892	33,480	337,480
Whiting & Lake Erie.....	311	852,021	84,550	1,694,936	145,073	207,391	59,036	431,442	47,036	870,681	101.50	80,892	33,480	337,480
Whiting & Lake Erie.....	311	852,021	84,550	1,694,936	145,073	207,391	59,036	431,442	47,036	870,681	101.50	80,892	33,480	337,480
Whiting & Lake Erie.....	311	852,021	84,550	1,694,936	145,073	207,391	59,036	431,442	47,036	870,681	101.50	80,892	33,480	337,480

New York City Votes Daylight Saving

New York City, by vote of its Board of Aldermen, is to set its clocks ahead one hour on April 24 and continue daylight saving until September 25; five months instead of seven months, as in previous years.

The New York, New Haven & Hartford announces that its New York suburban trains, and probably many others, will be run one hour earlier than at present. Other roads will, no doubt, take similar action. The New York State law now allows all cities and towns to adopt local ordinances for daylight saving. Connecticut, in which lie hundreds of miles of the New Haven road's lines, sticks to Eastern Standard time, a law just passed making it virtually out of the question for cities to take independent action.

Charges of Shop Unions Renewed

Five additional organizations of shop employees and the Railway Employees Department of the American Federation of Labor have joined with the International Association of Machinists in the complaint filed with the Interstate Commerce Commission requesting an investigation of railroad car and locomotive repair work. The original complaint was filed January 8, 1921, by W. Jett Lauck, representing William H. Johnston, president of the machinists. The press notice, just issued by way of keeping the subject alive, says that since the filing of the original complaint additional investigations have been made and the employees now claim to be prepared to fully substantiate all the charges made. The union heads who have joined with the Machinists' Association in the complaint, and the organizations which they represent, are as follows: B. M. Jewell, president of the Railway Employees Department, American Federation of Labor; J. J. Hynes, international president of the Amalgamated Sheet Metal Workers' International Alliance; Martin F. Ryan, general president of the Brotherhood of Railway Carmen of America; James P. Noonan, international president of the International Brotherhood of Electrical Workers; J. W. Kline, president of the International Brotherhood of Blacksmiths, Drop Forgers and Helpers of America; J. A. Franklin, president of the International Brotherhood of Boilermakers and Iron Shipbuilders.

Appointments Made and Pending

John J. Esch has been given a recess appointment by President Harding as a member of the Interstate Commerce Commission. This will enable him to begin service on the commission at once, pending his confirmation by the Senate, which was postponed until the opening of the extra session because of the opposition of Senator LaFollette, who asked time to file a minority report on the action of the committee in interstate commerce in recommending confirmation.

There are still two vacancies on the commission to be filled by President Harding's appointment and the claims of a large number of candidates have been urged upon the President. A delegation of Senators and Representatives from the Northwestern states has called upon the President to urge him to appoint a commissioner from that section. It is persistently reported that one of the positions is to be offered to Frank Hagenbarth of Salt Lake City, president of the National Wool Growers' Association. F. I. Cox, an officer of a traveling men's association, has also been prominently mentioned as a candidate.

The resignation of John Barton Payne as director general of railroads in charge of the Railroad Administration was made effective as of March 15, but the President has not yet appointed his successor.

The terms of office of three members of the Railroad Labor Board, H. J. Hunt of the public group, W. L. Park of the railroad group and J. J. Forrester of the labor group, expire next month under the terms of the transportation act and the President is expected to make appointments for these positions for the full term of five years. Under the law the original appointments included one man in each group for one year, one man in each group for two years and one man in each group for three years. The appointments are to be made in the same way as the original appointments, that is, on nominations by the labor organizations and by the railroads in the case of the representatives of those groups.

Traffic News

The Traffic Club of Kalamazoo (Mich.), organized late in 1920, finds itself prosperous and growing. The regular meetings are held on the first and third Thursdays of each month. The officers are: W. C. Thoms (Mich. Cent.), president; L. R. Fulton (Barley Motor Car Company), vice-president; G. J. Bolender (Chamber of Commerce), secretary; A. H. Bock (N. Y. C.), treasurer.

W. K. Vandiver, assistant manager of the Department of Traffic, United States Railroad Administration, has resigned to become traffic manager for the Grain Dealers' National Association, with office in the Gardner building, Toledo, Ohio. Mr. Vandiver had been with the Railroad Administration for about a year, previous to which time he was assistant general freight agent of the Mobile & Ohio.

At a recent meeting of the El Paso, Texas, Traffic Club the following officers were elected: President, N. L. Rankin, traffic manager, Texas & Pacific; vice-presidents, J. D. Neely, traffic manager, Krakauer-Zork Company; W. C. McCormick, assistant general freight and passenger agent, Southern Pacific, and H. D. McGregor, division passenger agent, El Paso & Southwestern; secretary-treasurer, George Deck, district passenger agent, Texas & Pacific.

"Weighing Carload and Less Than Carload Freight" was the subject of the transportation discussion at the Traffic Club of Chicago on March 24. Among the speakers were A. S. Dodge, superintendent Western Weighing Bureau; F. V. Roy, Fairbanks, Morse & Co.; H. A. Foss, Weightmaster, Chicago Board of Trade; J. S. Brown, Chicago Board of Trade; W. J. Womer, Consumers Company; Murray N. Billings, Illinois Steel Company; R. B. Goe, Illinois Central, and C. T. Scribner, Chicago, Burlington & Quincy.

Traffic Director Hardie and Examiner Healey of the Interstate Commerce Commission will next Monday conduct a conference relative to rates on fruits and vegetables, at the Federal building in Dallas, Texas. This conference is called at the request of the Texas commission and the Texas state legislature, to investigate the alleged serious situation of producers of fruits and vegetables in Texas. The conference is to be held between shippers and carriers, and while it relates primarily to the rates to and from Texas and Southwestern points, carriers' and shippers' organizations from other fruit and vegetable producing districts, in particular the Southeast and Florida, will be given an opportunity of making a statement relative to the general situation, if they so desire.

Coal Production Continues to Decline

Production of soft coal during the week ending March 12 dropped below the 7,000,000 ton mark. The total output is estimated at 6,891,000 net tons, according to the weekly bulletin of the Geological Survey, a decrease of 5 per cent below the revised figure for the week preceding. What was last week reported to be a slight recovery is now shown by corrected figures to have been instead a decrease, so that the decline in production since December, 1920, has been unbroken.

Temporary Reduction of Live Stock Rates

A temporary reduction in the rates on stocker and feeder cattle from the ranges in the Southwest to the feeding grounds in Oklahoma, Kansas, Nebraska, Colorado, Wyoming and Montana, from April 15 to July 1 was agreed to by traffic officers of the western railroads at a conference in Washington with representatives of the live stock shippers and Chairman Clark of the Interstate Commerce Commission on March 17. The rates in effect on August 25, 1920, prior to the 35 per cent advance made under Ex Parte 74, will be restored. It was estimated that this reduction would result in a movement of 900,000 head of cattle and was agreed to because of the depressed condition of the live-

stock industry and the need for larger shipments of cattle to the regions which have been subject to drouths.

Coal-Car Distribution Rules to Be Investigated

The Interstate Commerce Commission has ordered an investigation of the present car distribution rules in so far as they apply to privately owned coal cars and cars furnished for railroad fuel coal, with a view to prescribing such just and reasonable rule or regulation as may appear to be necessary. The proceeding is assigned for hearing at such times and places as the commission may hereafter direct.

Service Order No. 18, issued on September 28, providing for the assignment of cars for railroad fuel has been vacated and set aside.

Free Tolls Through Panama Canal Proposed

The new Congress which meets in extra session on April 11 is expected to take up at an early date the question of restoring the law providing for free tolls for vessels using the Panama Canal which was repealed early in the Wilson administration. President Harding has expressed himself as being in favor of free tolls and it is commonly predicted that the measure will be passed by Congress. Such a step would greatly increase the competition against the transcontinental railroads which have been comparatively free from water competition during the war period. The transcontinental rail rates have been readjusted in various ways in accordance with the condition of comparative absence of competition; and the stimulus to shipping which would be given by taking off the tolls would doubtless reopen the question of the rail rate adjustment.

Application of Rate Increases to

Points Near Regional Border Line

W. V. Hardie, director of traffic of the Interstate Commerce Commission, has issued a notice concerning increases in freight rates under Ex Parte Order No. 74 to and from points in close proximity to the border line between the eastern and southern groups as defined in the report in that proceeding.

The commission sees no occasion to question the action of the carriers in treating points on the Bristol line of the Norfolk & Western from Radford, Va., to Bristol, as border line points, applying an increase of 40 per cent to the rates locally on such line and to rates between points on such line and points in the eastern group; and 25 per cent to the rates between such points and points in the southern group.

The situation as to the Clinch Valley branch of the Norfolk & Western leading from Bluefield, Va., to Norton, Va., and of the Lexington-Louisville branch of the Chesapeake & Ohio from Ashland, Ky., to Louisville is similar.

The Big Sandy Division of the C. & O. (Huntington to Elkhorn City) and the line of the Morehead & North Fork should be considered as being within the southern group, subject to 25 per cent increase upon local rates and 33½ per cent as to rates to and from points in the eastern group.

In reaching the informal conclusions above indicated, the commission gave consideration to the following paragraph which appears in its report in Ex Parte 74 on page 247:

"In the construction of rates in accordance with these findings it is not intended that the group boundaries should be strictly observed, but the territorial boundaries heretofore recognized should be observed. For example, Richmond, one of the so-called Virginia cities, should continue on the basis which it has heretofore enjoyed."

In many cases local rates between points on the lines above described are and have been subject to the official classification; joint rates between such points and points in the eastern group have been generally subject to the official classification and have been constructed and predicated in a general way with relation to the adjustment in trunk line and central freight association territories. To apply any increase as to traffic between such points and points in the eastern group different from that applicable to the eastern group would create many fourth section violations and require numerous readjustments, many of which may be avoided by the method of applying the increases which has been used by the carriers and is considered informally by the commission not to be at variance with its findings in Ex Parte 74.

Commission and Court News

Interstate Commerce Commission

The Commission has issued its order in the Georgia intrastate rate case, ordering increases in the rates on cotton, cotton linters and brick, corresponding to the increases made in interstate rates.

The Commission has further suspended until April 30, proposed changes in rates for the diversion and reconsignment of fruits and vegetables and other commodities shown in tariffs of various carriers throughout the United States.

The Commission has further suspended until April 21 the operation of certain proposed cancellation of and increase in water competitive rates on lumber, c. l. from various shipping points in the Carolinas, Georgia, Florida, Virginia and eastern Alabama to Baltimore, Philadelphia, New York, and Boston, etc.

The Interstate Commerce Commission has issued its decision in Nevada intrastate rate case ordering a general increase in the rates in Nevada by the percentages previously authorized for interstate rates. The Nevada Public Service Commission had denied permission to the railroads to make such increase.

The Interstate Commerce Commission has issued a decision finding not justified proposed increased rates on lumber from points in the South to Eastern Trunk Line and New England territories. The railroads by tariffs filed to become effective November 22 had proposed to cancel the joint rates designated as water competitive rates, thereby leaving in effect higher commodity rates.

Florida Rates Increased

The Interstate Commerce Commission has issued its order in the Florida intrastate rate case ordering increases in the state freight rates to correspond with the increases in interstate rates authorized in Ex Parte 74. No issue as to passenger fares was involved. The Florida commission had issued an order effective on October 1, 1920, directing an increase in freight rates on the basis of the rates in force prior to the effective date of General Order No. 28 of the director general of railroads, plus 25 per cent, plus a second 25 per cent. This was to avoid the effect of the general order which had increased rates for short haul traffic by more than the general increase made at that time. The opinion, by Commissioner Daniels, says that the effect of this order is to treat Florida as separate and distinct from the other states in the Southern group and to require a different scheme of rate-making which would obviously result in a serious disruption of the rate structure in Florida and indirectly in other parts of the Southern group. Referring to the Interstate Commerce Commission's order in Ex Parte 74, the opinion says that in reaching its conclusions in that case the commission "anticipated that the various state authorities would authorize corresponding increases, as most of them have since done."

Court News

Foreclosure Purchasers of Unprofitable Railroad Cannot Be Compelled to Operate at a Loss

Ordinarily, the owner of a railroad may be compelled to perform the obligations which it has assumed to the public. Having constructed and operated its road under the powers and privileges of its franchise it cannot at its option or caprice abandon it and tear it to pieces. But where a railroad has never earned any surplus above operating expenses or enough to keep it in repair, pay taxes or meet interest charges, the Iowa Supreme court holds that purchasers on foreclosure cannot be compelled to restore the road at a large outlay, and to operate it at a loss.—*State v. Blaton* (Iowa), 178 N. W. 1.

Assumption of Risk

The Wisconsin Supreme Court holds that the head brakeman of a freight train, late for his train, who attempted to board it when it was moving at 10 or 12 miles an hour, assumed the risk of being thrown under a car.—*Ramstrom v. C. M. & St. P.* (Wis.), 178 N. W. 239.

Care of Automatic Bells at Crossings

The Indiana Appellate Court holds, in a crossing accident case, where an electric gong installed by the railroad at the crossing did not ring, that knowledge of the railroad that the gong was out of repair and want of knowledge on the part of the traveler, are both essential to recovery for failure to use reasonable care to keep the gong in good condition.—*Lake Erie & W. v. Howarth* (Ind.), 127 N. E. 804.

Agreement to Extend Time of Confinement of Cattle

The Indiana Appellate Court holds that a contract to ship cattle within a reasonable time was not made a preferential one in violation of the statutes regulating interstate commerce merely because the shipper requested the railroad to extend the time of confinement without unloading for feed, water and rest for 36 hours, as authorized by statute, the agreement to extend the time being open to all shippers.—*B. & O. S. W. v. Bower* (Ind.), 127 N. E., 458.

Passenger With Intoxicated Driver

The Indiana Appellate Court holds that a member of an automobile party which had been drinking intoxicating liquors, who knew of the intoxicated condition of the driver in time before a crossing was reached to have left the automobile and avoided injury when it was struck by a train, was guilty of contributory negligence, barring recovery; and this whether warning signals were given by the railroad or not.—*Kirinse v. Chicago, T. H. & S. E.* (Ind.), 127 N. E. 837.

Limitation as to Passengers' Baggage Valid

Despite Cummins Amendment

The North Carolina Supreme Court holds that the amendment of Aug. 9, 1916, to the Cummins amendment of March 4, 1915, expressly exempts baggage from the provisions as to an interstate carrier's liability for full actual loss notwithstanding a release; and a railroad's limitation of its liability to \$100 in a baggage tariff duly filed and approved, restricts the passenger's recovery to \$100.—*Culbreth v. Martin* (N. Car.), 103 S. E. 374.

"Last Carrier" Road Which Switches Car

In an action for damages to a shipment of machinery which the defendant, amongst others, carried, it appeared that the defendant delivered the sealed car to another carrier, to be switched a short distance to the plaintiff's warehouse. The other carrier received no part of the through freight, but charged defendant \$2 for switching. The South Carolina Supreme Court held that the defendant was not the last carrier, and therefore was not chargeable with the presumption that it wrought the damage; and judgment for the plaintiff was reversed.—*Southern Textile Mach. Co. 5, Piedmont & Northern* (S. Car.), 103 S. E. 475.

Reasonable Notice of Claim Necessary Though

Disease Develops After Delivery

A provision in a bill of lading for live stock that a verified statement of any claim shall be filed within five days after delivery at destination, is valid. The Indiana Appellate Court holds that, while the fact that pneumonia did not develop until three days after delivery would be a reasonable excuse for not presenting the claim in five days, this would not relieve the shipper entirely from giving any notice or presenting any claim within a reasonable time; and a failure to give notice or present claim for 75 days was a violation of the contract. The railroad must have an opportunity to investigate as to its liability within a reasonable time and while the cattle were sick.—*Chicago, I. & L.* (Ind.), 127 N. E. 209.

Foreign Railway News

Chile Asks Bids for Electrification

The Chilean government will receive bids, beginning March 31, for the electrification of the government railway from Valparaiso to Santiago, according to a cablegram from Ambassador Shea at Santiago.

The British Railway Situation

The Ministry of Transport of Great Britain last September appointed a committee headed by Lord Colwyn to examine into the nature and terms of the agreements made between the government and the various carriers, to determine the liabilities of the government under the agreements and whether or not any further steps should be taken to assure that the interests of the state under the agreements was adequately safeguarded. The committee was unable to report on the amount of the outstanding liabilities at the present time. Claims against the government are expected, however, to amount to a considerable sum for arrears in maintenance, abnormal wear and tear and depletion of stores. The committee reported that these claims, which it estimates at about \$750,000, can be reduced to an "insignificant figure." This statement is taken by some of the railway officers as an indication of an attitude on the part of the government which gives little promise of satisfactory legislation providing for a return of the roads to their owners in the fall and a general lack of sympathy with their requirements.

China Notes

PEKING.

Revenues.—Revenues of the Chinese Government Railways for 1920 are estimated to aggregate a nominal total of \$89,000,000, or an increase of \$6,000,000 over the previous year. This is considered very favorable in view of the fact that operations on the four largest lines were almost entirely interrupted throughout July due to military demonstrations. However, the nominal increase will not be realized in cash, for it includes charges for a large increase in military transportation, and charges for grain carriage for famine relief societies, all of which will be accepted as government accounts.

Famine Alleviated.—Early reports of famine conditions prove not only to have been badly exaggerated, but the ability of native means for combating those conditions was under-rated. Perhaps the biggest piece of famine relief work done by any authority or group has been accomplished by the Ministry of Communications. Early in the autumn grain rates into the famine area were reduced thirty per cent and in the reverse direction were advanced by the same amount. The result has been a great movement of grain into the larger centers of the famine provinces, and stable prices. In addition, in spite of an empty treasury, the Ministry granted free transportation to food stuffs shipped by bona fide relief societies, and to relief workers. Construction work was started on the Tsangchow-Shihchiachuang line in Chihli, through the heart of the famine district, on the Cheefoo-Weihsien line in Shantung, and on the extension to the Taokow-Chinghua line in Honan, another famine district.

Railways Assume Risks for Freight.—On January 1, the principal Chinese Government Railway lines began to assume risk of shipment, under special conditions. Heretofore shipments have been accepted only at owner's risk, which necessitated sending of watchmen along with every shipment. On ordinary freight, now, the railway will assume full responsibility at a rate ten per cent in excess of the usual rates.

Metric System Adopted.—On January 1, the metric system of weights and measures went into effect on the Government Railways. All distances and rates are quoted in terms of kilometres. Passenger rates between stations are unchanged, however. Freight rates underwent considerable change on January 1, for with the change to the metric system, new classifications of goods went into effect, uniform on the principal lines. The tapering system of rates was introduced. The "taper" is effective every hundred kilometres, but the rate of taper is temporarily left to the

discretion of each line, so that local conditions may be met. Over a distance of 400 kilometres the reductions on the various lines fluctuate from 15 to 25 per cent. Standard rules for passenger and freight traffic also went into effect on January 1.

New Passenger Service.—Beginning January 1, the Peking-Mukden and Tientsin-Pukow lines began to operate a through express passenger train from Pukow to Peking, eliminating the necessity of change and possible loss of connection at Tientsin. This express makes through service from Peking to Shanghai with only one break, the transfer over the Yang Ste river, Nanking to Pukow. A train ferry over the river at this point has been authorized in the budget and is expected to be in service within eighteen months. An express extra-fare train between Peking and Hankow has also been inaugurated. No passes are good on this train and the soldier evil is therefore eliminated. This train is tri-weekly in each direction. A ferry service connecting the Peking-Hankow Railway with the Canton-Hankow line at Wuchang has been established by the former line. January 1, the Peking-Suiyuan line opened an extension of about 40 miles north of Fengchen. It is expected that rails will be laid into Suiyuan by mid-summer.

Railway Funds for Railways Only.—Yeh Kung Cho, Minister of Communications, has secured the approval of the cabinet to a resolution that hereafter "railway funds will be devoted exclusively to railway uses." The first fruit of this policy is the application of the famine sur-charges on passenger tickets and freight charges to the construction of the three railways mentioned above, upon which famine refugees are employed. This has aroused some friction with the Ministry of the Interior to whom general famine relief measures have been committed. The second fruit of the policy has been the setting aside of \$250,000 per month out of the revenues of the Peking-Hankow and Tientsin-Pukow railways, to be devoted to the construction of the Canton-Hankow line. C. J. Carroll, chief engineer of the American section of the Szechuan line, has been put in charge of surveys for this new construction.

Bids Asked for Bridge.—The Ministry of Communications is advertising for bids for the Yellow River bridge. The present bridge was originally intended as a temporary structure to last fifteen years. That period has elapsed, and the wheel load of new types of power render the structure unsafe at a speed in excess of eight miles per hour.

New Accounting System.—Because of the multiplicity of new methods coming into effect on January 1, the through billing of goods has been postponed to be effective February 1. Uniform station accounts have been postponed, effective July 1, and uniform store accounts, which were framed six months ago will not be promulgated until July 1. In the meantime the standing committee for the unification of railway accounts and statistics has framed a standard set of forms and rules for engineers on construction, which will be held over until effect has been given to the above. However, most of the lines having occasion to make changes are voluntarily following the suggestions of the committee. On February 1, the "through-traffic" lines will inaugurate standard forms and rules for car distribution and car records. These rules involve the employment of a regular "car distributor," the compilation of "car kilometrage" both loaded and empty, and the direct reporting of car detention to the car distributor. A beginning is made also toward tonnage rating of locomotives, and a record of per cent of total power utilized.

Record Traffic.—A tremendous strain is being put on the Peking-Mukden line to haul sufficient grain from Manchuria to supply the famine area. Manchuria is the only large source of supply, and the Peking-Mukden is the only connecting railway. Old locomotives and 65-lb. rail on the northern half of this line make a severe handicap, but during the four months September to December inclusive, 1920, the tons delivered "inside the wall" were nearly ten times any previous record. Cars average nearly 200 kilometres per day while in this service.

Loan for New Rolling Stock.—Probably the most significant piece of railway financing of recent years in China, is the loan just concluded by the Ministry of Communications with a group of native banks for \$6,000,000 to be used for the purchase of rolling stock. It is secured on the revenues of the Peking-Hankow line, and bears interest at 8 per cent. By some this is interpreted to be the answer of China to the alleged terms of the Consortium. This is undoubtedly overshooting the mark. But it probably does mean an intelligent interest in governmental affairs hereafter on the part of Chinese financiers, which will have a salutary effect upon governmental credit as well as expenditure.

Equipment and Supplies

Locomotives

THE IMPERIAL JAPANESE GOVERNMENT RAILWAYS is having 30 locomotives built in Japan.

THE HOKKAIDO KOYO TETSUDO, Japan, has ordered 1 2-6-2 type locomotive from the Baldwin Locomotive Works.

Freight Cars

THE IMPERIAL JAPANESE GOVERNMENT RAILWAYS' program for new equipment calls for the construction in Japan of 1,500 new cars each year. The construction of 50 freight cars and 50 passenger cars may be authorized in the near future.

THE TIENSIN-PUKOW, reported in the *Railway Age* of February 4 as being in the market for 300 40-ton all-steel gondola cars, has ordered this equipment through Mitsui & Co., 65 Broadway, New York, from the American Car & Foundry Co.

THE ANGLO-BRAZILIAN COMMERCIAL & AGENCY COMPANY, LTD., Rio de Janeiro, Brazil, reported in the *Railway Age* of January 21, as inquiring through the car builders for 300 low side freight cars, has renewed its inquiries for this equipment.

Passenger Cars

IMPERIAL JAPANESE GOVERNMENT RAILWAYS. See item under Freight Cars.

Machinery and Tools

THE BATAVIA CAR WORKS, INC., Batavia, N. Y., is in the market for a large amount of shop equipment.

THE NEW YORK CENTRAL is inquiring for a 400-ton wheel press, a 6-ft. radial drill, a 48-in. planer, and a 54-in. boring mill, for its shops at Avis, Pa.

THE DELAWARE, LACKAWANNA & WESTERN has ordered a 5-ft. Ryerson-Conradson radial drill, for its Kingsland shops, from Joseph T. Ryerson & Son.

Miscellaneous

THE NEW YORK CENTRAL will receive bids until noon March 28, for its requirements until July 1, 1921, for the line Buffalo and East, of fuel oil, gasoline, kerosene, gas oil and lubricating oil, also turpentine substitute and tallow candles.

THE LONG ISLAND is asking for bids until 2 p. m., March 30, for 3,000,000 to 3,300,000 gal. of fuel oil for use on vessels and boats controlled and operated by the marine department of the Long Island Railroad during the 12 months from April 1, 1921

Signaling

MITSUI & Co., 65 Broadway, New York, has ordered 21 complete sets of automatic signals from the Union Switch & Signal Co., for use on 10 miles of double track of the Osaki Interurban Railway.

EASTERN RAILROAD EXECUTIVES, Daniel Willard of the Baltimore & Ohio, F. D. Underwood of the Erie, A. T. Dice of the Philadelphia & Reading, A. H. Smith of the New York Central and Elisha Lee of the Pennsylvania, had a long conference with Chairman Clark and other members of the Interstate Commerce Commission at Washington on March 24. It was stated that the possibility of operating economies was under discussion.

Supply Trade News

Carl W. Bettcher has been appointed sales manager of the Eastern Machine Screw Corporation, New Haven, Conn. Mr. Bettcher will give his special attention to the expansion of its H & G die head business.

The Track Specialties Company, 29 Broadway, New York, on March 1, appointed the C. H. Small Company, Monadnock building, San Francisco, Cal., as its agent at that place and R. J. Glendinning & Co., 1102 Newhouse building, as its agent in Salt Lake City, Utah.

The Blaw-Knox Company will establish a sales office in the southwest, with headquarters in Kansas City, Mo., on April 1. R. B. Randall of the Chicago office will be in charge of the new territory and offices will be located in the Interstate Building at Kansas City.

Ralph T. Hatch, whose appointment as general manager of sales of the Reading Steel Castings Company, a subsidiary of the American Chain Company, with headquarters at Reading, Pa., was announced in the *Railway Age* of March 18 (page 738).



R. T. Hatch

entered railroad sales work with the B. F. Goodrich Rubber Company at Akron, Ohio, and was for several years railroad representative of this company. For the past 14 years he has been connected with the sales department of the National Malleable Castings Company, serving this company first as manager of Canadian sales with headquarters at Montreal, Can., and later coming to the Chicago office of the company. At the time

of his recent appointment he was serving as district manager of sales for the Northwestern territory, with headquarters at St. Paul, Minn., a position he had held for several years.

Gunni Jeppesen, formerly chief engineer of the Strauss Bascule Bridge Company, Chicago, has joined the Chicago Bascule Bridge Company, Chicago, Ill., as associate engineer. Mr. Jeppesen, who is a graduate of the State Polytechnical Institute at Copenhagen, Denmark, was connected with the Strauss Company for 12 years, from its inception until 1917, and since then has been engaged in industrial plant work as structural engineer of the Leonard Engineering Company.

The Arkansas Preservative Company has been organized by E. B. Fulks, president and John L. Pfeiffer, secretary, to make zinc chloride. The company has established offices in the Carlton building, St. Louis, and is now completing a plant to manufacture zinc chloride at Little Rock, Ark., which plant will be completed in about a month. Mr. Fulks was vice-president of the American Tar Products Company, Chicago, until last summer.

J. Brookes Spencer, assistant to first vice-president of the Southern Wheel Company, St. Louis, Mo., has been elected vice-president with headquarters at St. Louis. Mr. Spencer was born in St. Louis on January 15, 1888. He was educated at the Hill School, Pottstown, Pa., and was graduated from Yale University in the class of 1910. In 1917 he entered the service of the Southern Wheel Company at St. Louis and has been with this company since that time with the exception of a year when he served in the United States Army.

Fairbanks, Morse & Co.

The annual report of Fairbanks, Morse & Co for the year 1920 shows a net profit of \$2,678,735 for the year, after providing for sinking fund, federal taxes and special inventory depreciation, the latter deduction amounting to \$1,650,000. After allowing for preferred dividends, the net balance available for common stock is \$2,558,735, equal to \$8.25 per share on the no par common stock outstanding. The net balance available for common stock in 1919 was \$3,176,862, equal to \$10.25 per share on the present capitalization.

Chicago Railway Equipment Company

During the year 1920 the business of the Chicago Railway Equipment Company was the largest in its history, both in volume and in money. While the volume of railway work was 50 per cent of its total business, the profit from that work was only 37 per cent of the company's total profits for that year. Dividends totaling 10 per cent were paid during the year.

No income account was issued, but the following balance sheet was given:

ASSETS			
	Dec. 31, 1920	Dec. 31, 1919	
Property	\$1,476,663	\$1,325,910	
Good will, patents, etc.....	793,225	766,757	
Inventories	1,700,280	1,236,359	
Investments	1,176	1,176	
Liberty bonds	549,450	666,900	
Accounts, bills, revenue and cash.....	1,786,158	1,598,490	
Deferred charges	3,156	357	
Total assets	\$6,310,110	\$5,595,960	
LIABILITIES			
Capital stock	\$2,996,800	\$2,993,760	
Current liabilities	479,752	306,305	
Reserves	305,020	163,439	
General reserves	2,000,000	1,500,000	
Surplus	530,536	632,546	
	\$6,310,110	\$5,595,690	

Western Electric Company

The total sales of the Western Electric Company during 1920 amounted to \$206,112,000 as compared with \$135,722,000 in 1919. The net earnings for the year, as shown by the company's annual report, were \$8,277,414, or 7.2 per cent on the average investment for the year, which was \$114,900,000. This compares with net earnings of \$5,652,089 for 1919, or 6.9 per cent on the average investment for that year of \$81,400,000. Interest amounting to \$4,037,645 and dividends amounting to \$3,345,000 were paid, leaving a surplus of \$894,769.

The unfilled orders of the company at the end of the year aggregated \$82,655,000, as compared with \$47,442,000 at the end of the year 1919, and \$26,265,000 at the end of the year 1918.

The balance sheet, December 31, 1920, follows:

ASSETS			
Total plant		\$37,838,313	
Merchandise	\$72,209,721		
Cash	7,825,257		
Bills receivable	848,378		
Trade acceptances	1,869,307		
Accounts receivable	44,012,698		
Total current assets		126,765,361	
Liberty Bonds		1,193,220	
Trustees, employers' bond purchase plan.....		1,066,751	
Sundry investments		2,703,265	
International Western Electric Co., Inc.....		19,017,286	
Grand total		\$188,584,196	
LIABILITIES			
Common stock	\$57,949,453		
First mortgage bonds, 5 per cent, 1922.....	15,000,000		
Convertible gold bonds, 7 per cent, 1925.....	27,000,000		
Total capital liabilities		\$99,949,453	
General bills payable	\$41,550,000		
Bills payable secured by Liberty Bonds	1,200,000		
Trade acceptances discounted	1,082,384		
Accounts payable	14,563,466		
Total current liabilities		58,395,850	
Reserve for depreciation on plant	\$24,021,005		
Reserve for employees' benefit fund.....	1,600,000		
Reserve for contingencies	4,617,888		
Total reserves		30,238,893	
Grand total		\$188,584,196	

Bethlehem Steel Corporation

The net income of the Bethlehem Steel Corporation for the year ended December 31, 1920, as shown by its annual report, was \$14,458,836, comparing with \$15,356,860 for 1919. The value of unfilled orders on December 31, 1920, was \$145,286,637, as compared with \$251,422,545 at the close of 1919.

The summary of surplus account since the formation of the corporation in 1905 showed total net earnings for that period of \$317,798,983. Of that amount \$165,797,372 was deducted for interest charges, discounts, special reserves and depreciation. Cash dividends of \$41,174,825 and stock dividends amounting to \$30,000,000 were paid. The sum appropriated for and invested in additions to property and working capital aggregated \$70,000,000, leaving an unappropriated surplus of \$10,826,786 at the end of the year.

The report, which is signed by C. M. Schwab, chairman of the board, and E. G. Grace, president, says in part:

"An issue of \$2,660,000 Bethlehem Steel Company equipment trust 7 per cent gold certificates was sold in 1920 to provide in part for the purchase of 1,000 70-ton coal cars of steel construction. Another issue of \$750,000 Bethlehem Steel Company equipment trust series B 6 per cent gold notes was delivered during the year in part payment for 549 steel coal cars purchased from New England Fuel & Transportation Company.

"Through the medium of the employees' representation plan in the plants of your corporation, relations with the employees have continued on a satisfactory basis. The rapid contraction in the volume of business and the decline in the market prices of all products have necessitated a very large decrease in the number of employees, together with a reduction in wage rates. In this readjustment representatives of the employees have met the management in a fair and co-operative spirit."

The comparative income account for the years ended December 31, 1920 and 1919, is as follows:

	1920	1919
Gross sales and earnings.....	\$274,431,236	\$281,641,908
Less—Manufacturing cost and operating expense, including administrative, selling and general expense, and taxes.....	239,468,865	246,494,159
Net manufacturing profit.....	\$34,962,371	\$35,147,749
Interest, dividends and other miscellaneous income	1,389,182	2,293,469
Total net earnings.....	\$36,351,553	\$37,441,218
Less—Interest charges, including proportion of discount on and expense of bond and note issues	7,951,203	9,518,206
Balance	\$28,400,350	\$27,923,012
Provision for depreciation, obsolescence and depletion	13,941,515	12,566,152
Net income for the year.....	\$14,458,836	\$15,356,860



Photo by Keystone

Railway Bridge and Castle at Conway, England

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company contemplates the construction of a craneway building, with dimensions of 50 ft. by 100 ft., at Topeka, Kan., to cost about \$13,000.

CHICAGO & NORTHWESTERN.—This company contemplates rebuilding its grain elevator on the Calumet river, Chicago, which was leased to the Armor Grain Company and which was partially destroyed by an explosion on the evening of March 19.

CHICAGO UNION STATION COMPANY.—This company has awarded a contract for fabricating the structural steel to be used in the construction of the new railway mail terminal building, Chicago, to the MacClintock-Marshall Company, Pittsburg, Pa. The company has awarded contracts to the Fort Pitt Company, Pittsburg, for fabricating the structural steel to be used in building the Madison street viaduct, and in widening Canal street between Van Buren and Harrison streets, Chicago.

ILLINOIS CENTRAL.—This company is accepting bids for two viaducts at Fort Dodge, Iowa, to cost approximately \$30,000 each. The company is also accepting bids for the construction of two bridges at Council Hill, Ill., to cost a total of \$60,000.

ILLINOIS CENTRAL.—The Groom Coal Company, which was announced in the *Railway Age* of February 11, as contemplating a coaling station on the line of the Illinois Central at Belleville, Ill., has awarded a contract for a 500-ton frame coaling station, to cost approximately \$40,000, to the Railway Water & Coal Handling Company, Chicago.

OREGON SHORT LINE.—This company contemplates improvements on its station at Twin Falls, Idaho, to cost approximately \$15,000.

UNION PACIFIC.—This company in conjunction with the United States Bureau of Public Roads and the State of Utah will construct a viaduct over the company's tracks and a bridge crossing the Weber river, Riverdale, Utah.

Railway Financial News

ALABAMA & VICKSBURG.—*Authorized to Issue and Pledge Bonds and Notes.*—This company has been authorized by the Interstate Commerce Commission to issue \$542,900 of 5-year, 6 per cent, promissory notes and \$2,423,000 of 6 per cent, first mortgage bonds maturing April 1, 1951, to pledge \$543,000 of the bonds as collateral for the notes and \$1,880,000 with the Secretary of the Treasury for loans from the revolving fund.

CHICAGO, BURLINGTON & QUINCY.—*Declares Stock Dividend.*—The directors have declared a stock dividend of 54.132 per cent, payable to stockholders of record March 31. The stock dividend will amount to 600,000 shares on the \$110,839,100 capital stock outstanding (\$100 par value). Northern Pacific and Great Northern together own \$109,114,810 Burlington stock. Their share of the dividend will amount to 590,660 shares.

The Burlington was recently granted permission to issue \$60,000,000 additional stock as a step to assist the two owning lines to meet the \$215,000,000 Great Northern-Northern Pacific joint Burlington collateral 4s maturing July 1, next. As noted in the *Railway Age* of March 4, page 499, the commission refused that part of the Burlington's application which requested permission to capitalize an additional part of its surplus by the issuance of \$80,000,000 bonds.

CHICAGO & ILLINOIS MIDLAND.—*Asks Authority to Issue Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue \$1,750,000 of 10-year, 7 per cent debenture bonds to be delivered to the Commonwealth Edison Company, Chicago, to refund an equivalent amount of open account indebtedness.

HAMPDEN RAILROAD.—*Receivership.*—By an interlocutory decree filed in the Superior Court at Springfield, Mass., on March 19, William E. Gilbert was appointed receiver for this corporation with instructions to make a complete return of the road's assets within thirty days. Mr. Gilbert is president of the Union Trust Company of Springfield, Mass. The court action was taken on a suit brought against the road by the Hampden National Bank of Westfield, Mass. H. W. Ely, counsel for the road, said that the receivership was for the purpose of winding up the affairs of the corporation.

The Hampden Railroad was incorporated in July, 1910, in Massachusetts. It runs from the Boston & Albany, two miles east of Springfield, to a connection with the Boston & Maine at Pondsville, 15 miles. Upon completion, the Hampden Railroad was to be leased to the Boston & Maine for 99 years at rental equal to interest on the debts of the corporation and 5 per cent dividends on the stock, but as the lease has not been approved by the Public Service Commission of Massachusetts, the road has not been opened for operation, and the Boston & Maine has not assumed any obligations under the lease. The directors of the Boston & Maine voted on December 29, 1913, to buy or lease the road on terms approved by the Massachusetts Railroad Commission, but the Massachusetts legislature on June 18, 1914, defeated the bill providing for the lease. The company on July 4, 1914, filed a suit against the Boston & Maine to enforce its alleged contract liability, amounting to between \$3,500,000 and \$4,000,000, the approximate cost of the line, but the suit was decided in favor of the Boston & Maine. The case was taken to the Supreme Court on exceptions and an opinion was rendered on June 25, 1919, overruling the exceptions. The petition for a rehearing was denied by the court in the fall of 1919.

ILLINOIS CENTRAL.—*Authorized to Issue Equipment Trust Certificates.*—This company has been authorized by the Interstate Commerce Commission to enter into an equipment trust agreement with the Commercial Trust Company for the issuance of \$3,564,000 of 6½ per cent equipment trust certificates for the acquisition of 50, 2-10-2 type freight locomotives and 25, 8-wheel switching locomotives at an estimated cost of \$5,941,250.

MAINE CENTRAL.—*Annual Report.*—The annual report of this railroad is reviewed editorially in this issue.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—*Asks Authority to Purchase Line.*—This company has applied to the Interstate Commerce Commission for authority to acquire by purchase the property of the Wisconsin & Northern, which operates 133 miles in Wisconsin, at a price of \$25,000 per mile, or \$3,339,500, of which \$668,500 is to be paid in cash and \$2,671,000 in 5 per cent consolidated gold bonds. Authority for the issuance of the bonds is also requested.



Darling in the Chicago Post

NATIONAL RAILWAYS OF MEXICO.—Annual Report.—The income statement of the National Railways of Mexico for the fiscal year ended June 30, 1920, does not include any earnings for the operation of the National Railways of Mexico. It shows charges, principally of interest on funded debt and short term notes, amounting to 24,708,498 Mexican gold pesos (\$12,354,249 in United States currency) and a deficit balance for the year of 23,557,264 pesos (\$11,778,632). The general balance sheet as of June 30, 1920, shows a deficit balance to profit and loss of 169,445,025 pesos (\$84,722,513). The funded debt as of June 30 is shown as 407,672,380 pesos (\$203,836,190) and among the other items on the liabilities side is 67,324,263 pesos (\$33,662,132), representing notes payable which matured in 1915, 1916 and 1917, which were not paid.

The earnings of the lines of the National Railways of Mexico as operated by the government are shown in an exhibit to the executive president's report. They show gross earnings of 73,207,569 pesos (\$36,603,785), operating expenses of 46,983,697 pesos (\$23,491,649) and net earnings of 26,223,872 pesos (\$13,111,936), but, as noted above, this figure is not included as income by the corporation. Subsidiary lines showed operating deficits under the government administration as follows: Vera Cruz & Isthmus, 179,029 pesos (\$89,515); Pan-American Railroad, 620,612 pesos (\$310,306).

NEW YORK, NEW HAVEN & HARTFORD.—No Receivership Contemplated.—In reply to the assertion of E. J. Rich, counsel for the Associated Industries of Massachusetts, that he doubted if anything could save this road from a receivership, E. J. Pearson, president of the New York, New Haven & Hartford, has issued the following statement:

"The unauthorized talk of receivership," he said, "is unfortunate at the present time. Edgar J. Rich is not counsel for the New Haven Road, and while I do not know what the future may bring forth, I think it may duty to say that no receivership for the New Haven Road is now in contemplation. We hope to get justice in division of rates and labor readjustment.

"We need just a little assistance to turn the corner, and, with everybody co-operating and helpful, prosperity can be restored to New England, not only for her industries, but for her transportation. Coal and supply costs are coming down and more cars will soon be moving.

"It is a pity that people should be frightened out of their railroad ownership just at this point. The New Haven Railroad Company, after charging off all its bad investments, will have an appraised valuation for its property far exceeding its entire indebtedness and its entire share capital at par."

An article and an editorial on the New England situation appear elsewhere in this issue.

PITTSBURGH & SHAWMUT.—Authorized to Endorse Notes.—This company has been authorized by the Interstate Commerce Commission to assume obligations as endorser in respect of promissory notes aggregating \$1,110,975 and to pledge the notes, together with \$1,000,000 of its first mortgage 5 per cent bonds, as security for collateral note to the amount of \$1,500,000.

READING COMPANY.—Iselin Committee Defends Plan.—The committee representing certain holders of Reading first and second preferred stock, consisting of Adrian Iselin, Robert B. Dodson, Edwin G. Merrill, and William A. Law, known as the Iselin Committee, has petitioned the United States District Court at Philadelphia for leave to intervene. The petitioners ask that the Reading plan be approved as submitted. They represent 89,611 shares of first preferred and 117,786 shares of second preferred, having an aggregate par value of \$10,369,850. The committee holds that the plan does not contemplate a distribution of Reading's \$33,000,000 surplus, as asserted by the Prosser Committee, but a distribution of assets, to acquire which the preferred stock was originally issued.

WILMINGTON, BRUNSWICK & SOUTHERN.—Authorized to Issue Promissory Notes.—This company has been authorized by the Interstate Commerce Commission to issue promissory notes to the amount of \$81,000 in renewal of notes about to become due.

WISCONSIN & NORTHERN.—May Be Purchased.—See Minneapolis, St. Paul & Sault Ste. Marie.

Dividends Declared

Chicago, Burlington & Quincy—Stock, 54.132 per cent, payable March 31 to holders of record March 31. Quarterly, \$2, payable March 25 to holders of record March 19.

Great Northern—One and three-quarter per cent, quarterly, payable May 2 to holders of record April 2.

Kansas City Southern—Preferred, 1 per cent, payable April 15 to holders of record March 31.

Reading Company—Common, 2 per cent, payable May 12 to holders of record April 19.

Railway Officers

Executive

Ross Beason, traffic manager of the Salt Lake & Utah, with headquarters at Salt Lake City, Utah, has been promoted to vice-president, with the same headquarters, and has been succeeded by **A. V. Kipp**, general freight and passenger agent, whose former position has been abolished.

Traffic

T. E. Harris has been appointed traffic manager of the Gulf & Ship Island with headquarters at Gulfport, Miss.

J. F. Keate has been appointed commercial agent of the Salt Lake & Utah, with headquarters at Salt Lake City, Utah.

R. C. Semon has been appointed commercial agent of the Southern with headquarters at Cincinnati, Ohio, effective March 15.

C. B. Newcomb, west bound agent on the New York Central, with headquarters at Chicago, has been appointed general agent on the Rutland, with headquarters at Chicago.

Stuart A. Allen, assistant freight traffic manager on the Baltimore & Ohio, Eastern Lines, with headquarters at New York City, has been promoted to freight traffic manager, Western Lines, with headquarters at Chicago, effective March 19, succeeding **O. A. Constans**, deceased.

W. D. Cook, general freight agent of the Georgia & Florida, has assumed jurisdiction over all matters pertaining to the freight traffic of that company, **T. E. Harris**, traffic manager, having resigned to accept service with another company.

D. F. Kirkpatrick has been appointed assistant general freight agent with headquarters at Augusta, Ga.

J. B. Graham has been appointed commercial agent on the Gulf Coast Lines, with headquarters at Baton Rouge, La., effective March 1, succeeding **C. A. Richardson**, who has been transferred to the transportation department. Other appointments effective this date are: **W. R. Butler**, commercial agent, with headquarters at Dallas, Tex., and **S. W. Elder**, who has been transferred from San Francisco, Cal., to Houston, Tex.

Engineering, Maintenance of Way and Signaling

C. C. Haire has been appointed engineer auditor on the Illinois Central, with headquarters at Chicago, with jurisdiction over valuation and capital expenditures, effective March 1.

W. P. Hayes, assistant engineer on the Missouri Pacific, with headquarters at Monroe, La., has been promoted to division engineer on the Louisiana division, with the same headquarters, effective March 15. **R. G. Bush**, assistant engineer in the valuation department with headquarters at St. Louis, Mo., has been appointed assistant engineer on the Valley division, effective March 1, succeeding **N. B. Topping**, who has been assigned to other duties.

Obituary

H. L. Anderson, editor of the Illinois Central magazine, died at the Illinois Central Hospital, Chicago, on March 16, after an illness of three weeks.

H. E. Renick, superintendent of the Colorado & Southern with headquarters at Denver, Colo., died in Los Angeles, Cal., after an illness of two months. Mr. Renick was 59 years old at the time of his death and had been with the Colorado & Southern for more than 20 years. Since 1910 he had been division superintendent.

EDITORIAL

Railway Age

EDITORIAL

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One middle western railway has a painting schedule that calls for the painting of one-seventh of its bridges each year.

Keep Up the Painting Schedule

In other words, each bridge is painted at intervals that average very close to seven years. Of course, some of the structures require attention oftener than others, but seven years represents the average for the entire system, including the great variety of exposures which tend to cause paint failures to occur more rapidly in some localities than in others. Seven years is by no means a short interval for what may be termed the average conditions. Nevertheless, the structures on this railroad are in very good condition as regards the paint surfaces and it is the opinion of the bridge engineer that the success attained in maintaining this painting schedule may be ascribed primarily to the policy of the management in adhering to the program year after year; the bridges are not allowed to get into a condition that calls for large expenditures for cleaning or scraping before the new coat is applied. It goes almost without saying that a coat of paint applied over one that still has some life left in it is going to last much longer than one applied over a coat that has entirely disintegrated. Herein lies one danger in the present situation. Curtailment of painting this year may result in much greater expenditures in overcoming the harm done to the surfaces on steel bridges in the years to come. Deferred painting is much more expensive than painting done before extensive scraping and wire brushing becomes necessary.

In his report to the Interstate Commerce Commission on the Porter, Ind., accident W. P. Borland, chief of the Bureau of Safety said that "the locations of the train-order and home signals were such that it would have been possible for the fireman to have mistaken the green indication of the train-order signal for a clear indication of the top blade of the home signal if the light on the latter was out or obscured by steam or smoke." This raises the question as to the necessity for the continued use of a double signal system since one system can and should be made flexible enough to meet all requirements of train operation by signals. At the present time two systems for the operation of trains are in common use, one consisting of the time table, the train-order and the telegraph or telephone and the other the automatic block signal and interlocking system. Both systems are designed to do one thing—to enable the trains to move over the road with safety and despatch. It is true that the train-order signal system was the first in use, but is it necessary to retain this system after traffic conditions have warranted the installation of automatic block signals and such installations have been made? Each system is largely independent of the other and progressive managements are now directing their efforts towards the co-ordination of the two into one well rounded system. It is realized by operating officers and signal engineers that many "potential danger points" (commented on editorially in the *Railway Age* for March 25, page 775) such as the one at Porter, Ind., exist and they realize further that "something" should be done to eliminate this condition.

Is a Double Signal System Necessary?

"Something" will be done when the railroads conclude that one flexible system is desired—not one superimposed on the other. It is difficult and sometimes unwise to change from old established practices too rapidly but if progress is to be made along any line old practices must give way to new. Railroad officers can well consider the advisability of requiring the automatic block signal system to be self-contained and so complete as to meet all signal requirements. In this way they will obtain greater and better operating results on the initial investment made. The proper co-ordination of signal systems will also remove "potential danger points."

Brazil, as is pointed out by J. P. Risque in an article appearing elsewhere in this issue, is a country as large as the United States, the British Isles, the Netherlands, Portugal and Switzerland combined. In spite of this great area, it has a population of only 24,000,000 and only 13,340 miles of railways, 30 per cent of which is owned by British capital. The possibilities of future railway development and the consequent growth in the market for railway supplies is plainly evident from these figures: During and since the war American manufacturers have been able to hold the lead in railway supply exports to that country, but it is significant to note that before the war made it impossible, Brazil imported more railway supplies from little Belgium than from any other country—and this in spite of the large British investment in the railways of the country. During the past year there has been a marked tendency in almost every foreign market for orders to drift away from American manufacturers and back into their pre-war channels. This tendency can be checked only by conscientious and effective effort by American exporters. Effective efforts make necessary a study of foreign markets. A study of Brazil will bring out the fact that Portuguese and not Spanish is the language of the country, a fundamental fact the ignorance of which has made ineffective many otherwise well planned selling campaigns of American concerns in that country. It is to be hoped that our exporters will supplement the activities of the financiers who are trying to finance our foreign trade by studying such fundamental facts concerning the prospective markets, so that ignorance in this essential may not set at naught an otherwise well laid plan of commercial expansion.

Selling Railway Supplies in Brazil

At one time or another, piece work systems have been developed and used in practically all branches of railroad repair shop work. Locomotive machine, boiler and blacksmith shops, also car shops, both passenger and freight, have enjoyed increased output due to the installation of piece work systems by which men are rewarded in proportion to their industry and ability to produce. While it is true that a large number of shop men are opposed to piece work, either honestly or through disinclination to do a day's work for a day's pay, some of the most ardent advocates of piece work systems are

Shop Piece Work Systems

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found among shop employees and workmen. It is generally admitted that the need of the day is greater production in all branches of industry including transportation, but under present standardized wages in railroad shops, superior workmen are brought down to the level of inferior ones by the absence of incentive for greater production. There is urgent need for the re-establishment of piece work in railroad shops to increase production and decrease maintenance costs. To be successful, a piece work system must be simple with fair prices set by capable, efficient inspectors. Satisfaction with the wage scale is absolutely necessary in order that the men will do their best work and the first requisite of a piece work system is that, due to its simplicity, any workman can compute quickly his actual earnings. The next important thing is the method of setting the price. It is self-evident that a price should not be set for a job unless the piece work inspector can produce a man from the ranks to do the work at that price and make 25 to 50 per cent over his day rate. Practically all the benefits of a piece work system will be nullified if rates are cut as soon as they become remunerative to the employees. With a fair price, experience has shown that no limit should be placed on earnings due to an increase in the personal efficiency of workmen. It has been maintained that the quality of work produced in shops under piece work systems is inferior, but this conclusion has never been borne out in actual practice. With a competent force of inspectors, the inspection of work is thorough under piece work systems, and when men have had to do work over once or twice on their own time, an immediate improvement in the quality of work will soon be evident. The fallacy of this old argument against piece work systems on the ground of inferior workmanship has been long since exposed.

We publish elsewhere in this issue an article entitled "Thieving and Pilfering on the Railroads," which was prepared by Alexander F. Lyman, general attorney of the New York Central. The article would be of timely interest if it ended with its analysis and discussion of the causes for the serious epidemic of dishonesty which is helping to drain railroad revenues. It is in its proposal of a remedy for this situation, however, that the paper merits close attention. Mr. Lyman presents a plan for criminal law bureaus, to be established by the carriers jointly in each of the big railroad centers where, naturally, thieving and pilfering reach their most alarming proportions. Another feature is the suggestion for reorganized police departments, called departments of surveillance, to carry out the work of the bureau on each road. It is claimed for the plan that it has a two-fold merit. It offers real economy by concentrating in one organization, jointly maintained, the needs of the individual roads for representation in the criminal courts. That there is considerable need for this economy is indicated by recent figures from the Freight Claim Division of the American Railway Association which show that during November, 1920, 180 roads reported robberies of goods valued at \$807,438, while during the same period their losses of entire packages and their unlocated losses, neither of which were officially classed as robberies, totaled \$1,790,451. A conservative estimate, based on these figures, placed the total cost to these roads of dishonesty during November at approximately \$2,000,000. In addition to its economy, it is claimed that the proposed organization offers a maximum of efficiency. By concentrating the entire attention of a well-trained personnel on securing adequate protection for all the participating carriers, the plan does away with the lack of co-ordination which is making possible much of the present dishonesty. It would no longer be easily possible for men discharged by one road on grounds of dis-

honesty, to find employment and a chance for further depredations with another carrier if these bureaus of surveillance were established to check up the past records of all applicants. Furthermore, it has been proved that those roads which have provided themselves with efficient police departments and energetic criminal counsel, enjoy comparative immunity, while the thieves concentrate on less well-protected roads. A joint criminal law bureau, looking after the interests of all, would, it is argued, strengthen these weak spots and offer a solid, well-fortified front to thieves and pilferers.

Passenger Traffic Under Increased Rates

A FREQUENT topic of conversation during recent weeks has been the falling off of passenger travel and most railroad men have probably had to listen to sarcastic suggestions that they raise fares again to make up for the loss of revenue caused by the loss of traffic said to result from the advance in rates. It is surprising how many people think they can correctly judge the railroad situation by their personal observations during occasional business trips. Passenger travel, like most other kinds of business, has certainly fallen off during the winter and we hear of many trains carrying but a few passengers, but statistics of passenger travel and the earnings of the railroads from passenger service as compiled by the Interstate Commerce Commission fail to bear out the common impression that the passenger business of the railroads has been greatly reduced by the increases in fares put into effect on August 26, although it has, of course, failed to keep up the usual increase from year to year.

Statistics of passenger revenues are now available for five months after the increased rates were made effective, September to January, inclusive. They show an increase of revenues of about 15.6 per cent as compared with the corresponding months of 1919, resulting from an increase in rates of about 20 per cent. The number of passengers carried and the distance they traveled are not yet available for any later period than December, but figures for four months show a slight increase in the number of passengers as compared with the corresponding months of 1919 when the lower rates were in effect, although a slight decrease in the average journey, indicating doubtless a reduction in the amount of long distance travel, with the result that passenger mileage, the number of passengers carried multiplied by the mileage they traveled, was only 2 per cent less than for the corresponding four months of 1919. That the long distance travel should have fallen off is not surprising when it is considered that a large proportion of travel is for business purposes and business generally has been at a low ebb during the winter. Moreover, the long distance travel is more likely to be in Pullman cars and therefore subject to the 50 per cent surcharge. The big bulk of railroad passenger business, however, does not consist of long distance travel but of short trips of less than 40 miles on each railroad at an average cost of a little over one dollar, and this appears to have been very slightly affected by the increased rates so far as the statistics now indicate. During September, October and November there was an actual increase in the number of passengers.

In September the passenger revenues were \$129,438,552 as compared with \$110,219,099 in September, 1919; in October they were \$114,044,152 as compared with \$99,033,423; in November \$106,829,660 as compared with \$92,475,222, and in December \$115,060,511 as against \$100,080,515. Preliminary returns for 194 roads for January also show an increase in passenger revenues of 14.6 per cent as compared

"Thieving and Pilfering on the Railroads"

with January, 1920. The passenger revenues, number of passengers carried, average journey per railroad, total number of passengers carried one mile, average fare paid and average rate per mile, according to the Interstate Commerce Commission reports, have been as follows:

PASSENGER REVENUES		
	1920-21	1919-20
September	\$129,438,552	\$116,219,009
October	114,044,132	99,033,423
November	106,829,660	92,475,222
December	115,060,511	100,080,515
January	104,777,000	91,437,000
194 roads	\$570,149,000	\$493,249,259
NUMBER PASSENGERS CARRIED		
September	104,351,950	103,204,614
October	99,118,514	99,322,004
November	96,783,529	95,239,268
December	99,181,982	100,805,201
	399,435,875	398,571,087
AVERAGE JOURNEY PER PASSENGER		
September	41.25 miles	41.84 miles
October	37.95 miles	38.99 miles
November	36.35 miles	37.17 miles
December	36.71 miles	37.73 miles
PASSENGER MILEAGE		
September	4,318,000,000	4,294,000,000
October	3,716,000,000	3,872,000,000
November	3,518,000,000	3,540,000,000
December	3,640,000,000	3,803,000,000
	15,192,000,000	15,509,000,000
AVERAGE FARE PAID PER TRIP PER RAILROAD		
September	\$1.23	\$1.06
October	1.14	.97
November	1.097	.97
December	1.153	.991
AVERAGE RATE PER MILE		
September	2.99 cents	2.54 cents
October	3.022 cents	2.556 cents
November	3.019 cents	2.609 cents
December	3.142 cents	2.626 cents

Of course, travel has been lighter during the winter than during the fall months but these figures show that a similar decrease took place during the preceding year. Many people argue strenuously that if the railroads would reduce rates they would make more money by inducing more people to travel. Those who make such assertions forget that in order to reduce rates to persuade some people to travel more or oftener (except by special rates such as are being offered for summer excursions), it would be necessary to throw away the corresponding percentage of revenue from the large number of passengers who have been traveling under the present rates. They also forget that during the past two or three years when the railroads were carrying just about all the passengers they could accommodate at lower rates they were steadily earning deficits most of the time. It is easy enough for a man to say that he knows that if rates were lower he would travel oftener. The question is whether enough such people could be induced to take enough more trips at a rate which the railroads could afford to make to offset the reduction in revenue which would result in the ordinary business. Past experience indicates that without a reduction in expenses the railroads could not carry enough passengers at any lower rate to break even.

For the five months ending January 31 the passenger revenues of the railroads were \$570,000,000 as compared with \$493,000,000 in the corresponding period of 1919-20, an increase of 15.6 per cent. For the four months ending December 31 the number of passengers carried was 399,435,875, as compared with 398,571,087, an increase of 0.2 per cent, but because of the reduction in the average journey per railroad from 38.8 miles to 36 miles, the passenger mileage was 0.2 per cent less. For the five months the berth and seat revenues of the Pullman Company increased 13 per cent, under a 20 per cent increase in rates, although for November, December and January the expenses were so great as to produce a net loss.

Railway Labor Costs and Financial Results

THE RAILROADS constitute a great industry and their successful operation demands the application of the same principles and methods as the successful management of any other business. The principal requisite to the successful management of a business is the prompt and constant adjustment of expenses to earnings.

The railroads are now in a different position from that ever before occupied by any other industry. The rates they may charge are fixed by one government body, the Interstate Commerce Commission, or by a large number, if we include the state commissions and legislatures. The working conditions and wages of their employees, which determine their payroll, are fixed by another government body, the Railroad Labor Board. Their payroll constitutes over two-thirds of their operating expenses, and even with a normal traffic consumes over one-half of their earnings. With the present volume of traffic the payroll is consuming close to two-thirds of their total earnings.

Since the solvency of any business concern, or class of concerns, depends upon prompt adjustment of its expenses to its earnings, and since one government body controls the charges the railways may make and another government body controls the working conditions and wages that principally determine their payroll, it follows that unless both these government bodies act intelligently, promptly and harmoniously in the performance of their functions the results to the railroads must be disastrous. Disaster to them means disaster to the public, because upon the ability of the railways to earn a reasonable net return depends, first, their ability to meet their financial obligations, and, secondly, their ability to so enlarge their facilities that they will be able to handle the commerce of the country when business is active.

The foregoing statements are obviously true, and yet although the railways have for months been engaged in a desperate struggle to avert a general bankruptcy, the threat of which is due to the heavy decline of traffic and earnings which has occurred while their unit costs, especially those of labor, are the highest they ever were, they have not in this terrible crisis received any substantial assistance either from the government body that fixes their rates, or the government body that determines the working conditions and wages of their employees. No blame for this attaches to the Interstate Commerce Commission. It could not reasonably be asked to make any advances in rates under present conditions. Can it likewise be said that no blame attaches to the Railroad Labor Board?

The Labor Board last summer granted an advance in wages which it was estimated amounted to over \$600,000,000 a year, but which recent statistics of the Interstate Commerce Commission indicate, while traffic was still heavy, was running over \$700,000,000 a year. Its wage award continued the indefensible standardization of wages throughout the country which was adopted under government control. Over the protest of representatives of the railways it took jurisdiction of and continued in effect the standardized rules and working conditions which were adopted under government control. The railways, when the board five months later gave them a hearing on national agreements, took only a month to present their case. Almost two months have now passed since the railways finished presenting their case. The spokesmen of the labor unions were said by the Labor Board itself to have presented their main case in favor of these agreements in the wage hearings which ended last June. Nevertheless, at this most critical time, the Labor Board has allowed the labor leaders one delay after another in presenting their rebuttal to the case of the railways; and further delays which seem indefensible are yet in prospect.

In an effort to meet the desperate crisis through which they are passing the railways have laid off hundreds of thousands of men. They are not doing maintenance, rehabilitation and improvement work which are imperatively needed. In spite of all the retrenchments that have been made their financial results are indescribably bad. The Labor Board in one of its decisions has said that "all questions involving the expense of operation or necessities of the railroads, and the amount of money necessary to secure successful operation thereof, are under the jurisdiction not of this board, but of the Interstate Commerce Commission."

The Transportation Act mentions seven specific points the board must take into consideration "in determining the justice and reasonableness of such wages and salaries or working conditions," but adds that these are to be taken into consideration "among other relevant circumstances." It seems plain that the effect of wages and working conditions on the financial condition of the carriers is a "relevant circumstance." In fact, when, in the decision just quoted the board added, "if any of these rules and working conditions are unjust and unreasonable they constitute an unwarranted burden upon the railroads and upon the public," it practically conceded that the effect produced upon the financial position of the carriers by wages and working conditions was a "relevant circumstance." Nevertheless, thus far the board seems to have proceeded upon the assumption that the effect which its action, or failure to act, may have in preventing or precipitating financial disaster to the railroad industry is a circumstance which it is no part of its duty to consider.

The situation presents an anomaly in business management and in government regulation. The board is an administrative body, and the first consideration of every governmental administrative body in the performance of its duties should be the public welfare. The board, with its control over two-thirds of the expenses of the railways, has the power not only to see that the employees are fairly treated, but also that the railways are not so unfairly treated in respect to wages and working conditions that they will be ruined. It must be plain to members of the board that the ruin of the railroads is not in the public interest. The board was created by Congress by the passage of the Transportation Act. One of the plainest and most important purposes of that act was to put the railways on their feet financially so that they would be able to render better and more adequate service to the public. The ruin of the railroads will not help to carry out this purpose. It will defeat it.

The Railroad Labor Board has most important duties and an enormous responsibility under present conditions, and if it does not perform its duties in accordance with the spirit and plain intent of the Transportation Act, and the result is a great disaster to the transportation industry, the public will not and should not fail to hold it responsible.

"Corresponding Members"

THE SUCCESS of an association in the railway field as elsewhere is measured almost directly by the character of its committee work. With active committees, the work of the association will be constructive; without it, probably mediocre. Likewise, one of the most important advantages to the individual membership in an association is the opportunity which is offered for the joint study of problems confronting the industry.

No association has been more successful in developing constructive committee work than the American Railway Engineering Association. From the date of its inception its work has been based upon this foundation. Last year 25 committees with an aggregate enrollment of over 500 members were at work and the reports which were presented at the recent annual convention were the result of the mature

investigations and deliberations of these groups of men for periods up to three or four years. The value of their conclusions requires no demonstration. Yet, even in this large organization only about one-fourth of the membership was assigned to committees.

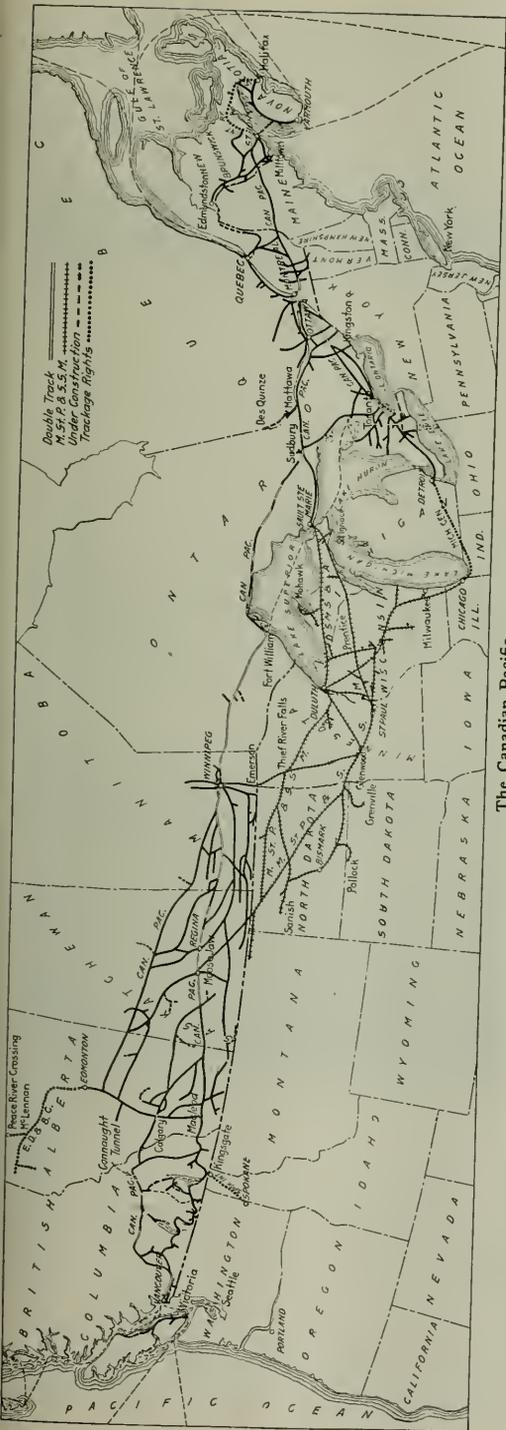
The development of means whereby the latent ability and experience of the remainder of the membership can be utilized to the best advantage and to the mutual benefit of the individual members and of the association is now receiving the careful consideration of the Board of Direction. In his address at the annual meeting H. R. Safford, president of the association, suggested the establishment of "corresponding members" of committees as one means to this end. This plan has much to commend it, especially when applied to those who are so situated geographically or for other reasons as to make attendance at committee meetings difficult or impracticable. The affiliation of such members with committees would enable them to participate to a considerable measure in the work of these committees and would place at the service of these committees the ideas and information possessed by those who are otherwise unable to share in the work. Such memberships would not only distribute the benefits of the organization among a larger number of members, but would also bring to the committees and through them to the association and to the railway industry, much information which is not now made available.

While this plan has been put forth only as a suggestion, it would seem to offer an excellent means of distributing the work of the association among a larger number of members. While the plan would undoubtedly add materially to the burden of correspondence falling on the chairmen of the committees, this is a detail which can undoubtedly be worked out satisfactorily.

Canadian Pacific

MORALE is a rather intangible element, but it is one of the most important elements in any enterprise, business or any other kind. We heard a great deal about morale during the war, and the military officer and layman alike were made to realize that an army could not be successful in its campaigns unless its morale was of the highest order. There may have been those who thought during the war period that possibly the use of the word "morale" was a fad. That, however, is not the case. James Ford Rhodes, in his standard work, entitled "History of the United States from 1850 to 1877," published several years ago, covers the story of the Civil War. His descriptions of the campaigns and of the battles are very detailed, but in the treatment of every campaign he is careful to analyze the morale of the contending armies and to show the importance of the conditions affecting good or poor morale and of the effects of either the one or the other.

Good morale is important in any organization; it is particularly important in a large organization such as an army. A railroad is a large organization; it differs from an army in that its forces are spread over a wide territory, whereas an army is more compact. It has now become generally recognized that morale on a railroad is just as important as it is in an army. The question might arise as to why the importance of morale on a railway has not been so well realized and given as much attention in the past as in the case of an army. The reason probably is that the morale of the forces on a railway has been more or less taken for granted. There is no doubt that under the influences accompanying Federal control, the high morale on the railways of this country was lost. It has required the lack of proper morale to emphasize how important that element is to successful railway operation. The railway executives, since the return of their lines to their own control, have made every



The Canadian Pacific

effort to restore the morale of the men employed on their lines. Against the adverse conditions, some have succeeded in greater measure than others, but all realize that morale is of the greatest importance.

The Canadian Pacific was operated throughout the war period as an independent self-controlled property. It was not subjected to those influences which we in this country are now inclined to regard as included among the accompaniments of Federal control. It is not now confronted with those problems which the railroads of the United States are having to meet, relative to the return of their lines to private control. There is no gainsaying that the morale of the forces of the Canadian Pacific was not lessened as it undoubtedly was in this country. Rather the huge task confronting the Dominion during the Great World War served to strengthen the morale on Canada's leading railway rather than to weaken it. The annual report of the Canadian Pacific for 1920 is a story of how that company took advantage of the high grade morale of its organization. It shows how the company was able, despite adverse conditions, to make what under ordinary conditions would have been an extraordinary showing. The showing is all the more remarkable in the comparison with the roads in the United States, many of which have properties equally as good; organizations equally as efficient, which are also conservatively financed, but which throughout much of 1920 lacked that one element which the Canadian Pacific was able to count on so strongly—the morale of its employees.

In its annual report the Canadian Pacific makes a plain distinction between the earnings from railway operation and those from ocean steamship lines, telegraph, etc. The gross earnings from railway operations in 1920 were \$216,641,349, as compared with \$176,929,060 in 1919. Its railway net earnings in 1920 were \$33,153,045, as against \$32,933,036 in 1919, despite the fact that working expenses in 1920 were charged with income taxes which were not payable in 1919 and years immediately prior thereto because of the existence in those years of a special tax on surplus after the payment of dividends. The operating ratio was 84.70; in 1919, 81.39 per cent. Fixed charges in 1920 were \$10,775,409, as compared with \$10,161,510 in 1919. The railroad income available for dividends in 1920 was \$21,877,636, and in 1919 \$22,271,527. The usual dividends of 4 per cent were paid on the preference stock and 7 per cent on the ordinary stock. The net surplus was \$450,359. The surplus in 1919 was \$844,250, but this amount was held in reserve for the special taxes imposed by the government which are referred to above.

The dividends on Canadian Pacific ordinary or common shares are 10 per cent annually. On this 7 per cent is paid from railway earnings, as noted heretofore. The other 3 per cent is paid from what is known as special income wherein are included the net revenue from investments, interest and dividends on securities, net earnings of the ocean and coastal steamship lines, telegraph, etc. This special income account on December 31, 1920, after the inclusion of the items mentioned and the deduction of the 3 per cent dividend, stood at \$20,530,292; on December 31, 1919, the balance was \$17,363,844. The net earnings from the steamship lines were not as great in 1920 as in 1919, but the several other items showed a considerable increase in 1920 over 1919.

The operation of the railway, we have noted, showed a net surplus after the payment of the preference or preferred dividends and 7 per cent on the ordinary shares of \$450,359 as compared with \$844,250 in 1919, the latter total, however, being subject to special government taxes. In view of the trend of earnings in 1920 on most of the railways in the United States, this showing of the Canadian Pacific is nothing short of remarkable. The Canadian Pacific has a great property; it is well organized and efficiently man-

aged; it is conservatively financed and, as has been noted, the morale of its forces is of the highest. That it succeeded in deriving the advantages of all these things in 1920 is evident.

There is no intention in this review to lead the reader to think that the Canadian Pacific was not without its problems in 1920. These problems are included in higher wages; high fuel costs, in high costs of materials and in addition another factor which does not confront railroads in the United States, the matter of exchange. President E. W. Beatty, in his annual report to the stockholders, estimates that the wage increases in May added about \$12,000,000 to expenses during the year and the exchange situation about \$4,000,000.

The wage increases in Canada were effective May 1 as in the United States. In Canada the increase is known as the Chicago Wage Award, in somewhat the same fashion as the name McAdoo scale is used in reference to the increases made during the period of the Railroad Administration. The application of the scales established by the United States Railway Labor Board to Canada was, of course, a natural step, although not the least of the reasons may be said to lie in the fact that of the international railway organizations, about 92 per cent of the membership is in the United States and 8 per cent in Canada. Although the Canadian roads had to accept the so-called McAdoo scale, they did not have to accept the national agreements. These particular deterrents to efficiency of the railway crafts have not applied in Canada. Similarly the Canadian Pacific was not affected by the outlaw strikes of the spring of 1920, except insofar as may have concerned traffic interchanged with connections.

The cost of fuel affected the Canadian Pacific in much the same way as it did many of the roads in the United States, namely in the form of higher prices for coal, increased transportation charges and poor quality. The Canadian Pacific receives coal from British Columbia and from mines in Pennsylvania and other fields. Some of this coal cost in 1920 as high as \$10.50 a ton.

The matter of freight rates came up in Canada just as it did in the United States. The increase in Canada became effective September 13. It was, speaking generally, 40 per cent in eastern Canada and 35 per cent in the west, although with the provision that on January 1, 1921, these increases would be reduced to 35 and 30 per cent respectively. The increases were based principally on what the Canadian Pacific would need to pay fixed charges and dividends. The Canadian Pacific suffered a falling off in its traffic but the decline did not come until about December 15. The increased rates were thus sufficient to enable the company to absorb the increased expenses and with the road's efficient management to enable it to earn a surplus for the year's operations. President Beatty in his report puts it in this fashion: "While, for the reasons mentioned, the net earnings are not commensurate with the volume of business transacted, still in the opinion of your directors, the year's operations must be regarded as satisfactory and compare most favorably with those of any other system on the American continent."

The total freight revenue of the Canadian Pacific in 1920 was \$145,303,400 as compared with \$111,064,442 in 1919. The total tons carried were 30,160,134 as compared with 25,102,821 in 1919. The revenue ton-mileage in 1920, totaling 13,856,607,551, represented an increase of 26.81 per cent over 1919. The average revenue per ton-mile in 1920 was 1.058 cents; in 1919, 1.003 cents. The average revenue train load in 1920 was 599 tons, an increase of 6.82 per cent over 1919. The average number of revenue tons per loaded car mile in 1920 was 26.54.

The total revenue from passengers in 1920 was \$49,

125,739 and from sleeping cars, express, etc., \$20,713,980, as compared with \$46,182,151 and \$18,199,135 respectively in 1919. The total number of passengers carried in 1920—namely, 16,769,555—represented an increase of 7.01 per cent over 1919. The total of passengers carried one mile, however, represented a decrease of 2.58 per cent. The average journey per passenger in 1920 was 102.45 miles; in 1919, 112.53 miles. The revenue per passenger mile in 1920 was 2.82 cents; and in 1919, 2.59 cents.

Before referring to the matter of finances, attention should be drawn to an interesting table in the report showing where the stock of the Canadian Pacific is owned. The shares are rather widely distributed in comparatively small holdings. Of the total ordinary shares 47.8 per cent are held in the United Kingdom, 17.73 in Canada and 24.10 in the United States. The table shows ownership of common shares as follows:

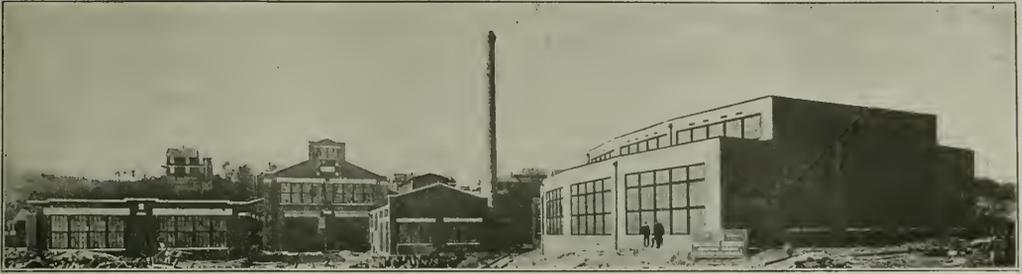
	Shares	Percentages
United Kingdom	1,242,837	47.80
Canada	460,838	17.73
United States	626,510	24.10
France	79,123	3.04
Other holdings	190,692	7.33
	2,600,000	

President Beatty in his report has considerable to say concerning possible new financing. The amount of unissued consolidated debenture stock authorized but not issued is \$36,000,000 and issued but not disposed of \$32,000,000, a total of \$68,000,000. "The capitalization of the company," he says "is conservative and even low, and this has been accomplished largely through the utilization of surpluses in betterments and improvements which would normally have been paid for out of the proceeds of capital issues. While capital expenditures for the immediate future will be curtailed and the resumption of work requiring large amounts of money will be deferred until a decided improvement in business conditions furnishes warrant for incurring them, your directors consider that it will be desirable that a portion of the cash reserves expended on capital account should be restored within a short time and, to this end, in order to supplement and extend the powers of the company to issue forms of securities other than those it is already empowered to issue and which are more appropriate to present market conditions, have made application for an amendment to the company's charter permitting the issuance of bonds, debenture or other securities, collateral to or in lieu of any consolidated debenture stock which the company is or may hereafter be empowered to issue and for the same amount, such securities to be payable in such currency at such times and places, and bearing such interest as your directors may think proper. *** The annual meeting will be made special for the purpose of authorizing, if approved, the issuance of such securities."

The following table shows the earnings of the Canadian Pacific in 1920 as compared with 1919:

	1920	1919
Mileage operated	13,402	13,389
Freight revenue	\$145,303,400	\$111,064,442
Passenger revenue	49,125,739	46,182,151
Total operating revenue	216,641,349	176,929,066
Maintenance of way expenses	32,573,927	28,912,230
Maintenance of equipment	46,350,793	33,897,728
Traffic expenses	4,999,345	3,829,687
Transportation expenses	86,608,511	63,054,175
General expenses (inc. taxes)	8,969,996	6,105,783
Total operating expenses	183,488,305	143,996,024
Net operating income	33,153,045	32,933,036
Fixed charges	10,775,409	10,161,510
*Railroad income available for dividends	21,877,636	22,771,527
Special income	10,966,448	9,049,343
Total income	32,844,083	31,320,869
Transferred dividends (4 per cent)	3,227,277	3,227,277
Common dividends (10 per cent)	26,000,000	26,000,000
Surplus from all operations	3,616,806	2,093,593

*The 4 per cent dividend on preference stock and 7 of the 10 per cent dividends on the ordinary stock are paid from this amount and the remaining 3 per cent on the ordinary shares from special income. Deduction of preferred dividends and 7 per cent common dividends left net surplus in 1920 of \$450,339 and in 1919, \$344,250, the latter amount, however, being placed in reserve for special taxes.



A Typical Layout of a Roundhouse and Small Shop

Modern Engine Terminals and Repair Shops*

The Results Contributed to Successful Operation by Proper Design
of Terminal Buildings

By H. E. Stitt

Chief Engineer, The Austin Company, Cleveland, Ohio

MANY PAPERS prepared heretofore on Modern Engine Terminals and Repair Shops have dealt primarily with the general layout of the terminals. In so doing, the results contributed to the successful operation of railway terminals by proper design of terminal buildings has been rather briefly disposed of. Too much stress and emphasis cannot be attached to the important role the buildings play in this field. They are not simply shelters, but they, them-

For this reason considerable thought and attention have been given to the development, design and construction of modern terminal buildings.

A further fact complicates the situation in that it is very difficult to add modern facilities to an existing plant which is designed and constructed without the contemplation of such added facilities. This is true, very often, because the plant has become surrounded by the city in which it is located. This makes reasonable priced land frequently unavailable for building additional units. Also, it is impossible to install crane runways and other labor saving devices in existing buildings, due to lack of clearance and insufficient strength in the existing structures.

Assuming, therefore, that the railway executive is more conversant with the facilities required for his terminals and admitting that the location and layout of each terminal is a separate, individual problem in each case—what is there, then, to influence the design of the terminal more than the major features of the terminal buildings? The major design of course must be followed up by the detail design. The design which is not based on modern practice should be superseded.

Development of Modern Terminal Buildings

The older types of terminal buildings of all classifications, including engine houses and repair shops, almost without exception have been—as considered in contrast with the modern terminal buildings—low, poorly lighted and ventilated, devoid of proper sanitary facilities, rest rooms, artificial lighting and heating. The advent of the overhead, electric traveling crane, as well as the modern smoke exhausting devices and other such improvements, have thrown many of the older type buildings into the obsolete class.

Other changes such as the substitution of structural steel and reinforced concrete for timber, the substitution of concrete for rubble masonry or brickwork, the substitution of steel sash for wood sash, and many other well-known changes have had a marked effect in bringing about a striking contrast between the old and new terminal buildings.

(At this point Mr. Stitt called attention to a number of articles dealing with locomotive terminals and shops that have



A Modern Erecting Shop Served by Light and Heavy Cranes and Transfer Table

selfes, are appliances in that they support labor saving devices.

One of the prime requisites of the up-to-date terminal is to have modern terminal buildings, or in other words, the character of the terminal buildings determines, to a very large extent, not only the present facilities at a terminal, but also in a considerable measure the facilities it is possible to add to an existing terminal.

Because of the many classes and sizes of terminals and the many uses to which these buildings are put, it is impossible to determine on a type which is suitable for all conditions.

*From a paper presented before the Central Railway Club, March 10, 1921.

appeared recently. He supplemented his paper with comments from some of these and quoted at some length from the article entitled "Are Modern Locomotives Efficiently Used?" which was published in the *Railway Age* of February 27, 1921.)

Design of Modern Railway Terminal Buildings

The function of engine terminals has been ably defined as a means to provide adequate facilities for the proper maintenance and repairs of locomotives and current routine operations as inspecting, cleaning, coaling, sanding, washing within the shortest possible time. Any factor, therefore, that will minimize this time is well worth our consideration. The human element as well as the mechanical element works to better advantage under proper environment and treatment.

The proper design of railway terminal buildings usually suggests itself after due consideration has been given to the facilities required for the terminal in question. By this I mean the work to be performed rather than the equipment required. In this regard the operating executive is surely most conversant with the requirements. This is true in general industrial work as well as in the railway field. Our observation indicates the railway executive needs support in determining the equipment and the general and detail design of the buildings on account of their intimate relations with the equipment to be installed.

It has been said in one of the articles quoted that "The author has purposely omitted reference to detail construction of buildings as these features generally conform to the railroads' standard practice." This is naturally applicable only to railroads having enough new construction under way to enable them to keep their standards up-to-date; likewise to enable them to maintain an organization of the proper experience and training as well as adequate capacity for this work.

If the railroad has not had the recent new construction work their engineering organization is not enabled to keep

tion. Then, when estimates are prepared, the mistake is realized and the work either postponed, due to lack of available funds, or considerable time and money are lost in the preparation of revised designs.

To properly make designs for railway terminal buildings, it is necessary that the designer have a working knowledge of railway requirements, as well as being familiar with modern terminal construction. As a matter of fact, it requires an engineering corps to do this work properly. In such a corps the men will have had experience covering different operations of the design. For instance, one man may be an expert on layout, another man an expert on structural design, while still another man or group of men will be experts on the



Roundhouse with Down-Draft System and Traveling Crane Spanning the Engine Bay

trades involved by the mechanical and electrical equipment. By adhering to these principles, together with the added advantage of close co-operation with the railway executive, who defines the needs and requirements for the particular problem in hand, there is a definite plan of action provided.

The modern railway terminal building should be the result of close observation in determining the needs of railway men. As a consequence certain types of construction have been generally accepted and those most commonly used have been more or less standardized. Standardization should be used only where standard buildings or equipment meet the necessary requirements.

If a provision in the layout of the buildings for a railway terminal will permit of more than one arrangement for future expansion, it generally results to advantage to use such a design. Regardless of how sure you are that your future development will be along certain lines, it has become a matter of note that there will be some changed conditions interposed before the future extension is built. For instance, the passage of the Adamson Law imposed entirely new conditions which determined the desirable locations of railway terminals.

Believing that a table, or schedule, of the options that arise in designing terminal buildings would meet with a favorable reception, the writer has prepared the tabulated schedule given below:

Suggested Schedule for Engine House Design

- I. CAPACITY OF HOUSE:
 - A. Approximate number of locomotives per day, at present.
 - B. Approximate number of locomotives per day, ultimately.
 - C. Suggested number of stalls for the present.
 - D. Suggested number of stalls for ultimate capacity.
- II. TYPES OF BUILDINGS:
 - A. Roundhouse.
 - (a) Single turn-table installation.
 - (b) Twin turn-table installation.
 - B. Longitudinal House.
 - C. Transverse House.



A Small Shop with Light Crane and Unwheeling Hoist

step with the development in latest designing and construction methods. This has to do with railroads equally as well as it has to do with general industrial organizations.

The next step in the design is a careful review of the facilities required, as set up by the railway executive most conversant with the conditions involved. This review taken into consideration with the importance of the terminal and the work to be accomplished there, points its way naturally to the facilities which should be provided.

A common error, made in all kinds of designing work, is in the ignoring of the financial resources of the owner by the engineer. This practice frequently leads to the preparation of elaborate, expensive designs, entirely unsuited to the situa-

- III. SPECIFY NUMBER, WIDTH, AND ARRANGEMENT OF SECTIONS.
IV. DETERMINE TYPE OF ROOF ARRANGEMENT.
- V. MECHANICAL EQUIPMENT TO BE PROVIDED INSIDE THE HOUSE.
- A. Electric Overhead Traveling Crane.
 - B. Hoisting Jacks.
 - C. Jib Cranes.
 - D. Number of Drop Pits.
 - E. Mechanically Operated Down Draft Smoke Exhaust System.
 - F. Heating Plant.
 - (a) Blower system with underground ducts.
 - (b) Blower system with overhead ducts.
 - (c) Integral fan blowing unit—steam heated.
 - (d) Integral fan blowing unit—direct fired.
 - (e) Direct radiation. Not commonly used in modern terminal buildings.
 - G. Electric Lighting.
 - H. Plumbing.
 - I. Sprinkler System.
- VI. MECHANICAL EQUIPMENT TO BE PROVIDED OUTSIDE THE HOUSE:
- A. Turn-Table.
 - (a) Deck Girder Type.
 - (b) Through Girder Type.
 - B. Transfer Table.
 - C. Water Conditioning Plant.
- VII. KINDS OF CONSTRUCTION:
- A. Fire Proof.
 - (a) Steel encased in concrete.
 - (b) Reinforced concrete structure with hollow tile and concrete joist roof construction.
 - (c) Reinforced concrete structure with so-called tin pan concrete joist roof construction.
 - (d) Reinforced concrete structure with concrete slab roof construction.
 - (e) Brick side walls—steel sash.
 - B. Non-Combustible.
 - (a) Exposed steel structure with non-combustible roof.
 - (b) Brick side walls—steel sash.
 - C. Slow-Burning.
 - (a) Steel structure—heavy timber roof framing and plank roof decking.
 - (b) Heavy timber structure and plank roof decking.
 - (c) Brick side walls—steel sash.
 - D. Inflammable. (Practically obsolete as applied to new structures.)
 - (a) Heavy timber structure with small dimensioned timber roof framing and decking.
 - (b) Small dimensioned timber side walls and wood sash.
 - E. Floors.
- VIII. REPAIR FACILITIES TO BE PROVIDED:
- A. Heavy and Light Machine Shop.
 - B. Light Machine Shop Only.
 - C. Blacksmith Shop.
 - D. Engine Room.
 - E. Boiler Room.
 - F. Pump Room.
 - G. Pipe Tunnels.
 - H. Boiler Washing Plant.
 - I. Tool and Storeroom.
 - J. Offices.
 - K. Toilet and Locker Rooms.
 - L. Oil House.
 - M. Water Tank.
 - N. Coal, Coke and Iron Storage.
 - O. Light, or Running Repair Shop.
- IX. TYPE OF SMOKE JACK FOR NATURAL VENTILATION:

- VI. MECHANICAL EQUIPMENT TO BE PROVIDED OUTSIDE THE SHOP:
- A. Transfer Table.
 - B. Water Conditioning Plant.
- VII. KINDS OF CONSTRUCTION:
(Same as given above for engine house)
- VIII. REPAIR FACILITIES TO BE PROVIDED:
- A. Heavy and Light Machine Shop.
 - B. Light Machine Shop Only.
 - C. Boiler Shop.
 - D. Truck Shop.
 - E. Blacksmith Shop.
 - F. Separate Boiler, Engine and Pump House.
 - G. Lye Vats.
 - H. Paint Shop.
 - I. Oil House.
 - J. Tool Room.
 - K. Storehouse.
 - L. Water Tank.
 - M. Pipe Tunnels.
 - N. Scrap Platform.
 - O. Ash Pit.
 - P. Coal Storage.
 - Q. Offices.
 - R. Toilet and Locker Rooms.
 - S. Coal, Coke and Iron Storage.
 - T. Reclamation Plant.
 - U. Foundry.

Schedule for the Design of a Modern Car Repair Shop

- I. CAPACITY OF HOUSE:
- A. Approximate number of cars for heavy repairs per day, at present.
 - B. Approximate number of cars for heavy repairs per day, ultimately.
 - C. Approximate number of cars for light or running repairs per day, at present.
 - D. Approximate number of cars for light or running repairs per day, ultimately.
 - E. Suggested number of tracks—for the present.
 - F. Suggested number of tracks for ultimate capacity.
 - G. Suggested number of pits for the present.
 - H. Suggested number of pits for ultimate capacity.
- II. TYPES OF BUILDINGS:
- A. Longitudinal House.
 - B. Transverse House.
- III. MECHANICAL EQUIPMENT TO BE PROVIDED INSIDE THE HOUSE:
- A. Electric Overhead Traveling Cranes.
 - B. Jacks for straightening steel car frames.
 - C. Heating Plant.
 - (a) Blower system with underground ducts.
 - (b) Blower system with overhead ducts.
 - (c) Integral fan blowing unit—steam heated.
 - (d) Integral fan blowing unit—direct fired.
 - (e) Direct radiation—not commonly used in modern terminal buildings.
 - F. Electric Lighting.
 - G. Sprinkler System.
- IV. MECHANICAL EQUIPMENT TO BE PROVIDED OUTSIDE THE HOUSE:
- A. Transfer Table.
- V. KINDS OF CONSTRUCTION:
(Same as given above for engine house)
- VI. REPAIR FACILITIES TO BE PROVIDED:
- A. Wooden Car Shop.
 - B. Steel Car Shop.
 - C. Riveting Shop.
 - D. Blacksmith Shop.
 - E. Wheel Shop.
 - F. Separate Boiler and Engine House.
 - G. Paint Shop.
 - H. Woodworking Platform.
 - I. Scrap Platform.
 - J. Miscellaneous Platforms.
 - K. Depressed Track.
 - L. Service Building.
 - M. Track Scale and Scale House.
 - N. Toilet and Locker Room.
 - O. Coal Storage.
 - P. Shop Yards.
 - Q. Light Car Repair Yard.

Schedule for the Design of a Modern

Locomotive Repair Shop

- I. CAPACITY OF PITS:
- A. Approximate number of Locomotives per day, at present.
 - B. Approximate number of Locomotives per day, ultimately.
 - C. Suggested number of pits for the present.
 - D. Suggested number of pits for ultimate capacity.
- II. TYPES OF BUILDINGS:
- A. Longitudinal.
 - B. Transverse.
- III. SPECIFY NUMBER, WIDTH AND ARRANGEMENT OF SECTIONS:
- IV. TYPE OF ROOF ARRANGEMENT:
- A. Flat Roof, with Monitor.
 - B. Sloping Roof with Monitor.
 - C. Aikens or Depressed Bay, Roof.
- V. MECHANICAL EQUIPMENT TO BE PROVIDED INSIDE THE SHOP:
- A. Electric Overhead Traveling Crane.
 - (a) Light crane runway—for handling locomotive parts.
 - (b) Heavy crane runway—for lifting locomotives.
 - B. Hoisting Jacks.
 - C. Heating Plant.
 - (a) Blower system with underground ducts.
 - (b) Blower system with overhead ducts.
 - (c) Integral fan blowing unit—steam heated.
 - (d) Integral fan blowing unit—direct fired.
 - (e) Direct radiation—not commonly used in modern terminal buildings.
 - D. Electric Lighting.
 - E. Plumbing.
 - F. Sprinkler System.

Schedule for the Design of a Modern

Separate Boiler and Engine House

- I. GENERAL CHARACTER OF PLANT:
- A. Plant consisting of boilers and engine room with steam driven electrical generators and motor-driven air compressors.
 - B. Plant consisting of boiler house and engine room with steam driven air compressors and electric power furnished from central station.
 - C. Plant consisting of boiler house only—where electric power is furnished from central station.
- NOTE: This type of plant is required when all electric power is generated at the terminal.
- II. LEVEL AND ELEVATED TYPES:
- (a) Boiler room floor at elevation of surrounding grade or ground line.
 - (b) Boiler room floor elevated so that ash hopper floor is at elevation of surrounding grade or ground line.

III. SPECIFY NUMBER, WIDTH AND ARRANGEMENT OF SECTIONS:

IV. DETERMINE TYPE OF ROOF ARRANGEMENT:

V. EQUIPMENT TO BE PROVIDED INSIDE THE BOILER HOUSE:

- A. Boiler Horsepower Required.
- B. Type of Boilers and Number of Units.
- C. Arrangement of Batteries.
- D. Type of Furnace.
 - (a) Mechanical stokers.
 - (b) Hand fired.
- E. Type of Natural Draft Stokers.
 - (a) Chain grade.
 - (b) Over-feed.
- F. Type of Forced-draft Stoker.
 - (a) Under-feed.
- G. Coal bunkers.
 - (a) Steel.
 - (b) Concrete.
- H. Type of Coal Conveyor.
- I. Ash Handling Equipment.

VI. EQUIPMENT TO BE PROVIDED INSIDE ENGINE HOUSE:

- A. Generator driven by reciprocating engine.
 - B. Generator driven by steam turbine.
 - NOTE: Specify characteristic of electric current.
 - C. Condensers.
 - D. Air Compressors.
 - (a) Steam driven.
 - (b) Motor driven.
- Note: Specify cubic feet of air required per minute.

VII. EQUIPMENT TO BE PROVIDED OUTSIDE BOILER HOUSE:

- A. Stack.
 - (a) Brick.
 - (b) Steel.
- B. Ash Loading Equipment.

VIII. KINDS OF CONSTRUCTION:

(Same as given above for engine house.)

SUBJECT: AUXILIARY BUILDINGS FOR MODERN RAILWAY TERMINALS

The arrangement and character of construction for auxiliaries for the modern railway terminal should be determined by the general decisions determined upon for the design of the principal buildings at the terminal.

For instance, if it has been determined to build a terminal at a certain location, the more tentative assumptions which can be made before the general proportions of the building are determined and the general layout of the terminal is drawn up, the more expeditiously can the designing work and estimating work be prosecuted. Certainly, you cannot make a general layout for a terminal without knowing what buildings you contemplate erecting there and approximately the size and character of the buildings.

For this reason, then, early decisions relative to the design and character of the buildings becomes paramount. Right here let us note that where there is a lack of such decisions being made by executives, there results improper designs, lost motion in general, increased cost of designing and estimating and other numerous difficulties. Where the executive himself does not make the decision, certain assumptions have to be made by his subordinates. These subordinates make their assumptions to the best of their ability, taking into consideration the information they have at hand. Naturally, they do not have access to the resources of the company to the same degree that is available to the executive.

Assuming this occurs and the designs approved, and the estimates prepared, it may then be realized that the design is not sufficiently economical to promote the best interests of the company. In such cases, a new design may be called for; in other cases, the building might have to be constructed and a fixed charge incurred which is not warranted by the resources and the policies of the company.

If the executive who is primarily responsible for the determination of the design and the construction which is to be used in the terminal buildings will use this, or a similar schedule, we believe this procedure will be found of value.

In preparing the schedule it has been borne in mind that such a list should cover the needs and requirements of small railroads as well as large railroads, and railroads whose resources and earning capacities are limited, as well as the railroads which have unlimited resources and a well sustained earning capacity due to location, affiliations, etc.

It of course goes without saying that the schedule after having been properly developed should be given to the parties responsible for the layout of the terminal and for the design of the terminal buildings, as well as for the complete estimate.

Wheel Burning Injures Rail

THE BUREAU OF SAFETY of the Interstate Commerce Commission has issued a report covering the investigation of a derailment of a Baltimore & Ohio passenger train at Glenwood, W. Va., on December 11, 1919, which was caused by the breaking of a rail which showed evidence of having been wheel burned. The train involved in the accident consisted of nine cars and was pulled by two engines. The accident happened at the station at Glenwood on the Kenova-Parkersburg line, while the train was traveling at a speed shown by a speed recorder to have been between 42 and 43 miles per hour. The track at this point was laid with 75-lb. rails supported on an average of 18 ties per 33-ft. rail.

This report is summarized as follows: The wheel burning of rails, in some degree, is a matter of common occurrence in many places in the track. Rails in this condition abound in yards, freight terminals, and in the vicinity of signal towers and stations. Few, if any, of these localities are free from examples of rails which are thus affected.

The derailment in question was due to the failure of a rail which broke at several places along its length, exhibiting incipient cracks in the head. Investigation by James E. Howard, engineer-physicist of the commission, showed these cracks to have had a thermal origin. That is, this was a wheel-burnt rail, although its appearance in the track was not suggestive of such action having taken place. There was a series of fine crosswise cracks visible on the running surface of the head near the gage side, but the usual evidence of wheel burning, a roughened, abraded surface, was not shown.

Sections of the rail were pickled in hot hydrochloric acid. This exposure and the microscopic examination conducted each revealed the effects of wheel burning. The rail had been exposed superficially to a high temperature and hardening had resulted therefrom. Incipient cracks were developed in the thin layer of hardened steel, some of which had penetrated the normal metal of the rail. These incipient cracks greatly weakened the rail and led to its premature failure. This type of wheel burning is one of peculiar danger.

The series of short crosswise cracks was not conspicuously shown. They were noticeable, however, because they did not present the usual characteristics of flow of metal under wheel pressures. Their full significance now appears in the results of the investigation of the rail. They stand as warning indications of the seriousness of their presence.

In cases of wheel burning, profound changes take place in the structural state of the steel, changes which take place within extremely narrow limits. Rapid transition from one phase to another so narrowly confined may in itself intensify the internal destructive forces. Special tests were made to illustrate the phases in detail which the hardened zones experience, the results of which are embodied herein. The destructive influences which prevail are clearly shown, and they constitute elements of danger in the track.

The prevention of wheel burning in its entirety presents great practical difficulties. Efforts should be directed toward minimizing these destructive influences. The presence of incipient cracks as they were displayed by this rail is evidence of impaired strength and constitutes a warning signal that a dangerous state has been reached.

ACCORDING TO A RECENT ARTICLE in the Gazette (Montreal), a movement is on foot in Canada for the establishment of a corporation for the financing of foreign trade similar to organizations in the United States under the Edge law. The proposed corporation would have a capitalization of \$25,000,000, its resources to be derived principally from the sale of debentures to the amount of four times its capital.

Preventing Thieving and Pilfering on the Railroads

Organized Efforts Necessary to Combat Effectively This Heavy Drain on Revenues

By Alexander S. Lyman

General Attorney, New York Central, New York City

THE WAVE OF MORAL DEGENERACY which has swept over the world in the wake of the great war, finds an all too familiar expression in crimes against property, notably in the perpetration of frauds, thefts and robberies. The condition is a general one, but the railroads have felt it with peculiar force. A large proportion of the property taken from their custody is difficult of identification, or its markings can be destroyed. In consequence nearly all of it is susceptible of ready sale at good prices.

The wage-earning classes on railroads, as elsewhere, have been selected especially as the target for bolshevist teachings under one or another guise. Much of this propaganda has as its primary object the inculcating of a contempt for the institution of private property and for the right of individuals to possess private property. These surreptitious teachings have been effective with many in the ranks of wage-earners with the result that, if not actually dishonest themselves, many railroad employees are indifferent to the depredations and frauds of others.

Another influence stimulating crime is the reluctance of judges exercising criminal jurisdiction, to impose substantial sentences upon persons convicted before them of theft. This may be due in some instances to the belief on the part of many judges that our penal institutions are merely schools for crime and moral profligacy, and that to send a young man to one of these institutions is simply to assign him forever to the ranks of the criminal classes. Again, it may happen that the judges are persuaded to leniency by political or personal influence. Too often corruption is found among members of the railroad police forces themselves, and all too frequently thefts are committed in collusion with railroad police, the local municipal police and railroad employees. Many wholesale robberies have been perpetrated under circumstances indicating a detailed conspiracy between railroad employees who are in a position to know of the arrival of large and valuable shipments at a given terminal, and well organized gangs of thieves. Last but among the most important of the malefactors, are the receivers of stolen property, men of large means who stand behind the thieves, maintain elaborate machinery for spiriting away and disposing of stolen property, and who supply any amount of unimpeachable bail when the thieves are arrested. These men even provide the services of experienced criminal lawyers.

It frequently happens, too, that the railroads or the shippers are victimized by frauds practiced on or by shipping and delivery clerks, or arising from the careless or inefficient performance of their duties.

While pilfering, or thievery on a petty scale, has been prevalent for many years and perhaps will never be wholly suppressed, the present losses are so appalling that the carriers must realize that a new situation has arisen, presenting new problems which cannot be solved satisfactorily by merely pursuing the old lines of defense. When the freight loss and damage account presents an aggregate which may mean the difference between a thin or a fat dividend on the capital stock, the managements must realize that they are confronted with one of the most serious problems in modern railroading.

Properly detailed statistics compiled by the freight claim

department should show where the weak spots are, that is, where the greatest number and the most serious depredations occur. It will be found that these are the larger cities where there are numerous railroad terminals. Experience has shown that if a particular carrier in one of these centers has an unusually effective police department, and especially if it has provided itself with criminal counsel of energy and experience in aiding the prosecution and conviction of those caught stealing property in its custody, this carrier will have comparative immunity, while the thieves concentrate their efforts on other less well fortified roads.

The obvious method of reaching this situation is through a joint criminal law bureau. This has been tried and is being employed successfully at the present time in St. Louis and in New York City. At the head of such a bureau is placed a lawyer of long criminal experience who is not only thoroughly familiar with criminal procedure from the prosecuting point of view, but who also has extensive acquaintance with the judges who sit in criminal cases and with the prosecuting officers. His qualifications for dealing successfully with thieves will be much enhanced if he also possesses means of securing reliable information from the underworld. The salary and expenses, and the hire of necessary assistants for this lawyer are supplied by the carriers whose lines terminate in a given city, and the proportionate contributions may be readily placed upon an equitable basis. Each carrier, although a party to this agreement, retains the organization and control of its own police force. Each police chief is, however, required to report at once every serious depredation and frequently minor cases, the prosecution of which will have a wholesome effect, to the criminal counsel, who takes immediate personal charge of the more important cases, securing statements and directing investigations. In most instances the thefts are of property transported in interstate commerce so that jurisdiction is conferred upon the Federal courts. One great advantage Federal courts possess over the State courts is that the jurisdiction of the former extends over the entire country so that the attendance of witnesses from remote points can be compelled. On the other hand, the fact that the goods stolen were in interstate transit must be established in order to hold jurisdiction, and this line of proof under the decisions, is frequently of a very technical nature. It follows, therefore, that the accumulation of the necessary proof can usually be secured successfully at the outset only under the guidance of an experienced criminal lawyer. Too frequently the police departments of the carriers, if they attempt to work out this investigation by themselves, fail in some technical but essential particular. Under the guidance of criminal law experts, members of the railway police force show a much greater intelligence and efficiency in handling criminal work in all its stages, and they avoid the errors which otherwise often result in the escape of guilty parties.

The measures described above, effective as they are in coping with ordinary situations, must be added to in handling the present problem. A department of surveillance, organized and conducted by a high type of executive is called for. The chief of this department should report only to the head of the corporation and should have under his charge three co-

ordinating branches, each under a separate command, as follows: (1) A bureau of efficiency, having to do with (a) the selection of men entering the employ of the company, on the score of their previous record for probity, (b) the caliber, habits and conduct of conductors, and of receiving and delivery clerks, (c) the method of receipting for, tallying and checking freight, and the notification of its arrival and delivery to the consignee; (2) a bureau of patrol to guard freight at terminals and in transit, and (3) a detective bureau to investigate and collect evidence against thieves and receivers, and to recover stolen property.

With this type of organization for each carrier, and with means adopted for exchanging information in the larger centers of traffic and for co-operation through joint criminal counsel in the prosecution of frauds and thefts, there would be a reasonable expectation of coping successfully with the problem. The average railroad police department of the present day (with some praiseworthy exceptions) is obsolete and inadequate in personnel, organization, scope and methods.

Roads Continue Wage Reduction Conferences

MANY ROADS are continuing the conferences with employees regarding the matter of wage reductions, although there are few evidences in any quarter that any considerable number of the men are going to accept decreased wages without a decision to that effect by the Labor Board. Several companies, including the New York Central and the St. Louis-Southwestern, have already laid their cases before the board and many other companies will probably follow their example.

The Delaware, Lackawanna & Western will hold conferences on April 5 with certain classes of its skilled labor in the endeavor to come to an agreement regarding wage reductions. The unskilled labor on this road has refused to accept the wage reductions proposed, and the matter will be laid before the Labor Board on April 4.

The management of the Gulf Coast Lines has held conferences with representatives of its unskilled labor and proposed new wage rates ranging from 20 to 25 cents an hour on a 10-hour day basis. The employees did not agree to accept these reductions and the question will be referred to the Labor Board for decision.

Application by certain organized employees for an injunction to prevent four subsidiary companies of the New York Central from reducing wages on April 1 which was filed in Columbus, Ohio, was withdrawn when the company's attorney announced that, pending the Labor Board's decision, the present rates would continue in effect.

The Central of New Jersey held conferences with its unskilled workers on March 24 and with certain classes of skilled employees on March 25. The attitude of the employees was that, while they admitted the necessity of certain reductions in wages, at the same time they were not disposed to accept a decrease unless it was passed upon by the Labor Board. The company is, accordingly, planning to file its petition to that body at an early date.

The Lehigh Valley, following unsuccessful attempts to secure the agreement of their unskilled employees to reductions in rates, has laid the matter before the Labor Board.

As was noted in the *Railway Age* of last week many other roads, including the Pennsylvania, the Philadelphia & Reading, the Erie, the New York, New Haven & Hartford, the Nashville, Chattanooga & St. Louis, and the Central of Georgia are also seeking reductions in the wages of various classes of their employees.

The conferences with the marine workers in New York harbor are being continued but no definite general settlement has as yet been reached.

Court Denies Labor Board's

Jurisdiction in A. B. & A. Case

Judge Samuel H. Sibley in an oral opinion March 25 denied the petition of former employees of the Atlanta, Birmingham & Atlantic, now on a strike, that the receiver be required to take the question of wages to the Labor Board in Chicago. He stated that in some cases the Labor Board might be a better judge of questions of wages than a court would be, but in a case involving, as this case does, the proposition that the wages fixed by the said Labor Board are so high that the railroad cannot pay them and continue to function, the question becomes a judicial one, and therefore entirely proper for the court to decide.

As to the rights of the former employees under the Newlands Act, Judge Sibley held that the Newlands Act was constitutional and affected the court's powers with reference to wages, and that the court ought not to reduce wages of men to whom the act applied without giving them a hearing after 20 days' notice, and that the act applied as he saw it now, only to engineers and train crews.

B. L. Bugg, receiver of the company, announced on March 26 that pursuant to the court's order of the day previous the train and engine men would be paid at the old wage rate for the five days they worked after the reduction order was put into effect.

The striking employees withdrew from the wage hearing before Judge Sibley on March 26 when he ruled that the receiver should not discharge 900 men taken on to replace the strikers. Earlier in the session the counsel for the railroad declined to consider a proposal of the employees that they return to work immediately accepting the wage reductions, provided that they be allowed to return to work in a body at their former status and provided that the court should appoint auditors to examine the company's books to ascertain whether or not it was able to pay wages on the old basis.

Regional Boards Question Referred

to Roads in Each Region

On March 24 the standing committee of the Association of Railway Executives heard the report of the conferences which T. DeWitt Cuyler, chairman of the Association, held with the leaders of the train and engine service brotherhoods relative to the question of the advisability of establishing regional boards of adjustment. The committee decided that the question should be submitted to conferences of the individual roads in each region. Accordingly the following men were chosen to arrange for conferences of the railroads in each territory: L. F. Loree, president of the Delaware & Hudson, for eastern territory; W. R. Cole, president of the Nashville, Chattanooga & St. Louis, for southeastern territory; S. M. Felton, president of the Chicago Great Western, for western territory; B. F. Bush, president of the Missouri Pacific, for southwestern territory.

A Boom is well under way in Mexico. Care, however, must be taken that it does not degenerate into a "crazy" one. The revolution gave Mexico a considerable amount of free—but costly, to speak in paradox—advertising; now that peace has come, every office boy in the United States "knows all about Mexico." The greater part of the "all" is in many respects grotesque. The average American's ignorance of the real Mexico is sublime. The prevailing idea in these United States at the present moment is that one has only to go to Mexico to pick up a fortune; the popular mind must be disabused of this notion if real progress is to be made in the development of the natural resources with which nature has endowed our sister nation.—*N. Y. Commercial*.



Sao Paulo Railway—New Line at Right—Old Line at Left

Brazil as a Market for American Railway Supplies

Thirty Per Cent of Country's Lines Are British—Opportunities Are with State-owned Railways

By John P. Risque

SOME INDICATION of the extent of British railway operations in Brazil was given in the preceding article of this series in which the Sao Paulo Railway was described. Just as English, however, as that road, which has been called the richest railway in Brazil, is the country's longest line, the Leopoldina, which operates approximately 1,800 miles of meter gage line. This road runs from Nictheroy, across the bay from Rio de Janeiro, to Friburgo, Campos, Victoria, Leopoldina and other points in the states of Minas

be found in the Brazil Northeastern Railway, a 470 mile line, also of meter gage, which runs from the seacoast town of Fortaleza inland through the state of Ceara. It has 41 locomotives, 41 passenger cars and 285 freight cars. The state of Ceara is about the size of Illinois and has a million inhabitants. This railway is one of those which have been leased by the government to private operators and is said to be due to revert to the government in 1970, but, by terms not unfavorable to the operating company, can be returned in 1940.

The fourth British enterprise in the Brazilian railway field is the line with a very pretentious name but a diminutive mileage—the Brazil Great Southern—a meter gage road but 185 miles in length. This railway, which is owned by the Brazilian government, is leased to English operators and runs from a town called Quarahim on the Uruguayan border to another town called Itaquí, on the Argentine border, and forms a connecting link between the northwestern line of Uruguay and the Paraguay Central in that republic, both of which are owned and operated by Britons.

The British railway operations in Brazil reaches some 4,000 miles of line, or 30 per cent of the country's total mileage. It is now proposed to consider for the moment some Brazilian roads which are outside of the English "buy-at-home-at-any-price" sphere of influence. There are some railways and projected lines in the country which are now, to a certain extent, patrons of our mills and factories, and which, under the gradual but unmistakable extension of control and operation by a government which is known to be friendly to us, will, it is hoped, in due time, become "steady customers" of our railway supply interests. Before attempting to set down some statements referring to the relative locations, sizes, manner of operation and other characteristics of the country's non-British railways, a few words are introduced here on Brazil in general—and the Brazilian in particular—in the hope that those who expect to cultivate the somewhat extensive field which that country's railway possibilities will eventually offer us, will profit thereby.

The first thing which an uninitiated American should do in a plan for the cultivation of the South American railway



One of the Sao Paulo's Pacifics

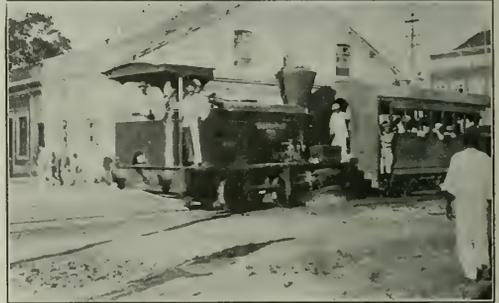
Geraes, Rio de Janeiro and Espirito Santo. Its route follows the Paranyha river for some distance and then strikes out across a series of mountain ranges involving very heavy grades. This company has 220 locomotives, 278 passenger cars and 2,350 freight cars.

There is another British railway of considerable importance in Brazil, the Great Western of Brazil, the zone of influence of which radiates from the Port of Pernambuco, located in the northern part of the state of that name between the parallels of latitude 5 and 10 south. This road traverses the states of Pernambuco, Alagoas, Paranyha and Rio Grande do Norte. Its mileage is roughly 1,000, the gage is one meter and it has 160 locomotives, 255 passenger cars and 2,200 freight cars. Further British railway interests are to

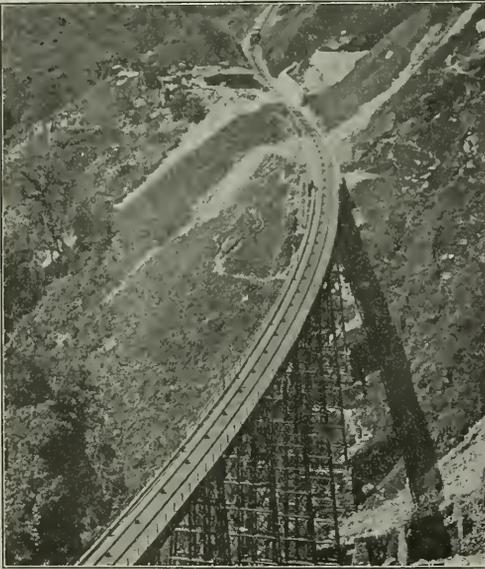
supply market is to correct the almost universal impression which he may entertain that South America is merely South America instead of, as it is, a number of distinct countries. The belief that that continent is inhabited simply by South Americans, and not by Brazilians, Peruvians, Chileans, etc., does not, for business reasons, reflect to the advantage of the would-be exporter to those fields. A thorough familiarity with the geography of South America is a paramount requisite to success. After such familiarity is attained, the intending trader can be figuratively said to have learned to crawl. Learning to walk involves a knowledge of the numerous fundamentals included in whole libraries which have been written on the subject of "trading with Latin America," the sole intent of which is to save money and time for Americans who wish to develop this trade which they, in comparison to their European—and particularly their British—competitors, know relatively little about.

South America should be thought of in the sense of its respective countries and considered as Spanish America and Portuguese America. Brazil is Portuguese America and has nearly half of the area of the whole continent, representing a single country as large as continental United States, the British Isles, the Netherlands, Belgium, Portugal and Switzerland, all combined—a fact which is not generally appreciated. The word "immense" is not misused in referring to

languages of those lands are *Spanish* and *Portuguese*. It is quite as reasonable to go to Chile or Peru and expect to do business successfully in Portuguese as it is to tackle Brazil with Spanish propaganda either written or spoken. The inhabitants of neither of these two great divisions will acknowledge the superiority of the official language of the other. On the contrary, each will strenuously maintain, in a friendly manner, that their's is the original tongue and that the other is merely a dialect. The lack of comprehension of this important subject, particularly in its reference to Brazil, constitutes the rock upon which has been wrecked many an otherwise worthy effort on the part of American merchants to introduce goods in the latter country. Any doubt as to the damaging effects of trying to win the



A Street Railway in Pernambuco



Gruta Funda Trestle on the Old Line of the Sao Paulo

this, the largest South American republic, with its 3,292,000 square miles of territory and a population of 24,000,000.

Along with other considerations comes language, the average American's ignorance of which is not making him popular in those countries where its knowledge would give him an insight into the thoughts of the people which he can get in no other way. It is generally believed by a majority of Americans that the language of South America is Spanish and they let it go at that. *Spanish America* on that continent speaks *Spanish*; *Portuguese America—Brazil*—speaks the language of its founders, *Portuguese*, and nothing else. In both of these divisions, both English and French are spoken and understood, but for all practical purposes the

Brazilian with Spanish literature will be easily allayed by a talk with any of the American representatives of the Department of Commerce in the respective cities in which they are located. Although the Spanish descendant can read Portuguese (and will read it in a pinch if the information is unavailable through any other means), and the Brazilian can likewise read Spanish (and will decline to do so in a majority of cases), both will prefer to read advertising in English rather than in the neighboring tongue.

The Brazilian gentleman, who upon opening his mail drew forth three letters in Spanish from inspired but wholly ignorant correspondents of business houses in the "States" and dumped them into the waste basket unread, voiced the sentiment of Brazil's entire business community when he expressed the fervid wish that progressive America would "wake up" to the fact that the language of his country was not Spanish, but *Portuguese*. Fortunately, due to the educating influence of many publications devoted to the interests of American export trade, the truth is gradually spreading. Consideration of the Brazilian likewise involves a study of his history and his habits today. Unlike the case of many of his neighbors, his projects are his own. He points with pride to the fact that big enterprises in his country are, in a majority of cases, operated with Brazilian capital and by Brazilian people. In this connection, he is especially proud of the fact that most of the railways are not an exception to the rule and he hopes that, in due course of time, the movement to nationalize the lines will result in success.

To the intending cultivator of the Brazilian railway supply market it may be mentioned in passing that both the Baldwin Locomotive Works and the American Locomotive Company maintain branch offices in the city of Rio de Janeiro under the direction of men, who, in our vernacular, "know the ropes" in regard to the railroad trade in those parts. Their knowledge of the possibilities of the field from an American point of view is worth having and their advice, along the lines of approaching the prospects, will follow

in some degree the tenor of the discussion written above. Their information and admonishments will, if mixed in a proper degree with the opinions and advice of Brazilians who know, provide the newcomer with an asset of worth.

Although Brazil, to use familiar terms, is "three times as big" as Argentina and has three times as many people as the latter, it has only three-fourths the railway mileage of her well-developed neighbor. This inviting comparison, when considered in connection with the friendly attitude of Brazil's government toward America and things American, constitutes a reasonable basis for hope and an inspiration for the future, *commencing now*.

A table of 27 Brazilian railways sets their combined 1915 mileages at 13,340—approximate figures and close enough for the purposes of this article. Among them, they are reported as owning 1,350 locomotives, 2,370 passenger cars and 21,500 freight cars. Deducting the combined mileages of the five British railway enterprises mentioned previously as about 4,000 and their 536 locomotives, 700 passenger cars and 8,216 freight cars, there remains that in which the American manufacturer of railroad machinery and supplies of all kinds is most interested and which might be called, for reasons due to the economic situation resulting from the war, a temporary American market. Just how permanent that market can be made is a matter of American determination, plus an inclination to study carefully the rules of the game, plus the use of common sense in their application, tempered with a knowledge of the psychology of the situation. It sounds like a lot of precautions, but the observance of these little details put tiny Belgium at the head of the list of shippers of railway materials to Brazil in the year 1912. The war's effects upon the situation resulting in America's opportunity in this direction, is ably illustrated by the following comparative table of the railway supply imports for Brazil, by countries of origin, for the years 1912, 1915 and 1916, expressed in American dollars.

Country of origin	1912	1915	1916
Belgium	\$8,025,991		
United States	6,106,622	\$745,784	\$1,793,360
Germany	3,509,863	17,730	
England	2,546,000	427,159	284,056
France	2,265,453	1,154	1,020

The significance of these figures is hard to grasp. The total of the first column represents a business in the shipment of railway supplies for one year (1912), contributed to by five nations, of \$22,444,731. As England is still in the game, and more active now than ever in her determination to maintain her world trade, quite an admirable resolution to be sure, it might be just as well to subtract that country's quota of \$2,546,000, which may have gone to her own national roads in that country, leaving a balance, in round numbers, of a business of \$20,000,000. This deduction is advised in spite of the table's showing a decline of Britain's share from over \$2,000,000 to a little over \$200,000, for it will be well to bear in mind, as stated before, that England, in spite of the damage suffered in the war, is still in the game. Just how well she is doing, in spite of the contentions of those who would have us believe that she is out of the railroad supply business and that we are going "to get it all" simply because we are not so badly "crippled" as she is supposed to be, is indicated by some highly interesting figures from the British Board of Trade. They show that in the months of January and February, 1919, Great Britain exported \$3,134,357 worth of railroad supplies. In the corresponding months of 1920, in a short space of a year, the value of those same exports reached a sum of \$16,328,369—a little matter of only 429 per cent increase.

Great Britain, therefore, is America's competitor in the market of Brazil and, for that matter, in all of the markets of South America, and it is for those reasons exceedingly logical in discussing the possibilities that those markets are

said to offer, to deduct the British owned lines and give the intending exporter the benefit of the doubt. If, as frequently happens, a good size order from a British owned railway accidentally, or for some unknown reason, falls to an American concern, all right; we are not ungrateful and will try to please in the hope that we will again be favored. However, in this respect, the Brazilian government's increasing influence in the management of all railways and its lively interest in economy creating devices offered by American manufacturers encourages, at least, a hope for business on even the English owned lines, although this qualification cannot be taken as a guaranty of rewards for efforts spent in that direction.

New Issue of Great Northern-Northern Pacific Bonds Proposed

WASHINGTON, D. C.

A NEW PLAN for refunding the \$215,227,000 of joint 4 per cent bonds secured by a pledge of the stock of the Chicago, Burlington & Quincy, which mature on July 1, was filed with the Interstate Commerce Commission on March 25 by the Great Northern and the Northern Pacific. The new plan, for which the authority of the commission is asked, provides for the issuance of \$230,000,000 of 15-year 6½ per cent joint convertible gold bonds secured by the pledge of the Burlington stock, of which with the increase of \$60,000,000 recently authorized by the commission, the two roads now own 1,658,674 shares, plus \$33,000,000 of 6 per cent bonds of the Northern Pacific and \$33,000,000 of 7 per cent bonds of the Great Northern. The joint bonds are to be callable in whole or in amounts of not less than \$5,000,000 on 75 days' notice at 103 per cent and convertible into bonds of either or both the Northern Pacific and Great Northern under provisions which the application says it is believed will insure the early substitution of mortgage bonds and a gradual division of the Burlington stock which would thus be released. This would provide for a separation of the joint control of the Burlington.

This plan, which has been carefully considered by the officers of the roads after conference with the commission and with bankers, is proposed as a substitute for the earlier plan which could not be carried out because the commission by a five to four decision refused to authorize the issuance of \$80,000,000 of bonds by the Burlington against its surplus, the proceeds to be used to retire a part of the joint bonds at maturity and thus reduce the amount to be refunded.

The joint application asks approval of a joint trust indenture to be dated on or before July 1, 1921, to be executed by both applicants to the First National Bank of New York as trustee, and of the issue of the \$230,000,000 joint bonds on or before July 1. Approval is also asked of the pledge as collateral under the indenture of the 1,658,674 shares of Burlington stock owned by the applicants and now subject to prior pledge under the indenture securing the outstanding joint fours; also the issue and pledge as collateral of \$33,000,000 of refunding and improvement mortgage 6 per cent bonds, series B, of the Northern Pacific due July 1, 2047, callable after 15 years or any interest date on three months' notice, at 110 per cent; also the issue and pledge as collateral of \$33,000,000 of general mortgage 7 per cent bonds, series A, of the Great Northern, due July 1, 1936, non-callable. Approval is also asked of a general gold mortgage of the Great Northern, dated January 1, 1921, to the First National Bank of New York as trustee, providing for an authorized issue of \$140,000,000 of general mortgage 7 per cent gold bonds. Approval is also asked of the issue by each applicant under its mortgage, in event either of payment of joint bonds or their conversion into mortgage bonds, of mort-

gage bonds against deposit and pledge of Burlington stock.

It is proposed to issue and sell the new joint bonds on or before July 1, through a contract to be made with a syndicate of bankers upon the syndicate undertaking to provide the money which will then be required to pay the outstanding 4 per cent bonds, but no such contract is expected to be made until approved by the commission.

The outstanding joint bonds are said to be held by more than 18,500 holders. Applicants have no available funds with which to make a substantial payment on the bonds but they are advised by bankers and believe that, being unable to have recourse to the plan previously presented to the commission, the best and only sure method of raising on July 1 the necessary funds is the proposed issue of convertible bonds. The application says that collateral trust bonds secured on stock alone as collateral are no longer legal investments for insurance companies under the laws of New York, nor will they be purchased by insurance companies, savings banks, trust companies or similar financial institutions or trustees. It is, therefore, necessary, in order to reach this market, to offer, either directly or indirectly through conversion, securities which will be legal investments under the insurance laws and for savings banks and trustees.

The commission has sent notice of the filing of the application to the governors of the States through which the roads operate and has assigned the application for hearing before the commission at Washington on April 11.

Results of Railroad Electrification*

By C. C. Whittaker

Railway Engineering Department,
Westinghouse Electric & Manufacturing Co.

STEAM RAILROADS are studying the problems of electrification. Now and then some road, pressed a little harder than the others for increased road, tunnel or terminal capacity, or for lower operation costs, arrives at the solution which is the answer to its own particular requirements. That these solutions have been justified is evidenced by many statistical testimonials from these electrified roads.

Studies on the substitution of the electric locomotive for steam motive power on various railroads have indicated that the resulting operating economies are sufficient, not only to carry the charges on the capital investment, but in addition that the flexibility of this type of power permits a greater volume of traffic to be handled over the existing trackage, and thereby obviates additional capital expenditures for increased trackage required with steam operation.

Very often, where certain sections of a railroad have about reached their limit of tonnage with steam operation, it has been found that electrification would enable them to care for a 75 per cent increase in tonnage over the same trackage, and that the capital expenditure for electrification would be less than for the additional trackage and facilities to handle this same increase in business with steam motive power.

In case of electrification, in most cases, operating economies care for fixed charges on this increased capitalization.

Capital expenditure for electrification of terminals has been justified solely by the fact that electric operation afforded the only means of enlarging the traffic facilities. One dead-end terminal in the center of one of our large cities handled a large number of suburban trains. The operation of steam motive power necessitated considerable switching movement in order to remove each arriving train and make it up for departure. Business had increased to that point where it was impossible to take care of the increasing

traffic by the introduction of more trains. The physical location was such that it was impossible to increase the trackage facilities at any price. Electrification with the introduction of multiple unit car trains practically eliminated switching and making up of trains, and increased the capacity of the terminal 50 per cent. The cost of electrification was \$3,000,000, and increased earnings cared for the charges.

Another of the principal electrifications on a heavy tonnage coal-carrying road was undertaken primarily to increase the facilities of their present trackage. This section amounting to about 30 route miles of grade and 100 miles of trackage was the limiting factor in their operation, as it represented the congested section of the system. The study of electric operation indicated that the tonnage capacity of this trackage could be doubled with electric motive power, and that the saving on the difference in investment for electrification, and that necessary for additional steam equipment, was a very attractive figure. As a matter of fact, the traffic on this road after electrification did double, and the figures given in the report were justified. These figures are as follows:

	Electric Operation	Steam Operation
Gross investment	\$2,939,000	\$1,090,000
Net investment	1,849,000	.....
Operating expense	500,760	925,165
Saving in operation .....	.....	\$424,385
Return on gross investment .....	.....	14.45 per cent
Return on net investment .....	.....	23.2 per cent

In this tabulation the savings were largely effected by reduced maintenance and overtime crew expense. The cost of generated power was practically the same as for the steam locomotive, due to the fact that the location was in the coal mine district, and coal was cheap.

Studies in other localities where coal is scarce and expensive, and where power is developed by hydraulic plants, show economy in operation due largely to the saving made in the cost of power. This is indicated by the results of a study of a single-track western railroad of this type, where congestion was not involved, and the general method of operation with electric power is quite similar to that of steam. The section represented 133 route miles of single track, and the following tabulation is made on the bases of providing for a 40 per cent increase in business.

	Electric Operation	Steam Operation
Gross investment	\$12,561,000	\$3,599,260
Net investment	8,961,740	.....
Operating expense	3,826,381	5,530,217
Saving in operation .....	.....	\$1,703,836
Return on gross investment .....	.....	13.6 per cent
Return on net investment .....	.....	19 per cent

In considering steam railroad electrification, we must not look for any sudden conversion from steam propulsion to electric. From the date of the first steam engine to the present time, there appears a long succession of improvements and perfection of detail so that at no time, or certainly not at the present day, is one justified in saying that there is nothing more to expect from this system of railroading.

The development of the steam locomotive has been typical of the development of other mechanical necessities, the first efforts demonstrating little more than principles involved. From the first wood burners of a few thousand pounds weight up to the up-to-date Mallet, fitted with mechanical stokers, superheaters and all auxiliaries, weighing several hundred tons, we get some idea of the progress made.

Coincident with locomotive development, other developments essential to the use of improved locomotives, either steam or electric, such as roadbed, rolling stock, signal service, etc., have kept pace with each other.

At the present time, when more and more is required of the railroads in the way of increasing their carrying capacity and expediting their movements, in order to meet the near future demands on most railroads, there is but one economical answer, and that is to electrify.

*Abstract of an address delivered before the Providence Engineering Society, March 15, 1921.

Further Methods of Increasing the Car Load

Contributors to the Contest on This Subject Suggest Various Methods for Obtaining Improvement

THIS IS THE THIRD of a series of articles on the subject of increased car loading which were submitted by representatives of the railways and the shippers in the contest on this subject. The prize winning papers and three others were published in the *Railway Age* of January 28 and six other papers appeared in the issue of February 11. In this issue nine contributors present a variety of suggestions designed to aid both the shipper and the carrier to increase the average loading of the cars to their mutual benefit.

The Solution Is in a Graduated Freight Rate

By M. Nicholson

General Manager, Chicago, Milwaukee & St. Paul, Seattle, Wash.

The benefits derived from increasing the average load per car in excess of traffic minimum or commercial trade units during times of car shortages, are overwhelmingly in favor of both the shipper and receiver of freight, which the shippers generally do not appreciate. The railroad benefits to a considerable extent, but the shipper's advantage is so apparent that there should be a concentrated effort on the part of shippers to sell and have moved the largest unit that any freight cars will carry.

Continued efforts put forth by the War Board, prior to government operation of railroads, the Food Administration during government control and the railway officers at all times increased the average load per car from 10 to 15 per cent. Shippers were appealed to from a patriotic standpoint and a satisfactory response resulted. Following the close of the war, the old trade units were in most cases re-established and based on published tariff minimums which were established when the average capacity of freight cars was between 40,000 and 50,000 lb. The shippers generally took the position that carload trading was on the basis of so many dollars per car for the commodities rather than so many pounds for a car.

Having followed the subject of heavier car loading for the past four years and as a member of the original commission on car service, having fathered the heavier car loading under the original War Board, the writer feels justified in making the statement that the freight rate will alone govern the quantity of any commodity shipped in a freight car. The method which will produce the results required is similar to our commercial system of trading. Smaller quantities are sold at a higher price to cover the increased handling cost. A purchase from a retail store is necessarily at a higher price than the wholesaler demands from the retail merchant. The wholesale firm purchases in larger quantities and gets a lower price from the jobber or manufacturer. The difference in price of the article is influenced by the quantity involved in each transaction. The same system applies to transportation and is recognized by one rate established for l.c.l. shipments and another rate much lower in most cases, established for c.l. shipments, the distinction being made on account of the relative difference in handling cost.

It would not be contrary to past or present principles to differentiate between quantities shipped in carload lots. Assuming that the present rates can be used as a basis, they could be applied to the maximum carrying capacity of the car furnished to a shipper for loading. This maximum carrying capacity being based on structural strength or cubic capacity. Then graduate the rates upward where full capacity of equipment furnished is not used. As an

example, an 80,000-lb. capacity car fully loaded with any commodity would take the present rate. The same car loaded with 60,000 lb. would take a 10 per cent increase in rate and the same car loaded with 40,000 lb. would take a 20 per cent increase. This plan is in conformity to the rules of trade and would offer to the shippers present rates for wholesale transactions and require the payment of a slightly increased rate for a retail transaction.

Stimulate in the Interest of the Employees and the Public

By A. P. Brown

Secretary to Superintendent, Southern Pacific, Tucson, Ariz.

Due to competition and the desire to give service, most railroads lose in l.c.l., or package freight loading. However, this loss could be overcome to a certain extent by a revision in the shipping day schedules for package freight where the service required will permit. This would not necessarily result in a decrease in the efficiency the carriers render the public, but would, in a great many instances, benefit the service and increase the carload. Only where this result could be obtained should a change be made.

Much car capacity can be saved in the loading of railroad company material by establishing days for company material shipments, stopping such cars enroute to have the load filled out with other company material which is to move in the direction the car is moving. To do this requisitions should be placed and filled to conform to the loading schedule, in order that the full car load may be secured.

In order to create keener interest in a campaign of this nature, it is at times well to offer nominal prizes to agents for the best commodity loading, giving due consideration to the business offered in different sections, and make the contest of such a nature that competition for the prizes would be universal on the railway system offering them. Interest would have to be stimulated from time to time by means best suited to the campaign; comparative statements, circular letters, or other forms of publicity.

However, to obtain the maximum results the public is the most important factor in the campaign. To attain the goal desired in car loading it is necessary to solicit and receive its co-operation. An educational campaign could be conducted to increase the load per freight car. In addition, the shippers could be solicited directly by means of attaching posters to freight bills, typing or printing phrases about car loading in conspicuous places on stationery, etc. Without the public's aid our campaign would be a failure.

Raise the Carload Minimum

By C. H. Bristol

Assistant General Manager, Atchison, Topeka & Santa Fe, La Junta, Colo.

During the past two years the Santa Fe has conducted a vigorous campaign in the direction of heavier loading, the matter being watched very closely by all concerned from the general managers, superintendent of transportation, car accountants down to the agents. We have always required daily reports from agents showing in itemized form the cars loaded, commodity capacity of car, weight of load, etc.; these reports are checked by the superintendents and assistant

general managers and any cases of light loading noted are handled at once with shippers through the agents or by a personal call from the superintendent or other representative of the railway. A consolidated report is rendered each month showing the average loading by commodity. It is the practice to take up individual cases where it would seem that the loading might be increased, and it has been found the majority of shippers are willing to co-operate to the best of their ability in this direction.

In a campaign of this kind the result to be obtained must necessarily depend to a large extent, if not entirely, on the shipper; and it goes even farther, involving the jobber and commission man or large dealer who buys in carload lots. These people appreciate the importance of maximum loading and realize the benefit of making one car do the work of two. They are, however, frequently handicapped by the buyers, who, for various reasons, hold their orders down to the carload minimum as set forth in the tariff. This seems to be especially true right at this time, as the merchants and others are buying only what they have to. For this reason it will be necessary that the revision of such carload minimums be given immediate attention if we wish to get the maximum out of our equipment.

Effective Crating Is Important

By N. A. Ryan

Trainmaster, Chicago, Milwaukee & St. Paul, Milwaukee, Wis.

To gain the mark of 30 tons per car as an average load will require a great deal of careful thought and hard work on the part of railroad officers and employees. So much can be accomplished in a small way along these lines—for instance, if each shipper would increase his loading even 100 lb. per car, many additional cars would result. This is merely an illustration of how easy it is to accomplish something along these lines.

An enormous amount of space is wasted in a great many cars and the best way to increase loading quickly and generally is to maintain high minimums in our several classifications on commodities that will stand it.

The proposition of economical and efficient crating and packing of products is a large study in itself for any concern and if the packing is efficiently done much space is saved. The use of awkward and odd shaped packages should be avoided wherever possible.

We do not give enough thought or time to the instruction of our district clerks in large terminals. These men can do more toward increasing loading than any other railroad employees. They distribute the equipment and sign for the freight and see a great deal of it loaded. They should be taught that when they see a shipper wasting car space they should call his attention to it, or notify the agent or a traffic representative that a call on the shipper would be of benefit, as in some cases the railroad representative might be able to tell the shipper something about his shipping department he did not know and would be glad to correct when informed of it. The clerks should also be instructed in car distribution in order that they will distribute the available equipment economically and intelligently.

The railroads handling their own material are as a general rule about the most extravagant of any shipper in the use of equipment and much can be accomplished by education in store rooms, material yards and shops. The intelligent placing of the right size and class of equipment by the yardmaster in charge of store and shop districts is also a very important item. A systematic check should be made at freight houses and transfer platforms daily by the agent and periodically, by a loading inspector or other traveling inspector to see that the freight is properly loaded, that cars

are not being used extravagantly, and that cars are loaded as heavy as should be, taking into consideration the chances of damage enroute.

What the Shipper Can Accomplish

By R. G. Kreitler

Manager Traffic Department, Goodyear Tire & Rubber Company, Akron, O.

About three years ago the company with which the writer is connected undertook to secure increased loading of cars. The first step was to eliminate l.c.l. shipments to the 70 branch houses maintained throughout the United States at that time. During the first 3 months and 20 days of these efforts l.c.l. shipments to branches were entirely eliminated and the loading per car increased by 69 per cent.

It is impossible to load the finished product of this company to 30 tons because of its bulk and its low density per cubic foot. The minimum provided for pneumatic tires is 20,000 lb. per car and for solid truck tires and other classes of material, 30,000 lb. per car, but even with this low minimum by making a study of the best methods of loading cars and securing concessions from the various classification committees in the way of packing requirements, it was possible to produce a loading of all classes of material, including both pneumatic and other classes of rubber goods, at an average of 30,325 lb. per car for the year 1919.

In many cases it was not possible to load to the visible capacity of the car by reason of the manner in which orders were placed by the customers. In this connection it is suggested that sales organizations in co-operation with purchasing organizations of their customers might be induced to co-operate to the end that customers in placing their orders would have it understood with the seller, that cars should be loaded to the full visible capacity so far as possible. On inbound shipments, consisting of various kinds of raw materials, etc., the average loading per car was 79,335 lb. The average for the total movement, inbound and outbound, was 58,155 lb.

One of the greatest evils, as it affects the larger use of equipment, is the custom on the part of many receivers of freight to order far in excess of their daily requirements, the result being that they have a large accumulation of loaded cars on hand. However, all of the fault in this respect does not lie with the shipper or the receiver by reason of the unreliability of the service offered by the carriers. It is disconcerting to a shipper who is actually trying to get the fullest possible use from railroad equipment by loading up to the visible or carrying capacity of the car to send forward a shipment destined to a point to which ordinarily they would make delivery in six days and to find the car actually going through in from 60 to 85 days.

What One Division Accomplished

By F. E. Slater

Southern Pacific Railway, Dunsmuir, Cal.

The following is a brief account of the methods used and results secured on the Shasta division of the Southern Pacific in increasing carloading during 1920. To start with it was necessary to ascertain the approximate number of cars of each commodity that each shipper would ship during the year, therefore in the month of January, 1919, every agent was requested to interview the shippers in his territory and secure this information first hand. During the early part of March a letter signed by the superintendent was sent to each shipper, each letter being worded slightly different to avoid having the appearance of being stereotyped. The following is an abstract of a typical specimen:

"I feel reasonably sure that a majority of the large shippers

are acquainted with the shortage of equipment at the present time, due principally to the reduction made in the building program during the past several years, and one of the best methods of combating this shortage is by loading what cars we have to 100 per cent capacity.

"I appreciate that you are often confronted with obstacles that are hard to overcome; however, when the opportunity is favorable considerable can be accomplished. Should you have any suggestions to offer whereby we can assist you in accomplishing better loading, I would appreciate your taking up the matter with me promptly."

While no reply was requested, not a shipper failed to answer the communication and assure us of his co-operation and many of the suggestions received were followed up by a division officer who investigated them personally and reported his findings. Those meriting it were favorably acted upon, thus assuring the shipper that we were anxious to do our part.

As a result of this campaign, instead of showing a loss of over 3,000 cars as during the year 1919, a saving of 4,933 cars was accomplished for the period from March to September, 1920, alone, the period beginning March being selected, as it was during that month that the appeal was made to the shippers. The following tabulation shows the result by months for 1920 as compared with 1919.

Month	Average tons per car		Per cent of contents to capacity	
	1919	1920	1919	1920
January	36.0	27.9	83.8	69.5
February	32.2	30.1	77.6	78.1
March	30.9	31.8	78.1	80.7
April	29.8	32.3	79.3	83.4
May	27.2	32.1	72.8	80.1
June	29.6	32.3	79.5	78.2
July	26.8	29.3	68.5	80.1
August	28.8	37.4	73.9	92.4
September	27.9	36.8	74.2	89.5

Have a Consistent Policy

By A. T. Mercier

Superintendent, Southern Pacific, Portland, Ore.

Two things enter into the attainment of an average of 30 tons per car. (1) When practicable, furnish a car of the size required. (2), load to maximum space or weight capacity.

In attaining the latter, the carriers rely very largely upon the personal contact of the local agent with the shippers, as it is only through the influence of the local agent in many instances that the shipper can be prevailed upon not to take advantage of the minimum weight. In this connection, consideration should be given to the question of raising the minimum carload on various commodities as the existing tariffs work very greatly against attaining the maximum carload.

In this territory we have been working energetically to obtain maximum carloads. It is a matter of education that must be guarded very closely, as the shipper will lose interest in car conservation if after being inconvenienced and incurring additional expense, to supply a maximum load the car were permitted to remain on his siding an excessive length of time before being moved.

Some Lading Requires Special Treatment

By G. C. Conn

General Traffic Manager, Buick Motor Company, Flint, Mich.

The question of heavy loading of freight cars is like the "Tariff," a local issue. The great variance of commodities and the lack of uniformity of railway equipment almost obliges each territory to work out its own salvation. Assuming that everyone does his best to load heavily, and usually a shipper will load all he can in order to get more money in return, there are conditions under which the cubical capacity and not the weight capacity of the car must govern the load.

In Michigan, for example, an unusual number of light and bulky articles are produced such as hay, beet pulp, refrigerators, sewing machines, kitchen cabinets, furniture, woodenware, automobiles and other commodities. These all require large cars in order to get the minimum load, and the weight capacity of the equipment is never reached. So far as automobiles are concerned, it is not a question of tonnage capacity. This is why automobiles pay the highest rate per ton per mile of any regular carload traffic. Large cars with wide doors are absolutely essential.

The Buick Motor Company and other units of the General Motors Corporation have purchased several trains of flat cars for moving automobiles. These are equipped with steel decking with the result that the load is doubled. There is no question but what double decking is feasible on open as well as closed cars for a great variety of tonnage. Shippers must experiment and find the method best adapted to their business.

Railroads Should Set a Good Example

By G. F. Burns

Traffic Manager, United Drug Company, Boston, Mass.

It is absolutely necessary that the carriers furnish dependable equipment. Shippers can hardly be expected to load to the maximum, if such action will result in merchandise being transferred en route, as is now infrequently the case, because of faulty equipment.

The carriers' methods of loading and stowing merchandise at terminals and freight houses could be very much improved upon. In a comparison between the loading of cars by private industries and by carriers, particularly so-called merchandise or package cars, it is believed that the cars loaded by the shippers will show to much better advantage. Visits to the terminals of various carriers where there are a number of merchandise cars loaded daily lead to the opinion that these cars are, as a whole, insufficiently and improperly loaded.

It is believed that the carriers could utilize equipment loaded by themselves to much better advantage and that many shippers would load much heavier if they felt reasonably sure that a transfer en route would not result, because of cars being too heavily loaded.

Are We Buying Coal Enough ?

DR. GEORGE OTIS SMITH, director of the United States Geological Survey, and F. G. Tryon, coal statistician of the Survey, have issued a statement making the following analysis of the obvious facts in the present coal depression:

During the first week of March the operators at some 2,600 soft coal mines reported to the Geological Survey that they worked on the average only 19 hours out of the possible 48 working hours in the week. They were closed down, so they stated, on account of "no market," or lack of orders, an average of 26 hours. They lost a little time on account of labor shortage, and a smaller amount because of local strikes in Kansas and Missouri. Here and there a mine lost a few hours' working time because cars were not placed when ordered, or because of mechanical breakdowns. But the loss on account of all these other factors combined was only 2½ hours as against the 26 hours—more than three days—because of lack of demand.

Making due allowance for what may have been happening at other mines not reporting to the Survey and for the fact that no mine can in practice long maintain output at 100 per cent capacity, it is still clear that the soft-coal industry

is at the moment very short of business. It has 8,000,000 tons a week of demonstrated mine capacity lying idle, and what is worse, piling up capital and maintenance charges waiting for the consumers in the United States or abroad to place their orders. Most serious is the fact that the bituminous coal industry has a veritable army of unemployed. The 615,000 mine workers are offered not over three days' work a week, and at many mines only two or even one day. Coal miners in the United States draw a pretty good day's wage, but they cannot continue indefinitely to make ends meet on one or two days' work a week.

It may be charged that even in times of active demand the railroads cannot provide cars to keep the mines busy continuously. Very well, then, measure the present depression against what we know the railroads can do. In the first week of March the output was 7,263,000 tons. The next week it dropped to 6,891,000. The preliminary figure for the third week of March (14-19) is 6,525,000. Now, four months ago, before the market broke, the railroads were furnishing cars enough for an output of over 12,800,000 tons a week. Indeed, on two occasions in the past, when extraordinary measures were invoked to stimulate car supply at the mines, the railroads provided transportation sufficient to get out a total of 13,100,000 tons. Thus the present rate of output is less than half what the carriers can handle under pressure, and a good 6,000,000 tons short of what they were doing last December. The best demonstration that the roads stand ready to handle more coal is that they have some 204,000 open cars lying around idle on sidings, according to the American Railway Association. Because these cars are idle the roads are discharging men by the thousands. And as in the case of the idle mines and machinery, so with the idle cars; not only are they bringing the roads no revenue, when revenue is badly needed, but they are steadily eating up other earnings with capital and maintenance charges.

All signs, then, point to the consumer as the controlling factor in the present situation. Of course the coal man has come to expect a period of dullness in early spring as one of the drawbacks of his seasonal business. But this year the slump is far worse than the normal, even considering the mild winter. For the consumer is having troubles of his own; the business depression has reduced his requirements. In December last the beehive coke ovens, for example, were taking 600,000 tons of coal a week. Today they are using only 270,000 tons. Somewhat the same reduction has been going on in other domestic industries and at the same time exports have also fallen sharply. With current consumption curtailed in this manner it is clear that the mere fact that production is down to six and a half million tons a week does not of itself prove that consumers are purchasing less than their requirements. Indeed, the rate of output has not yet touched the low point reached during our latest real business depression, in 1914. That, however, was seven years ago, and our normal rate of growth has been such that 7,000,000 tons in 1921 would be as low as 6,000,000 was in 1914. If the business depression proves to be long-sustained, then the present low rate of production carries no threat of an approaching shortage of coal. If, on the other hand, business should suddenly resume at full blast we know that the railroads will hardly be in a position to haul coal enough to rebuild stocks, meet current consumption, and handle other freight at the same time without signs of distress.

There is reason to believe, however, that the business depression is not the only consideration in the mind of the consumer at present. He remembers what he used to pay for coal before the war. He recalls that he could then get an abundance of coal for \$1.15 f.o.b. mine. He knows that on the average in 1918 coal was costing \$2.50 or \$2.60 at the mine. He sees that prices of many other commodities have fallen since 1918, and then he takes up a copy of "Coal Age"

or "The Black Diamond" and notes that the lowest price quoted on spot coal is \$2 run of mine, f.o.b. mine, with many quotations at \$2.50, \$2.75 and \$3, or over. He finds that little coal is offered for contract at less than \$3 a ton. He remembers, with resentment, the prices he had to pay last year, and he decides to buy only as needed and wait for the price to come down to a reasonable figure.

The operator, however, retorts that the price has gone down as far as it possibly can; that many mines have been in consequence forced to close, and that with the successive wage advances of April, 1916, April and October, 1917, and March and August, 1920, the cost of producing coal has so increased that a return to pre-war prices is impossible. The consumer must awaken to the fact, argues the operator, that whereas before the war he would think in terms of \$1.00 or \$1.25 coal, now he must think in terms of \$2.50, \$3.00, or \$3.50 coal f.o.b. mine.

Insofar as the consumer is waiting for the price to come down, at the risk of depleting his reserves against winter requirements, the relief turns upon a question of fact, namely, whether the present market price of coal is a reasonable price, whether it is as low as can be expected later. It is to be regretted that the Federal Trade Commission has been enjoined from learning the facts and so is not able to issue a statement of present-day costs that would enlighten the public.

"Buy only as needed" may prove too conservative advice at this time. The consumer waiting for low prices and the producer delaying price adjustment might be found equally responsible for the uneconomic seasonal fluctuation in coal output. "Buy only as needed" may result in cheaper coal in the bin, but the bin may be too nearly empty much of the time when the need is greatest.

The plain situation is that the coal buyer distrusts the coal seller and "no market" as given in the weekly returns in part simply reflects the consumer's attitude. His answer to offers of contracts may be natural, but is it safe?

The consumer must ask, "Have I sufficient stocks in my bin to tide me over a period of bad weather, or an interruption to my supply, in view of what I shall need to make the goods to fill the orders I expect to have?"

To the railroads the question becomes, "Have we as the largest consumers of coal laid in an adequate reserve against the period of active business which must one day come?"

And not the least searching should be the question asked by the producer of himself, "Have I made the utmost possible concessions to the user of coal? Have we as an industry done wisely in opposing the collection and publication by the federal government of data on the costs of production?"



Photo by Ewing Gallowsay

Duluth, South Shore & Atlantic Train Ferry, St. Ignace, Mich

Practical Propaganda for Fuel Conservation

Fuel Conservation Committees a Force for Fuel Economy on the Delaware & Hudson

ANYONE HAVING OCCASION to visit a shop or terminal on the Delaware & Hudson is at once impressed with what might be termed the spirit of conservation. A neat, orderly arrangement of parts usually bespeaks attention to detail and the elimination of waste. The impression deepens at the sight of a well-proportioned bulletin board conspicuously mounted just outside the engine despatcher's office. In the glare of an electric light immediately over the board Fuel Conservation Bulletin No. 5 gives a very vivid description of what may happen as the result of pulling air hose apart under pressure. There is an illustration showing a sectional view of a hose weakened by being pulled apart under pressure with the following explanation:

"The picture shows the result of pulling hose apart under pressure. This practice punctures the inner tube when the hose straightens out, due to the nipple being at an angle of 45 deg. This practice also destroys the inner tube, allowing the pressure to reach the canvas wrapping, causing air leaks which are difficult to discover by inspection, and in a short time will cause a bursted hose, resulting when freight trains are in motion in an emergency action of brakes, sometimes buckling trains, causing derailments and detentions.

"This destructive practice can be eliminated by parting hose by hand in accordance with Rule No. 4 as covered in the Air Brake Instruction Book. Air leaks and detentions waste fuel and by complying with Rule No. 4 this waste can be eliminated. Will you help?"

If we can be persuaded that we need a biscuit because we are forever being reminded of the fact by signboards on every corner and advertisements in every street car, is it not logical to assume that a constant reminder of the fact that fuel may be saved in various ways will have its effect on all loyal employees?

The object of a fuel conservation bulletin is to sell fuel conservation to every employee and so far as practical it should conform to the principles that have made commercial advertising a success. Commercial advertising is a success because its reasoning is logical, its portrayal vivid and its message persistent. The Delaware & Hudson bulletins are good because they are logical; where practical, they are vivid and they have been persistent. What merchant would expect to sell goods on the strength of the feeble, inconspicuous and irregular bulletins that have been attempted by some railroads in the name of fuel conservation?

Some of these mimeographed documents would not serve to sell a postage stamp, much less fuel conservation,

to a skeptical engineman. What the railroads really need in this direction is the same sort of advertising appeal that helped to put over the Liberty Loans—and it would be money well spent.

Getting Co-Operation

Some railroads have failed in fuel conservation because the problem was too big and intangible; they do not know where to start in. The Delaware & Hudson has discovered that fuel conservation is an individual problem with nearly every employee and that the whole-hearted co-operation of these employees is essential. How this co-operation is invited, encouraged and becomes a live factor in saving coal

on this railroad may be observed in the following account of the organization and activities of the fuel conservation committees taken from a manual on fuel conservation published by the railroad:

The committee organization is headed by a General Fuel Conservation Committee comprising:

- General manager, chairman.
- General superintendent of transportation.
- Chief engineer.
- Superintendent of motive power.
- General fuel agent.
- Purchasing agent.
- Superintendent of stores.
- Master car builder.
- Fuel engineer, secretary.

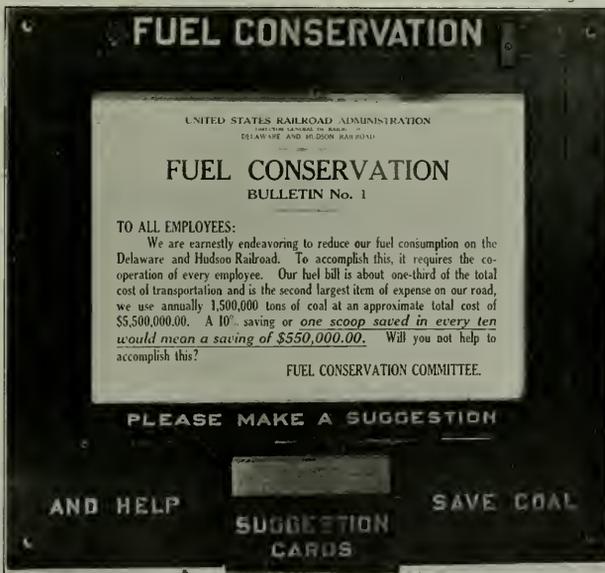
On each division the Divisional Fuel Conservation Committee is composed as follows:

- | | |
|---------------------------|-------------------------------|
| Superintendent, chairman. | Conductor.* |
| Fuel engineer. | Engineer.* |
| Fuel supervisor. | Fireman.* |
| Road foreman of engines. | General air brake instructor. |
| Yardmaster. | |

"Those members designated thus * are to be selected for a period of six months by the chairman, in conference with the fuel engineer and the master mechanic. At the end of six months after the first committee has been organized, and each succeeding month thereafter, the chairman will appoint the number of new members, necessary to fill the vacancies from the same branches of the service, so as to bring about a gradual but complete change of members so designated every six months. A member whose term of office has expired will be an honorary member of the committee. Such honorary member is at all times free to make suggestions to the divisional committee on fuel conservation."

The activities of the committee organizations are outlined as follows:

"Fuel Conservation committeemen should always be alert to correct any practice wasteful of railway fuel, making corrections themselves when possible, and at the proper time rendering reports of their activities. They should at all times so conduct themselves as to teach fuel saving by example and precept to all



employees with whom they come in contact and employees should be urged to conserve and save fuel at every opportunity.

"The fuel engineer will act as secretary of divisional committees and prepare the minutes of the meeting and list all suggestions fully on a form provided for that purpose, giving the name of the employee offering same and numbering them in consecutive order.

"All committees must meet during convenient business hours at least once every month at divisional headquarters or other place designated. Members will be required to attend all regular meetings and supervisory officers will arrange to relieve members for the time necessary to attend.

"Members of divisional committees will report to the chairman of the Fuel Conservation Committee on prescribed forms. Every member will furnish the chairman of his committee with a report each month on the form shown in Fig. 1."

Following this outline of the activities of the fuel conservation committees, the purpose of the organization is described as follows: First, to study and correct the wasteful practice in the handling of railroad fuel, such as over-loaded tanks, coal lost in transit, and second, to study, suggest and apply the most economical use of railroad fuel on locomotives, power plants and other places where railroad fuel is used.

How Everyone Can Help

One of the best suggestions ever offered on saving coal appears on the cover of the Delaware & Hudson manual to the effect that if employees will endeavor to save the extra shovelful, the tons will take care of themselves. Suggestions for saving coal are addressed to employees as follows:

"Over 90 per cent of railroad fuel consumed on his division is charged to cost of transportation, and of total cost of transportation the fuel bill is about one-third, hence, *superintendents* may not only assist in conserving the coal pile but may also reduce his divisional expenses by devoting a portion of his time to a study of fuel conservation and putting his efforts back to the fuel conservation campaign.

"The *trainmaster* should keep the cars moving and to full car capacity, and wherever practicable avoid moving locomotives over the road light, insist on maximum tonnage over ruling grades and quick movements in and out of yards, and keep in touch with train despatching to insure good and proper train movements.

"The *train despatcher* must see that trains are properly despatched so as to avoid as much as possible slow movements over the road and unnecessary delays in sidings.

"*Yardmasters* can see that incoming and outgoing trains are handled promptly, that proper inspection of trains is made before leaving yards, that locomotives are not ordered before the time that they are actually required and that cars are properly handled on the hump to prevent damage. Rough handling will loosen brake pipe and cylinder connections, resulting in an extra drain on the air pump, air supply and the fuel pile.

"*Car inspectors and repairmen* should see that all cars are properly inspected and repaired before leaving the yard because improper repairs to brake pipes, brake cylinders, reservoirs, brake rigging, etc., results in fuel waste.

"*General foremen and foremen* should see that all locomotives receive proper repairs. They should also supervise and inspect all work to see that it is properly done, as work intelligently and properly done will have its influence in fuel conservation.

"The *roundhouse foremen* should not fire a locomotive up too far in advance of the time it is needed nor neglect to make necessary repairs as called for on an engineer's report. He should see that fire is in good condition before the locomotive leaves the roundhouse. If a locomotive is reported not steaming, don't reduce the nozzle; have a talk with the engineer and ascertain the real cause and apply the remedy. Remember steam leaks, poor cylinder and valve stem packing, worn-out grates, valves out of square, improper drafting, exhaust nozzles smaller than required, clogged flues, etc., all tend to waste fuel.

"The *master mechanic* should bear in mind that since there is not an element of locomotive maintenance that does not in some degree affect fuel consumption, it is therefore of the utmost importance that locomotives are in proper mechanical condition before releasing them to the transportation department.

"*Road foremen of engines and traveling firemen* must ride locomotives frequently. They should keep in touch with engineers and instruct them how to handle their locomotives economically, also instruct firemen as to economical firing."

What *conductors and trainmen* are expected to do has been outlined in the following terms:

"See that your train is in proper condition before leaving terminal.

"Make an extra effort to keep your train moving to prevent blocking man back of you, thus requiring him to burn extra coal.

"In freight service anticipate and prepare for station work before you reach the station.

"In passenger service, encourage the quicker handling of passengers, mail and express. (The making up of time lost unnecessarily at stations, in yards, etc., takes fuel.)

"Leaky train lines waste fuel. Keep them tight.

"In passenger service the following will cause fuel waste: leaky steam hose connection, drip cocks too wide open, overheated coaches, all of which tend to add an additional drain on the boiler and fuel pile.

"Give prompt attention to hot journals. A hot journal means increased friction and fuel.

"Watch the brake shoes on your train; dragging shoes, whether due to stuck brakes or to train line leaks, result in fuel loss.

"Keep box car doors closed. Open doors result in resistance and loss of fuel.

"Report for duty early enough so as to leave the yard on time. A locomotive held in yard waiting for the train crew wastes fuel."

Instructions to *engineers* read as follows:

"Co-operate and assist the firemen wherever possible.

"If your locomotive is not steaming do not ask for a reduced nozzle but ascertain the real cause instead, reporting it to the roundhouse foreman.

"Keep the valves and bearings properly lubricated, as friction results in a fuel loss.

"Take advantage of grades in the operation of locomotives.

"Do not fail to make proper report of mechanical defects on your arrival at terminal, as steam blows from cylinder and valve stem packings, worn-out grates, valves out of square, etc., help to waste fuel.

"Endeavor to work your engine at the shortest practicable cut-off at all times, so as to obtain full benefit of the expansive force of the steam.

"Endeavor to feed the boiler uniformly, and do not allow the water level to rise so high that the effectiveness of the engine or the superheater will be destroyed.

"Avoid slipping your engine. It tears the fire and wastes coal."

The *fireman's* part is described as follows:

"See that the fire is in proper shape before starting the train. This is the proper time, and not after engine is using steam.

"Do not allow the locomotive to pop unnecessarily; tests show that a pop opened one minute wastes 15 lb. of coal.

"Keep deck and tank clean, and thus prevent coal from dropping off on roadway.

"Close the firedoor after putting in each scoopful of coal.

"Three or four scoops to a fire, even with the largest engines, has been proved practicable and gives the most economical result.

"Avoid bringing in dirty, heavy and dead fires. This results in an excessive amount of good coal being lost at the ash pit. When within a reasonable distance of any terminal fire very light and try to consume only what coal you have in firebox.

"On arrival at the terminal inspect the firebox. If any flues are leaking, ask the engineer to report them at the roundhouse."

Terminal operations play a very important part in the operation of the Delaware & Hudson. The time involved in every terminal movement is accurately checked with a view to reducing the number of idle locomotive hours and the condition of every locomotive is carefully observed with a view to correcting any condition that tends to impair its efficiency. In this connection, the condition of the fire on arrival is given particular attention and all heavy, dirty fires are reported by the hostler. This matter is given special attention, because it is known that heavy, dirty fires indicate inefficiency in operation and increase the time locomotives are held at terminals by delaying the progress of these locomotives over the ash pit.

Departmental Lines Ignored

It will be apparent from the foregoing that the responsibility for fuel economy rests with all departments and on all officials from the general manager down. The following statement by an officer of the company affords a very clear conception of the scope of this work:

"Fuel conservation is in charge of the fuel engineer, who in turn reports to the general fuel agent. Reporting to him is a chief fuel supervisor on each division. To date there have been held on each division 20 meetings. There has

laws of the railway employees department of the American Federation of Labor and to its members and officers credit is due for this very desirable condition."

Taking up the advantage of a national agreement, Mr. Jewell said:

"As representing the federated shop crafts' employees, we hold that an agreement applying alike to all railroads will be a great, if not the greatest factor, in assisting to establish efficient and economical railroad operation. It will remove the costly 'labor turn-over,' which has always existed to a greater or lesser extent and is due mostly to the fact that wages and conditions of employment on one railroad were more favorable than upon another railroad.

"Management, during the fall of 1917, recognized this condition as a very important factor in computing increased expenses in the operation of railroads, and based their claims for increases in transportation rates to the Interstate Commerce Commission partly upon 'labor turn-over.'"

Mr. Jewell's presentation to the Board will require a week or more, following which the labor side will present numerous exhibits regarding various rules and principles of the national agreement.

Continuing the reading of his rebuttal statement Mr. Jewell cited voluminous correspondence between the railway employees department of the American Federation of Labor and the Railroad Administration leading up to the formation of the shop crafts national agreement. Much of this correspondence dealt with the plans for vocational training for mechanics and apprentices in railroad shops under direction of the Department of Labor.

Board Dismisses Short Line Dispute

The Board's decision on the demand of labor leaders for the application of the rates of pay fixed by Decision No. 2 to employees on the short lines was announced on March 23, although dated March 16. This finding dismissed the dispute because of the Board's inability to determine just and reasonable wages in view of the "varying work done under infinitely varying conditions by the 4,000 employees of the carriers parties to the dispute."

In outlining its position the Board said in part:

To determine just and reasonable wages for any class of employees requires consideration of the work done for such wages. In the present case the work done by each class of short line employees varies to a substantial extent on each carrier. In many instances the work done by any class varies substantially as between the individuals in that class. Thus the determination of just and reasonable wages for any class requires the consideration of innumerable and diverse circumstances and in many instances consideration of the work done by individual employees.

There are wide variations as between these carriers in the cost of living for employees in the communities they serve, in the scales of wages paid for similar work in other industries, in the hazards of the employment, the training and skill required, the degree of responsibility, the character and regularity of the employment, and in other circumstances relevant to a determination of just and reasonable wages.

The Labor Board has found it impracticable to decide on the evidence submitted in this case what are reasonable wages for the "varying" work done under infinitely varying conditions by the 4,000 employees of the carriers parties to this dispute. Classification of short line employees is necessary for such decision and such classification requires elaborate study. A classification of employees of standard railroads is now in progress. It is practically impossible for this Board to undertake the classification of short line employees while the classification of standard railroad employees is still undetermined.

After ruling out that portion of the controversy relating to national agreements on the ground that this question is now before the Board in another case, the finding says:

Changes are now taking place in the cost of living and in the wage scales paid for similar work in other industries which appear to justify conferences between the carriers parties to this dispute and representatives of their employees. It is the view of this Board that as to the short line carriers such conference would produce more reasonable results than would be accomplished if this Board should now undertake to determine reason-

able wages and working conditions for the employees of the short lines parties to this dispute.

Lest the principles set forth in this finding be taken as an indication of the Board's views regarding the general questions of wages and working conditions, the following paragraph was appended:

This statement is to be understood as applicable to the circumstances of this dispute as to short line employees and not to be taken as indicative of the Board's view as to appropriate action as to conference in another dispute now before it as to rules and working conditions on standard railroads.

The Board's decision reads:

For the reasons stated, without prejudice to the right of representatives of employees of said carriers to meet representatives of the carriers or any of them in conference as to wages and working conditions and without prejudice to the right of the parties to such conference to refer any dispute undecided therein to this Board for decision, *these disputes are dismissed*. This decision shall not be considered as affecting any wage increase now in effect nor any agreement regarding wages between any of the carriers and their employees.

Wage Reduction Disputes Come Before Board

The development of paramount interest during the past week has been the initiation of controversies over the wages of employees, particularly of unskilled labor by practically all of the larger carriers. This action is in accord with the recommendations made some time ago by the Association of Railway Executives after their plea for permission to pay unskilled labor the prevailing rates in the territory in which they are employed was denied by the Labor Board. The Board held that any reduction in the wages of unskilled labor could be made only after the negotiations between the carriers and the representatives of the employees, or by the order of the Board after such conferences had ended in disagreement. Changes in the cost of living and wages paid in outside industries have led many carriers to institute controversies over the wages of skilled and unskilled employees.

Some action, either to reduce the wages of unskilled labor or of all employees, has been taken by practically all of the larger carriers throughout the country, and two of these disputes have already been docketed by the Labor Board, the controversy by the New York Central and its unskilled employees being scheduled for hearing before the full Board on March 30, and that between the St. Louis-Southwestern and its unskilled laborers on March 31.

It has been generally supposed that when these cases were brought before the Board it would, in the interest of all concerned, consolidate all of these cases into one hearing on the justness and reasonableness of the rates of pay established by its Decision No. 2 last July. However the docketing of the New York Central and the St. Louis-Southwestern cases indicates that this procedure will not be followed, at least for the present time, and that therefore that settlement of many of the controversies will probably be delayed.

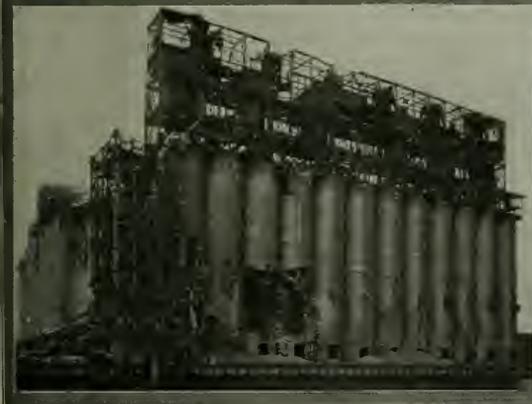
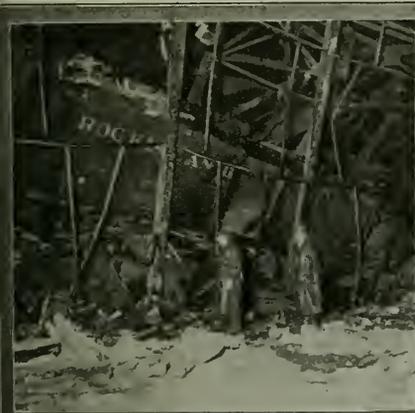
It is significant that the New York Central, in bringing the dispute with its unskilled laborers before the Board, has asked the Board to put a temporary decrease in effect on April 1 and to make the permanent decrease finally decided upon retroactive to that date. It will be recalled in this connection that a similar procedure was followed on behalf of the employees when the Board's decision of July 20 was handed down in that it made the increased rates retroactive to May 1, thus relieving the employees of the financial burden during the progress of the hearings. Similar treatment is now asked on behalf of a carrier and if this request is granted it is not improbable that all of the carriers will be similarly treated and a general wage decrease will be put into effect in the near future, pending the Board's retroactive decision. The Board has also announced that two other hearings involving two other small roads will be held on April 4 and 5. These roads have already reduced wages and the disputes were brought to the Board by the employees.

Dust Explosion Wrecks Large Grain Elevator

Chicago & North Western Structure at South Chicago Suffers
Enormous Damage from Blast

AT 6:20 SATURDAY EVENING, March 19, an explosion of dust wrecked the great terminal grain elevator of the Chicago & North Western on the Calumet river in Chicago. The disaster resulted in the death of six persons and a property loss estimated at about \$4,000,000. The structure was leased and operated by the Armour Grain Com-

modating cars on five tracks and surmounted in part by a dryer, a large rectangular structure having a structural steel frame covered by walls of reinforced stucco or "gunite." The walls of the galleries and cupolas above the bins were composed of the same material while the roof consisted of thin concrete slabs covered with a suitable roofing.



Photos—Left, Underwood & Underwood; right, International

The Wrecked Track Shed

The Work House and the Twisted Frame of the Dryer

The River House, and the Frame of the Marine Leg

The Broken Corner of the Storage House

pany and was one of the largest plants of its kind in the world.

This grain elevator, which represents an investment of about \$10,000,000, was composed of a storage house, a work house and a "river house," each consisting essentially of concrete bins of the usual construction with a storage capacity of 6,000,000 bu. and surmounted by superstructures or galleries and cupolas, which in the case of the work house and the river house extended to a height of approximately 200 ft. above the track level. The work house, which consisted of 95 bins, was flanked on the west by a track shed accom-

All evidence now available indicates that the explosion consisted of the progressive ignition of an explosive mixture of dust and air filling practically all of the enclosed spaces in the structure which were not occupied by the grain. The greatest intensity of the explosion was apparently in the two cupolas over the work house and river house, respectively, and in the galleries over the storage bins, the effect being to burst off all of the gunite walls and concrete roofing from the steel frame which was left in a more or less distorted and otherwise damaged condition. The fragments of wall and roofing construction were blown to great distances from

the elevator and this material, falling from a great height on the roofs of the power plant, office building and other auxiliary structures, crushed in their roofs and otherwise seriously damaged them. The dryer structure was torn from its supports against the side of the work house bins and fell on the track shed which was completely wrecked, crushing 20 cars which were in the shed at the time or causing them to be thrown into the pit or track hopper below the tracks.

A superficial examination also indicates serious injury to the concrete bin structures. Fifteen of the bins at the southeast corner of the storage group collapsed completely, allowing the grain to run on to the ground, as shown in one of the photographs. The outer walls of many of the remaining exterior bins are also badly split or cracked, both horizontally and vertically. The condition of the interior walls cannot be determined until the grain now in many of these bins has been removed.

A number of small fires were started by the blast of the explosion but these were readily extinguished by firemen shortly after the accident. There has been some indication of smoldering fires in the grain but apparently very little of the damage has resulted from fire.

Freight Car Loading

WASHINGTON, D. C.

Freight car loading, which during the first two weeks of March had shown a slight gain, was again reduced during the week ending March 19 to lower figures than had been recorded since the first of the year, with the exception of one week containing a holiday and one other week in February. According to the weekly report of the Car Service Division of the American Railway Association, the number of cars loaded with revenue freight for the week was 691,707, as compared with 702,068 the week before and with \$55,060 in the corresponding week of 1920 and 699,720 in 1919. The car loading figures have been following closely the curve shown on the chart for 1919 and for two weeks had shown a slight gain over 1919 but for the week of March 19 they again fell below 1919. The loading of all classes of commodities showed a decrease as compared with the previous week except merchandise, l.c.l., and miscellaneous freight, which amounted to 440,920 cars, a gain of 7,000 cars. There was a gain, however, as compared with 1920 in the loading of grain and grain products, which for the week

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO, FOR WEEK ENDED SATURDAY, MARCH 12, 1921

Districts	Year	Total revenue freight loaded							Received from connections						
		Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Miscellaneous	This year 1921	Corresponding year 1920	Corresponding year 1919	This year 1921	Corresponding year 1920	Corresponding year 1919	
Eastern	1921	5,851	2,438	39,651	851	6,600	903	51,184	57,458	164,936	192,685	169,889	189,913	215,418	187,393
	1920	5,960	2,729	48,871	3,629	5,490	3,556	33,105	89,836	192,685	169,889	189,913	215,418	187,393	
	1919	2,164	3,111	42,886	4,365	4,083	1,592	39,954	46,063	142,920	176,801	141,338	126,565	114,058	
Allegheny	1921	2,447	2,928	52,337	5,340	3,713	3,187	42,341	66,247	176,801	141,338	126,565	114,058	114,058	
	1920	157	75	13,334	53	1,467	10	2,541	5,349	22,986	22,986	22,986	17,902	18,004	
	1919	158	27	19,949	757	2,019	310	160	10,181	36,611	27,523	27,523	17,902	18,004	
Peachontas	1921	3,431	2,090	18,438	571	14,213	938	39,713	35,528	114,922	126,302	111,318	62,508	64,089	
	1920	2,945	2,348	23,496	1,355	18,054	2,653	21,058	55,613	126,302	111,318	111,318	78,398	64,089	
	1919	10,574	5,882	5,017	1,010	17,698	1,044	28,809	29,204	98,938	109,606	109,606	45,774	48,393	
Southern	1921	9,256	7,690	10,060	1,306	20,979	1,392	21,637	40,354	112,773	109,606	109,606	57,116	48,393	
	1920	11,164	9,839	13,655	1,539	3,238	1,945	29,533	30,741	100,294	112,773	109,606	47,708	48,393	
	1919	8,486	9,843	23,185	407	6,035	2,815	22,957	41,501	115,029	95,344	95,344	67,462	55,326	
Northwestern	1921	4,555	1,712	3,416	94	6,183	432	16,580	24,100	57,072	57,072	57,072	40,355	35,326	
	1920	3,840	2,424	6,710	162	6,974	891	16,432	24,695	62,128	46,246	46,246	51,601	35,721	
Total all roads	1921	37,896	27,847	136,097	7,103	52,484	6,864	205,334	238,443	702,068	819,329	701,266	494,588	522,988	
	1920	37,721	28,109	184,808	9,797	63,273	14,604	157,690	328,327	819,329	701,266	701,266	614,091	522,988	
	1919	36,373	29,557	141,939	.....	57,086	15,537	.....	420,784	.....	701,266	701,266	.....	522,988
Increase compared 1920	1921	5,175	.....	.....	.....	.....	.....	47,644	.....	.....	.....	.....	.....	.....
Decrease compared 1920	1921	.....	262	48,711	2,694	10,789	7,740	.....	99,884	117,261	.....	.....	119,503	.....
Increase compared 1919	1921	1,523	.....	.....	7,103	.....	.....	205,334	.....	802	.....	.....	.....	.....
Decrease compared 1919	1921	.....	1,710	5,842	.....	4,602	8,663	.....	192,341	.....	.....	.....	28,400	.....

L. C. L. merchandise loading figures for 1921 and 1920 are not comparable, as some roads are not able to separate their L. C. L. freight and miscellaneous of 1920. Add merchandise and miscellaneous columns to get a fair comparison.

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO, FOR WEEK ENDED SATURDAY, MARCH 12, 1921

Districts	Year	Total revenue freight loaded							Received from connections					
		Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Miscellaneous	This year 1921	Corresponding year 1920	Corresponding year 1919	This year 1921	Corresponding year 1920	Corresponding year 1919
Eastern	1921	5,884	2,548	35,647	795	6,379	849	52,345	59,563	163,700	192,685	169,889	188,726	246,511
	1920	5,884	2,980	47,495	4,347	7,518	3,532	38,324	92,851	183,137	163,375	163,375	188,726	246,511
	1919	2,279	2,716	37,932	3,467	2,401	1,152	46,305	47,059	137,307	163,375	163,375	94,866	110,956
Allegheny	1921	2,787	3,216	50,380	4,686	3,543	4,122	43,064	71,339	183,137	143,694	143,694	125,56	110,956
	1920	157	61	13,804	616	1,529	11	2,636	5,579	23,513	23,513	23,513	12,536	110,956
	1919	140	66	19,681	749	2,445	275	145	10,205	34,336	30,035	30,035	17,710	17,206
Peachontas	1921	3,241	1,804	17,642	568	13,624	728	39,970	37,540	114,217	136,800	118,930	63,083	60,991
	1920	3,202	2,053	24,417	145	17,727	2,355	25,173	55,628	136,800	118,930	118,930	80,745	60,991
	1919	10,407	7,634	4,969	961	16,458	1,046	26,872	27,909	96,256	106,114	106,114	44,085	47,749
Southern	1921	9,334	7,690	9,291	1,220	21,616	1,878	1,602	41,008	113,739	106,114	106,114	58,883	47,749
	1920	9,262	9,694	12,750	1,597	3,259	1,782	30,503	30,443	98,550	106,114	106,114	46,788	47,749
	1919	7,987	10,867	21,740	455	6,315	2,967	23,656	45,763	119,750	90,347	90,347	66,812	53,655
Northwestern	1921	4,605	1,966	3,637	142	6,415	480	16,895	24,021	58,164	58,164	58,164	40,861	38,106
	1920	3,443	2,494	7,851	141	7,504	851	16,666	26,327	65,477	47,023	47,023	52,758	38,106
	1919	3,638	2,643	126,081	6,122	50,065	6,048	20,816	232,114	691,707	490,938	490,938	.....	.....
Total all roads	1921	37,896	27,847	136,097	7,103	52,484	6,864	205,334	238,443	702,068	819,329	701,266	494,588	522,988
	1920	37,721	28,109	184,808	9,797	63,273	14,604	157,690	328,327	819,329	701,266	701,266	614,091	522,988
	1919	36,373	29,557	141,939	.....	57,086	15,537	.....	420,784	.....	701,266	701,266	.....	522,988
Increase compared 1920	1921	3,210	3,193	13,879	.....	.....	.....	47,644	.....	.....	.....	.....	.....	.....
Decrease compared 1920	1921	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Increase compared 1919	1921	798	.....	.....	6,122	.....	.....	208,816	.....	8,013	.....	.....	.....	.....
Decrease compared 1919	1921	.....	4,609	7,638	.....	6,664	9,239	.....	195,599	8,013	.....	.....	24,274	.....

L. C. L. merchandise loading figures for 1921 and 1920 are not comparable, as some roads are not able to separate their L. C. L. freight and miscellaneous of 1920. Add merchandise and miscellaneous columns to get a fair comparison.

amounted to 36,038 cars. The largest decrease was in the loading of coal, 126,081 cars, a decrease of 60,000 as compared with 1920 and of 10,000 cars as compared with the previous week. The summary for the week of March 12 is shown in the table on the preceding page.

The freight car surplus for the week ending March 23 was the largest ever recorded in the history of the railroads, the daily average for the week being 459,411, of which 230,394 were coal cars and 164,195 were box cars. The largest previous surplus was in February, 1919, when it was about 451,000. In 1908 there was a surplus of about 413,000.

The increase in the number of surplus cars and the reduction in car loading is largely attributable to the rapid falling off of the coal movement. The coal car loading during the week of March 19 was 64,000 cars less than during the first week in January. Loading of merchandise and miscellaneous freight was increased during that time by 61,000 cars.

President Takes Up Railroad Wage and Rate Situation

WASHINGTON, D. C.

PRESIDENT HARDING has decided to take a hand in trying to find a solution for the difficult railroad situation.

Following the cabinet meeting on Tuesday, at which the railroad situation and its effect on the business of the country was the principal subject of discussion, the President announced that he would confer on the subject at an early date with Chairman Clark of the Interstate Commerce Commission and Chairman Barton of the Railroad Labor Board. Chairman Barton arrived in Washington from Chicago on Thursday morning and shortly afterward, with Chairman Clark, went into conference with the President.

The President has expressed his deep concern in the situation and desires to do anything necessary or possible to bring relief. He has been informed that most of the railroads are not earning their operating expenses, under rates designed to give a 6 per cent net return, and that the situation has been made much worse by the large falling off in the volume of freight movement, which some of his advisers are inclined to attribute largely to the rate level. He has not publicly indicated that he has any plan in mind other than to get information from Messrs. Clark and Barton as to the questions involved in the rate and wage situations from their respective points of view, but the fact that they were considered together is taken as an indication of an appreciation of the dependence of the possibility of rate reductions on the largest item in the cost of transportation.

Most of the members of the cabinet who discussed the matter are interested in the subject from the standpoint of rates and their effect on business rather than the causes for the high rates, and it is understood that the President has been informed by railroad executives that rates are so high as to interfere in many instances with the free movement of traffic, but they have naturally emphasized the necessity for reducing wages before much can be done in the way of rate reductions. There have been predictions by the newspaper correspondents that the President would discuss the railroad question in his message to Congress, although some of his closest advisers on the subject, including Senator Cummins, have taken the position that legislation is not needed so much as the application of ordinary business principles.

"The whole question is one of operating costs," said Senator Cummins in a newspaper interview. "Rates cannot go higher. Railroad revenues last year were the greatest in the history of the railroads and they handled the greatest volume of traffic and the largest number of passengers in their history. The expense account is too big. It will be the purpose of our committee's investigation to find out where the trouble

lies. The reduction should not be limited to labor. It should apply to the whole structure. I do not see that we can do much in the matter of additional legislation. In my opinion it is impossible to make any material increase in the power of the Interstate Commerce Commission without bringing about government instead of private operation."

It is believed that Chairman Clark will tell the President that rates in general cannot be materially reduced until there has been a reduction in the cost of rendering the service. He expressed this opinion recently in a letter to Senator Harris of Georgia, in which he said: "Under these circumstances it is difficult to find an argument in favor of reducing rates unless in instances in which it can be shown that rates are stifling the traffic and that lower rates, which would still be compensatory, would effect a movement from which there would be some return."

If Chairman Clark should adhere to this position in talking to the President, the question as to what can be done in the way of reducing expenses as promptly as possible would naturally follow and Chairman Barton might be asked as to whether his board can expedite a determination of the wage issue. Railroad executives who have been in conference with Senator Cummins and other representatives of the administration have expressed the opinion that there should be a considerable reduction this year in the railroad fuel bill and they have also expressed confidence in their ability to bring about other economies, but no economies large enough to save the situation can be made without reducing the payroll.

The President will have an opportunity, if he desires to do so, to exert some influence on the complexion of the Railroad Labor Board when he comes to appoint successors to the three members of the board whose terms expire in April. The members of the railroad and labor groups, under the law, are to be selected from nominations made by the railroad executives and by the labor unions, so the President will not have a very wide range of choice as to two of the appointments and may reappoint the present members, W. L. Park and J. J. Forrester, but the three members of the public group hold the balance of power on the Board, and it is regarded as likely that the President will prefer to make his own selection for the new appointment in that group rather than reappoint President Wilson's selection, Henry T. Hunt, a Democrat. It is understood that Mr. Hunt has been inclined to side with members of the labor group on the Board more often than with the railroad representatives.

A good many prominent railroad officers have been in Washington recently and many of them have undoubtedly found ways of getting information to the ear of the President. Herbert Hoover, A. W. Mellon and Henry C. Wallace of the cabinet are also especially concerned with railroad matters. The railroads are not asking for any new legislation nor are they asking the government to do anything affirmatively for them at this time except that they are trying to collect as much cash as possible on account of their guaranty for the period of federal control and for the six months following it, as cash is their most pressing immediate requirement. Just now faster progress is being made in realizing on the six months' guaranty than in effecting settlements with the Railroad Administration for the earlier period. Up to March 28 the Interstate Commerce Commission had certified and the Treasury had paid \$97,322,990 in partial payments to 42 roads on account of the guaranty under the authority of the Winslow law, in addition to \$263,000,000 previously advanced, but some large sums are still tied up in the accounts with the Railroad Administration which the latter has been withholding pending a final adjustment. Some roads have had to borrow from the Railroad Administration and give collateral for money due on account of their compensation. Also some roads to whom sums are due on account of the six months' guaranty are still negotiating with the commission.

Duplex Compensating Suspension Applied to Baker Tractors and Trucks

THE BAKER R & L COMPANY, Cleveland, Ohio, announces its new series C models of electric industrial tractors and trucks replacing the series B machines produced during the past three and one-half years. An important feature of the new machines is the ingenious manner in which the heavy thrusts of the axle and the driving and braking strains

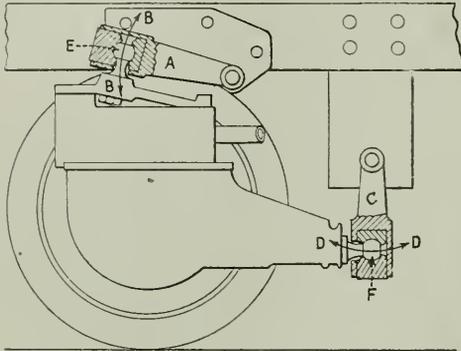


Fig. 1.—Line Drawing of Duplex Compensating Suspension

are resisted through what is known as the duplex compensating suspension. This suspension resists all torque and driving strain, provides for free spring action and maintains accurate alignment at all times between the axle and the frame.

Referring to Fig. 1, it will be seen that the axle is suspended by means of two V-shaped yokes through large ball and socket joints on the axle and trunnion bearings on the

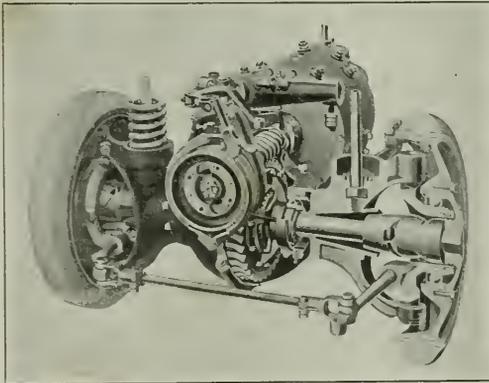


Fig. 2.—Driving Axle of Baker Truck Equipped with Duplex Compensating Suspension

truck frame. The horizontal or driving yoke *A* transmits the driving power from the axle to the frame while the vertical or torque yoke *C* resists "torque" or the tendency of the axle to rotate and also has a slight forward and backward motion when compensating for the angular movement of the driving yoke.

The double concentric helical springs support only the truck load. They are loosely seated in the frame and axle

members which are tied together against rebound with spring bolts, swiveling in their sockets. The flexibility provided by this construction permits the driving axle to negotiate either smooth or rough road surfaces, increasing traction without loss of efficiency or clamping or binding of the parts. Of equal importance is the elimination of maintenance expense, looseness and rattling when torque reactions are taken through sliding surfaces used in conventional constructions. The large lubricated trunnion bearings and adjustable ball and socket joints insure durability of parts for the life of the machine. A phantom view of the mechanism is shown in Fig. 2.

Emphasis is laid on the importance of the duplex compensating suspension because machines of the industrial truck type are subjected to extremely severe torque stresses. Although operated at slow speed they are frequently bumped into heavy objects and throughout their life must resist the strains coming from abrupt starting and stopping. In fact, many operators change abruptly from full speed ahead to full



Fig. 3.—View Showing Method of Making Impact Tests

speed reverse, subjecting the machine to heavier strains than are encountered in other vehicle work.

Sample machines incorporating this new feature were subjected to unusual tests of a spectacular nature and stood up satisfactorily under strains which would easily have caused failure to trucks equipped with a less rugged, yet flexible type of spring suspension. In one of the tests a tractor equipped with duplex compensating suspension, was operated down a 12½ per cent ramp at 10 miles per hour as shown in Fig. 3. The tractor struck a blow of 46 tons against the bumping post without damage to the spring suspension or other parts.



Photo by International

A Passenger Train at Gondia, India

Railway Business Association's Annual Meeting

Equipment Policies and Stability of Purchases Dismissed.

Dinner Addressed by Willard and Clark

THE ANNUAL MEETING of the Railway Business Association at the Waldorf-Astoria Hotel, New York, on March 31 marked the completion of one of the most successful years in the history of that organization, not only from the standpoint of the work done during the year, but also from that of the increase in the membership.

The meeting, following the usual custom, took place in the morning, at which time the committee reports were presented, and resolutions adopted. The annual dinner was addressed by Daniel Willard, president of the Baltimore & Ohio and chairman of the American Railway Association, and by Edgar E. Clark, chairman of the Interstate Commerce Commission. Mr. Clark came to the dinner direct from the conference with President Harding and Chairman Barton, of the Railroad Labor Board, held in Washington to discuss the present railway situation.

The feature of the annual meeting was the presentation of two reports, one by the Committee on Equipment Policies,

and the other by the Committee on Stability of Railway Purchases, both of which were adopted without discussion. They are reproduced below.

The report of the General Executive Committee reviewed the work of the year, and pointed out wherein the association had enlarged its activities. Particular reference was made to the action taken by the organization in favor of the Winslow bill, passed recently, to permit partial payments of the Government guaranty to the railroads; to a circular issued recently opposing decreased rates without decreased operating costs; to the work of the Committee on Stability of Railway Purchases, etc.

A report of the field manager showed that the organization in 1920 increased its membership by about 88 per cent, and by about 70 per cent more companies. This does not include new members secured since the first of this year. The membership at present is about 700; in 1919 it was less than 350.

Report of Committee on Equipment Policies

THE REPORT of the Committee on Equipment Policies, E. B. Leigh, president of the Chicago Railway Equipment Company, chairman, was in the form of a suggestion that the Railway Business Association take up with the Interstate Commerce Commission the question of its attitude or policies as to new devices, etc., which may be offered to the Commission for government test. Particular reference was made to automatic train stop and train control devices. With the report was a letter addressed to Edgar E. Clark, chairman of the Interstate Commerce Commission, by Alba B. Johnson, president of the Association, taking up the question and offering the assistance of the Association.

The report follows:

Your Committee on Equipment Policies recommends that an inquiry be addressed to the Interstate Commerce Commission regarding certain aspects of the policy which that body is preparing, through the Bureau of Safety, to adopt toward automatic train-stop and train-control devices. The inquiry, which we hope will be considered before a policy is determined, is whether or not the individual railway will retain freedom to install without government test or previous government approval such devices as in the judgment of the road will meet the government requirements, leaving it for the Interstate Commerce Commission to inspect operation, to decide whether the requirements have actually been fulfilled and if not to act accordingly.

The jurisdiction of this Committee embraces every field in which the Interstate Commerce Commission under the law has authority or duty to exert an influence upon the character of railway facilities. In a previous report we summarized the provisions of the Transportation Act, 1920, which bestow such authority or impose such duties. In that report we said: "In due course the Interstate Commerce Commission in its dealings with the railways will be confronted in this field by concrete situations which will require it to proceed in accordance with some general policy." Discussing specifically safety appliances we said: "We believe the Commission will have solidly behind it the best informed part of the public if that body adheres to its traditional program of regulation without undertaking management. . . . The concern of the Commission if it adopted this policy would be not what the appliance is but what it does."

Train Control Typical

Since that report was made your Committee has caused the course of events to be observed. The only field in which we understand that the formulation of a policy has since been undertaken is that of automatic train stops and train-control devices. The principle involved is identical with that involved in the determination of policy affecting every other kind of railway facilities over which the Commission has or may acquire jurisdiction. Whatever is determined in respect to automatic train control will establish a precedent of principle to be applied in due course to every facility upon whose character the Commission exercises an influence. All our members are therefore interested.

The Transportation Act, 1920, provides that with two years' notice the Commission may order a carrier "to install automatic train control had been made under the auspices of the Commission." Previous to that Act an investigation covering several years into the feasibility of automatic train control has been made under the auspices of the Commission. After the new Act went into effect committees were formed by the Bureau of Safety and the American Railway Association and have labored jointly upon definition of tests. They have visited manufacturing and demonstration plants. On Feb. 15 the joint board made the following announcement:

Official Announcement

"The functions to be accomplished and the specifications and requirements to which a device to be installed in any designated location must conform will of necessity be determined by traffic, operating and other local conditions and can be prescribed in detail only when the specific location for an installation has been designated. In connection with the test installations now in contemplation, it may be necessary to establish specifications and requirements merely tentative at the outset and subject to modification and development as the work progresses. Such specifications and requirements for several test installations, together with records of alterations in the installations which may become necessary in the course of the tests, would furnish data from which the Commission may ultimately prepare specifications and require-

ments to be prescribed in accordance with the terms of the law."

On the same date the joint board adopted a tentative statement of the performance which should be expected of a system in stopping trains or in controlling their speed. More than 300 concerns and individuals have registered their desire to have appliances considered. Many of these the Bureau of Safety has reported to be without merit. There are some signs that the time may be approaching when the Interstate Commerce Commission will be called upon to determine whether or not practice on the several roads is in accordance with the Act.

Considerations

Following are some of the considerations which have been laid before your Committee:

1. Practical conditions preclude tests by the Commission of all appliances offered.

The cost of testing out hundreds of different devices under service conditions within a reasonable time would be prohibitive even if experts could be assembled in sufficient numbers to do the work.

2. If not all the devices offered could be tested the Commission would have to choose arbitrarily which it would admit.

If a device can only be tried by the government there will be many which cannot be tried at all. Through overlooking what might prove feasible or might lead up to something feasible if tried, valuable advances may be lost and, more important and far-reaching than this, inventive effort may be discouraged. Mechanical progress not alone in safety but in economy and efficiency has been attained by leaving each of the railroads free to try such appliances as it thinks promising.

3. The Commission is under no obligation either of law or of custom to make government tests a pre-requisite for railway installations.

The law gives the Commission authority to order a railroad to install devices "which comply with specifications and requirements prescribed by the Commission." If so interpreted by the Commission this might mean the specifications and requirements could be so drawn as to exclude every device save one; but the Commission is under no compulsion so to interpret it. The bestowal of discretion is obvious.

What Is Wise?

The question is, *What is wise?* As to custom, the railroads install, for example, locomotives with such boiler and safety appurtenances as they deem prudent and Bureau inspectors notify them when the requisite performance is not attained and prescribe what the railways shall do to meet government requirements. The same thing is true as to safety appliances on cars or track.

In other words, the train-stop and train-control provisions empower the Commission to order such devices, meeting certain stipulated requirements, and to compel observance of its order, all of which it can do if it so elects without forbidding one device or insisting upon the trial or use of another. If this policy were adopted each railroad would retain the freedom it has heretofore had of trying on its own initiative such devices and systems as it may deem promising while remain-

ing responsible for fully complying with the specifications and requirements officially promulgated under the law.

Your Committee recommends that this report be transmitted to the Commission with the inquiry whether the official purpose has been defined and whether there is such diversity of view that our Association might with advantage to the federal authorities participate in a hearing or conference.

The members of the Committee on Equipment Policies are as follows:

E. B. Leigh, Chicago, Chairman, president Chicago Railway Equipment Co.

H. F. Ball, New York, president Franklin Railway Supply Co.

W. S. Bartholomew, Pittsburgh, president Locomotive Stoker Co.

F. W. Edmunds, New York, east sales mgr., Sunbeam Electric Mfg. Co.

Frank L. Fay, Greenville, president Greenville Steel Car Co.

A. C. Moore, Chicago, assistant to president Globe Seamless Steel Tubes Co.

H. M. Pfleger, St. Louis, vice-president Commonwealth Steel Co.

A. G. Wellington, Baltimore, vice-president Maryland Car Wheel Works.

W. H. Woodin, New York, president American Car & Foundry Co.

Letter to Interstate Commerce Commission

The letter addressed to Chairman Clark said:

By request of our Committee on Equipment Policies I transmit herewith a letter addressed to me by its chairman, E. B. Leigh.

The general scope within which this inquiry falls includes all aspects in which the Commission has statutory authority to exercise an influence over the character of railway facilities. The particular illustration here discussed, automatic train control, is understood to be within the special jurisdiction of the Bureau of Safety. We presume, however, that the Commission will consider other illustrations together with this in approving the course to be pursued in developing a policy; hence this communication is addressed to the Commission through you.

Your attention is requested to certain phases of the inter-rogatory:

1. As developers of progressive mechanical appliances and purveyors of competing devices and materials, our members have special knowledge and experience which we think should give their conclusions weight and can perform their services to transportation more effectively if the policy of the Commission takes those conclusions into account.

2. Automatic train control is merely typical. The policy adopted with regard to this will necessarily forecast future action touching other facilities. Hence all our members, whatever the character of their products, are interested in the train-control precedent.

3. Participation by developers and makers of appliances in the discussion of policy will be actual only if their point of view is known to the authorities before the official conclusion is put in effect.

The questions which our Committee propounds are these:

A. Has the official purpose governing automatic train control and stop appliance requirements been defined?

B. Is it contemplated that the individual railway will retain freedom to install without government test or previous government approval such devices as, in the judgment of the road will meet the government requirements, leaving it for the Interstate Commerce Commission to inspect operation, to decide whether the requirements have actually been fulfilled and if not to act accordingly?

C. Is there such diversity of view as to policy in this matter that our Association might with advantage to the federal authorities participate in a hearing or conference?

Stability of Railway Purchases

THE REPORT of the Committee on Stability of Railway Purchases, S. P. Bush, president and general manager of the Buckeye Steel Castings Company, chairman, took the form of a communication to Herbert Hoover, Secretary of Commerce.

The report said:

Responsive to a resolution of the general executive com-

mittee, the chairman of the Committee on Stability of Railway Purchases, with the co-operation of the president and secretary, is engaged in the serial publication of leaflets upon various aspects of the subject as set forth in its January report. The first leaflet, with charts, was "The Next Step Toward Preventing Depressions" (abstracted in the *Railway Age* of January 7, 1921). Herewith is presented the second,

which is intended to combine action with discussion. Its text is a request to Secretary of Commerce Hoover for a conference upon industrial and commercial prosperity and stability.

Letter to Secretary Hoover

The Railway Business Association, comprising several hundred concerns which have goods or services for sale to railroads, welcomes the opportunity for co-operation afforded by your recent utterances on industrial and commercial stability.

Other groups besides ourselves have distinct special interests parallel to ours. These include all whose customers are institutions requiring very large amounts of machinery, material and supplies. So-called public utilities are among the number. A vast buying power is that of governmental units, city, county, state and federal. Stability of purchases is important to all concerns which sell goods or services to any of these. With all such concerns our Committee on Stability is ready to work for the common end. All of them are invited to aid us in our discussion of railway buying. To all these groups everyone everywhere whose wages depend upon general prosperity can profitably accord full sympathy and help. This project is everybody's affair.

We request a conference with you upon the opportunities and responsibilities which the present situation gives to all concerned and upon ways and means for restoring prosperity and promoting stability hereafter. The possibilities of your leadership cannot be measured.

As we view it, the course desirable for large purchasing institutions to pursue in the months immediately in front of us has two aspects: (1) to prove their faith in the national future to the limit of their resources; (2) to lay foundations now, when unemployment disposes citizens to listen, for systematic accumulation of such resources in busy years to be used in dull years.

Our proposal is no more than merely sound business policy. Whatever must be bought, whether machinery, materials or labor, by a city, a county, a state, the United States, a public utility or a railroad can be obtained most economically when general business is depressed. Large buying at such a time mitigates unemployment of labor and commercial distress. Instead of being idle a large part of the time and at other times overtaxed, the men, the buildings, the machines, all the accessories of supply, including transportation facilities, are kept steadily busy; not so much plant and overhead is required, while the personnel escapes periods of acute privation.

In government works this principle has long been discussed and has begun to be applied. The commonwealth of Pennsylvania by law binds itself to that policy. The legislature in 1917 created an Emergency Public Works Commission, who were made custodians of a fund to be accumulated by successive legislative appropriations during good times and spent during other times on public works. When demobilization of the army came in 1919 the proceeds of a bond issue and a special appropriation were supplemented by the beginnings of such an accumulated fund. When the soldiers came back Pennsylvania did more on public works than in any previous year. Other cities, counties and states made special arrangements to intensify public construction in 1919 and appreciably helped minimize distress of unemployed soldiers in the transition from war to peace. The distinctive feature of the Pennsylvania state policy is deliberate financial provision in advance. A certain specified amount is annually raised, put aside and ear-marked for expenditure in an emergency.

Some famous railway presidents have made history by a similar practice. Two most often cited are A. J. Cassatt and E. H. Harriman. A familiar anecdote tells of the consternation with which some of the Pennsylvania Railroad directors heard Mr. Cassatt propose in time of depression an expenditure of many millions for intensive development of the property and his serene inquiry at what time such expenditures would buy more material or labor or interfere less with the company's merchandise traffic. Mr. Harriman with the Union Pacific was noted as a thrifty, courageous and confirmed seeker of bargains. The Santa Fe and other railroads have pursued a similar course.

Adoption of such a policy and adherence to it by railroads cannot wisely or effectively be forced by government requirement. It is one thing to command a railroad to possess a given surplus and quite a different thing for the railroad to obtain such a sur-

plus or to make it, if possessed, tide over a slump the continuance of which is any man's guess. Vice-president E. J. Engel of the Santa Fe in a letter favoring purchases in time of light traffic tells us some of the limitations. Mr. Engel says, "No one can tell how long the period will last, and there is a risk of having to carry the materials for a very long time before they can be used, with consequent carrying charges under adverse conditions, and many other points to consider; so that no railway company can establish a fixed policy and each must decide as occasion arises what will best meet its conditions."

Judgment how long a depression is going to last must of course weigh conclusively with every railroad directorate in deciding how far it is necessary to husband its surplus for interest and for dividends stabilized at a figure deliberately made moderate in busy years in order to avoid its interruption when income sags. Vice-president A. J. Conroy of the Pennsylvania points out that Mr. Cassatt's "big program and large expenditures did not occur in a period of heavy traffic losses, but only after the certainty that the bottom had been reached and that business was on the upturn and would certainly require the new tracks, facilities and equipment, revisions of grade and alignment."

We must here condense in a paragraph the momentous suggestion that if purchases of the great buyers were stabilized as proposed this itself would constitute what our committee recently set forth under the title, "The Next Step Toward Preventing Depression." Once the railroads, utilities and governments had put in operation a policy of accumulating resources for the period of acute adversity they would have come near postponing that time to the day after never. We have established a Federal Reserve system. We have practically eliminated crop failures. If now large purchasers can provide themselves with emergency funds and credits they themselves can do much to stop depression when incipient by coming into the market. Especially will they mitigate the commercial failures which result from violent fluctuations in demand for commodities and plant and hence in values. Whatever large buyers do in this direction will tend to weaken the force of industrial convulsions and to shorten their duration.

Business at this moment appears to be mending. Serious problems face us, particularly that of foreign markets, which restrict the outlet for agricultural and manufactured products. But your own grasp of that situation underwrites the prosecution of every proper available measure for our relief and that of our neighbors abroad; and already failures are less and car loading larger. This last means increased gross earnings for the railroads, and with completion of the labor liquidation now in process should in due course bring more satisfactory net railway income.

For the conference which we request the following topics are suggested:

1. What co-operation among various business interests and with the government is desirable to effect such adjustments and arrangements as will permit and induce without loss of time reasonable activity of purchasing power and of production?
2. What co-operation of interests is desirable with a view to the continuous adjustment of railway earnings, expenses and net income to a basis which will permit accumulation of funds for economical expenditure in dull years?
3. How may each large buyer be systematically advised of the methods pursued and the advantages realized by those who purchase heavily in depressions?
4. How may the several elements variously interested in stability of large purchases best reach and maintain an understanding of one another's problems and related problems of government?
5. How may signs of returning prosperity be observed and widely reported for the information of large buyers whose responsibility it is to judge the probable duration of depressions?

S. P. BUSH, Chairman.

The membership of the Committee on Stability of Railway Purchases is as follows:

S. P. Bush, Columbus, Ohio, Chairman, president and general manager Buckeye Steel Castings Co.; John K. Broderick, St. Louis, president Broderick & Bascom Rope Co.; Frank G. Echols, Greenfield, Mass., president Greenfield Tap & Die Corp.; J. M. Gillespie, Pittsburgh, vice-president Lockhart Iron & Steel Co.; R. W. Gillispie, S. Bethlehem, Pa., assistant general sales agent, Bethlehem Steel Co.; Grafton Greenough, Philadelphia, vice-president Baldwin Locomotive Works; Clarence H. Howard, St. Louis, president Commonwealth Steel Co.; N. S. Reeder, New York, vice-president Pressed Steel Car Co.; Charles R. Robinson, Buffalo, vice-president Lackawanna Steel Co.; Wm. E. Sharp, Chicago, president Grip Nut Co.; Alex. M. Stewart, New York, president James Stewart & Co., Inc.; E. M. Zehnder, Scranton Pa., president Scranton Bolt & Nut Co.

Resolutions

The meeting expressed its attitude towards the present problems of the railroads in the following resolutions:

I.

We witness the high standard of performance established by the Interstate Commerce Commission in its administration of the Transportation Act, 1920. The Commission has functioned with wisdom, courage and energy.

II.

We regard the very small net earnings, and in many cases deficits of the railroads at this time, and for several months past, as seriously inimical to the economic welfare of our transportation system and of the country at large.

We recognize that further advances in transportation rates are impracticable, and that a reduction thereof, as soon as possible, is imperative.

We, therefore, urge the vital necessity of prompt reductions in railroad operating costs which includes, of course, costs and prices in private industry essential thereto.

III.

The Interstate Commerce Commission on March 1, 1922, under the statute, acquired authority to fix from time to time the rate of return upon railway property which transportation rates are to be designed to yield. It therefore becomes the duty of the Commission to define the purposes for which new capital is desirable. The United States needs a transportation program that looks further ahead than a few months, and a financial program upon which to base the rebuilding program. The Interstate Commerce Commission, entering upon a far-reaching experiment with a given level of rates to see whether it will bring to the roads the income, the capital and the improvements which the country requires, those who are tempted to agitate for rate reductions each on his own commodity should bear in mind

that if everybody was accorded the reduction he would like, railway facilities would be inevitably diminished below the requirements of our nation's commerce. A broad policy requires the fullest support of all our citizens.

IV.

Regulation and not management should be the policy of the government in its exercise of influence upon the character of railway facilities. Engineering and mechanical progress will be best assured when each road installs devices and methods of its own selection for meeting the tests officially prescribed, subject to official determination whether or not those tests are met, and, if not, wherein the test should be not what the appliance is but what it does. This will encourage invention, assure open competition among developers and makers, and give reason for existence to the valuable plants and organizations which competing purveyors now maintain for experiment, demonstration and inspection service.

V.

We vigorously dissent from proposals that have been made to centralize production of railway equipment under a board which would contain Government representatives. Purchase by a Government Bureau tends to over-standardization, to the arrest of advance, to emphasize upon price at the neglect of quality, upon cheapness rather than upon economy.

Election of Officers

Alba B. Johnson was re-elected president. The following were elected vice-presidents for the ensuing year: Samuel G. Allen, Franklin Railway Supply Company, New York; Stephen C. Mason, McConway & Torley Company, Pittsburgh, Pa., and Charles J. Symington, of the T. H. Symington Company, New York.

Three Epochs of American History

Address by Daniel Willard, President, Baltimore & Ohio

THE HISTORY OF THE American railroads very naturally divides itself into three epochs. The first great epoch embraces the period from 1827, when the first charter was granted for the construction of a railroad organized for the purpose of doing a general freight and passenger business, until December 28, 1917, at which time the President, acting under authority granted him as a war power, took possession and assumed control of the steam railroads in continental United States and proceeded to operate them as if in fact they were owned by the government. The second epoch may be said to cover the period of twenty-six months while the railroads were under the direct control and operation of the government. The third epoch began on March 1, 1920, when the railroads were returned to their owners under the provisions set forth in the Transportation Act of 1920.

I shall now refer briefly to the first epoch. The American railroad system, as we use the term, is made up of more than 1,800 independent companies which, under the terms of the Transportation Act, report to and are under the control of the Interstate Commerce Commission. Something like 200 of these companies, having annual revenues in excess of \$1,000,000 per year, are designated by the Commission as Class I railroads. These 1,800 or more companies have a combined main line trackage of about 265,000 miles, and together they own about 2,400,000 freight cars, about 69,000 locomotives and about 157,000 cars designed for passenger

train service—representing in all an aggregate investment in property of about \$20,000,000,000.

These properties were built up almost wholly from private funds invested voluntarily in the hope of receiving a satisfactory return in the form of profits. They were developed under the competitive system, and no one so far as I know ever attempted to visualize an American railroad system reaching to all parts of the country. As a matter of fact, the laws themselves discouraged such a combination or concentration of transportation agencies under one central control. It may be said, however, that until the process was checked by the Sherman Act and other similar laws, there was observable a definite and active tendency on the part of the roads to resolve themselves into groups designed to serve more effectively—and by effectively I mean efficiently and economically—the traffic needs of certain large territories. The New York Central, Burlington and Santa Fe systems reflect the practical result of such tendencies. As I have already said, even that tendency was discountenanced and checked, if not wholly stopped, by the operation of the laws. It is true that men of vision some few years previous to federal control began to discuss the problem in continental terms, but no definite steps in that direction were taken until the spring of 1917, and the action then taken, which resulted in the establishment of the War Board, was undoubtedly hastened, if not wholly inspired by the emergency created by the entrance of our country into the great war.

My friend, Mr. Kruttschnitt, who was one of the members of the War Board, prepared a very illuminating report of the activities of the Board. He stated in his report, among other things, that the American railroads as a whole during 1917 carried 127,000,000,000 more ton miles than they carried during 1915, two years previous. Mr. Kruttschnitt further stated that during the period of the War Board's activities orders were given by them for the movement of more than 200,000 empty cars, regardless of ownership, from one part of the country to another, where they could be used best to promote the winning of the war. Nothing of the kind had ever been done before or even contemplated in this country.

It has been said by some that the railroads broke down as transportation agencies in 1917. I think you will agree, however, that if the figures I have quoted from Mr. Kruttschnitt's report have any significance at all, they show clearly that the railroads not only did not break down, but on the contrary made an unprecedented performance.

It is true that in the fall of 1917 there began to be an excessive accumulation of cars on the eastern seaboard, and the transportation movement began to slow down, but there is no earthly reason for ascribing the situation to a breakdown of the railroads. On the contrary it might better and more truthfully be said that it was due to the fact that the railroads were able to carry and did carry more tonnage than could be absorbed by ships for export, and by mills for manufacture. The trouble was due to an excess rather than to a shortage of transportation.

The second epoch began with the taking over of the roads by the President. The Director General, acting for the President, had full authority to consolidate, co-ordinate and operate the railroads regardless of all laws, and he also assumed and exercised autocratic control over the movement of all traffic, and properly so under the circumstances.

The ton mileage carried by all the railroads under the Director General in 1918, he having full authority and no restrictions, was barely 2 per cent greater than it was under the unified direction of the War Board, with no control over priorities or tonnage movement and with all the restrictions imposed by a long series of restrictive laws. If the railroads had indeed broken down in 1917, then I submit that a breakdown plus 2 per cent would not of itself be a very big accomplishment in 1918. At the same time we do know that during the year 1918 the railroads rendered a splendid transportation service and thereby contributed much towards winning the war, but even so we must remember that the service rendered only reflected an increase of 2 per cent above what had been accomplished the previous year.

During the period of federal control the statement was frequently heard that the advantages of unified control and operation were so great that they should be retained in the interests of the people. It was also said that they could only be realized in connection with the policy of government ownership, or at least with federal control and operation. The fallacy of that statement, I think, has now been established; that is to say, the fallacy of that part of the statement which claims that the benefits of unified operation can only be realized in connection with governmental control. In justice to the railroads it should be remembered that the railroad presidents themselves were the first to visualize the supreme importance of unified control of the railroads in times of emergency, and not only did they visualize its value, but they gave definite expression to their vision through the operations of the War Board.

I shall not discuss further the second epoch, not, however, because it does not afford a basis for further discussion, but simply because it represents a wholly illogical development, from my point of view—brought about by war conditions and not by normal economic influences or requirements.

We now come to the consideration of the third or present epoch, which I hope and believe will be an enduring and successful one, based on the policy of private ownership and operation of the railroads with governmental control.

A careful reading of the debates which took place in Congress during the consideration of the new Transportation Act clearly establishes the fact that it was the belief of Congress at that time that private ownership and operation of the railroads ought to be continued in this country, and it was just as clearly the intention of Congress to make private ownership possible by suitable legislation, and the new Transportation Act of 1920 was framed with that end in view. While there is much that is new in the Act of 1920, I will refer only to some of its outstanding features, which I consider of fundamental importance.

Of first importance, as I view the matter, is the question of unified control, to which I have already made reference, because the advantages to be derived from unified control of the railroads are so important that unless they can be realized under private ownership in times of emergency, that fact of itself might compel the acceptance of some other policy. It should be clearly understood, however, that unified operation can only be had at any time at the expense of competition of service, and such a price is too much to pay even for unified control except in times of emergency. Congress evidently believed, having knowledge of what the railroads had accomplished under the War Board, that with suitable legislation the benefits of unified control and direction could be fully realized under private ownership when necessary, and they wrote an important portion of the law to cover that point.

In short, they gave to their agent, the Interstate Commerce Commission, full power in times of emergency to control and direct the movements of all the cars and all the engines of all the railroads regardless of ownership. Congress also said that in the exercise of this great power the Commission could make use of such agencies as it might select.

In harmony with and shortly after the passage of the law, the railroads appointed an advisory committee, consisting of eleven executives geographically selected, to take over the direction of the Car Service Commission in Washington, which had been created by the War Board and continued by the Director General.

The advisory committee was instructed to co-operate with the Interstate Commerce Commission for the purpose of carrying out and accomplishing the real intent of the law.

I think we may fairly say that the railroads have again demonstrated, if further demonstration be necessary, that the advantages of unified control and operation can be fully realized with private ownership and operation under the terms set forth in the new Transportation Act.

One other important feature of the Act, and the last to which I shall specifically refer, is worthy of consideration at this time, and that is the provision which deals with the labor problem and has to do directly with the wages and working conditions of upwards of 2,000,000 employees. We ought not to minimize the importance of the labor problem in its relation to the railroad question as a whole. It is manifestly important that there should be continuity of service by the railroads in a country such as ours, and one of the important problems before Congress was to insure if possible continuity of service, by guarding against the interruption of the service by any misunderstandings and disputes which might possibly arise between the railroad managers and their employees.

It was urged by some that the law should be written so as to prohibit strikes upon the railroads, but it was not possible to enact legislation of that character, nor do I think it would have been wise to enact such legislation at that time. While I am as much opposed as anyone to strikes upon the railroads, I believe it would be a mistake for Congress to pass a law

prohibiting strikes unless we are quite certain we shall be able to enforce such a law once it has been enacted. Personally I did not believe that we had reached a stage where we could feel confident that such a law would or could be effectively enforced, consequently I was opposed to its passage. Congress dealt with the matter, I think, in the wisest way possible under the circumstances. It created machinery or set up agencies by which the employees could be assured of obtaining just as fair wages and working conditions without striking as they could reasonably expect to obtain even if they did strike.

It may indeed be said that Congress by this Act has made a preferred class of the railroad workers, because so far as I know, this is the first and only time that Congress has ever definitely said that any particular class of the people should be given at all times and under all circumstances just and reasonable wages and working conditions. Of course Congress did not do this primarily in the interest of the workers. Congress acted only as it had a right to act in the interests of the nation as a whole. Congress acted with a full realization of the importance of an uninterrupted transportation system in a country such as ours, but being unwilling to deprive the workers of their right to strike (and nothing in this bill does deprive the workers of their ultimate right to strike), it sought to provide machinery which would make it unnecessary under any circumstances for the men to stop work in order to obtain just and reasonable treatment. In short, Congress provided or aimed to provide by law so that the railroad workers would at all times be assured of just as good wages and just as good working conditions without striking as they could reasonably expect to secure if they did strike, for it is clear that no one could justify or expect to win a strike for wages or working conditions that would be unjust or unreasonable.

It may also be that in some respects this portion of the law is incomplete and inadequate, and time may develop that changes are necessary. If so, they will undoubtedly be made. In the meantime it is certainly in the interest of all that the law, or especially this particular feature of the law, should be given a fair and thorough trial, and I firmly believe that as the law comes to be better understood by the railroad workers they will realize that they have indeed been made a preferred class, in which event I venture to predict that we shall be largely, if not wholly, immune from railroad strikes in the future, not, however, because the men have been forbidden to strike, for I repeat, there is nothing in the law which limits the right of the railroad workers to strike if they still want to do so, but simply because the law provides a way by which they can obtain without striking everything that they could reasonably expect to obtain if they did strike.

While some criticism has been voiced against the labor provision of the Act, not only by the employees but by the employers as well, I am still hopeful that this feature of the Act will eventually prove to be wise and satisfactory, and if the three features of the new legislation to which I have specifically referred work out as it was the intention and belief of Congress that they would work out, then I think Congress has made private ownership and operation of the railroads in this country possible, but whether private ownership and operation of the railroads endures—having been made possible—depends largely if not wholly upon whether the railroads under private ownership and operation are able to give and do give the public satisfactory service. At the present time it would seem that there is a majority, in fact a large majority, of public opinion in favor of private ownership and operation, but we have seen public opinion change suddenly, and I have no doubt that it would change again just as quickly and react just as strongly against private ownership, if the public felt that upon the whole they would be likely to get more satisfactory service some other way. As

I view the matter, private ownership and operation of the railroads is still on trial in this country, but it has everything in its favor and it ought to win and I believe it will win if the managers, measured by the service which they give the public, deserve to win.

Since the termination of federal control we have actually seen the railroads, operated by private management under the provisions of the Esch-Cummins Act, move in 1920, 9,000,000,000 ton miles more than in 1918, employing substantially the same facilities. We have seen the Interstate Commerce Commission, under the terms of the same Act, promptly authorize such rate increases as would, in its opinion, fulfill the requirements of the Act, and we have also seen one of the most complex labor situations ever developed, dealt with in orderly fashion by the agencies created by the Act, without interruption of the transportation service. The very fact of the controversy in Chicago speaks volumes for the Act. Questions involving wages and working conditions affecting nearly 2,000,000 human beings are certain to bring out points of difference, and if the contestants should sometimes raise their voices above the conventional pitch of polite society, it would not follow that the law had failed—on the contrary it would indicate that the problem was being worked out just as Congress intended it should be, and without interruption of the service. I am inclined to think that under the present law wages of railway workers as a whole may be somewhat higher in the future than would be the case were there no such law, but even so, if the public is thereby assured freedom from interruptions of service, the immunity so purchased will be well worth the price.

It has sometimes been said in the past that the Interstate Commerce Commission seemed to be anxious only to protect the interests of the public. Perhaps there may have been a modicum of truth in that statement; perhaps the Commission felt that the railroads were quite able to look after their own interests, and consequently let the railroads bear the burden of proof. But whatever may have been the situation in the past, the new law makes it clear that while Congress still expects the Commission to look after the interests of the public, just as carefully as it ever did in the past, Congress also recognized by definite expression that in looking after the interests of the public, the Commission should keep in mind that the public's interests will be best promoted by an efficient transportation service, and will not be promoted by a poor, badly developed and inadequate transportation service.

Opportunity has been afforded me to view the situation, and I have been convinced that the Commission has taken hold of the difficult problems confronting it under the new Act with the desire only of carrying out the clear intent of Congress. Chairman Clark and his associates with whom I have had occasion to come in contact, have always been most helpful. They have always been anxious to know all of the facts concerning any particular case, and have not hesitated to use their power and authority in such way as seemed to them most likely to promote the public welfare. The relationship which has developed between the Federal Commission and the railroads under the new Transportation Act to my mind is most encouraging, and if the relationship already established continues and if the railway managers appreciate that they themselves, as well as the institution of private ownership, are on trial, and if they meet the fair and reasonable requirements of the public for transportation, I feel confident that the success of private ownership is assured.

The fact that, from rates fixed in accordance with the provisions of the Act, the net earnings of the carriers at the present time are disappointing, is not due to any fault or failure of the Act. The condition referred to is due largely to the decline in volume of business and the excessive cost of operation. I am confident that the problems so presented, while complex and difficult, will be solved.

The New Problems of Management and Regulation

Address by Edgar E. Clark, Chairman, Interstate Commerce Commission

CONGRESS DEALT liberally with the railroads that had been taken from the possession of their owners as a war measure. For something over two years the government fixed the level and conditions of expenditures and of rates. The operating expenses were increased in greater proportion than were the rates and fares. Recognizing this situation Congress provided, for a period of six months following the termination of federal control, certain guaranties. It recognized that further increases in rates were imperatively necessary and it was contemplated that within that guaranty period arrangements would be made to make such increased rates effective. That policy and purpose were carried out with the result that rates and fares were placed upon a higher plane than they had been for many years. This fact, of course, attracted the attention of all users of our railroads. Too many of them, however, directed their attention to the charges for service and closed their eyes to the increased operating expenses.

Roads' Capacity Demonstrated

Immediately following the termination of federal control the railroads successfully moved a larger tonnage than had ever been moved. The capacity of the transportation machine was demonstrated. Serious interference resulted from labor difficulties and later the volume of traffic fell off due to readjustment of industrial conditions. The financial results from operation in recent months have been disappointing. Grave, and no doubt in many instances serious, losses have been experienced by producers and distributors. This has caused a good deal of impatience which has taken the form of demands for reductions in transportation charges. The official figures for the month of December show that for the United States the Class I roads had an operating ratio of 91.3. That means that the operating cost of earning each dollar was 91.3 cents, and 8.7 cents of each dollar were left with which to pay taxes, interest charges, and return upon property values. Obviously that margin is too narrow.

Modern Charioteers

As might be expected, suggested measures of relief are extreme or moderate dependent upon the point of view of the one who makes the suggestion. Phaeton, having been promised by his father, Apollo, that any wish that he might express should be granted, demanded that he be permitted for one day to drive the chariot of the sun. Unable to dissuade his son and unwilling to break his promise Apollo gave Phaeton careful instructions and warnings and permitted him to start. The last advice Apollo gave was "Spare the whip and hold tight the reins." Phaeton started but soon found that he could neither control nor guide the fiery steeds. They dashed headlong and unrestrained into unknown regions, now high in the heavens, now down almost to earth. The earth was scorched and blackened and was saved from destruction only by Jupiter launching a lightning bolt that struck Phaeton dead from the chariot. Modern Phaetons now clamor to be given permission to drive the chariot of transportation by railroad.

I knew a locomotive fireman who had difficulty in keeping the water in the boiler warm enough to shave with, but who could see, day by day, that the master mechanic and the superintendent were making pretty nearly clear scores of errors. Such men are now in evidence.

Reason Must Prevail

When we consider the circumstances out of which present conditions grew is it not sensible and reasonable to recognize

the necessity for gradual readjustment of the economic forces and affairs of the world as the foundation for gradual improvement in the situation we are discussing? Some rates are too high to permit the free movement of traffic. Some rates are unreasonably low. Careful study of such situations has been and is going on and readjustments have been and are being made accordingly. Doubtless there have grown up operating expenses, the aggregate of which is substantial, which cannot reasonably be defended. They should be eliminated. Every effort must be made to insure all possible, attainable, reasonable economies. The owners of the properties may be obliged for a time to accept less return upon their investment than would otherwise be expected. If reason can prevail and a united, genuine effort can be put forth and maintained, it is morally certain that the situation will improve and that we will progress toward that condition of affairs which the Congress had in view, which the law contemplates and which we all hope to see. Slightly paraphrasing an expression I read recently—"it is doubly incumbent upon us in the stand which we take to avoid the appearance of selfish shirking.

"We all know how large a part popular impressions have in forming public opinion and how long it takes for the slowly developing proof of facts to rectify such impressions when once they have taken hold." We must build upon the foundation of experience and sound business judgment that is free from "selfish shirking," and not upon the unstable ground of theories and opinions that in large part ignore the true facts.

Necessary Preferences

Some critics assert that the law makes of the railroad business a preferred business and confers upon the owners special favors. Others assert that it recognizes a preferred class of labor.

Conceding that on the surface there is that complexion, and assuming for the purpose of the discussion, but not admitting, that these preferences exist, I ask, if this be so, is it wrong? If this be so, why is it so? Congress recognized, as did all thoughtful men, that transportation is the life blood of commerce and industry and vital to the protection of our nation. It must be provided in adequate and reasonably efficient form. Continuous and dependable operation of our transportation machine is almost as important as its existence. The law was formulated in the interest of the country and of the public. The capital invested in, and the men who operate our transportation machine are employed in serving the public which must and should compensate both. If it clearly appears that in order to give the country the quantity, quality and character of service that it needs, to which it is entitled, and for which it must pay, some preference, apparent or real, should be afforded to the capital and the men that are employed in that service, I submit that such preference is not undue so long as the public's right to reasonable and nondiscriminatory service and charges is protected. But if that capital and those men are recognized as having a preferred status because of the public character of the service in which they are employed, those men and the owners of that capital must recognize an obligation to the public which also springs from the character of the service in which they are employed.

Long before the Transportation Act was framed the Supreme Court had made it entirely clear that the Federal Commission was clothed with power and charged with the duty to require removal of undue prejudice against interstate shippers or localities and undue preference of State shippers and localities. That principle of law was accepted

as sound and as settled. The Transportation Act retains the condition that its provisions shall not apply to transportation wholly within one state. That provision is, however, in a section the foundation of which is that all rates, fares and charges shall be just and reasonable. In another section the Congress has put in statutory form what was the law before. It has made it a little more explicit by specifically prohibiting unjust discrimination against interstate commerce and has authorized a carrier to complain of such discrimination. The states are left free as they were before to regulate the state charges so long as they do not create undue preference of state traffic, undue prejudice against interstate traffic, or unjust discrimination against interstate commerce. The federal Commission does not interpret the law as conferring upon it any regulatory powers over the state rates or fares except for the purpose of removing the prohibited preference, prejudice or discrimination. It has found it necessary in several instances to exercise that power, and appeals therefore have been taken to the courts in various jurisdictions. In so far as the courts have spoken they have sustained the power exercised. The underlying question has been submitted to the Supreme Court of the United States and in due time will be by that body set at rest.

Fluctuation of Rates

One who is not versed in transportation charges and their effect can not appreciate the extent to which changes are necessary due to constantly changing commercial and industrial conditions and to competitive relationship between carriers and between communities and commodities. It is neither necessary nor desirable that the States shall be shorn of power to regulate their internal affairs. The same considerations that led the framers of the Constitution to reserve to the federal government the powers to which I have referred require retention and exercise of those powers within reasonable and appropriate limits. If a state has the right to require the railroads traversing it to serve the citizens of that state at lower charges than they contemporaneously assess against the citizens of other states, the effect would be the same as if that state were to levy a tax upon outsiders for the privilege of transporting goods into the state.

When the Supreme Court shall have spoken and these controversies have been stilled it will, I predict, be found that in principle and substance the law is not materially different now from what it was when that court decided the Shreveport case. When that clarification of the law shall have occurred there will, I think, be no serious difficulties about the exercise by the federal and state regulating bodies of their respective powers in their respective fields.

Local Self-Government

I would not unduly centralize power and control. I like to think of the United States as a single entity, and the experiences through which we have just passed have emphasized more strongly than ever before the fact that among the nations of the world we must be so considered and must so consider ourselves. At the same time in the conduct of our domestic affairs we can and should adhere as far as is practicable to the ideas of self-government and local government, reserving, however, certain fundamentals for control and administration by the national government.

The growth of civilization has been accompanied at every step by the maintenance and exercise of the police power. Peaceful possession of property and safety to life could not otherwise exist. The police power must extend as far as civilization and human rights extend. The limits of the jurisdiction of the various police powers must be clearly defined and properly recognized, and that after all is the real question in the controversies to which I have just referred.

It is not alone in what might be called minor matters of competition and charges that changes which affect transportation problems in substantial degree come with frequency and rapidity. These changes, some of them almost fundamental, must be taken into account along with arrangements for caring for the steadily and continuously growing population and traffic.

Water and Highway Lines

During the war expenses of operation on vessels increased more than they did on railroads. There was a heavy demand for ships in overseas traffic and transportation by rail and water became more expensive than by rail. The currents of traffic were markedly affected thereby. In the light of the experiences of generations it can not be expected that water transportation will long remain on a higher level of cost than transportation by land. There is now an abundance of ships and no one can predict the extent to which they will be employed in direct competition with our railroads or the extent to which that competition will necessitate readjustment of the affairs of the railroads.

The development of the automobile and the auto truck and the building of good roads have made possible transportation for comparatively short distances by that means in sharp competition with the railroads. During the war the utilization of that and other methods of transportation was urged in an attempt to relieve the railroads in their efforts to move the tremendous volume of traffic which was offered. Now freight is moving in substantial quantities in that manner instead of by railroads. In many instances it is doubtless the cheaper method of transportation. The state furnishes and maintains the right of way and track.

No one can confidently predict what the effect of the solution of these problems may be upon questions which we perhaps now consider as settled. New problems will arise, and so with continuous changes in the affairs of men, of business and of nations there is an ever present necessity for changes in the facilities and machines through and by means of which transportation is conducted. No one can now see clearly the extent to which electricity will be substituted on our railroads for steam power.

No General Rate Reduction

It is no time for stubborn thinking, but it is a time to think of facts, which are said to be stubborn things. The whole country and all of our people, excepting those who are and have been shamelessly profiteering, are suffering the after effects of a titanic war. In some places the agriculturist and the horticulturist are leaving their crops to decay in the fields and on the trees because they can not sell them at prices that more than cover the costs of harvesting, transporting, and marketing, and yet the housekeeper purchasing for the home table finds the cost of such commodities close to what it was during the active hostilities.

In some quarters zealous efforts are made to have it appear that this situation is in large part or in the main due to high freight rates. The freight rates are high. I have yet to meet a well informed man who does not feel that as a general thing they can be made no higher as a revenue measure. Careful inquiry into some distressing situations discloses that the utilization of products is prevented, not by freight rates, but by economic conditions and perhaps manipulated markets. In November, 1920, the average ton-mile revenue of the railroads of the United States was 75.7 per cent higher than in 1913. At the same time the wholesale prices of commodities that are transported in large quantities averaged 107 per cent higher than in 1913, and in May, 1920, they were 172 per cent over 1913. Reference has been made to operating costs of the railroads. Until the foundation has been laid for widening the margin between the revenue and the cost of earning it, it is difficult to find justification for a general reduction in rates.

General News Department

The thirteenth annual meeting of the International Railway Fuel Association will be held on May 24 to 26 at the Hotel Sherman, Chicago.

Traffic was resumed on the Missouri & North Arkansas on March 24 after a tieup of more than a week due to the destruction of the road's property by strikers. One train was started each way on the northern end of the line with guards on the train and special officers and citizens volunteers to prevent further destruction of bridges or other property.

The Committee on Relations of Railway Operation to Legislation, provided for by the action of the American Railway Association at Chicago, last November, consists of the following members: W. J. Jackson (chairman), C. & E. I.; L. W. Baldwin, I. C.; E. P. Bracken, C. B. & Q. This committee will work in close co-operation with Colonel A. P. Thom, general counsel of the Association of Railway Executives.

The Freight Station Section of the American Railway Association has begun operations under a temporary committee of direction; and each railroad is requested to furnish the committee with names of officers or agents who are to serve as representative members. Where more than one is designated the advice should give the name of the individual who is to cast the vote of the railroad company. This information should be sent to R. O. Wells, secretary of the Section, 431 South Dearborn street, Chicago.

P. J. McNamara, vice-president of the Brotherhood of Locomotive Firemen and Enginemen, and W. L. McMenimen, deputy president of the Brotherhood of Railroad Trainmen, called on President Harding last week to discuss the railroad situation and urge him to appoint a railroad employee as a member of the Interstate Commerce Commission. Representatives of various organizations whose membership consists largely of the so-called "subordinate officials" called on President Harding on March 28 and submitted several names from which he was urged to select one as a member of the Railroad Labor Board.

The National Lumber Manufacturers' Association has been asked by the National Retail Lumber Dealers' Association to join in a demand upon the Railroad Labor Board that the shipping public be given consideration in the controversy over wages and working conditions in railroad employment. The association urges that the public be given a hearing, the national agreement abrogated, and that the railroads be allowed to take the action they deem necessary for the protection of the public interest and the revival of prosperity for the transportation systems in order that business conditions may be stabilized.

"Summer time" will prevail in Massachusetts for five months this year, a law to that effect having been approved on March 23. The Boston & Albany intends to adopt its summer time-table on April 24, the same date on which the New York, New Haven & Hartford changes the times of trains to correspond with the daylight saving action of New York City. The city of Providence, Rhode Island, has provided for five months' summer time, the legislature of the state having failed to take action. Towns in Connecticut near New York City have asked the governor to refuse approval of the recent act of the Connecticut legislature requiring clocks to be continued on Eastern Standard time. The Merchants' Association of New York City is working for a referendum, to be held next November, on the question of establishing summer time throughout the state of New York. The governor of Michigan has issued a proclamation urging all cities and towns in that state to adopt Eastern time, be-

ginning April 3, as a daylight-saving measure. A number of cities in Michigan have already taken action looking to the adoption of Eastern time in the summer.

Proposed changes in the classification of railway employees for statistical and similar purposes were considered at a joint hearing held at Washington on March 30 by Horace Secrist, statistician of the Railroad Labor Board, and M. O. Lorenz, chief of the Bureau of Statistics of the Interstate Commerce Commission. Mr. Secrist explained that it was of great importance for the purposes of the board to have more accurate classification of railway employees than has heretofore been found necessary and that it was especially important that there be accurate definitions of the various classifications so that there might be general agreement in discussing these matters. The board had proposed a tentative classification of 148 classes and has been working in connection with the Interstate Commerce Commission with a view to having similar classification used by the commission for statistical purposes. Alfred P. Thom, representing the railway executives, said that this increase in the number of classifications would add \$4,000,000 a year to the expense to the railroads of reporting the information and he suggested that the plan be simplified by a reduction to 123 classes. It was then decided to hold a series of round table conferences attended by the representatives of the two boards, of the railroads, and of the railroad employees, for the purpose of working out the details of the classification.

Aishton Asked to Take Charge of Railway Mail Service

R. H. Aishton, president of the American Railway Association and formerly president of the Chicago & North Western and later regional director under the Railroad Administration, has been offered the position of second assistant postmaster general, in charge of the railway mail service, under the new postmaster general, Will H. Hays. It is understood that Mr. Hays is very anxious to have Mr. Aishton accept the position, but Mr. Aishton's attitude has not yet been stated.

Mechanical Division of A. R. A. to Meet in Chicago

The General Committee of the Mechanical Division of the American Railway Association, at a meeting in New York on March 30, decided to hold a business session at the Hotel Drake, Chicago, on June 15 and 16, instead of the convention that was to have occurred at Atlantic City. The program has been modified and reports will be presented only by the committees on the following subjects: Prices for Labor and Material, Car Construction, Loading Rules, Brake Shoe and Brake Beam Equipment, Train Brake and Signal Equipment, Specifications and Tests for Materials, Tank Cars and Standard Methods of Packing Journal Boxes. Both morning and afternoon sessions will be held while the division is meeting.

Railroads Report Deficit for January

Preliminary compilations of the reports to the Interstate Commerce Commission of 202 roads for January show a deficit of \$1,167,000. One hundred and nine of the companies failed to earn their expenses and taxes for the month, as compared with 88 that had deficits in December. To earn a 6 per cent return on their valuation it has been estimated that the railroads should have earned in January about \$67,000,000. Of the roads that had deficits 45 were in the Eastern district, 16 in the Southern and 48 in the Western. The total operating revenues for January were \$468,834,000, an increase of 5.2 per cent as compared with 1920. The total operating expenses were \$442,000,000, an increase of 6.6 per cent. Freight revenues for the month were \$323,000,000, an increase

of 4.2 per cent, while the passenger revenues were \$105,000,000, an increase of 14.6 per cent. For the five months dating from the rate increase the net operating income of the carriers has been \$225,000,000, which would be at the rate of 2.84 per cent a year on the valuation.

Investors Invite Brotherhoods

S. Davies Warfield, president of National Association of Owners of Railroad Securities has asked the "big four" railroad employees' brotherhoods to appoint a committee to confer with a special committee of twenty-five financiers and bankers on the solution of the present country-wide freight-rate and wage-rate problem. "An immediate and partial remedy seems to lie in an adjustment of relations between the railroads and their employees," said his letter. "One Governmental body sitting in Washington cannot be expected to successfully adjust rates and fares to meet the expenses incident to railroad operations while another, sitting in Chicago, attempts to adjust wages, the largest and most important of all railway operating expenditures which can only be met by rates the commission alone is required to establish."

Mr. Warfield hopes to have the conference on April 4, in New York. The four brotherhoods invited, are the Brotherhood of Locomotive Engineers, Brotherhood of Locomotive Enginemen and Firemen, Brotherhood of Railroad Trainmen and the Order of Railway Conductors.

New Terminal Plans for Chicago

Plans for a drastic rearrangement of all of the railway terminals occupying the area immediately south of Chicago's business center have been submitted to the mayor and city council of Chicago by the Chicago Railway Terminal Commission of which John F. Wallace is the chairman. This plan involves a straightening of the Chicago river between Polk and Sixteenth streets in an area occupied almost exclusively by the railroads. It also implies the removal of all terminal developments of the railroads in the area north of Roosevelt road between the Chicago river and State street as well as a considerable area south of Roosevelt road between State street and Clark street, thereby doing away with the Grand Central, La Salle and Polk street passenger terminals, these facilities to be replaced by adequate passenger terminal developments in connection with the Illinois Central lake front project. The freight terminals to be eliminated will be replaced by an extensive freight house and team track development in the area west of Clark street and south of Roosevelt road. The advantage claimed for this plan from the standpoint of the city would be the extension of four through north and south streets southward from the central business district which are now obstructed by railway properties.

To Make First Class Ticket Sellers

J. S. McClure, manager of the Consolidated ticket office at Denver, Colo., in a recent circular, gave his clerks a list of "a few good things to do," which will make interesting reading in any ticket office. He begins by telling the clerks that "this is old stuff"—which is true; but it is fresh advice nevertheless. Following are some samples:

Trying. Try to grant the passenger's request. Try to find instructions that will let you do so. Most requests can be granted if you try to find a way. When reasonable requests are apparently unauthorized, take up with agent's office and we will try to help you. When refusal is necessary, do so with regret, and explain why. We can please nearly everyone if we really try.

Don't take the easiest way and try to find an instruction that will allow you to refuse. Don't be curt or seem in a hurry in refusing.

Know your business. Know it in advance. Study and understand tariffs and fares. Understand folders and guides. Understand routes and optional routes, and give passenger the benefit. Understand tickets. If you don't know, *don't guess*. Find out, *and remember*. Learn the reason. There is a reason for rates, routes, etc., and you can find out. It will help avoid mistakes.

Interest. Take an interest in your passenger. His trip means a good deal to him, and he welcomes your interest. Cultivate

talking and getting an interest. It is easy to do, and enjoyable. It really makes your work easier, and much more satisfactory. It makes for a satisfied and thankful patron. But it must be a real interest, and not put-on or deceptive.

Be sure about little things. They count.

Pleasing. Most any one can get along nicely with 19 out of 20 of our patrons. Make a study of it and please the other one. The really good man can "handle" them all. If you make a mistake in your "handling" of a patron, profit by it and never make the same mistake again.

Meetings and Conventions

The following list gives names of secretaries, dates of next or regular meetings and place of meetings:

AIR BRAKE ASSOCIATION.—F. M. Nellis, Room 3014, 163 Broadway, New York City. Next convention, May 3-6, 1921, Hotel Sherman, Chicago. Exhibit by Air Brake Appliance Association.

AIR BRAKE APPLIANCE ASSOCIATION.—Fred W. Venton, 836 So. Michigan Ave., Chicago. Meeting with Air Brake Association.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—F. A. Pontius, Supervisor of Demurrage and Storage, C. & N. W. Ry., Chicago.

AMERICAN ASSOCIATION OF DYING CAR SUPERINTENDENTS.—S. W. Derr, Philadelphia & Reading, Philadelphia, Pa.

AMERICAN ASSOCIATION OF ENGINEERS.—C. E. Drayer, 29 S. La Salle St., E. I. R. R., 332 South Michigan Ave., Chicago. Next meeting, June, 1921, Quebec, Can.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—J. Rothschild, Room 400, Union Station, St. Louis, Mo. Next convention, August 24-26, 1921, Kansas City, Mo.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Burritt, 8 W. 40th St., New York.

AMERICAN RAILROAD MASTER TINNERS', COPPERSMITHS' AND PIPE FITTERS' ASSOCIATION.—C. Borchardt, 202 North Hamlin Ave., Chicago, Ill. Next convention September 12-14, Hotel Sherman, Chicago.

AMERICAN RAILWAY ASSOCIATION.—J. E. Fairbanks, General Secretary, 75 Church St., New York, N. Y. Next regular meeting, November 16, 1921.

Division 1—Operating, W. J. Frupp (Chairman), General Manager, New York Central Railroad, Eastern Lines, New York, N. Y.; R. E. McCarty (Vice-Chairman), General Manager, Central Region, Pennsylvania System, Pittsburgh, Pa.

Freight Station Section (including former activities of American Association of Freight Agents), C. E. Fish (Chairman), Freight Agent, Baltimore & Ohio Railroad, Cincinnati, Ohio; J. C. Gilmore (First Vice-Chairman), Freight Agent, Pennsylvania System, Philadelphia, Pa.; C. M. Teschemacher (second Vice-Chairman), General Agent, Chicago & Alton Railroad, Chicago, Ill.; R. O. Wells (Secretary), Freight Agent, Illinois Central Railroad, Chicago, Ill.

Medical and Surgical Section, D. Z. Danott (Chairman), Chief Surgeon, Western Maryland Railway, Baltimore, Md.; G. G. Dowdall (First Vice-Chairman), Chief Surgeon, Illinois Central Railroad, Chicago, Ill.; Duncan Eve (Second Vice-Chairman), Chief Surgeon, Nashville, Chattanooga & St. Louis Railway, Nashville, Tenn.

Protective Section (including former activities of the American Railway Chief Special Agents and Chiefs of Police Association), R. S. Mitchell (Chairman), Chief Special Agent, Missouri Pacific Railroad, St. Louis, Mo.; H. L. Denton (First Vice-Chairman), Police Superintendent of Police, Baltimore & Ohio Railroad, Baltimore, Md.; Emmet Gregg (Second Vice-Chairman), Superintendent Special service, Atchison, Topeka & Santa Fe Railway, Topeka, Kan.; J. C. Cavison (Secretary), 75 Church St., New York, N. Y.

Telegraph and Telephone Section (including former activities of the Association of Railway Superintendents), H. Hulatt (Chairman), Manager of Telegraphs, Grand Trunk Railway, Montreal, Que.; W. H. Hall (First Vice-Chairman), General Superintendent of Telegraph, Missouri, Kansas & Texas Lines, Demson, Texas; R. F. Finley (Second Vice-Chairman), Superintendent Telegraph, New York Central Lines, West of Buffalo, Cleveland, Ohio; W. A. Fairbanks (Secretary), 75 Church St., New York, N. Y.

Division II—Transportation (including former activities of the Association of Transportation and Car Accountants), E. J. Pearson (Chairman), President, New York, New Haven & Hartford Railroad, New Haven, Conn.; J. J. Bernet (Vice-Chairman), President, New York, Chicago & St. Louis Railroad, Cleveland, Ohio; C. W. Crawford (Chairman, General Committee), 431 South Dearborn St., Chicago, Ill.; G. W. Covert (Secretary), 431 South Dearborn St., Chicago, Ill.

Division III—Traffic, G. H. Ingalls (Chairman) Vice-President, New York Central Lines, New York, N. Y.; J. Gottschalk (Secretary), 143 Liberty St., New York, N. Y.

Division IV—Engineering, H. R. Safford (Chairman), Assistant to the President, Chicago, Burlington & Quincy Railroad, Chicago, Ill.; C. J. Kelloway (Vice-Chairman), Superintendent of Signals, Atlantic Coast Line Railroad, Wilmington, N. C.; E. H. Fritch (Secretary), 431 South Dearborn St., Chicago, Ill. Next annual meeting, March 15-17, 1921, Chicago, Ill.

Construction and Maintenance Section, H. R. Safford (Chairman), Assistant to the President, Chicago, Burlington & Quincy Railroad, Chicago, Ill.; E. H. Fritch (Secretary), 431 South Dearborn St., Chicago, Ill.

Electrical Section, George Gibbs (Chairman), Chief Engineer of Electric Traction, Long Island Railroad, New York, N. Y.; E. B. Knute (Vice-Chairman), Chief Engineer of Electric Traction, New York Central Railroad, New York, N. Y.; E. H. Fritch (Secretary), 431 South Dearborn St., Chicago, Ill.

Signal Section (including former activities of the Railway Signal Association), F. W. Pilegus (Chairman), Signal Engineer, Union Pacific Railroad, Omaha, Neb.; F. B. Wiegand (First Vice-Chairman), Signal Engineer, New York Central Railroad, Western Lines, Cleveland, Ohio; C. A. Christofferson (Second Vice-Chairman), Signal Engineer, Northern Pacific Railway, St. Paul, Minn.; H. S. Balliet (Secretary), 75 Church St., New York, N. Y.

Division V—Mechanical (including former activities of the Master Car Builders' Association and the American Railway Master Mechanics' Association), W. J. Tollefson (Chairman), General Mechanical Superintendent, Chicago, Rock Island & Pacific Railway, Chicago, Ill.; J. Coleman (Vice-Chairman), Assistant to General Superintendent Motive Power and Car Departments, Grand Trunk Railway, Montreal, Que.; V. R. Hawthorne (Secretary), 431 South Dearborn St., Chicago, Ill. A business session at the Hotel Drake, Chicago, will be held on June 15 and 16, instead of the convention at Atlantic City, N. J. Exhibit at this convention of Railway Supply Manufacturers' Association has been cancelled.

Equipment Painting Section (including former activities of the Master Car and Automobile Painters' Association), E. L. Younger (Chairman), Foreman Painter, Missouri Pacific Railroad, Little Rock, Ark.; J. G. Keil (First Vice-Chairman), Foreman Painter, New York Central Railroad, Western Lines, Elkhart, Ind.; J. R. Ayers (Second Vice-Chairman), General Manager Painter, Canadian Pacific Railway, Montreal, Que.; V. R. Hawthorne (Secretary), 431 South Dearborn St., Chicago, Ill.; A. P. Dane (Assistant Secretary), Foreman Painter, Boston & Maine Railroad, Reading, Mass.

Division VI—Purchases and Stores (including former activities of the Railway Storekeepers' Association), H. C. Pearce (Chairman), General Purchasing Agent, Seaboard Air Line Railway, Norfolk, Va.; H. E. Ray (Vice-Chairman), General Storekeeper, Atchison, Topeka & Santa Fe Railway, Topeka, Kans.; J. P. Murphy (Secretary), General Storekeeper, New York Central Railroad, Western Lines, Collinwood, Ohio; W. J. Farrell (Assistant Secretary), 75 Church St., New York, N. Y. Second annual meeting June 20-22, 1921, Atlantic City, N. J.

Division VII—Freight Claims (including former activities of the Freight Claim Association), H. C. Pribble (Chairman), General Claim Agent, Atchison, Topeka & Santa Fe Railway System, Topeka, Kans.; H. C. Howe (First Vice-Chairman), Freight Claim Agent, Chicago & North Western Railway, Chicago, Ill.; D. C. Macdonald (Second Vice-Chairman), General Claim Agent, Canadian Pacific Railway, Winnipeg, Man.; Lewis Filcher (Secretary) 431 South Dearborn St., Chicago, Ill. Next meeting Coronado Beach, San Diego, Calif., May 17, 1921.

AMERICAN RAILWAY BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W. Ry., 319 Waller Ave., Austin Station, Chicago, Next convention, October 18-20, 1921, New York City. Exhibit by Bridge and Building Supply Men's Association.

AMERICAN RAILWAY EQUIPMENT ASSOCIATION.—(Works in co-operation with the American Railway Association, Division IV.) E. H. Fritch, 431 South Dearborn St., Chicago. Exhibit by National Railway Appliances Association.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—(See American Railway Association, Division 5.)

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—R. D. Fletcher, 1145 East Marquette Road, Chicago. Next convention, August 9-11, Hotel Sherman, Chicago. Exhibit by Supply Association of the American Railway Tool Foremen's Association.

AMERICAN SHORT LINE RAILROAD ASSOCIATION.—T. F. Whitteley, Union Trust Bldg., Washington, D. C.

AMERICAN SOCIETY FOR STEEL TREATING.—W. H. Eiseaman, 4600 Prospect Ave.; Cleveland, Ohio. Next convention, September 19-24, Indianapolis, Ind.

AMERICAN SOCIETY FOR TESTING MATERIALS.—C. L. Warwick, University of Pennsylvania, Philadelphia, Pa.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Col. H. S. Crocker (acting secretary), Engineering Societies Building, 33 W. 39th St., New York. Next convention, April 27, 1921, Houston, Texas. Regular meetings, 1st and 3d Wednesdays in month, except July and August, 33 W. 39th St., New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York. Next meeting, May 23-26, Congress Hotel, Chicago.

AMERICAN TRAIN DISPATCHERS' ASSOCIATION.—C. L. Darling, Northern Pacific Ry., Spokane, Wash. Next convention, June 20, 1921, Kansas City, Mo.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—George M. Hunt, Chemist, Forest Products Laboratory, Madison, Wis.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—Willis H. Failing, C. R. R. of N. J., Jersey City, N. J. Next meeting at St. Louis, St. Louis, Mo.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W. Ry., Room 411, C. & N. W. Sta., Chicago. Exhibit by Railway Electrical Supply Manufacturers' Association.

ASSOCIATION OF RAILWAY EXECUTIVES.—Thomas De Witt Cuyler (chairman), 61 Broadway, New York, N. Y.

ASSOCIATION OF RAILWAY SUPPLY MEN.—C. L. Mellor, 212 W. Illinois St., Chicago. Meeting with International Railway General Foremen's Association.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—(See American Railway Association, Division 1.)

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—(See American Railway Association, Division 2.)

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—A. J. Filkins, Paul Dickinson Company, Chicago. Meeting with co-vention of American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—A. Booth, 131 Chaffon St., Montreal, Que. Next meeting, April 12.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 626 North Pine Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, New Morrison Hotel, Chicago.

CAR FOREMEN'S ASSOCIATION OF ST. LOUIS, MO.—Thomas B. Koeneke, Federal Reserve Bank Bldg., St. Louis, Mo. Meetings, first Tuesday in month at the American Hotel, St. Louis, Mo.

CENTRAL RAILWAY CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 2d Thursday in November and 2d Friday in January, March, May and September, Hotel Statler, Buffalo, N. Y.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S ASSOCIATION.—W. P. Elliott, Terminal Railroad Association of St. Louis, East St. Louis, Ill.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S SUPPLY MEN'S ASSOCIATION.—D. B. Wright, 34th St. and Artesian Ave., Chicago, Ill. Meeting with Chief Interchange Car Inspectors' and Car Foremen's Association.

CINCINNATI RAILWAY CLUB.—W. C. Cooder, Union Central Bldg., Cincinnati, Ohio.

EASTERN RAILROAD ASSOCIATION.—E. N. Bessing, 614 F St., N. W., Washington, D. C.

FREIGHT CLAIM ASSOCIATION.—(See American Railway Association, Division 7.)

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Huhner, 321 Grand Central Sta., Chicago. Regular meetings, Wednesdays preceding 3d Friday in month, Room 856, Insurance Exchange Bldg., Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—W. J. Mayer, Michigan Central R. R., Detroit, Mich. Next convention, August 16-18, 1921, Hotel Sherman, Chicago.

INTERNATIONAL RAILWAY FIRE ASSOCIATION.—J. G. Crawford, 702 E. 51st St., Chicago. Next annual meeting, May 24-26, 1921, Hotel Sherman, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 1061 W. Wabasha Ave., Winona, Minn. Next convention, September 12-15, Hotel Sherman, Chicago. Exhibit by Association of Railway Supply Men.

MAINTENANCE OF WAY MASTER PAINTERS' ASSOCIATION.—E. E. Martin, Union Pacific R. R., Room No. 19, Union Pacific Bldg., Kansas City, Mo. Next convention, October 4-6, 1921, Buffalo, N. Y.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York. Next convention, May 23-26, 1921, Planters' Hotel, St. Louis, Mo.

MASTERS AND LOCOMOTIVE PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—(See American Railway Association, Division 5, Equipment Painting Section.)

MASTER CAR BUILDERS' ASSOCIATION.—(See American Railway Association, Division 5.)

NATIONAL ASSOCIATION OF RAILROAD TIE PRODUCERS.—E. E. Pershall, T. J. Moss Tie Company, 720 Security Bldg., St. Louis, Mo.

NATIONAL ASSOCIATION OF RAILWAY AND UTILITIES COMMISSIONERS.—James S. May, 19 Lafayette St., New York.

NATIONAL FOREIGN TRADE COUNCIL.—O. K. Davis, 1 Hanover Square, New York. Next annual convention, May 4-7, Cleveland, Ohio.

NATIONAL RAILWAY APPLIANCES ASSOCIATION.—C. W. Kelly, Kelly-Derby Co., Peoples Gas Bldg., Chicago. Meeting with American Railway Engineering Association.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, excepting months of June, July, August and September.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meeting, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

PACIFIC RAILWAY CLUB.—W. S. Wollner, 64 Pine St., San Francisco, Cal. Regular meeting, 2d Thursday in month, alternately in San Francisco and Oakland.

RAILWAY ACCOUNTING OFFICERS' ASSOCIATION.—E. R. Woodson, 1116 Woodward Building, Washington, D. C. Next annual meeting, June 8, 1921, Hotel Traymore, Atlantic City, N. J.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Naxon, 600 Liberty St., Broad and Chestnut Sts., Philadelphia, Pa.

RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, 515 Grandview Ave., Pittsburgh, Pa. Regular meetings, 4th Thursday in month, except June, July and August, Americas Club House, Pittsburgh, Pa.

RAILWAY DEVELOPMENT ASSOCIATION.—D. C. Welby, Missouri Pacific R. R., Little Rock, Ark.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scriber, General Electric Co., Chicago. Annual meeting with Association of Railway Electrical Engineers.

RAILWAY EQUIPMENT MANUFACTURERS' ASSOCIATION.—D. L. Eubank, Galena Signal Oil Company, Richmond, Va. Meeting with Traveling Engineers' Association.

RAILWAY FIRE PROTECTION ASSOCIATION.—R. R. Hackett, Baltimore & Ohio R. R., Baltimore, Md.

RAILWAY REAL ESTATE ASSOCIATION.—R. H. Morrison, C. & O. Ry., Richmond, Va.

RAILWAY SIGNAL ASSOCIATION.—(See American Railway Association, Division 4, Signal Section.)

RAILWAY STOREKEEPERS' ASSOCIATION.—(See American Railway Association, Division 6.)

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 1841 Oliver Bldg., Pittsburgh, Pa. Exhibit at this year, 1921, convention of American Railway Association, Division 5—Mechanical, has been cancelled.

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, Waterbury Battery Co., 30 Church St., New York.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—F. J. McAndrews, C. & N. W. Ry., Sterling, Ill. Next annual convention, September 20-22, 1921, Chicago. Exhibit by Track Supply Association.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, Schroeder Headlight & Generator Co., New York City. Meeting with American Railway Association, Signal Section.

SOCIETY OF RAILWAY FRANCHISE OFFICERS.—L. W. Cox, 1217 Commercial Trust Bldg., Philadelphia, Pa.

SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, P. O. Box 1205, Atlanta, Ga. Regular meetings, 3d Thursday in January, March, May, July, September and November, Piedmont Hotel, Atlanta.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, West-cly, N. Y. Ga.

SUPPLY ASSOCIATION OF AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—C. N. Thulin, Duff Manufacturing Company, 935 Peoples Gas Bldg., Chicago.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Meets with Roadmasters' and Maintenance of Way Association.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. R. R., Buffalo, N. Y. Exhibit by Railway Equipment Manufacturers' Association.

WESTERN RAILWAY CLUB.—Bruce V. Crandall 14 E. Jackson Boulevard, Chicago. Meeting third Monday each month except June, July and August.

Traffic News

F. X. Baur, heretofore supervisor of transportation on the Lehigh Valley, has been appointed transportation manager of the North American Fruit Exchange, 90 West street, New York, and W. V. Degan, heretofore manager of the freight claim bureau of the L. V., has been appointed freight claim agent of the Exchange.

The Pennsylvania Railroad has "reorganized its entire freight service" on regular schedules. From Chicago, St. Louis and the middle west to eastern terminals, and from New York, Philadelphia, Baltimore and other eastern points to western terminals the freight trains run on these schedules are delivering freight at destination in from one to two or three days earlier than heretofore. The purpose, however, is to insure regularity rather than exceptionally fast time, and the movement of these trains is followed up as though they were passenger trains. From Chicago the delivery at New York, Philadelphia, Baltimore, etc., is, for livestock, the third morning; for perishable freight, the fourth morning; and other traffic, the fifth. From St. Louis the time is one day longer. Westbound, the delivery is scheduled for Chicago, Fort Wayne, Toledo and Cincinnati on the fourth morning, and other points in proportionate time.

The Coal Traffic of Canada

The coal production of Canada in 1920 amounted to 16,968,658 short tons as against 13,919,096 tons in the preceding year, or an increase of 21.9 per cent. Exports increased to 2,558,223 tons as compared to 2,070,050, but this was counterbalanced by an increase in imports from the United States from 16,982,773 to 20,815,596 tons. Nova Scotia yields to Alberta the honor of being the largest producer, the western province leading the eastern by nearly 4 per cent. Alberta produced 41 per cent of the total output; Nova Scotia, 37.8 per cent; British Columbia, 18.3 per cent; Saskatchewan, 1.9 per cent, and New Brunswick, less than 1 per cent. The war, which cut down shipments of anthracite from the United States, gave Alberta an opportunity to push her product. Shipments of Alberta coal eastward amounted to 500,000 tons in 1920 as against only half that amount in 1919.

Traffic Statistics

The Interstate Commerce Commission has issued its monthly traffic summary from reports of large steam railroads for December and the 12 months ending with December, 1920. For December the revenue tons carried one mile were 31,804,415,000 as compared with 30,856,283,000 in December, 1919. The average haul per revenue ton per railroad was 185.19 as compared with 187.74 and the revenue per ton mile was 1.209 cents as compared with .98 cents. The report shows a slight reduction in the number of revenue passengers carried and in passenger mileage for the month. The number of passengers carried was 99,181,982 as compared with 100,805,201. The passenger mileage was 3,640,548,000 as compared with 3,803,166,000. The average miles per revenue passenger per railroad was 36.71 as compared with 37.73. The average revenue per passenger mile was 3.142 cents as compared with 2.626 cents.

For the calendar year the number of revenue tons carried was 2,234,000,000 as compared with 2,034,000,000 in 1919. The ton miles were 409,970,000,000 as compared with 364,025,000,000. The average haul per railroad for the year shows an increase, 183.47 as compared with 178.97. The average revenue per ton mile was 1.052 cents as compared with .973 cents. The number of revenue passengers carried was 1,234,000,000 as compared with 1,174,000,000. The passenger mileage was 47,724,000,000 as compared with 46,192,000,000. The average miles per revenue passenger per railroad was 37.86 as compared with 39.32. The average revenue per passenger mile was 2.747 cents as compared with 2.545 cents.

Commission and Court News

New York Commissions Reorganized

The two New York Public Service Commissions are abolished, the division of the state into two districts, first established in 1907, is done away with, and a new public service commission of five members is to be constituted for the whole state. This radical change is embodied in a new law approved on March 30, and Governor Miller says that the new appointees will be nominated by him within ten days. It is expected that one or more of the present members of the Commission for the Second District will be named.

The new commission will have increased powers. It is to be composed of five members. Their terms are fifteen years and they are removable only after a two-thirds vote of the legislature. The salary of each member is \$15,000. The Governor intends to appoint two members from the city of New York.

In place of the existing commission for the First District, the duties of which have been mainly in connection with the subway and elevated railroads of New York City, the new law establishes a Transit Commission of three members, to devote itself wholly to these city lines, including authority over the construction of new lines. It will have extensive powers in the regulation of the fares on these lines, all of which are still on the old basis of five cents. The terms of the members of the Transit Commission will be five years.

Personnel of Commissions

James C. Davis Appointed

Director General of Railroads

President Harding on March 26 issued proclamations appointing James C. Davis, heretofore general counsel of the Railroad Administration, as director general of railroads in charge of the liquidation of the affairs of the Railroad Administration and also as the statutory agent against whom suits are to be brought arising from federal control of the railroads. He succeeds John Barton Payne, who resigned as director general following his retirement as Secretary of the Interior.

Mr. Davis has been general counsel of the Railroad Administration since July, 1920, when he succeeded E. M. Underwood, having been general solicitor of the Chicago & North Western. He was born in Keokuk, Ia., on September 2, 1857. He attended the public schools there and the Hellmuth Boys' College at London, Ont. He was employed in the law office of C. P. Lomax, Keokuk, Ia., was admitted to the bar in 1877 and practiced law at Keokuk between 1877 and 1903. From 1881 to 1883 he was city solicitor of Keokuk. On January 3, 1903, he was appointed general attorney for the Chicago & North Western for the state of Iowa with headquarters at Des Moines, which position he held for 16 years, until in 1918, he was appointed general solicitor of the Chicago & North Western under the federal administration, with headquarters at Chicago.

In a letter to Judge Payne the President said:

"I have inquired for you several times this week because I wished to have a conference with you respecting the appointment of your successor. I came to the conclusion today that the matter ought not to remain open longer and I have this day issued a proclamation naming Mr. Davis for your successor as director of railroads. I cannot allow this action to pass without conveying to you my gratitude for the signal service you have rendered the country, not only in the important work you have done in connection with the administration of the railways but also your notable contributions to the government service in one of the most difficult periods of all our history. I am quite sure the country shares the gratitude which I so willingly express. I trust your retirement from direct responsibility will not make it impossible for your successor and the Executive to avail themselves of your vast knowledge and helpful experience."

Equipment and Supplies

Locomotives

W. R. GRACE & Co., New York, are asking for prices on 6 locomotives for export.

THE EGYPTIAN STATE RAILWAYS are inquiring through the locomotive builders for some 2-6-2 type locomotives.

THE CHILEAN STATE RAILWAYS are inquiring through the Vulcan Iron Works for some 2-8-2 type locomotives.

THE OKINAWA-KEN (Japan) is inquiring through Mitsui & Co., 65 Broadway, New York, for 3, 0-6-0 type tank locomotives.

THE TOBU RAILWAY (Japan) is inquiring through Mitsui & Co., 65 Broadway, New York, for 2 Mogul type locomotives with tenders.

Freight Cars

THE LAKE CHAMPLAIN & MORIAH is inquiring for from 12 to 15 ore dump cars.

THE BALDWIN LOCOMOTIVE WORKS is asking for prices on 100 box cars for export.

THE UNION MINERE DU HAUT KATANGA is inquiring through the car builders for 50 steel hopper cars of 30 metric tons capacity.

THE ERIE RAILROAD is inquiring for 1,000 single sheathed 40-ton box cars. This road has also been asking for prices recently for repairing 1,000 box cars.

THE RHODESIAN RAILWAYS, reported in the *Railway Age* of February 11, as inquiring through the car builders for 15 cars, have ordered this equipment from English car builders.

THE PEKIN-MUKDEN, reported in the *Railway Age* of March 11 as inquiring for 200 gondola and 200 box cars, has ordered this equipment from the Metropolitan Wagon Works, England.

THE DELAWARE, LACKAWANNA & WESTERN is having repairs made to 1,000 box cars at the Berwick shops of the American Car & Foundry Co. This is in addition to the 1,000 cars on which repairs were authorized to be made at the same plant last October.

THE ATCHISON, TOPEKA & SANTA FE, reported in the *Railway Age* of February 25 (page 483) as inquiring for 1,000, 50-ton gondolas, has ordered this equipment from the American Car & Foundry Company; and 300, 50-ton gondola cars noted in the *Railway Age* of March 18 (page 737), from Haskell & Barker Car Company, Inc.

Passenger Cars

THE FEDERAL RAILWAYS, Eastern Brazil, are getting prices through the car builders on 2 first-class coaches and 6 combination baggage and mail cars.

Iron and Steel

THE MAINE CENTRAL is inquiring for 400 tons of fabricated steel for a bridge at Norridgewock, Maine.

Machinery and Tools

THE GENERAL ELECTRIC COMPANY, Schenectady, N. Y., is inquiring for 30 machine tools, including turret lathes, power presses and milling machines.

Miscellaneous

THE NEW YORK, NEW HAVEN & HARTFORD is asking for bids until 12:00 o'clock April 6, for between 310,000 and 385,000 net tons of deep mined, high volatile R. M. bituminous coal, to be delivered between May 1, 1921, and April 1, 1922.

Supply Trade News

E. E. Goodwillie has been appointed sales agent in charge of the Cleveland office of the Bethlehem Steel Company, Bethlehem, Pa.

W. D. Jenkins, Dallas, Tex., has been appointed southwestern representative of the Burden Iron Company Railroad and Steamship Division, New York.

The Universal Crane Company, Cleveland, Ohio, announces the removal of its plant from Cleveland, Ohio, to its new factory at Elyria, Ohio, construction on which has just been completed.

Frank H. Freeman, assistant sales manager of the Anaconda Copper Mining Company, with headquarters at Chicago, has been appointed general sales manager of the Illinois Wire & Cable Company at Syracuse, Ill. Mr. Freeman will assume his new duties about April 1.

Allan A. Ryan has resigned as a director of the Chicago Pneumatic Tool Company, New York. Mr. Ryan also resigned as a director of the Vanadium Corporation of America and has been succeeded on the board of the latter company by T. M. Schumacher, president of the El Paso & Southwestern System.

E. G. LeLaurin has resigned as southern sales representative of the Southern Supply & Hardware Co., St. Louis, Mo., to serve in a similar capacity with W. D. Jenkins, representative of railway equipment and supplies, Dallas, Tex. Mr. LeLaurin will serve the trade in the Dallas-Houston-New Orleans territory.

The Lima Locomotive Works, Inc., has been authorized by the New York Stock Exchange to list \$2,865,000 7 per cent cumulative preferred stock, par \$100, and \$4,350,000 common stock, par \$100, with authority to add \$335,000 preferred stock and \$3,200,000 additional common stock on official notice of issuance on conversion of preferred stock, making the total amounts applied for \$3,200,000 7 per cent cumulative preferred stock and \$7,550,000 common stock.

The Lilly Varnish Company, Indianapolis, Ind., was sold on February 1 to an organization consisting of C. M. Malott, president; C. F. Brigham, vice-president and general manager, C. F. Hackathorn, vice-president in charge of manufacture and purchases, and W. I. Longworth, secretary and sales manager. Mr. Malott is also president of the Indianapolis Paint & Color Company. William Lilly, who has managed the Lilly Varnish Company for a long time, will remain with the new organization as treasurer.

A fire in the Winthrop Harbor, Ill., plant of the Austin Machinery Corporation, Chicago, on March 22, destroyed the unfinished stock, warehouse and store rooms; also both the trenching machinery assembly and paving mixer assembly buildings, and a number of machines on which assembly was practically completed; but the fire did not reach the finished machine warehouses. The damage at Winthrop Harbor will not interfere with production and prompt delivery of Austin products, as all lines of Austin machinery are also being built at the plants at Muskegon, Mich., and at the former plant of the Toledo Bridge & Crane Co., Toledo, Ohio.

American Brake Shoe and Foundry Company

The annual report of the American Brake Shoe and Foundry Company for the year ended December 31, 1920, shows a net income, including \$542,293 received in final settlement of munitions contracts with the government, of \$2,571,848. This sum, after deducting the amount required for payment of the preferred stock dividends, is equivalent to \$12.86 per share on the outstanding common stock.

President Joseph B. Terbell in his report says: "The beginning of the year 1920 was of exceptional promise. During the

first nine months, the volume of operations in all of your company's plants exceeded that of any previous period, but the last quarter witnessed a decrease in incoming orders and a partial cancellation or suspension of orders that had previously been received, particularly in your malleable plants and the grey iron foundries, whose principal product is automotive castings. The average rate of production for the entire year was 77 per cent of capacity compared with 52.9 per cent for the year 1919.

"The duration of the period of adjustment through which the railroads and industries are passing will have considerable effect upon the earnings for the ensuing year. We are fortunate, however, in having a large proportion of our plant capacity devoted to the manufacture of commodities for which, even in periods of depression, there must be a moderate demand.

"The question of providing facilities for producing brake shoes in the Denver, Col., territory has been under consideration for some years, and the recent advance in freight rates made immediate action necessary. A new plant located at that place was, therefore, purchased. This plant started operations on September 1, 1920, and the results so far obtained have fully met expectations."

The consolidated balance sheet of the American Brake Shoe & Foundry Company, and subsidiaries, as of December 31, 1920, follows:

ASSETS	
Cash	1920
Accounts receivable	\$580,155
Notes receivable	4,757,580
Marketable loans and investments	164,475
Advances	86,665
Inventories	4,860,130
U. S. and Canada bonds	103,300
Deferred assets	152,653
Mortgages receivable	250,000
Capital stocks of associated companies	2,509,963
Plants and equipment, less depreciation	5,526,301
Patents, good will, etc.	6,814,113
	\$25,814,735
LIABILITIES	
Accounts and wages payable	\$3,321,899
Notes payable	254,000
Bond interest accrued	2,000
Federal taxes	226,151
Bonded debt	120,000
Reserves	671,055
Preferred stock	9,463,700
Common stock	*21,212,830
Capital stock of subsidiary companies	6,800
Surplus	.....
	\$25,814,735

*Outstanding 148,410 shares of no par value represented by surplus of \$11,749,130.

Trade Publications

URANIUM IN STEEL.—The history and function of uranium in the making of uranium steels, together with analytical methods and test charts, is the subject matter of a 32-page booklet published by the Standard Alloys Company of Pittsburgh, Pa.

* * *



Photo by International

The First Car of Corn Given by American Farmers to Starving Europeans

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company, which was noted in the *Railway Age* of March 25 (page 821), as contemplating the construction of a crane-way building to cost about \$13,000, at Topeka, Kan., will close bids for this work on March 29.

CHICAGO, MILWAUKEE & ST. PAUL.—This company contemplates rebuilding its coaling station at Wabasha, Wis., which was recently destroyed by fire.

CHICAGO UNION STATION.—This company, which was announced in the *Railway Age* of March 4 (page 532) as awarding a contract to the Chicago Foundation Company, Chicago, for the excavation work in connection with the new railway mail terminal, Chicago, and which was announced in the *Railway Age* of March 25 (page 821) as awarding a contract to the MacClintock-Marshall Company, Pittsburgh, Pa., for fabricating the structural steel to be used in connection with this project, will shortly accept bids for the construction of the terminal itself.

GREEN BAY & WESTERN.—This company has applied to the Interstate Commerce Commission for a certificate authorizing the abandonment of its La Crosse branch, 6.38 miles, on the ground that it is being operated at a net loss.

ILLINOIS CENTRAL.—This company, which was noted in the *Railway Age* of March 4 (page 532), as contemplating the installation of a new 100-ft. turntable at Waterloo, Iowa, at an estimated cost of \$45,000, is now accepting bids for this work.

ILLINOIS CENTRAL.—This company will shortly accept bids for building a viaduct over McLemore Avenue, Memphis, Tenn.

LONG ISLAND.—This company is preparing plans for grade crossing elimination at Far Rockaway, N. Y., to cost in excess of \$2,500,000.

OKLAHOMA-SOUTHWESTERN.—This company, which is constructing a line from Bristow to Nuyaka, Okla., a distance of 24 miles, has completed the line from Bristow to the crossing of the Canadian river at Deep Fork, a distance of 20½ miles. The company has awarded a contract to Allhands & Davis, Okmulgee, Okla., for grading between Deep Fork and Nuyaka. The company contemplates extending its line south of Nuyaka to Okmulgee, a distance of 12 miles, upon completion of the present work.

ST. LOUIS-SAN FRANCISCO.—This company is engaged in improving and extending its yards at Sapulpa, Okla., at a cost of \$75,000. The company also contemplates additions to its passenger station at Sapulpa to cost about \$85,000.

UNION PACIFIC.—This company, in co-operation with the city of Kansas City, Mo., contemplates the construction of a viaduct over 23rd street, Kansas City.

COMING HOME TO ROOST.—Yonder is the great Railway Farm, worth about \$20,000,000. Originally it produced transportation. See it now, covered with an enormous brood of chickens, constantly eating, yet calling for more. They were hatched in the Government Ownership incubator, which is the finest machine in the world for hatching theories, absurdities and other un-economic eggs. The brooder in which the chickens were developed is a wonder. It is the McAdoo patent, which is an improvement of the Adamson, and is warranted to produce insatiable appetites. The Director, who was not the owner of the farm, fed the chickens war-inflated wages. When more feed was needed than the farm would produce it was carted from the U. S. Treasury. Now the owners have possession of their farm, and are obliged to feed the vulture-like chickens the manager left behind. Worse yet; more of the brood are daily coming back to roost. The owners are obliged to keep them, but are not permitted to change the feed to peace-time corn, even though all the farm produces will not provide for them, and they even eat up the few eggs that are laid. The owners, in despair ask how they shall pay taxes, insurance, upkeep of the farm and make improvements when all it produces is eaten up. But the vultures swarm to the roosts and cluck and gabble for more.—*The Wall Street Journal Straws.*

Railway Financial News

ANN ARBOR.—Authorized to Pledge Bonds.—This company has been authorized by the Interstate Commerce Commission to pledge \$100,000 of its improvement and extension mortgage bonds with the War Finance Corporation as substitute security for a demand note.

CANADIAN NATIONAL RAILWAYS.—Deficit for 1920.—Hon. J. D. Reid, minister of railways, made his annual statement on the operation of the Canadian Government Railways before the Canadian House of Parliament on March 17. Dr. Reid first outlined the policy of management decided upon when the Canadian Northern was connected up with the Intercolonial and Transcontinental Railways, describing how the board of management was constituted. A year ago, he said, he announced the deficit of 1919, on Government lines as \$47,993,312. When final figures were available, the actual loss was found to have been \$48,242,536. Continuing he said:

When I made my annual statement of the operation of these roads a year ago, I believed from discussions I had with the management I would be able to advise the House this year that the deficit of 1919 had been reduced in 1920. Instead of a reduction, I must inform the House that the loss in operation alone for the year ending December 31, 1920, is much larger. It follows: Canadian Northern, \$16,258,580; Canadian government, \$10,449,876; total operating deficit of the Canadian National Railways, \$26,708,456. To which we add the operating deficit of the Grand Trunk Pacific, which, since last August 23, has been under management of the Canadian National Board, amounting to \$10,134,514, making a total operating deficit of \$36,842,970.

To this must be added the interest on bonds, etc., or what are called fixed charges, and which have been paid or assumed by the government, and are as follows: Canadian Northern, \$24,155,988; Grand Trunk Pacific, \$9,332,776; making the total deficit for operation and fixed charges \$70,331,735.

And this does not take into consideration any interest or fixed charges on Transcontinental or Intercolonial railways.

A Canadian National income credit, which will be shown in the statement of detail, reduces this sum to \$69,593,441, which is the loss on operation and fixed charges for 1920, as against 48 millions in 1919.

The total mileage operated by the Canadian National management at the end of 1920 was 17,054.69 miles. There were added during 1920, 140 miles by purchase and 236 miles on completion of new construction.

The income statement of the Canadian National Railways for the calendar years ended 1920 and 1919 was given as follows:

	1920	1919
GROSS EARNINGS		
C. N. R.	\$66,695,599	\$53,562,178
Can. government	44,537,804	40,179,381
G. T. P.	14,408,560	11,294,618
Totals	\$125,641,753	\$105,036,177
OPERATING EXPENSES		
C. N. R.	\$82,953,979	\$60,034,024
Can. government	54,987,680	47,728,206
G. T. P.	24,543,063	17,587,567
Totals	\$162,484,722	\$125,349,797
OPERATING DEFICITS		
C. N. R.	\$16,258,580	\$6,471,846
Can. government	10,449,876	7,458,825
G. T. P.	10,134,514	6,292,950
Totals	\$36,842,970	\$20,313,621
FIXED CHARGES		
C. N. R. due public	\$13,837,118	\$12,693,584
Interest due government	10,318,870	7,276,126
G. T. P. due public	6,048,951	6,048,850
Interest due government	2,475,474	1,910,265
Interest on receiver's certificates for 1920.	808,352	.....
Totals	\$33,488,765	\$27,928,925
TOTAL DEFICIT (OPERATING AND FIXED CHARGES)		
C. N. R.	\$40,414,568	\$26,441,656
Can. government	10,449,877	7,548,825
G. T. P.	19,467,290	15,252,156
Totals	\$70,331,735	\$48,242,537

The results of operation of the Canadian National Railways was no worse than obtained outside of Canada, but that did not mean that every effort should not be made to prevent losses. At present the country was faced with permanent fixed charges as follows: Interest, public debt (including sinking fund), \$142,800,000; pensions, \$31,816,000; permanent expenditure for carrying on the affairs of the government (about), \$127,000,000; total (about), \$301,616,000.

This was without a dollar for carrying on necessary public works, soldier

settlement, reestablishment and other expenditure. It meant very heavy taxation for many years, and it would be a very serious matter to have increased taxation for railways to the extent of from \$50,000,000 to \$70,000,000 per annum.

I have not been able to get the annual closing statement from the Grand Trunk management up to the present. I sent an expert auditor to secure from the books and submit a statement as to results of operations for the years 1919 and 1920, and secured the report that, after providing for operating expenses, tax accruals, income deductions, etc., the amount available for interest and dividends was as follows: 1919, \$11,164,036; 1920, \$5,692,301.

Out of the above amounts the railway was able to meet in 1919 the interest on its fixed charges, but not on the share capital, which includes 4 per cent guaranteed steel, first, second and third preference stock and ordinary stock.

In 1920 the company fell short \$6,563,091 of meeting interest on fixed charges. The Grand Trunk, however, had to pay \$3,635,000 to employees for back pay between May 1 and September 1, when no increases for freight rates had been allowed. But the figures of six millions did not take into account a loss of \$19,817,873 on the Grand Trunk Pacific, a subsidiary of the Grand Trunk, for which the Grand Trunk was responsible. The loss on the Grand Trunk Pacific had been included in the deficit for last year on government lines of \$69,593,441.

CANADIAN PACIFIC.—Annual Report.—A review of this company's annual report for 1920 appears on another page of this issue.

CHICAGO & EASTERN ILLINOIS.—Reorganization Plan.—A tentative draft of the reorganization plan has been distributed to members of the underwriting committee. A general meeting of the committees of bondholders will be held on or about March 31. The foreclosure sale of the road is scheduled for April 5.

Trading on the curb began March 24, when the Chicago & Eastern Illinois new common stock sold for \$13 a share and its preferred stock for \$31, with slight fluctuations.

CHICAGO, INDIANAPOLIS & LOUISVILLE.—Ask Authority to Issue Bonds.—This company has applied to the Interstate Commerce Commission for authority to issue \$3,493,000 of first and general mortgage 5 per cent gold bonds, to be held in the treasury or to be used for purposes of collateral.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—Purchase of E. I. & T. H.—This road has purchased the entire capital stock of the Evansville, Indianapolis & Terre Haute. The purchase is subject to the approval of the Interstate Commerce Commission.

Spencer Trask & Co. have purchased from a syndicate, represented by Raymond M. Smith, approximately \$500,000 of the Evansville, Indianapolis & Terre Haute Railway Company first mortgage 7s, due May, 1950. These bonds will be sold privately by the bankers at a price to yield about 7.15 per cent.

DENVER & RIO GRANDE.—Sale Confirmed.—The sale of this road to the Western Pacific for \$5,000,000 on November 20, 1920, in satisfaction of a judgment for \$36,000,000 obtained by the Equitable Trust Company of New York was confirmed in the federal court at Denver, Col., by District Judge Robert E. Lewis on March 28. The decree provides that William A. Jackson, who was appointed special master on a court order, shall deliver to the purchasers full deeds, all assets and assignments on the payment to the special master of the full amount of money within thirty days or within such time as the court later may designate. The decree also directed that all moneys held at present by A. B. Baldwin, receiver of the road, shall be turned over to the purchasers with the exception of \$100,000 which the receiver is authorized to retain for current expenses. The confirmation definitely disposes of any right of the stockholders to interfere with the road's operation. The payment of the \$5,000,000 in 5 per cent thirty-year gold bonds of the Western Pacific Railroad is given in the confirmatory decree.

Confirmation of the sale of the Denver & Rio Grande will mean its reorganization within the next thirty days, according to Charles M. Levey, president of the Western Pacific. The plans provide for the formation of a new company, the Denver-Rio Grande & Western. It will be operated under the direct supervision of the Western Pacific Company.

In spite of the court confirmation on the sale, the stockholders' protective committee of the Denver & Rio Grande will proceed with its attack on the original matters leading up to the judgment which forced the road's sale.

EL PASO & SOUTH WESTERN.—No Merger with Rock Island.—President T. M. Schumacher is quoted as having denied that any steps have been taken to merge this road with the Chicago, Rock

Island & Pacific and part of the Southern Pacific, but as having admitted such a plan would be agreeable to the Phelps-Dodge interests.

ERIE.—*Authorized to Guarantee Equipment Trust Certificates.*—This company has been authorized by the Interstate Commerce Commission to guarantee the prompt payment of principal and dividends on an issue of \$4,370,000 of equipment trust certificates to be issued under an agreement of assignment of lease by the United States Mortgage & Trust Company.

EVANSVILLE, INDIANAPOLIS & TERRE HAUTE.—*Purchased by Big Four.*—See Cleveland, Cincinnati, Chicago & St. Louis.

EVANSVILLE, INDIANAPOLIS & TERRE HAUTE.—*Asks Authority to Issue Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue \$400,000 of first mortgage bonds due May 1, 1950, with interest at 7 per cent, to be pledged with the Secretary of the Treasury for a loan.

FORT DODGE, DES MOINES & SOUTHERN.—*Loan from Revolving Fund Approved.*—The Interstate Commerce Commission has approved a loan of \$200,000 to this company for the purpose of assisting it in rebuilding 600 box cars.

GEORGIA & FLORIDA.—*Authorized to Issue Certificates of Indebtedness.*—The receivers have been authorized by the Interstate Commerce Commission to issue \$1,600,000 of receiver's certificates at 8 per cent, dated January 31, 1921, and maturing January 31, 1924; to pledge one-half of the amount with the Secretary of the Treasury as security for a loan; to sell \$600,000 of certificates and to distribute \$200,000 of certificates as payments on account pro-rata of the uncertificated indebtedness of the receivers incurred prior to January 1, 1921.

NEW YORK, NEW HAVEN & HARTFORD.—*Annual Meeting of Stockholders.*—The stockholders' annual meeting will be held in New Haven on April 20. Among matters to be considered are proposition for refunding the indebtedness of the company known as the European Loan which matures April 1, 1922, and to consider the acquiring or merging of the Central New England Railway Company, the Harlem River & Port Chester Railroad, the New England Steamship Company, the Hartford & New York Transportation Company and the New Bedford, Martha's Vineyard & Nantucket Steamboat Company.

READING COMPANY.—*More Petitions to Intervene.*—George S. Ingraham, individually and as attorney for Frances T. Ingraham, Robert S. Ingraham, Mabel B. Ingraham and Marcus L. Taft, holders of 11,000 shares of Reading common stock, has filed a petition in the United States District Court in Philadelphia asking for information from the Reading Company as to the value of their interest in the Reading property. The petition states that under the proposed plan of segregation the petitioners are required to elect as to the assets of the company in which they desire to hold an equitable interest, but that they are unable to make such election intelligently until more definite knowledge of Reading's assets has been provided.

William B. Knotz, a preferred shareholder, has also presented a petition to the court to intervene, suggesting certain modifications in the plan.

RICHMOND TERMINAL.—*Authorized to Issue Notes.*—This company has been authorized by the Interstate Commerce Commission to issue two promissory notes, each in the face amount of \$12,500, payable to the Richmond, Fredericksburg & Potomac and the Atlantic Coast Line.

SACRAMENTO NORTHERN.—*Purchase by Western Pacific.*—See item under Western Pacific.

TEXAS CITY TERMINAL.—*Application for Certificate.*—This company has applied to the Interstate Commerce Commission for a certificate authorizing it to operate the properties formerly owned by the Texas City Transportation Company sold at foreclosure on August 3, 1920.

TOLEDO TERMINAL.—*Authorized to Issue Promissory Notes.*—This company has been authorized by the Interstate Commerce Commission to issue \$72,000 of promissory notes for the acquisition of two freight locomotives.

VIRGINIA BLUE RIDGE.—*Authorized to Issue Notes.*—This company has been authorized by the Interstate Commerce Commission

to issue \$106,000 of promissory notes and to pledge as collateral security \$50,000 of its first mortgage 6 per cent bonds.

WESTERN PACIFIC.—*Purchase of Sacramento Northern Contemplated.*—This road has applied to the Railroad Commission of California for authority to issue \$4,180,000 of its first mortgage 5 per cent gold bonds in connection with its contemplated purchase of the Sacramento Northern Railroad. The bonds are to be exchanged for bonds of the Sacramento Northern, which are now in the hands of the trustee, on the basis of \$80 face value in Western Pacific bonds for \$100 face value of Sacramento Northern bonds. About 90 per cent of the Sacramento Northern stock, amounting to \$4,650,094, has also been deposited with the trustee. The Western Pacific agrees to pay \$27.50 per share for trust certificates representing first preferred stock; \$15 a share for certificates representing the second preferred stock, and \$6 for certificates representing common stock. See also Denver & Rio Grande above.

Guaranty Certificates Issued

The Interstate Commerce Commission has issued the following certificates for partial payments to railroads on account of their guaranty for the six months following federal control, in addition to those listed last week:

		Previously paid
Chicago, Milwaukee & St. Paul	\$2,000,000	\$17,434,000
St. Louis-San Francisco	800,000	3,000,000
St. Louis-San Francisco of Texas	200,000	.....
Paris & Great Northern	27,500	.....
International & Great Northern	260,000	1,815,000
Chicago Junction	200,000	1,000,000
Chicago, St. Paul, Minneapolis & Omaha	850,000	900,000
Kansas City, Clinton & Springfield	55,000	.....
Cumberland & Pennsylvania	60,000	.....
Brownwood North & South	5,500	.....
Fort Worth & Rio Grande	210,000	.....
Chicago, Peoria & St. Louis	60,000	238,000
Spokane, Portland & Seattle	250,000	200,000
Oregon Electric	180,000	.....
New York Central	20,000,000	.....
Pacific Coast	30,000	.....

The commission has also issued a certificate for a partial payment to the American Railway Express Company on account of its guaranty for \$4,500,000. This company had previously received advances amounting to \$19,700,000.

Dividends Declared

Bangor & Aroostook—Preferred, 3½ per cent, semi-annually; common, 2 per cent, semi-annually.
 Norfolk & Western—Preferred, 1 per cent, quarterly, payable May 19 to holders of record April 30.
 Philadelphia & Trenton—2½ per cent, quarterly, payable April 12 to holders of record April 1 to April 11.

DURING 1920 the value of the declared exports from Cairo, Egypt, to the United States was \$861,792, as compared with \$411,485 during 1919. Sheepskins, valued at \$215,811 during the past year and \$136,936 in 1919, were the leading items of this trade.—*Commerce Reports.*



Photo by Keystone

Electric Train About to Enter the Simplon Tunnel, Switzerland

ANNUAL REPORT

Canadian Pacific Railway Company—Fortieth Annual Report

To the Shareholders:

The accounts of the Company for the year ended December 31st, 1920, show the following results:

Gross Earnings	\$316,641,349.30
Working Expenses (including all taxes)	183,488,304.70
Net Earnings	\$133,153,044.60
Deduct Fixed Charges	10,775,408.99
Surplus	\$22,377,635.61
Contribution to Pension Fund	500,000.00
	\$21,877,635.61

From this there has been charged a half-yearly dividend on Preference Stock of 2 per cent., paid October 1st, 1920, \$1,613,638.42

And three quarterly dividends on Ordinary Stock of 1 1/4 per cent., each, paid June 30th, 1920, October 1st, 1920, and December 31st, 1920, 13,650,000.00

15,263,638.42

\$6,613,997.19

From this there has been declared a second half-yearly dividend on Preference Stock of 2 per cent., payable April 1st, 1921, \$1,613,638.42

And a fourth quarterly dividend on Ordinary Stock of 1 1/4 per cent., payable April 1st, 1921, 4,550,000.00

6,163,638.42

Leaving net surplus for the year \$450,358.77

In addition to the above dividends on Ordinary Stock, three per cent. was paid from Special Income.

SPECIAL INCOME FOR YEAR ENDED DECEMBER 31st, 1920

Balance at December 31st, 1919, \$17,363,844.27

Less: Dividend paid April 1st, 1920, 1,950,000.00

\$15,413,844.27

Net Revenue from Investments and Available Resources, Exhibit "C", 2,436,717.25

Interest on Deposits, and interest and Dividends on Other Securities less Exchange, 2,057,327.93

Net Earnings Ocean and Coastal Steamship Lines, 2,741,146.12

Net Earnings Commercial Telegraph and News Department, 3,731,256.51

Rentals and Miscellaneous, \$26,380,292.08

Less: Payments to Shareholders in dividends: June 30th, 1920, October 1st, 1920, and December 31st, 1920, 5,850,000.00

\$20,530,292.08

From this a dividend has been declared payable April 1st, 1921, \$1,950,000.00

2. The working expenses for the year, including all taxes, amounted to 84.70 per cent. of the gross earnings, and the net earnings to 15.30 per cent., as compared with 81.39 per cent., and 18.61 per cent., respectively in 1919.

3. The gross earnings of your transportation system during the fiscal year under review exceeded those of 1919 by \$39,712,289, and the net earnings by \$20,008. This large addition of \$39,492,281 in working expenses is due to the enforced application in Canada of what is known as "The Chicago Wage Award," which added approximately \$12,000,000 to the pay rolls for the year; the increase in the cost of fuel and materials and the charging of the year's Federal taxes into operating expenses, where they properly belong. The heavy and rapid movement of freight during October and November and the first half of December under the tariffs prescribed by the Railway Commission and effective on September 13th enabled your Company to absorb these expenses and earn its usual charges, directly therefrom. The heavy and rapid movement of freight during the net earnings are not commensurate with the volume of business transacted, still in the opinion of your Directors the year's operations must be regarded as satisfactory and compare most favorably with those of any other system on the American continent.

4. The sales of agricultural land in the year were 468,390 acres for \$9,592,706.95, being an average of \$20.48 per acre. Included in this area were 47,848 acres of irrigated land which brought \$50.43 per acre, so that the average price of the balance was \$17.07 per acre.

5. Your Directors disposed of \$8,000,000 of Four per cent Consolidated Debenture Stock to the British Government pursuant to arrangements previously made at the time of the deposit of \$40,000,000 of the Stock with the British Treasury in 1917. The balance of the Stock deposited, namely, \$32,000,000 has been returned to the Company and is available for all or other disposition as circumstances warrant.

6. As indicated in the last annual report, and with your approval, your Directors during the year issued \$12,000,000 of Equipment Trust Notes for the purpose of acquiring necessary additions to your Company's rolling stock.

7. Your approval was obtained in 1919 and 1920 to the construction, as conditions warranted, of branch line mileage in Western Canada amounting in the aggregate to 822 miles, and during the year under review 100 miles of track of this authorized mileage have been laid.

While extensive new construction is not under the present conditions advisable, your Directors are of the opinion that a moderate amount of construction should be proceeded with during the coming year in order that the full value of the lines already under construction should be realized and that the settlers in the districts to be served should obtain the railway facilities so necessary to their prosperity. The Branch Lines heretofore approved are in good territory and well located to become revenue producing.

8. Your approval will be asked to the construction of an extension of the Suffield South-westerly Branch from Lomond, a distance not exceeding thirty miles, and for the issuance and sale of a sufficient amount of Four per cent. Consolidated Debenture Stock to meet the expenditure.

9. Four steamers for Atlantic and Pacific Service previously contracted for are now being built for the Company, namely:—

- "Empress of Canada,"
 - "Montrose,"
 - "Montclair,"
 - "Montclare,"
- and the "Koenig Friedrich August" has been purchased.

An additional ship for British Columbia Coast Service, required because of the loss of the "Princess Sophia" and "Princess Irene," and the sale of the "Princess May" and "Princess Margaret," is also under construction. The estimated cost of these six ships is \$31,175,000, of which \$18,733,138 was paid up to the year 1920. The capital requirements for the year 1920, \$3,216,318, and, subject to your approval, on this account for the year and including the amount required for the completion of the payments on the "Koenig Friedrich August" purchased, amount to approximately \$12,200,000. Your approval will be asked to the issuance and sale of a sufficient amount of Consolidated Debenture Stock to meet the expenditure for these vessels. During the year, the S.S. "Sardinian," built in 1875, was sold.

10. In anticipation of your confirmation, your Directors authorized capital appropriations, in addition to those approved at the last annual meeting, for the year 1920, \$3,216,318, and, subject to your approval, have authorized expenditures on capital account during the present year of \$4,316,236—of this amount the principal items are:—

Replacement and enlargement of structures in permanent form	\$509,624
Additional stations, roundhouses, freight sheds and shops and extensions to existing buildings	398,158
The plates, rivets, anchors, ballasting, ditching and miscellaneous betterments	35,700
Replacement of rail in main and branch line tracks with heavier section	1,000,000
Additional and side-track accommodations	377,292
Extension work on Chateau Frontenac Hotel	853,000
Lining of Connaught Tunnel	400,000
Improvements in connection with Telegraph Service	55,033
Mechanical Department, machinery at various shops	30,950

The balance of the year 1920, \$3,216,318, and, subject to your approval, for the whole system and effect proper economies.

11. In view of the importance to the Company in its personnel and the value to Canada in the development of its resources and industry through the increase in the number of trained technical men, your Directors authorized a subscription to McGill University Endowment of \$250,000, and to the University of Montreal of \$50,000, payable in annual instalments. Contributions of \$10,000 to the Salvation Army and \$5,000 to the work of the Y. M. C. A. were also authorized. The value of the work of Salvation Army and the Young Men's Christian Association to the Company and its employees is of direct and indirect importance.

12. At the request of the Government of Alberta, and in order to ensure proper railway service in the districts served by the Edmonton, Dunvegan and British Columbia and Central Canada Railway Companies, your Directors have entered into an agreement with the Government, their stockholders, the Union Bank of Canada, and the Province of Alberta, for the operation, for a period of five years from the Twenty-first day of July, 1920, of the properties of the Edmonton, Dunvegan and British Columbia and Central Canada Railway Companies. The remuneration is the payment to your Company of 15 per cent. of the revenues in excess of working expenses, payable out of profits after payment of fixed charges, and an agreement giving your Company an option to purchase the capital stock on the terms set out in the agreement at any time during the period of five years. This arrangement provides for the improvement of capital improvements and betterments to the lines shall be loaned by the Government to the Companies to be operated, and it is estimated that an amount of \$2,500,000 will be required for this purpose, of which \$1,000,000 has already been provided. The value of the arrangement to your Company is that it enables an accurate appreciation to be obtained of the probable development of the country, and the present and prospective value of the properties as traffic contributors to your Company's system. The arrangement is likewise highly desirable from the standpoint of the people of Alberta in that it enables the benefit of a proper railway organization to be obtained and proper railway economies to be effected under the direction of your Company's officers, and at the same time permits the development of the North Country to be aided to the fullest possible extent and gives to present and incoming settlers the railway facilities so essential to their success.

13. In order to ensure the development of that portion of the Province of Quebec situated South and East of Lake Temiskaming, your Directors have entered into an agreement with the Government of Quebec, through your subsidiary, the Interprovincial and James Bay Railway Company, of a railway extending from Kipawa to Des Quinze River, with a branch to Ville Marie, having a total mileage of 76 miles. Subsidies of \$8,000 a mile in cash for 66 miles and 4,000 acres of land per mile of the entire railway have been voted, which will, of course, substantially reduce the cost of construction to the Company. A productive agricultural area of large extent and valuable timber lands will be opened and served through the construction of this railway.

14. The First of the Company deposited with the British Treasury was returned to the owners on the First of October, 1920, and the common stock on the Thirty-first of December.

The position of the holdings of Common Stock as of March First of this year was as follows:—

	Shares	Percentages
United Kingdom	1,242,837	47.80
Canada	460,838	17.73
United States	626,510	24.10
France	312,222	3.16
Other holdings	190,692	7.33
	2,600,000	

15. During the last six and a half years the Company has expended on Capital Account, \$88,000,000; and during the same period the proceeds of the sale of capital issued, amounted to \$26,000,000. The balance of recent Equipment Issue of \$12,000,000, the proceeds of which have not as yet been received in full because of the non-completion of the rolling stock under contract for construction. In consequence of these large expenditures, the demands upon the Company's cash reserves have been extensive, while the surplus operations during the past three years, for reasons with which the Shareholders are entirely familiar, have been merely nominal.

As indicated in this report, the capital requirements for 1921, exclusive of payments on stocks and the completion of branch line construction, will be very moderate. No extensive works are contemplated in the East, save the commencement of the Interprovincial and James Bay Railway, previously referred to, and the continuance of the work on the extensions to the Chateau Frontenac, which it is expected will involve the expenditure of \$1,000,000 during the present year.

The amount of unissued Consolidated Debenture Stock for the issuance of which your authority has already been given, is \$36,000,000, and the

amount issued and undisposed of is \$32,000,000, a total of \$68,000,000. The capitalization of the Company is conservative and even low, and this has been accomplished largely through the utilization of surpluses in betterments and improvements which would normally have been paid for out of the proceeds of capital issues. While capital expenditures for the immediate future will be curtailed and the resumption of works requiring large amounts of money will be deferred until a decided improvement in business conditions furnishes warrant for incurring them, your Directors consider that it will be desirable that a portion of the cash reserves expended on Capital Account should be restored within a short time, and, to this end, in order to supplement and extend the powers of the Company to issue forms of securities other than those it is already empowered to issue and which are more appropriate to present market conditions, have made application for an amendment to the Company's charter permitting the issuance of bonds, debentures or other securities, collateral to or in lieu of any Consolidated Debenture Stock which the Company is or may hereafter be empowered to issue, and for the same amount, such securities to be payable in such currency, at such times and places, and bearing such interest as your Directors may think proper. As mentioned in the notice to Shareholders, the annual general meeting will be made special for the purpose of authorizing, if approved, the issuance of such securities.

16. The Note Certificates of the Company issued in 1914 for \$52,000,000 will fall due on March 2nd, 1924. Your Directors are glad to be able to advise the Shareholders that ample provision has been made for the retirement of these Notes at maturity.

17. Your Directors desire to express their appreciation of the loyal and efficient services of the officers and men of the Company, which have permitted it to perform its functions as a common carrier with credit to itself and satisfaction to the public, and have resulted in returns from the year's operations which, under the difficult conditions existing, cannot but be regarded as highly gratifying to the Shareholders.

18. The undersigned Directors will retire from office at the approaching annual meeting. They are eligible for re-election:—

- Mr. EDWARD W. BEATY,
 - Hon. FREDERICK L. BÉTUÉ, K. C.
 - Mr. CHARLES R. HOSBIE,
 - Hon. WM. J. SHAUGHNESSY, K. C.
- For the Directors,
E. W. BEATY, *President*.

MONTREAL, March 14th, 1921.

EXPENDITURES		
Dividends on Preference Stock:		
2 per cent. paid April 1st, 1920.....	\$1,613,638.42	
2 per cent. paid October 1st, 1920.....	1,613,638.42	\$3,227,276.84
Dividends on Ordinary Stock:		
2½ per cent. paid April 1st, 1920.....	\$6,500,000.00	
2½ per cent. paid June 30th, 1920.....	6,500,000.00	
2½ per cent. paid October 1st, 1920.....	6,500,000.00	
2½ per cent. paid December 31st, 1920.....	6,500,000.00	26,000,000.00
Construction of Branch Lines, Exhibit "E".....		4,248,213.28
Additions and Improvements, main line and branches, Exhibit "E".....		6,702,262.68
Expenditure on leased and acquired lines, Exhibit "G".....		1,852,004.60
Rolling Stock Equipment.....		4,461,152.98
Shops and Machinery.....		1,485,737.30
Lake and River Steamers.....		74,910.00
Ocean and Coastal Steamships:		
Payments on Steamships acquired and under construction.....	\$14,255,914.25	
Less amount paid from Steamship Replacement Fund.....	454,441.42	
		13,801,472.83
Deposited with Trustee, Special Investment Fund.....		7,021,866.59
Securities Acquired:		
Lake Erie & Northern Ry. 1st Mortgage Bonds.....	\$11,000.00	
Alberta Stock Yards Co., Ltd., Preferred Stock.....	129,000.00	
Trustee Securities.....	3,294,244.81	3,434,244.81
Payment of Equipment Obligations.....		1,440,000.00
Increases in Working Assets and Advances to Controlled Properties and Insurance Premiums.....		20,803,326.58
		\$94,552,468.49
Cash in hand, December 31st, 1920.....		30,090,941.24
		\$124,643,409.73

ASSETS

GENERAL BALANCE SHEET, DECEMBER 31st, 1920.

LIABILITIES

Property Investment:		
Railway, Rolling Stock Equipment and Lake and River Steamers.....	\$567,283,037.04	
Ocean and Coastal Steamships, Exhibit "A".....	43,695,645.26	
Acquired Securities (Cost):		
Exhibit "B".....	124,469,836.18	
Advances to Controlled Properties and Insurance Premiums and Investments and Available Resources:	10,134,550.14	
(Including amount held in trust for 6% Note Certificates, \$60,197,030.76)		
Deferred Payments on Lands and Townsites.....	\$70,968,761.54	
Imperial and Dominion Government Securities.....	33,916,466.81	
Provincial and Municipal Securities.....	2,016,721.29	
Debenture Stock in Treasury.....	32,000,000.00	
Cost.....	35,056,439.66	
Assets in Lands and Properties, Exhibit "D".....	91,977,838.03	
Cash.....	6,871,549.71	272,807,797.04
Working Assets:		
Material and Supplies on Hand.....	\$33,734,639.66	
Agents' and Conductors' Balances.....	4,298,448.81	
Net Traffic Balances.....	6,011,475.62	
Imperial, Dominion and United States Governments, Accounts due for Transportation, etc.....	1,110,084.55	
Miscellaneous Accounts Receivable.....	17,511,737.11	
Cash in Hand.....	30,090,941.24	86,997,319.97
		\$1,105,388,185.63

Capital Stock:		
Ordinary Stock.....	\$260,000,000.00	
Four Per Cent. Preference Stock.....	80,681,921.12	\$340,681,921.12
Four Per Cent. Consolidated Debenture Stock.....		216,284,882.10
Mortgage Bonds:		
Algona Branch 1st Mortgage 5 per cent.....	3,650,000.00	
Note Certificates, 6 Per Cent.....	52,000,000.00	
Current:		
Audited Vouchers.....	\$19,429,625.95	
Fayrolls.....	4,886,048.37	
Miscellaneous Accounts payable.....	15,376,745.54	37,692,419.86
Accrued:		
Rentals of Leased Lines and Coupons on Mortgage Bonds.....		648,855.71
Equipment Obligations.....	\$18,550,400.00	
Less Balance on hand with Trustees.....	10,979,600.00	
		7,570,400.00
Reserves and Appropriations:		
Equipment Replacement.....	\$4,230,786.45	
Steamship Replacement.....	22,922,912.60	
Reserve Fund for Contingencies and for Contingent War Taxes.....	49,160,236.19	
		76,313,935.24
Premium on Ordinary Capital Stock Sold.....		45,000,000.00
Net Proceeds, Lands and Townsites.....		96,610,805.14
Surplus Revenue from Operation.....		127,725,728.35
Special Reserve to Meet Taxes Imposed by Dominion Government.....		3,144,249.81
Surplus in Other Assets.....		98,064,988.30
		\$1,105,388,185.63

J. LESLIE, *Comptroller*.

financial position of the Company at that date, and that the relative Income Account for the year is correct.

PRICE, WATERHOUSE & CO.,

Chartered Accountants (England).

Montreal, March 14th, 1921.

RECEIPTS AND EXPENDITURES.

Year Ended December 31st, 1920.

EXHIBIT "F."

DETAILS OF EXPENDITURE ON ADDITIONS AND IMPROVEMENTS FROM JANUARY 1st TO DECEMBER 31st, 1920.

Receipts:		
Cash in hand, December 31st, 1919.....	\$53,519,420.78	
Surplus Revenue as per statement.....	\$21,877,635.61	
Special Income as per statement.....	10,966,447.81	32,844,083.42
Land Department:		
Lands and Townsites:		
Proceeds of Sales and Interest, less cancellations.....	\$12,867,526.96	
Less Sales Expenses and Irrigation.....	4,706,321.08	
	\$8,161,205.88	
Deferred Payments on previous years' sales.....	3,383,543.88	
	\$11,544,749.76	
Amount remaining in Deferred Payments on the sales of the year.....	7,692,372.99	
	3,852,376.77	
Amount received from Sale of Government and other Securities.....	3,801,113.75	
Amount on account of Consolidated Debenture Stock, sold to the Imperial Government.....	7,658,578.54	
Amount applied in reduction of Cost of Mining and other Properties, Exhibit "D".....	38,682.69	
Increase in Current Liabilities, Rentals of Leased Lines and Coupons on Mortgage Bonds, Equipment Obligations and Reserves and Appropriations.....	22,929,153.78	
	\$124,643,409.73	

Eastern Lines:		
Additional Sidings, Buildings, Stations and Yards.....	\$460,357.68	
Permanent Bridges and Improvements of Line.....	652,653.09	\$1,113,010.77
Montreal Terminals.....		\$74,101.41
Quebec Joint Terminals.....		28,706.21
Western Lines:		
Additional Sidings, Buildings, Stations and Yards.....	\$1,024,804.93	
Permanent Bridges and Improvements of Line.....	1,152,172.15	
Fort William Terminals, including Coaling Plant.....	197,862.29	
Winnipeg Terminals.....	71,200.16	
Vancouver Terminals.....	585,483.08	
Connaught Tunnel.....	508,607.89	
Right of Way.....	11,427.20	
		\$3,551,557.70
Additions to Office Buildings and Hotels.....		564,280.93
Rented and Temporary Sidings.....		253,452.57
Telegraph Extensions and Additions.....		617,153.09
		\$6,703,262.68

STATEMENT OF EARNINGS FOR THE YEAR ENDED DECEMBER 31st, 1920.

From Passengers	\$49,125,738.88
" Freight	145,303,399.70
" Mails	1,498,231.14
" Sleeping Cars, Express and Miscellaneous.....	20,713,979.58
Total	\$216,641,349.30

STATEMENT OF WORKING EXPENSES FOR THE YEAR ENDED DECEMBER 31st, 1920.

Transportation Expenses	\$86,608,611.54
Maintenance of Way and Structures.....	32,573,927.27
Maintenance of Equipment.....	46,350,792.61
Traffic Expenses	4,999,345.21
Parlor and Sleeping Car Expenses.....	2,492,640.78
Expenses of Lake and River Steamers.....	1,492,991.54
General Expenses (including all taxes).....	8,969,995.75
Total	\$183,488,304.70

DESCRIPTION OF FREIGHT FORWARDED,

	Years Ended December 31st		
	1918	1919	1920
Flour	13,301,740	12,787,020	9,644,410
Grain	137,070,428	121,059,921	172,536,485
Live Stock	2,364,870	2,603,571	1,947,976
Lumber	3,241,312,802	3,143,431,200	3,565,175,867
Fireworks.....	339,631	279,925	273,546
Manufactured Articles.....	9,718,373	7,854,163	9,330,111
All other articles.....	9,798,523	7,589,275	9,625,065

	Years Ended December 31st		
	1918	1919	1920
Number of tons carried....	29,836,694	25,102,821	30,160,134
Number of tons carried one mile.....	13,014,665,922	11,121,322,012	13,994,508,975
Earnings per ton per mile....	0.85 cents	1.00 cents	1.04 cents

TRAIN TRAFFIC STATISTICS—FOR TWELVE MONTHS ENDED DECEMBER 31st, 1920 AND 1919
EARNINGS OF LAKE AND RIVER STEAMERS AND OF KETTLE VALLEY RAILWAY NOT INCLUDED IN THIS STATEMENT

	Year ended Dec. 31, 1920	Year ended Dec. 31, 1919	Increase or —Decrease	
			Amount or number	Per cent
PASSENGER TRAFFIC.				
Passengers carried (earning revenue).....	16,769,555	15,671,752	1,097,803	7.01
Passengers carried (earning revenue) one mile.....	1,718,084,609	1,763,604,596	—45,519,987	—2.58
Passengers carried	132,223	115,727	—16,496	—12.52
Average journey per passenger.....miles	102.45	112.53	—10.08	—8.96
Average amount received per passenger.....\$	2.89	2.91	—0.02	—0.69
Average amount received per passenger mile.....cts.	2.82	2.59	.23	8.88
Average number of passengers per train mile.....	76.75	78.89	—2.14	—2.71
Average number of passengers per car mile.....	15.91	15.58	.33	2.12
Revenue from passengers per passenger car mile.....cts.	44.88	40.32	4.56	11.31
Total passenger train earnings per train mile.....\$	2.81	2.59	.22	8.49
Total passenger train earnings per mile of road.....\$	4,844.78	4,463.87	380.91	8.53
FREIGHT TRAFFIC.				
Tons of revenue freight carried one mile.....	13,856,607,551	10,926,848,494	2,929,759,057	26.81
Tons of non-revenue freight carried one mile.....	1,830,407,240	1,378,437,805	451,969,435	32.79
Total tons (all classes) freight carried one mile.....	15,687,014,791	12,305,286,299	3,381,728,492	27.48
Tons of revenue freight carried one mile per mile of road.....	1,066,401	840,928	225,473	26.81
Tons of non-revenue freight carried one mile per mile of road.....	140,868	106,084	34,784	32.79
Total tons (all classes) freight carried one mile per mile of road.....	1,207,269	947,012	260,257	27.48
Average amount received per ton per mile of revenue freight.....cts.	1.038	1.003	.035	3.49
Average No. of tons of revenue freight per train mile.....	529.25	498.07	31.18	6.26
Average No. of tons of non-revenue freight per train mile.....	69.91	62.63	7.08	11.27
Average No. of tons of (all classes) freight per train mile.....	599.16	560.90	38.26	6.82
Average No. of tons of revenue freight per loaded car mile.....	23.44	22.08	1.36	6.16
Average No. of tons of non-revenue freight per loaded car mile.....	3.10	2.79	.31	11.11
Average No. of tons of (all classes) freight per loaded car mile.....	26.54	24.87	1.67	6.71
Freight train earnings per loaded car mile.....cts.	24.34	22.15	2.19	9.89
Freight train earnings per train mile.....\$	5.50	5.00	.50	10.00
Freight train earnings per mile of road.....\$	11,072.83	8,434.11	2,638.72	31.29

[Cont.]

Railway Officers

Financial, Legal and Accounting

H. C. Hicks has been elected treasurer of the St. Louis, El Reno & Western, with headquarters at St. Louis, Mo. L. A. Garner has been appointed auditor with headquarters at Fort Smith, Ark.

George C. Gahan, whose appointment as general auditor of the Canadian Pacific was announced in the *Railway Age* of March 18 (page 741), was born December 28, 1874, at Montreal, Que. He entered the service of the Canadian Pacific in April, 1890, and continued until January 1, 1901, occupying various positions in the accounting department. On the latter date he was appointed general bookkeeper and continued in that position until July, 1901, when he was promoted to chief clerk to the assistant comptroller and general auditor. In December, 1916, Mr. Gahan was promoted to assistant general auditor, which position he was holding at the time of his recent promotion.

Operating

The office of general superintendent of the Fort Worth & Denver City has been transferred from Fort Worth, Tex., to Wichita Falls and the office of superintendent of the Wichita Falls division has been abolished. Officers and employees formerly reporting to the superintendent of this division will hereafter report directly to the general superintendent. These changes are effective April 1.

A. Miller, district engineer on the Missouri Pacific with headquarters at Kansas City, Mo., has been appointed super-

intendent of the Missouri division with headquarters at Poplar Bluff, Mo., succeeding W. C. Morse. O. E. Coyne has been appointed superintendent of the Illinois division with headquarters at Illmo, Mo., succeeding H. H. Berry. The appointments are effective April 1.

Traffic

J. F. Gracey has been appointed general agent on the Louisville & Nashville with headquarters at Clarksville, Tenn., effective April 1.

D. F. Williams has been appointed general freight and passenger agent of the St. Louis, El Reno & Western, with headquarters at Fort Smith, Ark.

J. A. Dolan has been appointed general agent on the Erie, with headquarters at Cincinnati, Ohio, effective March 1, succeeding J. H. Webster, who has resigned.

L. K. Mulkern has been appointed division freight agent of the Canadian Pacific with headquarters at North Bay, Ont., succeeding W. S. Elliot, who has been transferred to a similar position at St. John, N. B.

R. N. Collyer has been appointed vice-chairman of the Traffic Executive Committee, Eastern territory, with headquarters at New York. Mr. Collyer will continue as chairman of the Trunk Line Association.

J. H. Regal, general baggage agent of the Oregon-Washington Railroad & Navigation Company, has been given jurisdiction over the duties of general baggage agent of the San Francisco & Portland Steamship Company, with headquarters at Portland, Ore.

F. W. Jones, general agent of the Norfolk & Western, with headquarters at Richmond, Va., has been appointed division freight agent with headquarters at Winston-Salem, N. C.,

succeeding F. T. Brinkley who has retired under the pension rules of the company. **D. W. Champlin** has succeeded Mr. Jones as general agent at Richmond. These changes were effective March 19.

Mechanical

E. J. Summers, smoke inspector on the Chicago, Milwaukee & St. Paul, has been promoted to fuel supervisor, with headquarters at Chicago, effective March 15, with jurisdiction over the system.

M. B. McPartland has been appointed superintendent of motive power of the Denver & Salt Lake with headquarters at Denver, Colo., succeeding **J. J. Connors**, resigned on account of ill health.

J. W. Small, formerly superintendent of motive power of the Seaboard Air Line, has been appointed superintendent of motive power and shops of the Cuba Railroad with headquarters at Camaguey, Cuba, succeeding **M. B. McPartland**, resigned, to accept service with another company. Mr. Small was born on September 24, 1870, at Chatham, Ont., and was educated in the high schools of that city and at the Collegiate Institute. He entered railway service in 1887 as a machinist's apprentice on the Northern Pacific. In 1892 he went to Pocatello, Idaho, as a machinist on the Oregon Short Line. The following year he went to Tacoma, Wash., as a machinist for the Northern Pacific. During the same year he entered the service of the Southern Pacific as a machinist and served subsequently as gang foreman, roundhouse foreman, assistant master mechanic and master mechanic for that company. In 1906 he became superintendent of motive power of the Mexican lines of the Southern Pacific. In 1910 he went to the Kansas City Southern in a similar capacity and the following year became superintendent of motive power for the Missouri Pacific. The same year he went with the Sunset Central Lines (Galveston, Harrisburg & San Antonio, Houston & Texas Central, Morgan's Louisiana & Texas, Texas & New Orleans, etc.) as assistant general manager. In 1913 he was appointed superintendent of motive power of the Seaboard Air Line. During federal control he served first as mechanical assistant to the regional director, Southern region, and later as mechanical staff officer to the regional director of the same region.



J. W. Small

Purchasing and Stores

A. Herrera, formerly purchasing agent of the National Railways of Mexico, with headquarters at Mexico City, has been appointed to his former position. Mr. Herrera was born September 16, 1878, at Mexico City. He was educated at the Merchants' School of that city and entered railway service March 1, 1895, with the Mexican Central. After serving in several minor positions in the stores department he was appointed chief clerk of that department in 1901. In 1903, he was promoted to material accountant and served in that capacity until 1906 when he was appointed fuel agent. In 1909 when the Mexican Central was incorporated into the National Railways of Mexico, Mr. Herrera's duties were extended to include the maintenance of the fuel service of the entire system. In 1910 he was appointed purchasing agent. Mr. Herrera continued in this position until 1915 when, because of the revolution, he retired to private life. With the return of normal conditions he has again resumed the duties of his office.



A. Herrera

Obituary

Charles H. Cox, assistant treasurer of the Ann Arbor, died on March 27, at Toledo, Ohio.

Thomas M. Orr, assistant secretary of the Union Pacific, died at his home in Omaha, Neb., on March 19, after an illness of several weeks. He had been with the Union Pacific for over 40 years.

A. C. Torbert, secretary and treasurer of the Gulf, Colorado & Santa Fe, was found dead in his berth on a Santa Fe train at Houston, Tex., on the morning of March 24. Mr. Torbert had been in the service of the Gulf, Colorado & Santa Fe for 34 years. He was born at Newtown, Pa., on July 4, 1859, and was educated at Racine College, Racine, Wis. He entered railway service in March, 1882, on the Missouri Pacific at Galveston, Tex. In 1885 he went with the Texas & Pacific, and after being employed for two years in the auditor's office at Dallas, Tex., entered the service of the Gulf, Colorado & Santa Fe at Galveston. He was promoted to cashier and paymaster in July, 1887, and ten years later was made secretary and treasurer, the position which he was holding at the time of his death.

F. A. Lister, formerly superintendent on the Galveston, Houston & Henderson, died at his home in Galveston, Tex., on March 23. Mr. Lister was born at Philadelphia, Pa., in 1849. He entered railway service at the age of 14 years as a messenger on the Philadelphia & Reading at Philadelphia. He later became a station clerk and subsequently station agent for this company. At the age of 24 he was appointed superintendent of the Camden & Atlantic (now part of the Pennsylvania). He later saw service on the National Railways of Mexico, the Missouri Pacific at Little Rock, Ark., the St. Louis-Southwestern at Cairo, Ill., and Tyler, Tex., the San Antonio & Aransas Pass at San Antonio and Yoakum, Tex., and the Colorado & Southern at Denver, Colo. In 1897 he went with the Galveston, Houston & Henderson as agent at Galveston and was later promoted to superintendent. He served for a time as acting general manager. In 1912 Mr. Lister met with an accident which resulted in the loss of his right foot, and since that time he had not been in active service.

Engineering, Maintenance of Way and Signaling

E. K. Hatten has been appointed assistant engineer of the Georgia & Florida with headquarters at Augusta, Ga. The office of chief engineer has been abolished.

G. H. Ballantyne, resident engineer of the Western Pacific with headquarters at Sacramento, Calif., has been appointed acting chief engineer with headquarters at San Francisco, Calif., succeeding **T. J. Wycke**, who has been granted a leave of absence on account of ill health.

A. L. Grandy, assistant general manager of the Pere Marquette, with headquarters at Detroit, Mich., has been appointed chief engineer and the position of assistant general manager has been abolished. **J. Tuttle**, chief engineer, has been appointed assistant chief engineer.

EDITORIAL

Railway Age

EDITORIAL

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The extent of the destruction of the railways of France and Belgium during the war and the rapidity with which they are being restored, and even considerably improved in many instances, is known only in a vague way in this country. The details of the reconstruction program, the peculiar difficulties

which have been met with and overcome, the general physical condition of the properties where the reconstruction is complete and the plans for future improvements are matters which are worthy of the interest of any one who is able to appreciate the successful solution of extraordinary railway problems. That the details of this work are not more generally known is due to the fact that the men who have it in charge have been, and are, so occupied with it that little opportunity has been given them to tell of their achievements even to the people of their own countries. In view of this the series of articles on railway reconstruction in France and Belgium, the first of which appears elsewhere in this issue, which Oliver F. Allen has prepared for the *Railway Age*, is especially timely. The first article deals with the extent of the destruction of the French railways and some of the work done in connection with the restoration of service on lines which had been destroyed in whole or in part. Subsequent articles will describe the work done in connection with the rebuilding of bridges and tunnels, the restoration and improvement of stations and terminals and the reconstruction work in Belgium. A knowledge of the problems which have been solved in France and Belgium may by comparison tend to make the difficulties of our own railways seem less serious.

There is a truism to the effect that exports follow investments. It follows naturally that no one earnestly working for the well-being of our export trade can afford to overlook a consideration of the feasibility of heavier American investments in foreign projects. Perhaps the greatest field for American investments in foreign countries is in railways. Such investments bring orders not only to manufacturers of railway equipment in this country but indirectly to exporters of almost every commodity. Moreover, our railway exports are each year assuming a more important place in the totals of our foreign trade. The exports of steam locomotives alone in 1920 were valued at \$53,629,847. Other items on the list bring the total value of the exports of all railway supplies to well over \$140,000,000 for the year. This figure compares favorably with the exports of many standard commodities. The foreign market for railway supplies, moreover, has great possibilities for further development, contingent to some extent upon increased investments in foreign railways. The failure to include in the program of the National Foreign Trade Convention, to be held in Cleveland from May 4 to 7, any recognition of either of these important subjects, as such, constitutes an omission which is difficult to understand. Other industries and other phases of the situation have a place on the program. The use of long term credits to increase our foreign sales is to be discussed thoroughly. The

problems of the exporters of lumber, of textiles, of agricultural products, of motion picture films—all these will be subjects for addresses by experts in each field. In addition the convention will take up the question of inland waterways to the exclusion of the American railways which now haul and probably always will haul by far the greater part of export shipments within the United States. The railway man or the supply manufacturer will, of course, find much of value, in a general way, at the convention. The financial aspect of exporting goods, advertising our products abroad and governmental assistance will be gone into fully and anyone interested in foreign trade can profit by attending. Nevertheless, the failure of an important convention of this kind to give attention to railway investments abroad or to railway transportation at home appears to be a rather serious omission.

The car manufacturers, even with production slowed down somewhat, are rapidly decreasing the number of orders on hand and undelivered, according to the monthly statement of the Railway Car Manufacturers' Association, published in full elsewhere in this issue. The February production of freight cars for domestic service, of the 25 builders reporting, was 6,276 and the freight cars for domestic service under order and undelivered at the end of the month amounted to 26,685. In January the production was 7,008 and the number on order and undelivered was 32,008. The production in December was greater than in January and the uncompleted orders totaled 35,268. The February report shows a decrease in the delivery of freight cars to foreign purchasers but somewhat of an increase in the unfilled orders. The February deliveries of passenger cars were greater than in January but the undelivered orders showed a decline. At the current production the car manufacturers have enough unfilled orders on hand to keep them busy through the month of June. By that time it is to be hoped that a revival of business and a return of buying power to the railroads will act to prevent a shutdown in the industry.

"Moral hazard" is a term used by fire insurance men to denote the risk due to possible negligence or misconduct on the part of policyholders; and it is said to be a subject of frequent discussion at the present time because of the widespread fall in commodity prices. When stocks of goods are shrinking rapidly in value the dishonest owner who would set them afire, for the purpose of selling them to the insurance company, is under a specially strong temptation. Arson fires decreased greatly between 1916 and 1919, but in 1920 they again became numerous. The moral hazard is one of which railroad officers have to take cognizance; and not alone in connection with merchandise. W. F. Hickey, president of the Railway Fire Protection Association, calls attention to the special hazard of large numbers of empty box cars now standing on lonely side tracks. This hazard is due to the dull times,

though not to any specific dishonesty. It is simply that the careless or thieving tramp has more frequent temptation to indulge in some form of devilry. The claim department feels a moral hazard, but it is not connected with fire. H. M. Moors, freight claim agent of the Southern Pacific, in a recent address, called attention to the fact that consignees are refusing valuable shipments of freight nowadays on very flimsy pretexts, the real reason being that the goods are falling in value, and every possible trick is being tried to avoid bearing the loss. The duty of the reasonable consignee is, of course, to accept damaged goods and to assist the carrier, as far as practicable, in saving as much as possible. Under present conditions the duty of the station agent and the freight conductor is to make extra efforts to deliver goods in perfect condition and without delay, leaving no valid excuse for refusal to receive.

Rate Making Under the Transportation Act

SHIPPERS WHO HAVE been complaining of the rule of the Transportation Act which requires the Interstate Commerce Commission to try to make rates which will produce "as nearly as may be" a 5½ or 6 per cent return, and which is still frequently referred to as a guaranty although it has never yet in any month produced anywhere near a 6 per cent return, may soon come to find that the rule in the long run is calculated to reduce freight rates just as surely as it has advanced them. Under the operation of the law and an advance of 33 1/3 per cent in rates the railroads in December and January did not earn 6 per cent, or 1 per cent even, on the value which Mr. Plumb or Mr. La Follette would put upon them.

Yet on March 16 the traffic officers of the transcontinental railroads agreed to a considerable reduction in rates on lumber from the Northwest to Omaha, lower river crossings and Chicago, and on March 17 the traffic officers of the western railroads agreed to a 35 per cent reduction in the livestock rates on stockers and feeders from the ranges in the Southwest. The reduction in lumber rates was merely an equalization of the rates via Omaha with those by way of St. Paul rather than a general reduction, but it was done in order to promote the movement of some traffic that was not moving at the former rates. The reduction in cattle rates represented an emergency proposition but it was agreed to by the railroads in part because they believed they could make more money from lower rates than from higher rates and undoubtedly further reductions will be made in particular rates which can be shown to be too high.

If a shipper can prove that his present rate is too high to move business and that the railroads could make more money by reducing the rate he would much better spend his time in laying the facts before the railroads or the commission than in protesting against the injustice of a 6 per cent rule. The rate-making rule of the law was intended to direct the commission to try to let the railroads earn sufficient revenue. It was not intended to produce paper rates that would not earn revenue. If the lower rate will result in more net revenue it is more in accordance with the mandate of the Transportation Act than a higher rate.

After a while more people will appreciate that the old rule of making rates "what the traffic will bear" meant that rates should not be too high as well as it meant that they should not be too low. But there is no rule that will justify a general reduction in rates without regard to the cost of operation merely because lower rates would let the shippers do more business at the expense of the railroads or even at the expense of the taxpayers.

The National Railway Service

THE NEW PLAN proposed by S. Davies Warfield, president of the National Association of Owners of Railroad Securities, has now been before the public long enough to permit an observer to see what kind of a reaction the offering of the plan has made upon the public mind or, more particularly, in railroad and financial circles. The plan was presented to Senator Cummins, chairman of the Senate Committee on Interstate Commerce, on March 21. It was given to the press about the same time; an abstract of it appeared in the *Railway Age* of March 25, page 793. It will be remembered that the plan provides for a so-called National Railway Service. At the head is a service division composed of five members of the Interstate Commerce Commission. This division is to have supervision and initiatory and regulatory powers exercised through a National Railway Service Board composed of 40 members, subdivided into two divisions—one, finance and administrative of 20 members; the other, railroad officers, also of 20 members. This board is to have a chairman, vice chairman, etc., and an executive committee of 11 members. There are also to be organized four railway group boards, each covering one of the rate groups recently established by the Interstate Commerce Commission in the rate case. Each board is to consist of seven members, five selected by the railroads in the group, and two from the shippers. The 20 officers in the four groups make up the railway officers division of the National Railway Service Board. Further than this, each group is also to have ten committees of five members each. The ten committees of each respective group will cover different phases of railway operation; they will each report to the group board. Another clause of the plan provides for the extension of the scheme embodied in the present National Railway Service Corporation, giving the National Railway Service power to buy equipment to be leased to the carriers.

There is evidently much room for discussion as to the good or bad points of the plan. The interesting and pertinent fact is, however, that the discussion of the plan has not been along these lines at all, but rather as to the advisability and propriety of introducing and agitating a plan such as this at this time. The general impression suggested by the critics is that there are enough uncertainties in the railway situation just at this moment not to make it advisable to bring in also the discussion of these new suggestions and the many complications attendant thereto.

It is rather difficult, it will have to be admitted, to criticize a plan that has been proposed by a recognized authority like Mr. Warfield and which apparently has the approval of such leaders in the investment world as Haley Fiske, president of the Metropolitan Life Insurance Company; Darwin P. Kingsley, president of the New York Life Insurance Company, and John J. Pulleyn, president of the Emigrant Industrial Savings Bank and also of the Savings Bank Association of New York, and others of similar standing. Nevertheless, we must agree with those who submit, despite this weight of authority, that the introduction of the plan at this time is not likely to prove of as much assistance in the present railway situation as might be wished.

The Congress of the United States has but recently put on the statute books the Transportation Act of 1920. This act has been termed the most constructive piece of legislation since the passage of the Federal Reserve Act. The Transportation Act, it is true, has not done all that it was expected to do. Particularly, it has not resulted in the railroads earning the net income which is going to be necessary if the carriers are to have their proper growth and efficiency or, in fact, much of any net income. Nevertheless, the Transportation Act cannot be said to have failed. By means of its provisions, the railroads were enabled to handle in 1920 their peak load. They are not handling their peak load

now. That they are not earning sufficient net income can hardly be said to result from faults in the Transportation Act. The difficulty at present is due to the falling off in business, to the high wage scales and to the conditions of employment embodied in the national agreements with the shop and other crafts. The wage question is a most serious one. Now that President Harding has realized that fact and has taken steps to seek a solution of it, we can, no doubt, soon expect some sort of correction.

Using one of Mr. Harding's own words, what the railroads need and what the country desires is a return to "normalcy" in railroading. In view of the many omissions and commissions that took place in the 26 months of federal control, it is evident that the return to normalcy is not going to be easy. It will help most measurably, it would seem, to give the carriers a chance to operate for a period "on their own" and as provided by the Transportation Act. It does not appear that we should change the entire scheme of the act because one agency created by it, the Railroad Labor Board, has permitted a too long drawn-out discussion of an important question. That particular problem can be remedied in a simpler way, and President Harding has already taken steps to that end. The complicated plan proposed by Mr. Warfield as an amendment to the Transportation Act is not a necessary part of a program of solution to the railway problem. The rather radical changes proposed in the plan and, more particularly, its introduction to the country's attention at this time, only befog and complicate an issue that already seems to be nearing its solution.

Exhibits at the Mechanical Conventions

WHILE THE REASON given by the Railway Supply Manufacturers' Association for abandoning the exhibition in connection with this year's convention of the Mechanical Division of the American Railway Association is thoroughly good, nevertheless, expressions of regret by both supply men and railway men are numerous. For some years the membership of the Railway Supply Manufacturers' Association has included some who do not believe that any good can come from exhibiting. In most instances they are manufacturers of what might be termed staple articles—devices which have undergone little or no change in design or workmanship for some years past. Even they are wrong in their attitude because they overlook the important fact that men come and go in railway service just as they do in every other walk of life; that where new generations are taking the place of the old they must be educated. Failure to educate means loss of business, sooner or later, to even an old established maker of a specialty; and while "old line companies" might feel that they are not warranted in spending money to show their wares to railway officers and many of their subordinates from all parts of the country, nevertheless it is a distinct loss to both buyer and seller when that opportunity is denied those who have something new to show and which cannot be carried around in a sample case.

Again, makers of appliances which mean increased economy and efficiency in railway operation sometimes complain that their devices fail because they are either not handled properly or else are not rightly understood; while on the other hand there are railway officers who are reluctant to apply more specialties to existing equipment because what they already have are not being properly used or maintained, sometimes through lack of facilities but as often through lack of knowledge. Here, too, there is a real loss to all concerned that they must forego a splendid chance to get together under ideal conditions.

As we have repeatedly said, and as railway officers themselves fully realize, there never was a time when it was more

necessary for them to get together to discuss their common problems than now; and this applies with equal emphasis to composite gatherings of railway men and supply men, of which meetings combined with practical demonstrations in the form of working exhibits, such as have been held at Atlantic City in June for a number of years, are ideal.

It seems unfortunate that in cancelling this year's exhibit it appeared necessary to the supply manufacturers to go to the drastic limit of deciding not to have any of their representatives at the convention. This action will prove costly to many concerns because it will deprive their representatives of the opportunity to talk business within a few days with a large number of railway officers and thereby make it necessary for them to incur the expense of traveling many thousands of miles and spending many months in seeing railway officers whom they could have seen in a short time while attending the convention. However, since the supply concerns have been asked by their own association not to send representatives to the convention, all of them, in justice to each other, should in good faith comply with the request.

A Strange Hallucination About Railway Rates

ONE OF THE MOST extraordinary hallucinations regarding a business matter ever known is that of people who argue that the railways would fare better under present conditions if they would make general reductions in their rates. They reason that the high rates have stopped the movement of a large amount of freight, and that the railways would make more money if they would reduce the rates and thereby revive the traffic.

There is the strongest reason for believing that the tremendous reduction of traffic has been due almost entirely to general business conditions, and would have come if there had been no advances in rates. If this is true, a reduction of rates to the old basis would not be followed by a revival of traffic unless the general business conditions that caused it to decline were removed.

Suppose, however, that a restoration of the old rates would immediately restore the old traffic. Where would this leave the railways? We can answer this question with the greatest accuracy, because we know exactly the position they were in before the rates were advanced.

In February, 1920, the last month of government control, the railways moved the largest traffic ever handled in that month. The old rates were in effect, and they earned \$270,000 a day less than the amount required to pay their operating expenses and taxes. With the government guarantees added, they incurred a deficit of \$1,930,000 a day.

Effective May 1, the Railroad Labor Board awarded advances in wages averaging \$2,100,000 a day. In the four months from May 1 to September 1, the railways handled the largest traffic they ever did—a traffic that taxed their facilities to their capacity—and in these months, with the advanced wages and the old rates in effect, they earned \$1,444,000 a day less than enough barely to pay their operating expenses and taxes. With the government guarantees added, their deficit during the last four months before the rates were advanced was over \$4,000,000 a day, or at the rate of about \$1,500,000,000 a year.

It is obvious, therefore, that to restore the old rates, even if this did restore the old traffic, would be to restore the old deficit of over \$4,000,000 a day, and throw every railroad in the country into the bankruptcy courts. Since the rates were advanced the traffic has greatly declined, but in spite of an unprecedented decline of traffic the railways in the first five months the present rates were in effect did earn their operating expenses and taxes, which they were not doing

before, and in addition a net return averaging 2.85 per cent. This is much less than 6 per cent, and as the traffic has declined the return earned also has declined; but bad as it is, it is much better than failing by \$1,444,000 even to earn operating expenses and taxes.

The *Railway Age* agrees with those who contend that rates should soon be reduced. But from the standpoint of the welfare of the railways, of travelers and shippers and of the public, it is hardly less than insane even to suggest that any general reduction of rates shall be made until relatively much larger reductions shall previously have been made in operating expenses, and especially in the payroll.

The present financial troubles of the railways are due quite as much to an excessive payroll caused by unreasonable rules and working conditions and excessive wages as they are to the decline of traffic; and anybody who seriously suggests general reductions of rates without previous reduction of the railroad payroll is either hopelessly ignorant of the facts about the present railway situation or is an entirely fit subject for a lunatic asylum.

Norfolk & Western

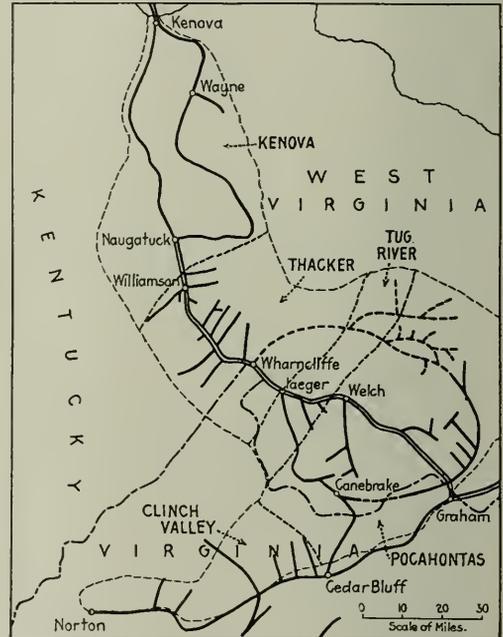
PERUSAL OF THE ANNUAL REPORT of the Norfolk & Western for 1920 indicates that this carrier did not have in like degree that great expansion in business and in gross earnings, as compared with 1919, which characterized its immediate neighbors, the Chesapeake & Ohio and the Virginian. The latter two roads were enabled to expand their net railway operating income measurably as between the two years despite great increases in expenses. On the Norfolk & Western the net railway operating income was considerably less in 1920 than in 1919. Increases of 80.83 per cent in costs of fuel, of 31.53 per cent in payrolls and of 6.10 per cent in costs of materials and supplies prevented the Norfolk & Western from realizing the advantages of increases of 7.22 per cent in tons of revenue freight carried, of 10.33 per cent in revenue ton-miles, or of 15.57 per cent in total transportation revenues.

It has become something of a fad in financial circles of late to compare the operations of the Norfolk & Western with the Chesapeake & Ohio, rather to the advantage of the latter. The comparison cannot be discussed at great length in this review, because the 1920 report of the Chesapeake & Ohio is not yet available to permit of an analysis of the detailed operating figures for that property. As far as gross and net earnings are concerned, it is apparent that the Norfolk & Western did not do nearly as well in 1920 as the Chesapeake & Ohio or the Virginian, although it did come through rather better than most of the other roads of the country.

All of these three roads are coal roads in adjacent territory. The bituminous coal tonnage of the Norfolk & Western constitutes about 64 per cent of the total tonnage. On the Chesapeake & Ohio, it constitutes about 68 per cent, and on the Virginian almost 90 per cent. One of the striking features of the coal business in 1920 was export coal, which trade reached its peak about October, but fell off considerably after that month. The three roads have coal-dumping facilities of the most modern type at Hampton Roads, the Chesapeake & Ohio at Newport News, the Norfolk & Western at Lamberts Point and the Virginian at Pinter's Point. The Chesapeake & Ohio was able to make a special "killing" in export trade in coal. In October it dumped at Newport News nearly 800,000 tons of coal, of which 60 per cent was for export. Its special advantage in export coal has been due to its having on its lines a coal specially desirable for export trade, in addition to which of late there has been a great expansion in the fields containing this coal. The Norfolk & Western apparently did not find itself in 1920 in as good a strategic position.

The total tons of bituminous coal moved by the Norfolk

& Western in 1920 were 26,035,500, or 63.99 per cent of the total tonnage. This total was in excess of the coal tonnage moved in 1919, when 24,265,803 tons were moved, but below the totals for 1916, 1917 or 1918. The number of tons moved in 1916 was 30,653,755. The coal carried on the Norfolk & Western originates from five fields—the Pocahontas, Clinch Valley, Tug River, Thacker and Kenova. As will be seen from the map, these fields adjoin one another and are in a fairly compact area adjacent to the point where Virginia, West Virginia and Kentucky join one another. Four of the five fields are on the main line; the fifth, the Clinch Valley, is on a branch. The movement from these five fields is in both directions, the Norfolk & Western being



The Coal Fields on the Norfolk & Western

especially well equipped to handle coal either at tidewater or to the north and west, or the lakes, where it has the advantage of favorable traffic relationships with the Pennsylvania system, which, it will be remembered, has a minority stock interest in the Norfolk & Western. The company is at present extending its lines in the coal fields. It began the construction on June 1, 1920, of the Lenore branch from Lenore, W. Va., to the properties of the United Thacker Coal Company in Mingo County, W. Va., consisting of some 26,000 acres of coal lands. The branch will be completed in August, 1921, but it is expected that coal shipments will commence in June or July.

The freight revenues of the Norfolk & Western in 1920 were \$73,918,301, as compared with \$62,681,028 in 1919, an increase of 17.93 per cent. The gross revenues were \$87,280,579, an increase of 15.57 per cent. Operating expenses in 1920 were \$84,943,837, as compared with \$64,021,285 in 1919, an increase of 32.62 per cent. The net railway operating income for 1920, however, was \$2,839,759 as compared with \$10,363,404 in 1919, a decrease of something like 70 per cent. The operating ratio in 1920 was 95.99 per cent; in 1919 it was 83.22 per cent, and in 1916, before federal control, it was 56.36 per cent. In comparison with these figures, the Chesapeake & Ohio in 1920 had

freight revenues of \$72,433,293, as compared with \$53,073,001 in 1919, an increase in the neighborhood of 28 per cent. The gross earnings in 1920 were \$90,190,745 as compared with \$71,475,015. It will be noted that, whereas in 1919 the gross revenues of the Norfolk & Western were about \$5,500,000 in excess of those of the Chesapeake & Ohio, in 1920 this position was reversed; the gross revenues of the C. & O. were nearly \$3,000,000 greater than those of the N. & W. The net railway operating income of the Chesapeake & Ohio in 1920 was \$11,357,968 as compared with \$7,463,955 in 1919. The operating ratio in 1920 was 86.27 per cent.

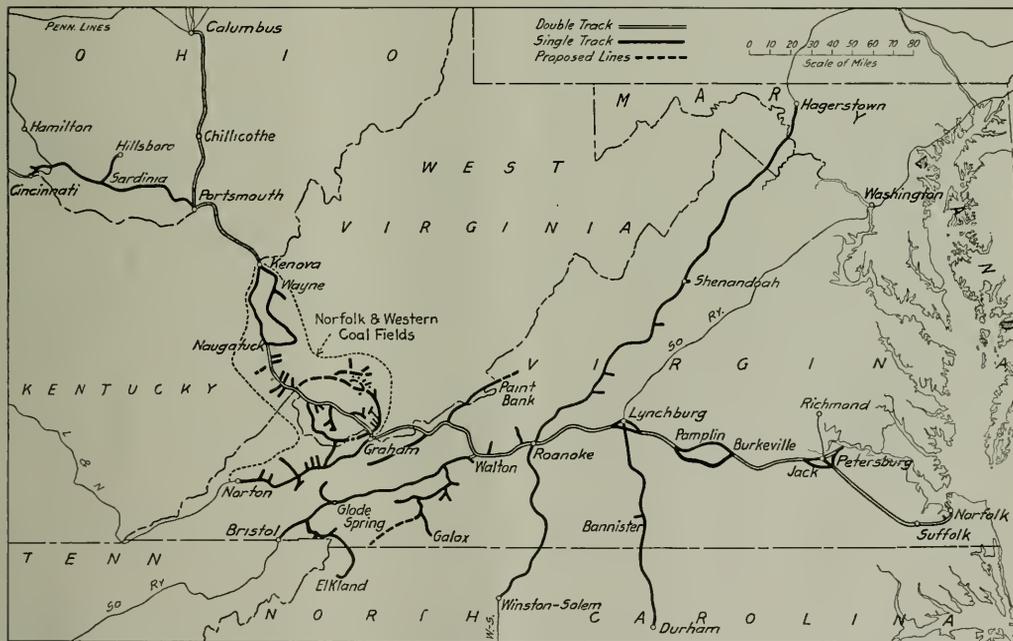
On the Virginian, the freight revenues in 1920, amounting to \$15,721,328, compared with \$10,268,428 in 1919, an increase of over one-half. The net railway operating income in 1920 was \$4,944,243 as compared with \$2,541,112 in 1919, an increase in this case of nearly double. The operating ratio in 1920 was 70.39 per cent.

The Norfolk & Western is a rather remarkable road in many ways. First of all, it is conservatively financed. In

that the company has under way as to new engine terminal facilities indicate a realization of the importance of this feature of railroad operation, such as few roads of the country can be credited with.

The Norfolk & Western, being a bituminous coal road with a large movement of that commodity to tidewater, has been enabled, like the Virginian and the Chesapeake & Ohio, to take advantage of the special opportunity presented for the use of heavy locomotives and large capacity cars. The figures for average trainload, etc., show a progressive increase over the last several years about as follows: The average revenue trainload on the Norfolk & Western in 1920 was 1,107 tons; in 1919, the average load was 1,106 tons; in 1916, 980 tons. The revenue load per freight engine-mile in 1920 was 835 tons; in 1919, 829 tons; and in 1916, 698 tons. The average revenue load per loaded car in 1920 was 40 tons; in 1919, 37; in 1916, 34 tons. The car-miles-per-car-day in 1920 averaged 34.3, and the net ton-miles per car per day 909; in 1919, the latter figure was 715.

The road had in service at the end of 1919, 1,027 loco-



The Norfolk & Western

the general balance sheet as of December 31, 1920, the investment in road is shown as \$229,129,714 and in equipment as \$83,662,149, a total of \$312,791,863. The stock outstanding consists of \$22,992,300 4 per cent preferred stock and \$121,481,100 common stock, on which 7 per cent dividends are paid. The total long-term debt consists only of \$114,241,050. The total corporate surplus as of December 31, 1920, was \$75,757,773. The railroad itself has a finished and well-kept appearance. The roadbed is of high standard and well maintained. As compared with its two neighbors, however, the Norfolk & Western is handicapped by heavy grades. Its main line is double-tracked from Lamberts Point and Norfolk through to the end of the line at Columbus, Ohio.

The distinguishing feature about the Norfolk & Western, however, is its motive power and equipment and the facilities for taking care of them. The engine terminals and the work

tives of a total tractive effort of 47,980,582. During 1920 it increased this number to 1,075, with a total tractive effort of 53,632,130, an increase in tractive effort of 11.78 per cent. The increase in tractive effort of steam freight locomotives as between the two years was 13.11 per cent. One of the features of operation on the Norfolk & Western is the use of 100-ton flat-bottom gondola cars, moved in solid trains to tidewater. In this respect the Norfolk & Western is not quite up to the Virginian, which has already received its first 120-ton cars; it is ahead of the Chesapeake & Ohio, which uses 70-ton hopper cars, and which will, however, soon receive some 100-ton gondolas. The Norfolk & Western has authorized the construction of 500 additional 100-ton cars and also of 1,000 of the 120-ton cars.

Much might be made of the improvements the Norfolk & Western is making in its engine terminals at the present time, and of those contemplated for the near future. Inas-

much as these things will be described in detail in an article in an early issue of the *Railway Age*, it will suffice here to point out merely some of the leading features of this work. At Roanoke the company has plans for two new 40-stall roundhouses, each with 115-ft. turntables. One of the houses is to be 115 ft. deep and is now nearing completion. The other, which is to be 130 ft. deep, is a later development. The building of these houses will require considerable change in the yard layout at Roanoke, thereby increasing the yard's capacity. At Roanoke, also, the company has installed a 1,200-ton coaling plant of the most modern type. Another interesting development is the project, now completed, of a 2,000,000-gal. water storage and a water treating plant, with a capacity of 100,000 gal. an hour, which will be the largest single-unit water softening plant in railroad service. At Bristol, the terminus of the Radford division, a new 16-stall roundhouse has been completed, 115 ft. in depth, and with a 115 ft. table, and similarly at Shenandoah, on the Shenandoah division, a 12-stall house of the same depth.

These engine terminals are only a part of a much larger plan of improvement for the Norfolk & Western. To handle the 120-ton cars there will be a new car-dumper at Lambert's Point; in connection with this improvement, piers 2 and 3 are to be electrified. It is expected that the entire program at this point will increase the capacity of these piers about one-half. At Lambert's Point also, a trimming machine for handling coal cargoes is planned. This machine is expected to save two-thirds of the labor at present required to trim a cargo; if it proves successful, five more will be installed. In addition to the new engine terminal at Bristol, mentioned above, new yard facilities also are planned; it is expected that the improvements at this point will enable the road to double its business through Bristol, at which point connection is made with the Southern Railway. Another interesting development of the many planned is a new tie-treating plant nearing completion at East Radford, Va., with a capacity of 1,000,000 ties yearly. Mention has already been made of the new Lenore branch. The total program for new construction on the road calls for the expenditure of about \$18,000,000. In 1920 the total additions and betterments to roadway and structures aggregated \$5,179,744 and to equipment \$7,624,665.

The total freight revenue of the Norfolk & Western in 1920 was \$73,918,301 as compared with \$62,681,028 in 1919. The total tons carried were 40,685,743 as compared with 37,944,615 in 1919. The revenue ton-mileage in 1920, totaling 11,063,033,480, represented an increase of 10.33 per cent over 1919. The average revenue per ton-mile in 1920 was 0.668 cents; in 1919 0.625 cents. The average haul in 1920 was 272 miles; in 1919, 264 miles.

The passenger revenues in 1920 totaled \$10,374,129 as compared with \$10,824,463 in 1919. The total number of revenue passengers carried was 7,376,109, the average revenue per passenger per mile was 2.996 cents, and the average journey 47 miles. The following table shows the earnings of the Norfolk & Western in 1920, as compared with 1919:

	1920	1919
Mileage operated	2,200	2,088
Freight revenue	73,918,301	62,681,028
Passenger revenue	10,374,129	10,824,463
Total operating revenue	85,459,356	76,925,599
Maintenance of way expenses	12,811,527	10,660,872
Maintenance of equipment	29,703,859	23,089,901
Traffic expenses	771,210	445,585
Transportation expenses	39,538,089	28,323,932
General expenses	1,895,550	1,274,624
Total operating expenses	84,943,837	64,021,285
Net from railway operations	3,545,519	12,904,314

The corporate income account is as follows:

	1920	1919
Compensation, January and February less war taxes	3,411,787	3,142,630
Guaranty, March 1 to August 31, less war taxes	10,405,436	9,427,889
Net railway operating income, September 1 to December 31	3,238,122	6,282,763
Total	17,055,345	18,853,281
Gross income	17,936,740	19,972,726
Net income	12,496,788	14,513,779
Preferred dividends (4 per cent.)	919,692	919,692
Common dividends (7 per cent.)	8,503,989	8,459,373

Letters to the Editor

Problem of the Train-Order Signal

PHILADELPHIA.

TO THE EDITOR:

A "survey" to determine how many deceptive signals are in use is suggested in your editorial of March 25, page 775. In this connection you speculate on whether we shall ever know to what extent the Porter collision was due to the presence of the train-order signal near the crossing. A survey surely is a good thing, if you do not know already; but can it be that any responsible railroad officer, who is half awake, is ignorant concerning this feature of his plant? And, for that matter, who can believe that Engineman Long was really deceived by that signal? He did not see the hand-lantern motions of the two brakemen on the track, although the brakemen, and the government inspector, say that he could have seen them if he had looked.

And is any competent officer ignorant of the simple remedy for this supposed difficulty; the simple expedient of putting one of the two confusing signals fifteen or twenty feet higher than the other? Even if enginemen persist in the careless habit of depending on what they see a mile away, a sufficient difference in height will deprive them of all reasonable excuse. An engineman who is satisfied to see one light where he knows that he ought to see two is—well, are there any such on our fast trains?

Why do we perpetuate the farce of the train-order signal? An electric connection to the interlocked or the automatic semaphore would enable the operator to stop trains with equal facility, and at a saving of expense. That signalman at Porter had no train-order signal for the Lake Shore trains; why couldn't he also stop Michigan Central trains with a flag?

I am not connected with the "P. R. R.," but I am interested in the safety of American railroad signals, for I am speaking in behalf of the 8,720,159 men, women and children who make up the commonwealth of

PENNSYLVANIA.

Plain Talk About the Seniority Rule

VIRGINIA.

TO THE EDITOR:

I have read much recently with reference to "national agreements" and the closed shop. I am not a member of any organization affiliated with the American Federation of Labor. I believe in the principles of organized labor to a certain extent, but not enough to forsake a principle for some of its aims.

I do not believe in any body of men, any salaried chairman, or others dictating to me when, how, why, where and how much work I may do for a man, corporation or others, and under what terms I may work. I feel that I am capable of deciding these questions myself. If I sell my services to a corporation with an understanding as to the nature of my work, hours and compensation, if at any time conditions are not satisfactory I do not have to continue in their service. I am employed as a clerk, having been in continuous service for five years, deducting 19 months in the service on this side and "over there." I received a furlough to enter the service. I returned and was discharged on June 5, 1919, and on the same day applied for my regular position. The general chairman, local chairman or others in the union notified the superintendent that I quit when I entered the

service. After five months of loafing I finally was restored to service with full seniority rights. This after having taken my case up with the war department, which in turn handled it with the department of labor. Naturally my impression and opinion of the clerks' organization did not change after such treatment. Immediately after going to work these same clerks sent and brought applications for membership in their organization to me daily. Some of the other organizations, even more radical than the clerks (?), threatened my dismissal as soon as they could put the closed shop into an "agreement." This did not happen in Russia. It happened in Virginia, the state of culture, refinement, hospitality, etc.

Recently during the reduction of forces and on account of "the national agreement" I have been on the move almost continuously owing to the interpretations of certain articles in an agreement, which the officials personally told me were unfair. Any fair-minded person could easily see that the interpretation of the article was made just to apply to my case because of the fact that I refused to join an organization whose general chairman made the statement that it was unfortunate we were in France and could not have the benefit of the promotions made during our absence.

I want to work and I want advancement. I have letters showing that my work has been exceptionally good, some that say even more. I have had the superintendent and other officials compliment my work highly and tell me personally that they wanted to keep me in the service. All of which sounds good to me, but how can I advance when promotions are made according to seniority? I am just like a little log floating down stream behind a lot of dead wood. I can't get by, but must follow. There is no possibility of another epidemic of "flu," fever or other dread disease removing any of those that rank ahead of me on the seniority list. Most of them are too slow and lazy to die a quick or sudden death. They will linger until Gabriel blows first call, and then delay traffic through the golden gates by being late. If they go to hell they will put the fire out because the devil works 24 hours a day without additional compensation. A grievance committee will certainly call upon him and demand an eight-hour day and time and a half for extra work. That will put hell on the bunk.

What is the use of a man giving a corporation his best services and proving to them beyond a doubt that he is an exceptionally good man? What is the use in my work being done a little better than the other fellow's? Promotions must be decided according to a seniority list. I'll get mine when a lot of dead wood drifts through the pearly gates, after I am so old that I am half dust and the other half man. None of the men ahead of me even catch a bad cold. Their physical beings will last long after Gibraltar has been made a sand pit. When opportunity comes around it hangs around the top of a list of dead ones and by the time that he reaches my door his knock will be so soft that I will not hear it. In fact I will be listening for the last bugle call. Perhaps I will have an opportunity in years to come—about the same chance I have of receiving some of the mail sent to me overseas while Mr. Bursleson was postmaster-general.

Recently I was employed by the railroad as checker. I hold and have held all kinds of positions. The national agreement has made me what I term "an orphan clerk." My shift was from four in the afternoon until twelve midnight. Under the agreement the yardmaster could not send me to the west yard after 11:30 p. m., because I could not get back by relieving time. A time freight was reported in at 11:25 p. m. The yardmaster is allowed a certain time to have the train shifted and get it out of the yard. Seeing that the yardmaster was deeply concerned over a certain delay of not less than an hour to the train I told him that I would go and get the seals, check the train and assist him in any way to get it out on time. He explained to me that he could not allow overtime if I was required to stay in the yard after

midnight and under the agreement he could not ask me to even go at all.

I picked up my lantern, went to the yard, checked and listed the train and returned to the office a few minutes after twelve. The train left the yard on time. As soon as I walked into the office they met me. They? Oh, the grievance committee, I believe they call themselves. I had violated the agreement, worked ten minutes without extra compensation. To listen to their side of the case it was something like a charge of murder, rape or highway robbery.

Well, I just felt myself swell like a mountain stream after a heavy rain. Soon I overflowed my banks and with a mighty rush of "Daniel Webster's Bull" I proceeded to bawl them and hand out a few compliments. They showed about as much fight as a Hun in close-quarter physical exercise with a Yankee doughboy and a bayonet. They wanted to fight all right. They would have fought anything to get out of the way. The yardmaster almost gave me a French kiss for getting the time cars out of the yard and afterwards proved his appreciation by favoring me in many ways.

I give you this as one of the necessary evils in connection with agreements. I could wear out this No. 6 machine writing of similar cases that I actually witnessed.

The national agreement sent me here. The superintendent wanted me elsewhere. But down here and especially around this community the chief topic of conversation is "agreements," "pulls" and other nice things concerning them. Dailies are ignored and lay on the front porches until the print fades. The brotherhood this and that has taken the place of them. Read some of them. Poor, abused, crushed workman. You see him pictured in torn overalls, torn and dilapidated hat, big toe peeping out the corner of a rundown, run over \$1.98 dog cover. Piteful sight as he looks into his dinner pail, takes out a piece of corn bread for his daily portion. Too sad!

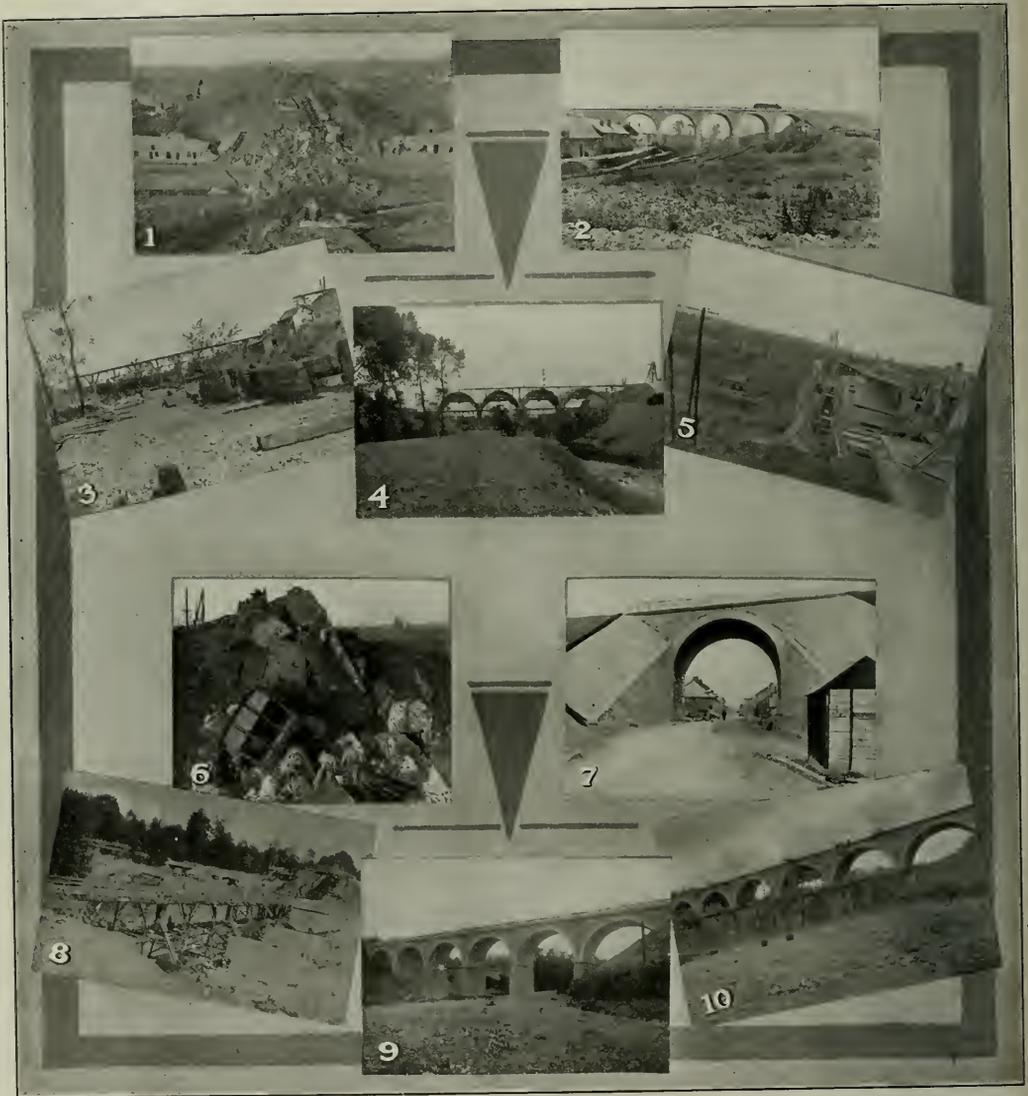
In my home town it is a little different. I see him going to work dressed in silk shirt, \$15 shoes, \$10 hat and the latest model suit. He stops at the Y. M. C. A. to change. After the change he proceeds to step the distance between the "Y" and the shop as though he were going to the electric chair. He could get there a minute or two ahead of time but he is afraid of the Grievance Committee. For dinner he has a king's spread or maybe he will crank a Ford and ride over town to get a hot meal at the hotel. He may hate cold food.

While on duty if the chairman of the Grievance Committee happens to see him working hard (they have a cemetery there to bury those that work themselves to death) he cautions (?) him without the aid of profanity. Believe me, efficiency has been buried so deep that it would require the strength of the former A. E. F. a short lifetime to extricate it from the débris.

I believe that some parts of an agreement are good. Mutual helpfulness and that sort of thing. But erase that part or article that makes promotion according to seniority. Let the man who has a desire to press forward have the right of way. Agreements that base promotion according to seniority cause a good man to apply the brakes, slow down and generally become unfit for promotion. Agreements have the same effect upon the speed of a good man as a hill does to a stream. If it doesn't stop him it certainly holds him up.

When corporations or others are allowed the privilege of selecting their men according to ability and qualifications, and not according to seniority, there will be an increase in efficiency that will shock the world. Don't force promotion on a man because he is senior. When the day comes that will find everyone working for advancement because he really deserves it, or because so and so is working for recognition and he must compete with him for promotion, we will show a long line running upward on the may of efficiency. Until then, hats off to Messrs. Lenine and Trotzky.

IMAN ORPHAN CLERK.



Views of Typical Railway Reconstruction in France

Figs. 1 to 5. LeGland Viaduct, on the Line from Valenciennes to Hirson. (1) War Destruction. (2) The Finished Structure in September, 1919. (3) Reconstruction Started by Light Temporary Framework. (4) Piers Completed and the Forms in Place for the First Ring of the Arches, That on the Arch at the Right Having Already Been Poured. This Viaduct Has Five Semi-circular Arches of About 54 ft. Span. (5) A Closer View of the Arch at the Right of Fig. 4. Note the 60 cm. (24 in.) Military Railway on the Temporary Structure Shown in Fig. 3, and the Concrete Blocks Used as Facing and Forms on and between the Arches.

Figs. 6 and 7. The Maquenoise Bridge, on the Line from Valenciennes to Hirson. (6) The Bridge Was Destroyed

While a German Train Was Passing Over. (7) The New Bridge. A Typical Example of the Way in which the Abutments and Adjoining Slopes Are Treated in the Reconstruction.

Figs. 8 to 10. The Blagny Viaduct Also on the Line from Valenciennes to Hirson. (8) Note the Partially Finished Piers with Concrete Block Facings and the Small Aperture About Half Way up in the Side of One of Them. This is an Opening to a Chamber for Explosives Which Is Closed up and Camouflaged Later. (9) Entirely Finished in September, 1919, Six Arches of About 54 ft. Span. (10) Partly Finished. The Completed Structure With the Balustrade and Other Finishing Parts being put in Place.



Fig. 11—Ohis Viaduct. Completed, except for the balustrade, in December 1919. In order to reduce the grades on this line the viaduct, of 13 arches of about 47 ft. span, was rebuilt about 9 ft. higher than the pre-war structure. All of the viaducts of this group were rebuilt with arches having about the same span as formerly in order to utilize parts of the original foundations.

Railway Reconstruction in France and Belgium

Extent of Destruction—Work of the Army Engineers—Plans for Permanent Improvements

By Oliver F. Allen

Formerly Major of Engineers, American Expeditionary Forces

IN STARTING THIS SERIES of articles on French and Belgian railway reconstruction, the author wishes to express his appreciation of the very many courtesies shown him by European friends to facilitate the study of the reconstruction program and its execution. The engineers, both civilian and

have accomplished. One of the necessary but unfortunate results is that we in America do not realize how farseeing the program is nor how much has actually been done. While under the strain of this intensive work our friends in France and Belgium found time to help in collecting accurate data of which this series of articles represents only a small part.

The Director of Railways and his staff in the Ministry of Public Works together with the engineers of the Northern Railway (Compagnie du Chemin de Fer du Nord) were especially generous, not only in furnishing information, but in giving their own precious time for showing the actual works and supplying many authentic photographs of the destruction and the different phases of the reconstruction. The engineers of the Central Association for the Resumption of Industrial Service in the Devastated Regions (Association Centrale pour la Reprise de l'Activité Industrielle dans les Régions Envahies), and of other railway and many industrial organizations, both in France and Belgium, have also been of great assistance in compiling these data.

The 10 devastated departments of France and the seriously injured parts of Belgium include a large part of their pre-war industrial regions, especially in the fields of metallurgy and coal mining. These areas were effectively served by interlaced railway lines. The invaded regions of France north of the Marne are in the territory served by the Northern Railway. One branch of it goes down the Sambre valley into Belgium along one of the lines of the German advance in 1914. From the beginning of that advance until the time of the Meuse-Argonne offensive of the American army in the late autumn of 1918 about half of the lines of the Northern Railway were in the enemy's hands. Some of the road beds were destroyed for military reasons on both sides of the fighting line as it moved back and forth. The greatest



Fig. 12. Ohis Viaduct Before Reconstruction

On the line from Busigny to Hirson. A typical illustration of war destruction. A piece of German narrow gage military railway track at the right.

military, who have had to do this task have found the work so tremendous and the demand for comprehensive plans looking far into the future so insistent that they have worked feverishly without rest not only since the armistice, but most of them as army railway engineers during the long strain of the war. They have had neither time nor opportunity to tell even their own people, let alone the outside world, what they

destruction was, however, done by the enemy when retreating, especially in 1917 and just before the armistice, and was mostly not a military necessity.

The railways were laid out for the normal peace time movement of freight as dictated by industrial conditions, such as coal going from the mines to the metallurgical plants and fabricated material going from and food coming to the various industrial communities in the very active areas first over-run by the Boches. To move the supplies required by the Allied armies and secure the maximum insurance against interruptions by airplane bombing and long range shelling, certain modifications of the railways back of the lines had to be made, including such things as the construction of large transfer yards, the double tracking some single track lines, the lengthening of passing tracks and sidings and the expansion of freight terminals. In some places complete new cutoffs or loops were built around railway centers not only to furnish a detour in case of interruptions to main junctions by bombs, but to expedite the movement of freight which would have otherwise been delayed on account of the congestion at the junction points.

These modifications, while done primarily for military necessity and sometimes of a very temporary character, were frequently made a part of the general reconstruction program, especially during 1917 and 1918. For example, a loop southwest of the city of Nancy built by the French army railway engineers will be of great permanent assistance in facilitating freight movement in that part of the East and has already become an integral part of the lines of the Eastern Railway (Chemin de fer de l'Est). This loop, several miles in length, has its concrete bridges, permanent grading, drainage, first-class road bed and track as if it had been built under normal peace time conditions. Several large transfer yards built

this work. Both tracks of about 700 miles of double track line, and one of the tracks of about 70 miles of double track line together with some 100 miles of single track line were put back in service, all by military engineers of the Northern Railway. This was made possible only by the utilization of temporary structures and by making only those repairs to the road bed which were imperative for operation of the military



Fig. 13. Villeneuve Bridge

The original destruction followed by the destruction of the temporary military bridge. Note at the left the remains of the original masonry pier, and in the center a temporary military concrete pier built on the foundations of the old pier.

trains at slow speeds. To facilitate the movement of supplies a great many locomotives, not only from all parts of France, but new ones imported by the American, British and French armies were added to the pre-war supply on the lines employed for military purposes. There was considerable loss



Fig. 14. Villeneuve Bridge Reconstructed

The old masonry pier at the left has been utilized. The right is a new concrete pier built on the old foundation. Note how this bridge blends with the landscape, and that the lower arches are made much flatter than the semi-circular arches of the large viaducts.

and used by the American and British armies were designed so as to have permanent value and are being utilized in the readjustment of traffic under the new conditions. Extensions of lines and additions to freight yards built solely for military requirements in order to secure greater rail-head capacity are being retained to facilitate after-the-war traffic.

When road bed, bridges or tunnels were destroyed on the Allied side of the line, temporary repairs were made by military engineers as rapidly as possible, and as the enemy was driven back this temporary reconstruction was carried forward. Some of the first jobs of the American army railway engineers in the spring of 1918 were in connection with

of locomotives and cars from enemy fire, capture and excessive use without adequate upkeep.

Even as provision for industrial reconstruction started in the spring of 1915, long before America seriously considered going to war, the general features of a comprehensive plan of railway reconstruction and expansion were studied by the French early in the war. Like our own organizations of railway engineers the French army railway units consisted principally of men taken from the ranks of the permanent organizations of the various railways, and consequently the liaison between the military engineers working directly under the general staff of the army, the organization of the Director

of Railways under the Ministry of Public Works, and the civilian staffs which the railways retained was so close that they were able to outline a very comprehensive program of rehabilitation. One of the constructive advantages of that program was the knowledge and ability to shape many extensions of traffic facilities of various kinds required by military necessity so that they are now utilized as permanent improvements.

Following the final evacuation by the enemy, when the railway company took possession of its property, there was the double problem of repairs to locomotives and cars so as to have rolling stock with which to move out the great bodies of troops to be demobilized and to move in the material and personnel required for the return of the refugees and the reconstruction work, and of rebuilding the bridges, road bed, etc., to carry this traffic. There were about 500 miles of com-

the clearing up and a big start with the permanent reconstruction. Detours, military roads, temporary bridges, etc., were utilized. Temporary army barrack buildings were kept as stations. Main lines in the devastated regions were reopened for both freight and passenger traffic in the spring and early summer of 1919.

A second phase, say the year 1920, covers the completion of nearly all permanent reconstruction of bridges and tunnels and the general restoration of lines so that traffic can follow normal avenues, be greatly increased in volume and move more safely, due not only to the better condition of rolling and roadbed, but to the reinstallation of the signals, etc. Conditions steadily improved throughout the year. Service was restored on practically all lines with regular schedules for both freight and passenger service. Traveling had become relatively comfortable. Dining cars were gen-

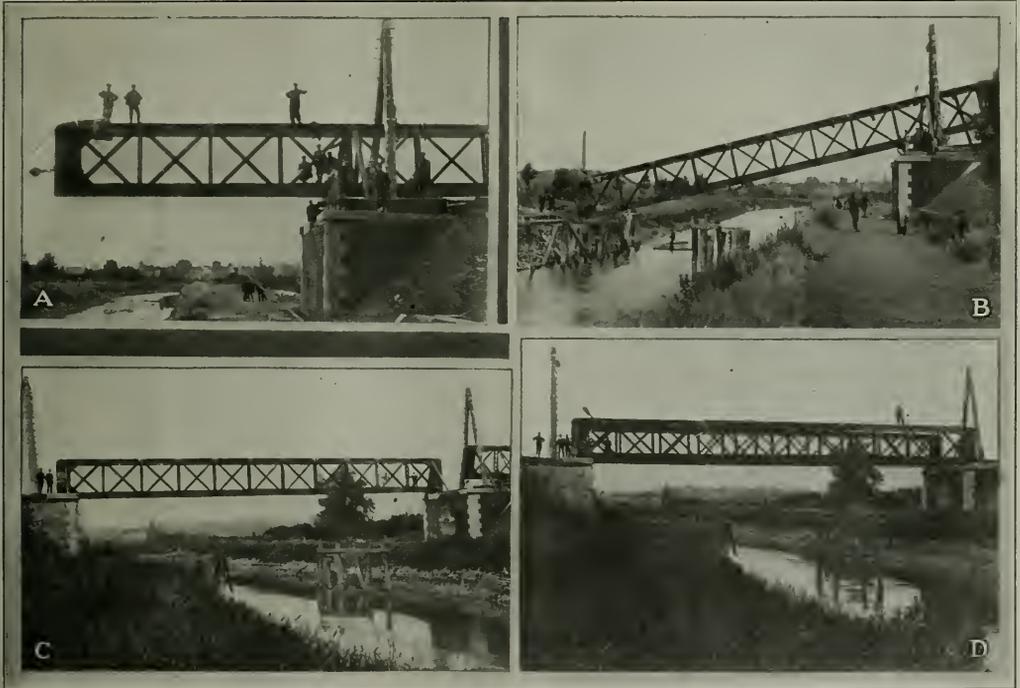


Fig. 15. Railway Bridge Over Canal at Reequignies

A—This and the successive photographs show the several phases in the placing of a temporary military girder by the French army railway engineers. This particular bridge placed a temporary wooden structure and was put in place on July 4, 1919; B—The girder further advanced; C—The first side in place; D—Both sides in place ready for floor structure.

pletely destroyed lines, mostly single track, which had not been rebuilt by the armies because they were not essential to military operations. It was, however, necessary to get them temporarily into service immediately. There were also more than 800 bridges, about 340 railway stations, at least 5 tunnels, over 1,500 employees' houses and many repair shops, round houses, etc., completely destroyed, all on the Northern Railway's system.

The first phase, which may roughly be taken as from the time of the armistice until the end of 1919, involved temporary reconstruction only so far as to provide for moving necessary freight and troops at very moderate speeds and limited passenger service at about half pre-war speeds and without most of the pre-war luxuries. It included much of

erally available on through trains. Tourists rode over and did not see the new bridges. They were protected by, but did not even realize the existence of the signal systems. They saw only the destroyed stations, the old army huts used in their stead, the slow schedules, the uncomfortable and disabled cars—and should not be blamed for not understanding that great progress had really been made in reconstruction. The railroad did first the things most essential to move freight and necessary passengers. The comforts of travel and such refinements as passenger stations could come later.

The final phase, which is commencing now and may last for some years, includes the completion of the reconstruction of roadbeds, signal systems, etc., and the rebuilding of freight and passenger stations in order to permit resumption of nor-

mal traffic conditions and speeding up of trains to pre-war schedules for passenger service. Freight trains will be heavier and faster than before the war. Freight schedules will be rearranged to meet changed industrial and economic conditions. The progress made in this last phase depends largely on the coal situation and the electrification problems which will be discussed in a later article of this series.

The accompanying illustrations give some indication of the extent of the destruction of the railway properties, the temporary structures provided by the military engineers and the permanent improvements which are rapidly being built. The next article of this series, which will appear in an early issue of the *Railway Age*, will give some details of the engineering problems, particularly with reference to bridges and tunnels, met with in carrying on the work of reconstruction and the manner in which the work was done.

Commission Recommends Caution in Adjustment of Grain Rates

WASHINGTON, D. C.

RECOMMENDATIONS of the Interstate Commerce Commission relative to the adjustment of grain and grain product rates with particular reference to the relation of rates to Atlantic ports as compared with Gulf ports, also of lake and rail charges vs. all rail charges, are made in a letter from W. V. Hardie, director of traffic of the Interstate Commerce Commission, to James T. Webster, freight traffic manager of the New York Central, and the chairman of the Western Trunk Line Committee, Eastern Traffic Executives Committee, Southwestern Tariff Bureau, and Central Freight Association, copy of which has been made public by the commission. The letter refers to the recent conference at Chicago and New York between representatives of the grain markets, Atlantic ports and Gulf ports and carriers of eastern and western territory relative to the proposed adjustments.

Under the instructions of the chairman of the commission, Director Hardie begins the letter with a statement that "the net revenues of carriers generally at the present time are far from adequate" and that "reductions in rates apparently are, therefore, at this time undesirable except insofar as they may be necessary to stimulate traffic, to remove discrimination or to relieve situations where rates appear to be unduly burdensome under present conditions."

Mr. Hardie says in part:

The whole situation is interrelated, and in determining what should be done as to any one of the situations involved, due regard should be had to the effect upon other rates and to the maintenance of a relatively proper and reasonable adjustment of rates which will not reduce the revenues of the carriers in the aggregate to a greater extent than is necessary. Various proposals have been submitted by shippers and carriers, most of which contemplate reductions in the existing rates, primarily intended to reduce differentials or differences in rates between competing markets, ports or routes, widened by percentage increases under Ex Parte 74 and previous thereto.

It is recognized that the differentials on traffic from the Missouri river to the Gulf ports for export as compared with Atlantic ports for export and of the all rail rates from Minneapolis to Eastern points as compared with the through lake and rail charges have been widened to an extent to make desirable reductions therein. Readjustments of rates to bring about this end, however, must be approached with extreme caution and having in mind all the factors which have led to the existing situation and which are likely to exist in the near future.

Having in mind these and other factors, it is not found consistent to recommend to the rail carriers that they shall adopt the proposals of the Minneapolis or of the Missouri river and Chicago markets. The former contemplates a reduction of 8 cents on export and 9½ cents on domestic traffic from Minneapolis to New York, while the latter contemplates reductions of 2 cents from the Missouri river to Chicago, 4 cents Chicago to eastern points, and 6 cents Mississippi river to eastern points. It is thought that reductions of this amount will not only reduce

the revenues of the carriers to an extent greater than appears at this time necessary upon the all rail traffic but will call for reductions in the "at the east" rates below even the present reduced rates which were established September 1, 1920, and are scheduled to expire April 15, 1921.

Neither does it appear desirable to indicate approval of the recommendations of either the western or eastern carriers in full. The latter contemplate an increase of 2 cents per 100 pounds in the rates from the Missouri river and St. Louis to the Gulf. The export rate from the Missouri river has in the past three years been increased from 18½ cents to 38 cents, and it is not thought desirable at this time to express any approval of an increase in such rate. No definite opinion will be expressed relative to the rates from St. Louis or Illinois points to the Gulf ports. These rates, however, are not upon the same level as the rates from the Missouri river, the St. Louis rate at the present time apparently being 23½ cents on export traffic whereas tariffs are now on file and under suspension in I. & S. Docket 1303 proposing to increase the domestic rate St. Louis to New Orleans to 45½ cents.

After a general discussion of the details of the proposed readjustment, Director Hardie says, in part, that

Based upon the information now available and without prejudice to any different conclusions which might be reached upon a more adequate record or in a formal proceeding, there appears to be no objection to the following readjustment of rates at this time:

(a) A reduction of 3 cents east of Chicago in the all-rail export rates on grain and grain products.

(b) A reduction of 1 cent on grain and grain products from Missouri river points (including Sioux City) to Chicago and Chicago rate points, limited to apply upon export traffic only.

(c) A reduction of 4 cents in export rates east of St. Louis on grain and grain products.

(d) Changes from Peoria and other related markets corresponding to those from St. Louis and Chicago to preserve existing equalization.

(e) No reductions to be made west of St. Louis.

(f) The existing "at and east" rates on export grain, now scheduled to expire April 15, to be continued beyond that date without expiration date, but no further reductions to be made in such rates at this time.

(g) The "at and east" domestic rates on grain on April 15 to revert to the rates in effect August 25, 1920, plus 40 per cent, such increase to be applied to the net rates.

(h) No reductions at this time appear necessary in the rates on grain products east of Buffalo, either domestic or export.

(i) Lake-and-rail rates on flour for export from Chicago, Duluth and Minneapolis to be reduced in the same amounts as the all-rail rates east of Chicago, thus maintaining differentials as compared with all-rail.

(j) No reductions appear at present necessary in the rates on grain or grain products Minneapolis to Chicago.

The above are intended as suggestions which it is hoped will produce a harmonious adjustment and at the same time have the effect of reducing the differentials on all-rail grain from Minneapolis compared with lake-and-rail traffic and also reducing differentials on export traffic from the Missouri river and western territory generally to Atlantic ports as compared with Gulf ports.

It has not been found consistent to recommend the basis sought by western millers, but the proposed reductions have been, except as noted, limited to export traffic. The same factors which enter into the export situation do not appear to apply with equal force to the domestic rates. Millers of New York are not satisfied with the rates on grain products ex-lake from Buffalo, but it has not been found consistent to recommend reductions in such rates at this time. (This is not intended as expressing disapproval of certain readjustments in the rates from Buffalo to New England points set forth in Chairman Collyer's letter of February 7, which changes should apparently be made.) Reductions in the domestic rates from the west would, however, but accentuate the complaints of eastern millers.

It has not been found consistent to recommend the establishment of 'overhead' rates from Minneapolis as proposed by that market and by some of the northwestern lines. As has been stated, it has been the practice for a number of years to maintain rates into and out of the principal markets equal to the through rates and the undersigned is not prepared at this time to recommend changes which would destroy this adjustment. It is recognized that the reductions made on traffic from Minneapolis are not as great as recommended by that market or by the northwestern carriers but it is thought that a trial should be made of the rates which will result from the changes above recommended. If it then develops that further readjustment should be made, consideration can be given thereto.

Canada's Heavy Loss from Government Railways

Total Deficit of \$136,000,000 for Population of 8,000,000 to Pay
Absorbs One-third of Dominion's Revenues from Taxes

By J. L. Payne

Formerly Comptroller of Statistics, Department of Railways and Canals of Canada

CANADA HAS NOW got far enough along in the matter of railway nationalization to permit of a calm survey of the results. With over 52 per cent of all mileage owned and operated by the state it will be agreed that the test is on a sufficiently comprehensive scale to warrant conclusions. The Dominion was not a novice in railway operation. Part of the bargain of Confederation in 1867 was the building of a line to connect the Maritime Provinces with what was then called Upper Canada, and just because the road was an integral factor in that pact it was always contended that results should not be counted as demonstrating either the soundness or unsoundness of the principle of state control. I allude to the Intercolonial.

There was never any doubt that the Intercolonial was a heavy load on the public treasury. Operating deficits were more frequent than operating surpluses. Interest charges were not made. In fact, it was always understood that the government road had bookkeeping methods peculiarly its own, with enough flexibility as to what should be charged to capital account and what to operating expenses to bring out a balance on either side practically at will.

Be that as it may, the people gave little concern to the matter. The road was a perennial football in politics, and each side blamed the other according as the fortunes of war put the Liberals or Conservatives in control. Certainly the road was not built to demonstrate the advantages of public ownership. It was built by government for the double reason that no company could be found to undertake it as a commercial proposition, and because it was felt that any loss arising from its operation should be borne by the whole people.

The Intercolonial, however, parted with all immunity from reasonable criticism when, in 1918, it was grouped with the Canadian Northern and the National Transcontinental to form the huge system now known as the Canadian National. The causes which led up to the establishment of this group of railways are familiar to American readers and need not be set forth in any detail. The story can be told in a few sentences, so that the essential facts of the case may be borne in mind as this sketch proceeds.

The Canadian Northern and the Grand Trunk Pacific fell into insolvency. An overwhelming proportion of their liabilities had been guaranteed by the government—Dominion provincial, or both. As the chief guarantor, the government took possession to protect the public treasury. The National Transcontinental was the 1,805 mile link built by government as a contribution to the Grand Trunk Pacific ocean-to-ocean scheme. It was to have been taken over by the latter on a three per cent basis; but the cost of construction was so stupendous that the parent Grand Trunk refused to live up to the bargain. The government therefore inherited its own expensive job.

Government Owns 22,500 Miles of Line

When these three roads had been thrown into a single operating group it was seen that it lacked the essential elements of a well-balanced system. At all events, that was the contention of the government. It was believed the acquirement of the pioneer Grand Trunk would produce the neces-

sary balance as to traffic conditions. So the Grand Trunk was bought—or the necessary steps were taken to put the government in possession. The cost of the purchase is now being worked out by process of arbitration, and a tedious and expensive thing it is proving to be. With the Grand Trunk brought in, the Canadian National was swollen to a system of 22,500 miles, or 52.4 per cent of the total mileage of the Dominion. This final step was taken in 1919, and was ratified by Parliament early in 1920.

One further explanation and we shall have the facts all set forth in proper order for what follows. While these momentous changes were taking place, it must be clearly understood that the Canadian people held the position of passive spectators. They were not asked to express their judgment as to whether the assumption of these large responsibilities by the government was prudent or another way out could be found. Nor did they express any judgment. The war was on and absorbed public attention to the exclusion of practically everything else. If they had any opinion on the subject nothing in the way of press comment or platform utterances gave the slightest clue to what that opinion might be. They were told that the taking over of these roads could not be helped, that there was no other way, and that it would come out all right; and they let it go at that. They stood neutral. If they were apprehensive, they concealed it. If they had the slightest suspicion of the shock that was going to stir the whole country in 1921, they were also silent as to that. My own view is that a majority, not keenly interested anyway, believed nothing serious would happen.

Let us now see what did happen. Of the approaching catastrophe some warnings were given. Sir Herbert Holt, president of the Royal Bank of Canada, one of our big monetary institutions, spoke to his shareholders early in January last, as reported in the press, as follows:

"Government control has practically disappeared during the year just past—wheat, paper and sugar being the commodities to be freed from regulation. Government ownership of transportation systems has developed. Without any advantage to the public in efficiency or rates, the operation of our national railways during the last 12 months has resulted in a loss which will probably more than absorb the amounts collected on excess profits and income taxes for the year 1919. Unless government methods of operation are more efficient in this country than they have been in others, tax payers in Canada may find the maintenance of their railroads and fleet more expensive than pension charges and other legacies of the war combined. Of a total of \$6,400,000,000 spent by the United States during the last year, \$1,037,000,000 went to pay the cost incurred by the government in its control of the railroads. The present waste is obvious and the remedy should be speedy and effective. The needs of the country call for business-like administration of its assets. If this be afforded, we can attack our problems with added confidence."

Under normal conditions this statement, from such a high source, would have been a bombshell; but Sir Herbert Holt's words fell on the ears of a people grown callous. He was not heeded any more than was Noah. But I for one knew that he was talking the truth, and I took the trouble to ascertain whether or not his estimate of the probable railway loss,

as compared with the burdens arising out of the war, was under or over the mark. It was under, as we shall soon see. Sir Herbert will now know that what he foresaw as a grim possibility has actually happened.

Railway Deficit Exceeds Cost of War

The question which this analysis assumes to answer is succinctly this: What is the government railway system costing the people of Canada? I say at once that it will cost them in this year of grace not less than \$130,000,000. The cost of the war, to which the president of the Royal Bank alluded, will not be more than \$109,000,000, made up as follows: Interest on public debt \$54,000,000, pensions \$30,000,000, and all other care of returned soldiers, \$25,000,000. The last item will grow less year by year. With the railways costing the country \$130,000,000 and the war \$109,000,000, very little is left, out of a total revenue of \$450,000,000, for general purposes. It may mean continuous borrowing. Since the Canadian National system was established it has absorbed upwards of \$500,000,000 of public money in one way and another to keep it going, and there may be worse to come.

The first step in making up a statement of facts is to set up a capital account for the Intercolonial and Prince Edward Island Railways—the two original examples of public ownership. What has appeared in official railway statements down to the present time has merely been the primary cost of construction. Not a penny of interest was ever charged, neither during construction nor at any later date. Deficits were ignored. The Dominion treasury took care of everything. The bonds were not ear-marked, and interest charges were absorbed along with the general liability on account of the public debt. Samuel O. Dunn took up the matter in 1916 and was able to bring the figures of what the capital account should be down to 1914.

I have taken up the work where he left off and have brought the account down to the present time. Taking Mr. Dunn's total of \$380,991,916 as the starting point, and using plus and minus signs to indicate an operating surplus or deficit, the calculation works out as follows:

	Capital liability	Surplus or deficit	Interest at 4 per cent	Total
1914				\$380,991,916
1915	\$7,761,544	—\$273,569	\$15,560,881	+404,887,910
1916	8,359,451	+2,224,692	16,428,947	427,152,616
1917	5,500,595	+1,392,957	17,250,410	448,510,664
1918	20,960,299	—2,842,917	18,892,555	491,206,435
1919	11,393,985	—3,898,415	20,260,033	526,760,858
1920	10,795,575	—7,000,000	21,662,258	566,218,701

It will be observed that there has been an increase of \$185,226,785 during the past six years. According to government figures the addition during that period has been but \$64,773,449, for the simple reason that only direct capital outlay for construction and purchase of equipment was charged. There was, of course, no defence for this unsound plan; but, having begun that way, accounting became a part of the general policy of easy drifting. Moreover, inasmuch as very loose methods prevailed in years gone by in railway bookkeeping, under which items were scattered around utterly out of their proper place, I am confident a true account would carry the total perhaps \$100,000,000 over what is here shown; for the compounding process carried along over more than 50 years produces startling results. At the present time the capital account of the Intercolonial is officially placed at \$152,300,044, and that of the Prince Edward Island at \$12,633,933—a total for the two of \$164,933,977. That Mr. Dunn's calculation is below the mark is clearly shown by a report just issued by the Department of Railways and Canals, which, for the first time, shows charges to capital on account of these roads amounting to \$479,956,931. That does not include a farthing for interest, to say nothing of compounding.

The National Transcontinental was built by government and followed the bad precedent of the Intercolonial in

respect of its capital account. It was begun in 1904 and opened for traffic in 1914. The cost is placed by the official records at \$165,128,742, omitting, of course, interest at all stages and deficits. I shall not take up space to tell the story of this ill-starred road; but may say at once that the true capital account is considerably in excess of \$250,000,000. The interest on that sum is reckoned at 5 per cent.

All Government Lines Losing Heavily

In dealing with the Canadian Northern unit we are brought at once into contact with standard accounting. It was the collapse of this road which brought about the present large scheme of nationalization. In fact, in one way and another the Canadian railway problem has its core in the unwarranted expansion of the Mackenzie & Mann enterprise between 1900 and 1914. But that is a story by itself, and not quite in place here. We are, for immediate purposes, merely trying to show what the existing government railway group is costing the people of Canada. With that object in view, let it be said at once that the balance sheet of the Canadian Northern for December 31, 1919, reveals a definite capital liability of \$540,155,623. This includes \$165,230,658 advanced by government; but we are obliged to add further advances of \$69,170,910 since that date, which, with an acknowledged deficit for the past year of \$25,670,358, brings up the final total to \$634,996,891. Without going into a considerable mass of details as to all the factors entering into the results for the current year, and which I have gone over with care, the deficit is placed at \$39,000,000 in round figures. If evidence were required to make my estimate good, it is found in the fact that, since that estimate was made, the Minister of Railways has announced to Parliament an actual deficit on the Canadian Northern for the past year of \$40,-414,563.28; so that I am nearly a million and a half under the mark.

The case of the Grand Trunk demands special treatment. It is rather complicated. In 1919 it had bonds outstanding to the amount of \$183,854,623, as well as \$155,480,169 of consolidated debenture stock and \$63,884,928 of guaranteed stock. The consolidated debenture stock must be regarded as a capital liability; so that capitalization for the purposes of this analysis is placed at \$339,334,792. Within the past two years, however, including appropriations now being asked of Parliament by the Minister of Railways, advances have been made totaling \$124,687,633. This is most astounding. It has simply staggered the people of Canada. The Grand Trunk was taken over on the assumption that it would strengthen the Canadian National group, and yet it has taken this colossal sum to carry it since the end of 1919. The immediate effect has been to raise capital liability to \$464,-022,425. Interest charges on this sum, as well as on a floating liability which consumed \$1,875,437 in 1919, joined to a variety of other debits of an unescapable nature, create fixed charges of \$25,346,877. These will be reduced by possibly \$5,000,000 of net operating earnings, although that is not certain. Instead of helping out the government railway system on the financial side, it now transpires that the net result of the Grand Trunk purchase will be a direct draft upon the treasury of \$12,000,000 for the current year. This adverse situation will be distinctly worsened when the purchase price of probably \$65,000,000—the limit fixed by statute—has been paid.

The Grand Trunk Pacific and Grand Trunk Pacific Branch Lines may conveniently be bracketed, although they are separate organizations. Direct capital liability of all classes amounts to \$191,570,540, to which must be added \$96,224,651 of advances by government during the past three years, making the total \$287,795,191. It must be understood that this does not include stocks. In all these calculations they are omitted as being free from permanent

charges against revenue. Again avoiding all details for the sake of brevity, the fixed charges are placed at \$9,754,498. Those are the official figures for 1919. When an operating loss of not less than \$5,000,000 is added, it will be seen that the public burden on account of these two units will exceed \$15,000,000. As a matter of fact, the Minister has placed the deficit at \$19,467,290.17, which will show how careful I have been to keep well on the inside of the truth.

From time to time during the past ten years the government has purchased branch lines in the Maritime Provinces on terms which are not immediately available and could not easily be put into definite form if they were. These purchases cover 366 miles of line all told, and fault will not be found with my estimate of the capital liability attaching thereto if I place it at \$10,000,000. It might be \$15,000,000. Charging merely a nominal 4 per cent, and nothing more, fixed charges are placed at \$400,000 per annum.

The government has also purchased a new line in the Province of Quebec, which is not quite completed—the Quebec & Saguenay. It will be thrown into the general group, and has thus far cost \$8,146,189. Interest charges of \$407,310 would attach.

The Quebec bridge is an essential part of the Canada National system, although appearing separately in the accounts. It had cost \$22,616,018, without interest charges, during its somewhat long and tragic history, and I am assigning nominal fixed charges of \$1,130,801.

Lastly, there remains the cost of the Canadian Northern common stock, for which the government paid \$25,000,000 in 1915 and \$10,000,000 more in 1918. The interest charges are placed at \$2,100,000.

To remove all suspicion of possible exaggeration in the foregoing analysis, the Hudson Bay Railway is entirely left out of the calculation. It could quite properly be brought in; but it has no direct association with the Canadian National. Nevertheless, it is being built by the government—although practically abandoned since 1917—and has cost \$25,000,000 in round figures. The interest on that considerable sum would allow for any adjustments which adverse criticism might suggest.

Government's Railway Investment Is \$2,284,000,000

It is now necessary to bring all these accounts together. The summing up is as follows:

	Capital liability	Fixed charges
I. C. R. & P. E. I.	\$563,218,701	\$21,662,258
Canadian Northern	634,326,531	33,000,000
Transcontinental	250,000,000	12,500,000
G. T. Pacific	279,006,751	8,524,424
G. T. P. branch lines	17,788,440	1,230,074
Grand Trunk	464,022,423	25,346,877
I. C. R. branches	10,000,000	400,000
Quebec & Saguenay	8,146,189	407,310
C. N. R. stock	35,000,000	2,100,000
Quebec Bridge	22,616,018	1,130,801
Total	\$2,284,125,057	\$106,301,744
Net operating deficit		16,250,000
Total deficit		\$122,551,744

The Minister had announced an operating deficit of \$21,250,000 for 1919 without including the Grand Trunk. It is here assumed that the result for the current year will be no worse, although there are ample grounds for an estimate of at least \$10,000,000 greater. It will be that much more if the experience of American roads is duplicated on this side of the line, and I have never known it to vary in any considerable degree. For the Grand Trunk an allowance of \$5,000,000 is made on account of net operating earnings. To keep entirely on the safe side, and swerve as far away as possible from the reproach of exaggeration, interest has not been charged on the total deficit for the past year, which of course must be taken care of in capital account. That would add another \$7,000,000; so that, in putting down a deficit of \$122,551,744 for the current year, which omits a number of

odds and ends the aggregate of which would be material, I have tried to keep well within the mark. If my estimate of fixed charges is sound, and the amount thus established is added to the operating deficit of \$36,842,970 for last year as announced by the Minister, the deficit for the current year will exceed \$136,000,000, after allowing a deduction of \$5,000,000 for net earnings by the Grand Trunk.

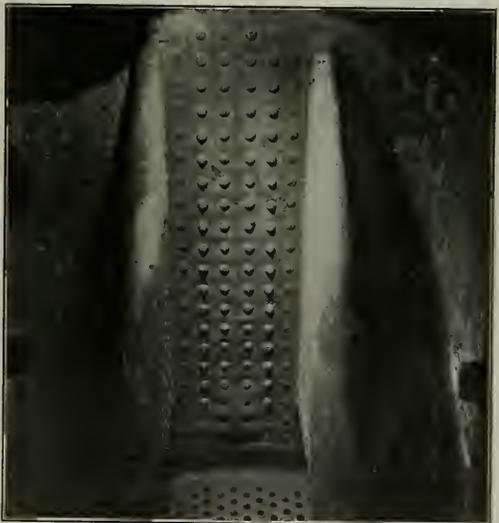
Concluding observations must be left for another article to follow.

A Crown Sheet Failure Without an Explosion

THE SERIOUS CONSEQUENCES which generally follow the initial failure of an exposed locomotive crown sheet when the boiler is under working pressure make noteworthy any case in which such a failure, caused by low water, remains within sufficiently narrow local limits to result in no more than an engine failure.

Such a case, of special interest because of the fact that the firebox was equipped with the Nicholson Thermic Siphon, occurred January 19, 1921.

At the time of the failure the locomotive, which is of the Consolidation type, was pulling a heavy freight train with a strong draft on the fire, to which the crown sheet was exposed with a water level afterwards determined to have been



Interior View of the Firebox Showing the Most Affected Area of the Crown Sheet

between five inches and eight inches below the highest point of the sheet. The location of the failure and the affected portion of the crown sheet are shown in the sketch and photograph. It will be seen that an area about 10 in. square just back of the first two transverse rows of stays became sufficiently overheated to be pushed off of the heads of the two center stays in the next two transverse rows, and pocketed to a maximum depth of about 1 1/4 in. The stays nearest adjoining this area in the second, third, fourth and fifth transverse rows from the front of the crown sheet all were partially pulled out of the sheet. With this condition existing the train was pulled into a siding before the locomotive failed

completely, due to the blow-down through the crown stays holes in the pocketed portion of the sheet.

After shopping the engine, a careful examination of the firebox disclosed the following facts: (1) That the water level at the time of the accident was below the highest point of the crown sheet, a distance variously estimated at from five to eight inches; (2) that from the pocket in the sheet back to within 10 in. of the door sheet the crown sheet was buckled from $\frac{1}{8}$ in. to $\frac{3}{8}$ in. between the two center rows of radial stays; (3) that the two center rows of radial stays were loosened in the sheet; (4) that with these two exceptions there was no evidence of overheating the sheets between or outside of the siphons, and (5) that between the flue sheet and the front of the siphons evidences of over-

Electrification of South

African Railways*

THE SOUTH AFRICAN GOVERNMENT RAILWAYS are about to begin the electrification of two sections of the system, and tenders are now being invited for power house equipment and rolling stock. The lines to be electrified immediately are the Cape Town-Simonstown suburban line, 22 miles long, and the Durban-Pietermaritzburg section of the Natal main line, 70 miles long.

The Simonstown line is partly double and partly single track. It carries a large and rapidly growing passenger traffic. Exclusive of season and "trip-bearer" ticket holders, the number of passengers carried rose from 2,701,105 in 1911 to 5,080,284 in 1919-1920. In the latter year 151,520 season tickets were issued, the increase over 1914 being more than 60,000. Electrification of this branch has been decided upon entirely on account of the heavy passenger traffic, and the undertaking presents no features of special interest. Multiple unit trains will be used.

The Durban-Pietermaritzburg section of the Natal main line differs completely from the Simonstown line. The Natal railway has always afforded plenty of scope for the ingenuity of the engineer. As originally located, it included a large number of grades as steep as 3.3 per cent and curves of 20 deg. radius were equally numerous. The line crosses a succession of spurs of the Drakensberg range, divided by deeply cut river valleys, so that it resembles a switchback on an enormous scale. In the distance of rather over 70 miles from Durban to Pietermaritzburg, a summit of 3,000 ft. is reached near Thoruville Junction, and the line then descends to about 2,250 ft. at Pietermaritzburg, where it again starts to climb steeply with occasional intermediate descents, to over 5,000 ft. near Highlands. It then falls 1,500 ft. as it crosses the Tugela Valley, and then mounts to about 5,500 ft., at which altitude it crosses the Drakensberg and enters the Transvaal. An up train ascends about 12,000 ft. in the 300 miles between the coast and the Transvaal border.

It may be readily imagined that under these conditions there has been a serious limitation on trainloads and speeds, while operating costs have been very high. About the time of the South African War, a Decapod side-tank locomotive, with only the six center driving wheels flanged, was introduced with the object of increasing the load hauled by a single engine unit. Though locomotives of this type possessed high tractive power, they did an extraordinary amount of damage to the track, in spite of the fact that 80 lb. rails seated on heavy iron chairs were in use. The cast iron chairs were broken by scores on each trip, and it was found necessary eventually to convert these engines to eight-coupled. Only about a dozen are still in use in their original, unchanged form.

THE TRAFFIC CLUB of Wichita Falls, Tex., has been organized and the following officers have been elected: President, A. A. Spencer, traffic manager, the Lone Star Refining Company; first vice-president, C. D. Arnold, traffic manager, the Wichita Motors Company; second vice-president, H. G. Smith, district freight and passenger agent, the Missouri, Kansas & Texas; third vice-president, C. L. Fontaine, assistant manager and traffic manager, the Wichita Falls & Southern; secretary-treasurer, J. W. Chatham, Jr. Members of the board of directors are: C. D. Arnold, G. L. Berry, W. S. Brown, J. W. Chatham, Jr., C. L. Fontaine, E. S. Goodner, F. W. Grace, O. E. Maer, H. G. Smith and A. A. Spencer. The last Friday of every month was selected as the regular meeting date for the organization.

*London Times Engineering Supplement, March, 1921.

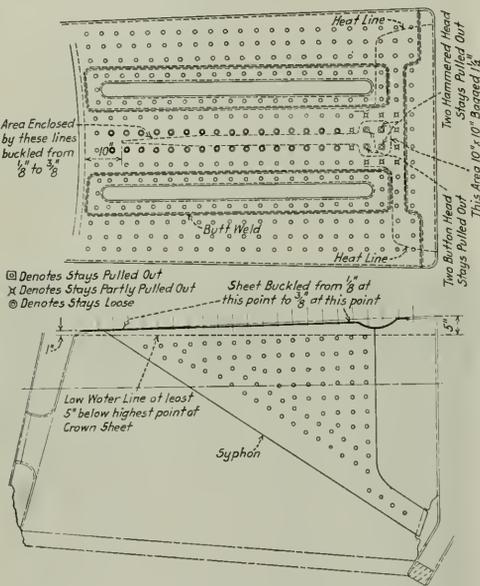


Diagram Showing Extent of the Damage to the Crown Sheet of Engine 1929

heating were clear on an area extending down about eight longitudinal rows of stays on either side of the center line.

In observing this case from the standpoint of the relation of the Nicholson Thermic Siphon to the extent to which the crown sheet was damaged, it should be pointed out that in other cases similar or even more extended areas of the crown sheets have pulled off the stays in boilers not equipped with the siphons without a complete failure of the sheets. Two of the principal factors determining the extent of the damage in such cases are the strength of the staying and the temperature and rate at which heat is being generated in the firebox at the time of the failure. In the case of the locomotive under consideration, one of these factors was favorable to the rapid extension of the affected crown sheet area, inasmuch as the temperature of the firebox and the rate of heat generation were high at the time of the initial failure. The reports of a number of boiler inspectors who examined the firebox after the accident agree in the opinion that water was delivered from the siphon over a considerable area of the crown sheet after it was exposed above the level of the water in the boiler. While the absence of this action might not have resulted in a complete failure of the crown sheet, its presence undoubtedly tended to limit the damaged area.

Final Valuations Served on Four Railroads

Commission Adds Estimate of Cost of Acquisition of Land Valuations Previously Served Recalled for Addition of This Item

WASHINGTON, D. C.

THE INTERSTATE COMMERCE COMMISSION on April 4 made public supplemental tentative valuations including the original and present cost of condemnation and damages, or of purchase of lands in excess of original cost or present value, and also a figure representing the final value of the properties of the Kansas City Southern, the Los Angeles & Salt Lake, the Atlanta, Birmingham & Atlantic, and the Winston-Salem Southbound railroads with their subsidiaries, together with a statement of the methods pursued in developing the so-called "excess cost" of lands. The valuations heretofore have been incomplete because the commission originally held it was unable to report the excess cost of lands, but since the decision of the Supreme Court in the Kansas City Southern case last spring, it has been engaged in investigations for the purpose of developing the proper amounts to be allowed for this item.

The 55 tentative valuations heretofore served by the commission have been withdrawn and amounts will be added for the cost of acquisition of carrier lands and for the value of the property, after which they will be again served upon the carriers as tentative valuations. Three hundred and one preliminary engineering, 229 land and 163 accounting reports have been tendered to the carriers for examination.

In the case of the supplemental tentative valuations interested parties are given 30 days from April 5 in which to file protests. In the case of the Kansas City Southern the commission by Division No. 1 reports the present costs of condemnation and damages, or of purchase of lands owned and used, and used but not owned, for common carrier purposes in excess of the present value of such lands, to be \$3,467,182 for lands used and \$2,735,490 for lands owned. The valuation is as of June 30, 1914. The following is an abstract of the order in the Kansas City Southern case and the same form is followed in the other cases:

It is ordered, That the following be, and it is hereby declared to be, a supplemental tentative valuation, covering only matters not covered heretofore by either the tentative valuation or the final valuation by the Commission of the properties of the Kansas City Southern Railway Company; the Maywood & Sugar Creek Railway Company; the Poteau Valley Railroad Company; the Arkansas Western Railway Company; Fort Smith & Van Buren Railway Company; Texarkana & Fort Smith Railway Company; Kansas City, Shreveport & Gulf Railway Company; the Kansas City, Shreveport & Gulf Terminal Company; and Port Arthur Canal & Dock Company, as of June 30, 1914:

Original and present cost of condemnation and damages or of purchase of lands in excess of such original cost or present value. The present costs of condemnation and damages or of purchase of lands, owned and used, and used but not owned, by the above named carriers for common-carrier purposes, in excess of the present value of such lands, are found to be as follows:

THE KANSAS CITY SOUTHERN RAILWAY COMPANY.	
In Kansas:	
Wholly owned and used.....	\$350,266
Exclusively used but owned or leased by other common carriers	7,248
Total	\$357,514
In Missouri:	
Wholly owned and used.....	\$1,994,405
Exclusively used but owned or leased by other common carriers	11,924
Total	\$2,006,329
In Arkansas:	
Wholly owned and used.....	\$198,297
Exclusively used but owned or leased by other common carriers	172,587
Total	\$370,884

In Oklahoma:	
Wholly owned and used.....	\$192,522
In Louisiana:	
Exclusively used but owned or leased by other common carriers	\$539,933
Total used	\$3,467,182
Total owned	\$2,735,490
THE MAYWOOD & SUGAR CREEK RAILWAY COMPANY.	
Wholly owned but exclusively used by the Kansas City Southern Railway Company, in Missouri.....	\$9,768
FORT SMITH & VAN BUREN RAILWAY COMPANY.	
Wholly owned but exclusively used by the Kansas City Southern Railway Company, in Arkansas.....	\$11,570
TEXARKANA & FORT SMITH RAILWAY COMPANY.	
In Arkansas:	
Wholly owned but exclusively used by the Kansas City Southern Railway Company.....	\$161,017
In Texas:	
Wholly owned and used.....	\$579,315
Exclusively used but owned or leased by other common carriers	8,172
Total	\$587,487
Total used	\$587,487
Total owned	\$740,332
KANSAS CITY, SHREVEPORT & GULF RAILWAY COMPANY.	
Wholly owned but exclusively used by the Kansas City Southern Railway Company, in Louisiana.....	\$539,933
THE POTEAU VALLEY RAILROAD COMPANY.	
Wholly owned and used, in Oklahoma.....	\$1,686
THE ARKANSAS WESTERN RAILWAY COMPANY.	
In Oklahoma:	
Wholly owned and used.....	\$2,882
In Arkansas:	
Wholly owned and used.....	14,478
Total owned and used.....	\$17,360
THE KANSAS CITY, SHREVEPORT & GULF TERMINAL COMPANY.	
Wholly owned and used, in Louisiana.....	\$26,266
PORT ARTHUR CANAL & DOCK COMPANY.	
In Texas:	
Wholly owned and used.....	\$271,989
Wholly owned but used exclusively by the Texarkana & Fort Smith Railway Company.....	\$8,172
Total used	\$271,989
Total owned	\$280,161

The original costs shown as expended by the above named carriers in the acquisition of all their lands, owned and used and used but not owned, dedicated to common-carrier purposes, include damages to property not taken, the amounts of which cannot be segregated from the costs of the lands taken. We are therefore unable to give the excess costs of acquiring the said lands, over the original costs of the same. Incidental expenses, such as court costs, recording fees, salaries of real estate agents, etc., are shown in a gross sum of \$272,537, which cannot be assigned in whole or in part to any particular state or states through which the lines are operated.

Statement of methods employed.—For the purposes of this proceeding, the reference to Appendix 3 of the report in *Texas Midland Railroad*, 1 Val. Rep., 1, 108, which by reference was made part of the final valuation herein, is amended by rescinding the following portions of said Appendix 3, viz.:

All that is contained on page 168, except the first five lines; and all of pages 169, 170, 171 and the first seventeen lines on page 172.

The following portions of the report and order herein, 1 Val. Rep., 223-442, are rescinded, viz.:

Paragraph numbered 12 on page 224, in so far as it relates to the original and present cost of condemnation and damages or of purchase of lands in excess of such original cost or present value; the paragraph entitled "present cost of condemnation and damages or of purchase in excess of present value" on page 249; the subject matter under the heading "present cost of condemnation and damages or of purchase in excess of present value" on pages 260, 261 and 262; and the subject matter under the headings "present cost of condemnation and damages or of purchase of land" on pages 287, 291, 294, 299, 303, 307, 312, 316 and 320.

The matter contained in Appendix A, attached to this order,

being a statement of methods pursued in developing excess cost of lands, is substituted for the language contained on pages 168, 169, 170, 171 and 172 of the decision of the Commission in *Texas Midland Railroad*, being the analysis of methods under which the valuation work is conducted, above rescinded.

Final value.—After careful consideration of all the facts submitted in this proceeding, and the cost valuations heretofore made, including the excess cost of the carrier lands, appreciation, depreciation going-concern value, working capital and materials and supplies, and all other matters which appear to have a bearing upon the values here reported, the values, as that term is used in the Interstate Commerce Act, of the properties of the above named carriers owned and used and not owned, devoted by the carrier to common-carrier purposes, are found to be as follows:

THE KANSAS CITY SOUTHERN RAILWAY COMPANY	
Wholly owned and used.....	\$29,977,055
Wholly owned but not used:	
Leased to the Missouri & Louisiana Railway Company.....	40,000
Used but not owned:	
Leased from:	
The Kansas City, Shreveport & Gulf Railway Company....	\$8,725,737
Texarkana & Fort Smith Railway Company in Arkansas....	4,284,500
The Maywood & Sugar Creek Railway Company.....	34,000
Fort Smith & Van Buren Railway Company.....	47,900
Hannibal & St. Joseph Railway Company (merged with Chicago, Burlington & Quincy Railroad Company in 1901)	7,106
Kansas City Terminal Railway Company.....	612
The Missouri Pacific Railway Company.....	980
Private parties.....	60,512
Total.....	\$13,160,447
Total owned.....	\$30,017,055
Total used.....	\$43,137,502
TEXARKANA & FORT SMITH RAILWAY COMPANY	
Owned and used.....	\$3,792,651
Used but not owned	
Leased from:	
Port Arthur Canal & Dock Company.....	\$258,761
Private parties.....	310
Total.....	\$259,071
Total used.....	\$4,051,762
Owned but not used:	
Leased to:	
The Kansas City Southern Railway Company.....	\$4,284,500
Total owned.....	\$8,077,191
KANSAS CITY, SHREVEPORT & GULF RAILWAY COMPANY	
Owned but not used:	
Leased to:	
The Kansas City Southern Railway Company.....	\$8,725,447
Leased from private parties and re-leased to Kansas City Southern Railway Company.....	290
Total leased to the Kansas City Southern Railway Company.....	\$8,725,737
THE MAYWOOD & SUGAR CREEK RAILWAY COMPANY	
Owned but not used:	
Leased to the Kansas City Southern Railway Company.....	\$34,000
FORT SMITH & VAN BUREN RAILWAY COMPANY	
Owned but not used:	
Leased to the Kansas City Southern Railway Company.....	\$47,000
THE POTEAU VALLEY RAILROAD COMPANY	
Owned and used.....	\$94,068
THE ARKANSAS WESTERN RAILWAY COMPANY	
Owned and used.....	\$343,228
THE KANSAS CITY, SHREVEPORT & GULF TERMINAL COMPANY	
Owned and used.....	\$150,799
PORT ARTHUR CANAL & DOCK COMPANY	
Owned and used.....	\$1,668,548
Owned but not used:	
Leased to Texarkana & Fort Smith Railway Company.....	\$258,761
Total owned.....	\$1,927,309
The following amounts have been included in the values above stated for properties used by operating companies, on account of working capital and materials and supplies:	
The Kansas City Southern Railway Company.....	\$1,215,430
Texarkana & Fort Smith Railway Company, in Texas.....	109,066
The Arkansas Western Railway Company.....	3,228
The Poteau Valley Railroad Company.....	2,068
The Kansas City, Shreveport & Gulf Terminal Company.....	5,779
Port Arthur Canal & Dock Company.....	18,548
No working capital and materials and supplies are found to be owned and used by non-operating companies, as follows:	
Kansas City, Shreveport & Gulf Railway Company.	
Texarkana & Fort Smith Railway Company in Arkansas.	
The Maywood & Sugar Creek Railway Company.	
Fort Smith & Van Buren Railway Company.	

Appendix A

Statement of Methods Pursued in

Developing Excess Cost of Lands

In meeting the requirement of paragraph entitled Second of Section 19 (a) of the Interstate Commerce Act to report the present cost of condemnation and damages or of purchase in excess of present value we attempt to show what the expense to a carrier would be of acquiring its common-carrier lands upon the date of valuation, on the assumption that it did not possess those lands, but was obliged to obtain them through purchase or condemnation at the value of similar lands in the vicinity, on that date.

It is evident that the figure reported can be only an estimate since the amount which would actually be paid would depend to a considerable extent upon circumstances and conditions which can not be definitely described. If a community is eager for the construction of a railroad the right of way can be obtained at a much lower figure than as though the building of the road is opposed by that community. So too the attitude of the carrier might exercise a considerable influence upon the amount of money expended in the acquisition of its lands. It is also apparent that if the railroad did not exist the present value of lands adjoining and adjacent to the railroad would not exist. The management of one railroad might deem it for its advantage to pay liberally, thus cultivating the good graces of the community, while another might deem it better business to force many cases into court thereby obtaining a better price where purchases were made. In our estimate no allowance whatever is made for anything of this character. We necessarily assume average conditions of all kinds, and we further assume that all lands are paid for.

One method by which this excess cost of acquisition might be shown would be to take each individual parcel and attempt to estimate how much the carrier would be compelled to pay the land owner by way of severance damages or in addition to the acreage value of the land. This would involve an examination of each parcel and a consideration of the various elements affecting these damages. In many cases testimony would be introduced. It would in effect be a proceeding in condemnation to determine what the carrier should pay. Manifestly this method can not as a practical matter be resorted to. It would require years of time and millions of dollars in expenditure to bring the work to a completion in that way.

So far as possible our prices have been determined with reference to actual transactions. The unit prices which we apply to our inventory in showing cost of reproduction are developed from a great number of actual prices paid by the carriers for the same class of work and material. In fixing the present value of lands more attention is paid to actual sales than to any other one factor. So it was felt here that if possible some method should be developed which would be based upon actual transactions.

The severance damages paid by a carrier to the land owner in one individual case would not be a reliable guide as to what would be paid or should be paid in all other cases of a similar character; but the thing aimed at is the same, in every similar case the rules of law applicable are identical and while human inclination or human judgment may go astray in individual instances still taken as a whole what has actually happened in the payment of these damages is the best guide we can obtain. While a single instance is not reliable if it is possible to find a great many instances and put those instances together in the form of an average that average will express the fact more accurately than any sort of an estimate. This is the general theory upon which this work has been developed.

First the lands of the carrier are divided into classes known as types. There is one type for city property of a certain kind, a second for city property of another kind, a third for farming land, a fourth type for wood land, etc., etc. The type may depend upon the shape of the parcel and the manner in which it is crossed by the road of the carrier.

Having determined these types we proceed to find actual cases corresponding to each type. These instances are obtained for the most part from carriers other than the one under consideration. We know with respect to each one of these actual transactions what amount paid by the carrier to the land owner was. We ordinarily know the present value which is the value which we ourselves determine and report. In some instances where the transaction is somewhat remote and where there is reason to suppose that the present value may have varied between the date of the transaction and the determination of our present value a present value as of the date of transaction is ascertained by the same methods as in our ordinary land work. This, however, is very unusual since our instances are taken from transactions occurring not to exceed ten years from the date of valuation.

Having selected these transactions which fit a particular type we carefully examine each one of them for the purpose of de-

termining whether it is apparently in all respects normal. If it appears to be abnormal it is rejected.

It will be noted that in case of each transaction we know the present value and also the amount actually paid by the carrier to the land owner. By subtracting the present value from the total amount paid the land owner we find the excess cost in each case and proceed to determine the ratio between such excess cost and present value. The result is known as the multiple of that individual case. All the multiples of a given kind are now combined into a weighted average and this average is treated as the multiple of that type. The multiple so determined is compared with multiples in other parts of the country.

When multiples have been determined for all the types into which the land of a given carrier falls the process of determining the excess cost consists of combining all parcels of a certain type, determining present value of those parcels in the aggregate and applying to that present value the multiple determined. When this has been done as to all the types it affords the basis for the estimate now made of the total amount of excess cost.

It frequently happens that a carrier is credited in our land report with the amount actually paid by it in securing the right to use a public street or some portion of the public domain. No multiple would be applied to the sum so stated since the carrier is allowed only the amount actually expended and we assume that the price charged by the municipality if this right is to be re-acquired would be the same that it originally was.

It is also evident that there would be certain expenses connected with the acquisition of these lands aside from the amount of money paid to the land owner and these are designated in our report as incidental expenses. They are made up of the fees and expenses of attorneys, right of way agents, etc., etc., together with cost of recording deeds, making maps and such like. The amount is small in comparison with the total cost. In determining the incidental expenses upon a particular carrier the expenses of a similar character upon that same carrier actually incurred when the road was constructed are examined if known. Similar expenses upon other roads are also examined and from all this an estimate is made of what the expenses would be upon the road under consideration. So far it has not been deemed proper to compile a percentage for the purpose of determining those expenses since they would vary upon different carriers according to the character of the right of way, the number of parcels and many other incidents.

If now we combine the excess cost paid to the land owner as hereinbefore stated and the incidental expenses incurred by the carrier in the acquiring of its lands we shall have the total excess cost. This figure is shown in our report as the excess cost of acquisition. In the column immediately following this is shown the per cent which the excess cost of acquisition bears to present value.

It is evident that this would show the excess cost to the carrier of acquiring its lands but the carrier insists that the figure shown by us should contain something beyond this. It is well known that one of the first expenses in the actual construction of a railroad is for its right of way lands and these lands develop no earning power and therefore yield no return on the investment until the road is finished and finally opened for operation. The carriers therefore insist that they should be allowed interest on their expenditure for lands from the time it is made until the money begins to earn from operation. However, this has been compensated for by basing the estimate on present value of land, rather than the value as of the time the lands would be acquired under the hypothetical reproduction theory. Further, while many of these lands would be purchased before construction actually begins others would not be, and many parcels would not be paid for until construction had ended.

The carrier would also pay certain taxes which would vary from nothing at all in some states where lines under construction are specifically exempted from taxation or where the gross receipts from operation are taxed, to other states where quite a substantial sum might be exacted if the period of construction were considerable. The taxes assessed, in practice, are levied upon lands, and for the same reasons that interest on the cost of acquisition of lands during the construction period is not consonant with the estimate here made, none is made for taxes during the construction period in this connection.

Other Valuations

In the case of the Atlanta, Birmingham & Atlantic the commission finds \$1,818,730 as the excess cost of lands used and \$1,188,330 of the lands owned; of the lands owned by the Georgia Terminal Company \$257,255 and of the lands owned by the Alabama Terminal Railroad \$386,080. The final value for the properties owned by the Atlanta, Birmingham & Atlantic is placed at \$21,698,250, and of the proper-

ties used \$25,630,000. The value of the properties owned by the Georgia Terminal Railroad is placed at \$2,000,000 and the Alabama Terminal Railroad at \$2,850,000. There is included in the valuation stated for the Atlanta, Birmingham & Atlantic, \$617,090 representing working capital and materials and supplies. No working capital and materials and supplies were found to be owned and used by the Georgia Terminal and Alabama Terminal companies.

In the case of the Los Angeles & Salt Lake, the commission has added \$2,504,529 as the excess cost of land and states the final value as of June 30, 1914, as \$45,871,093, including \$38,774.78 as the value of certain lands used by the carrier for common carrier purposes, but owned by parties other than a common carrier. There is also included \$2,221,093 for working capital and materials and supplies.

For the Winston-Salem Southbound the commission adds \$468,022 for the excess cost of lands and states the final value as of June 30, 1915, as \$5,850,000, including \$101,535 for working capital and materials and supplies.

Kansas City Southern Objects to Valuation Figures

The Kansas City Southern has issued a statement containing objections to the tentative valuation set by the commission's Division No. 1. The statement says:

The Kansas City Southern Railway Company does not, by any means, concede the corrections of the tentative valuation of its properties made by the three commissioners composing Division No. 1 of the Interstate Commerce Commission. It is apparently based on an incomplete estimate of the cost of reproduction of physical properties, less depreciation, with the addition of certain arbitrary but inadequate allowances for appreciation and going-concern value. As its name indicates, it is only tentative; it is a figure put forward by Division No. 1 against which the railway company is entitled to file its protest, and to make proof of the real value of its properties. The figures do not even purport to have any relation to present-day value. They represent only tentative figures as of June 30, 1914. It may be stated, in passing, that since that date the Company has expended over \$6,500,000 in additions, betterments and extensions.

The company has claimed, and still claims that the value of its properties, even as of June 30, 1914, was in excess of \$75,000,000. It introduced evidence to that effect before the Commission. It is not disposed to accept any lower valuation, and it is prepared, if necessary, to contest its rights in the courts.

In the tentative valuation, the earning power of the company, on a proper rate structure, which we contend is the real test of value, has been ignored. As an illustration, the company, for the calendar year 1917, under a rate structure claimed to be inadequate, earned approximately six per cent on \$75,000,000. That fact is given no consideration.

The stock and bond value of the company's properties has likewise apparently been ignored. During the five-year period preceding June 30, 1914, the prices of stocks and bonds, as every one knows, were unduly low, but the aggregate market value of the company's outstanding stocks and bonds, computed at the average prices during the five-year period, amounted to over \$62,000,000.

The original cost of the property is stated in the tentative valuation at \$47,000,000, which is approximately \$16,000,000 less than the company claims it should be. The cost of reproduction new of the company's properties, as of June 30, 1914, is stated at approximately \$52,000,000, which the company claims is approximately \$20,000,000 less than it should be. There has been deducted approximately \$10,000,000 for depreciation, although it is held by the courts that no depreciation should be deducted in determining value, where there is no deferred maintenance, and it is not asserted that there is any deferred maintenance in our case. The commission took into consideration its estimate of the cost of reproduction of the roadbed, bridges, buildings and other physical structures, but apparently omitted to give the same consideration to the cost of reproducing the right of way. The amount allowed for right of way is nearly \$5,000,000 less than the commission's own estimate, made after the decision of the Supreme Court in our mandamus case, of what its cost of reproduction or re-acquisition would have been. The company's interest in the Kansas City Terminal, amounting to approximately \$4,000,000, was ignored. The cost of reproducing the company's property, applying to the commission's quantities the prices current today, would materially exceed \$100,000,000.

Stockholders and others interested in the Kansas City Southern Railway Company will readily understand from the foregoing

statement why the officers of the company are prepared to contest this tentative valuation.

The final valuation issued by the Interstate Commerce Commission in the cases of the Kansas City Southern; San Pedro, Los Angeles & Salt Lake; Atlanta, Birmingham & Atlantic and the Winston-Salem Southbound railways indicate that a deduction has been made for depreciation because in each instance the value found is less than the figure previously reported in the case of these roads for cost of reproduction new plus the present value of lands. For the first three of the roads there is a wide variation between the final valuation and the company's book investment account or its capitalization, but in the case of the Winston-Salem the valuation exceeds the capitalization or the book cost.

In the Kansas City Southern case the commission had reported the cost of reproduction new plus land as \$51,262,747, and the final value is given as \$43,137,502. The capitalization of the Kansas City Southern as of the valuation date, 1914, was \$99,052,000 and the company claimed as its investment in road and equipment \$101,050,970. The commission in 1919 agreed with the company upon a figure for the investment in the property of \$45,742,093. The valuation covers 879 miles of road.

In the case of the San Pedro, Los Angeles & Salt Lake, the commission reported the cost of reproduction new plus land as \$47,226,043. The final value is stated as \$45,871,093. The investment in road and equipment claimed by the company was \$76,391,598. The capitalization in 1914 was \$81,274,000. The mileage was 999.

The commission reported for the Atlanta, Birmingham & Atlantic a cost new plus land of \$27,471,817, whereas it states the final value as \$25,630,000. The book cost of road and equipment was \$39,255,787. The capitalization was \$59,565,176 and the mileage was 663.

For the Winston-Salem Southbound the cost of reproduction new plus land was reported as \$5,939,099 and the original cost as \$5,598,999. The final value is stated as \$5,850,000 for 90 miles. The company's investment account was \$5,598,558, and the capitalization \$5,125,000.

President Studying Railroad Problem

WASHINGTON, D. C.

PRESIDENT HARDING and members of his cabinet are still earnestly studying the railroad problem, trying to find a way by which transportation costs may be reduced and by which bankruptcy for the railroads can be averted, but have thus far found no plan on which he is ready to act and he does not propose to dictate to or interfere with the functions of either the Interstate Commerce Commission or the Railroad Labor Board. Chairman Clark of the Interstate Commerce Commission is understood to have told the President what he told the Railway Business Association at its annual dinner and what he has previously written to various senators, that there can be no general reduction in rates until the foundation is laid for a reduction in the cost of operation, and Chairman Barton of the Railroad Labor Board has undoubtedly told him that the board cannot act without hearings, and it is not an easy thing to reconcile the conflicting views of its nine members in a short time. No definite plan for meeting the situation resulted from the two-hour conference which the President had with Mr. Clark and Mr. Barton on March 31, and the President has stated that he is going to seek farther for a solution and to obtain information from all sides of the question. Following his conference with the heads of the two organizations having jurisdiction over rates and wages, respectively, it was announced at the White House that the President was merely

seeking information and that he did not propose "to go over any one's head."

The subject was again discussed at the cabinet meeting on Friday, April 1, which was largely devoted to the general business problems of the country, including productivity, transportation, agriculture and financial questions, but the President stated in his talk with newspaper correspondents that no plan had been arrived at. Both boards are operating under a law which makes each supreme in its own field and which provides neither for the exercise of any authority over either body by the President nor for co-operative action. It was believed, however, that the President may have urged upon them the importance of expediting any action which may appeal to their judgment as proper and that aside from obtaining information from them he may have desired to emphasize the importance of their working with a common purpose in any way possible.

He had not yet decided upon an answer to the telegram from B. M. Jewell urging the President to call a joint conference of railroad executives and labor leaders and proposed to make some further inquiries before doing so, but he indicated that the entire question of the extension of the National Agreements beyond the period of government operation of the railroads was for the Labor Board to settle and that he did not propose to interfere.

Mr. Jewell's request that the President call the railroad executives and the labor leaders into conference on a matter which the law places within the jurisdiction of the Labor Board raises the whole fundamental question which has been involved in the hearings before the board as to whether the principle of National Agreements, adopted while the employees were working for the national government, should be extended into the period when they are no longer working for the national government but are employees of individual railroad companies. The point is understood to have been made at the cabinet meeting that to re-establish National Agreements would eliminate the right of the employer to negotiate with his employees and also the right of the employees to negotiate with their employers, and it was rather strongly indicated at the White House that the President does not intend to reply to Mr. Jewell's telegram in such a way as to commit himself to any such policy.

While giving no response to the suggestion of a joint conference, which would recognize the principle of a national adjustment, the President, in accordance with his announced policy of seeking information from all sides, on Monday consulted with Mr. Jewell and also A. B. Garretson, former president of the Order of Railway Conductors. W. S. Carter, president of the Brotherhood of Locomotive Firemen and Enginemen, talked with the President on Tuesday, and Warren S. Stone, grand chief of the Brotherhood of Locomotive Engineers, had an appointment for Wednesday.

The railroad situation was again discussed at the cabinet meeting on Tuesday. After hearing the labor side and their suggestions for a solution the President intends to consult with representatives of the managerial side. If he is led to believe that a probability of a solution lies in bringing the representatives of the two sides together that method will be attempted, but he has not yet decided to do so.

By calling in the labor leaders the President has indicated, it is believed, an appreciation of the fact that the chief difficulty in the problem lies in the wage question.

RAILWAY WORKERS OF Lemberg, Poland, recently received from the American Relief Administration 50 outfits of clothing for the children of the poorest workers. Out of gratitude the railway men who were in better financial condition collected the sum of 1,350 marks and presented it to the Administration to use as they saw fit. It was used to cover the cost of sewing clothing for orphans in different institutions in Warsaw.

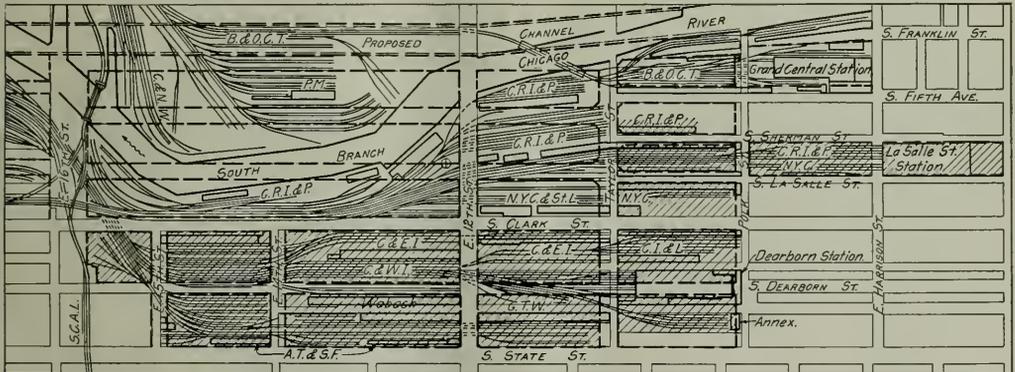
New Civic and Railway Development Plan

Chicago Terminal Commission Submits Extensive Report for Revamping Transportation Facilities

JOHN F. WALLACE, chairman of the Chicago Railway Terminal Commission, has just submitted a comprehensive report to the mayor and city council of Chicago, outlining a complete plan for the rearrangement of the railway terminal facilities located directly south of the "loop" or business center of the city. The plan proposes the vacation of extensive areas now occupied by the railroads with three passenger stations and a large number of freight houses as well as a change in the channel of the Chicago river, the object from the city's standpoint being to permit the opening of four north and south streets to connect the "loop" with the southern part of the city. From the standpoint of the railroads this is considered by the commission the third important step in a general plan for the reconstruction of the railway facilities serving the central part of the city. The first two of these steps have already been carried through

The project is estimated to cost \$43,000,000 (exclusive of provision for other facilities to replace those abandoned) which would be covered in part at least by the sale of valuable property released as a result of vacations and by the sale of air rights over the proposed terminal development. The project also involves some fine questions of law concerning riparian rights, the title to the old channel of the river, relationship to the various governmental bodies involved and enabling legislation. Plans for this project were developed to the preliminary stages as early as 1914 but like a great many other projects of first magnitude, it was subject to postponement at the beginning of the war.

An abstract of Mr. Wallace's report follows: "The present network of railroad tracks and facilities within the Chicago terminal district have been created by each railroad acting on its own initiative and for its own



The Present Railway Terminal Layout South of the "Loop," Showing Additional Through Streets Proposed and Suggested Vacation of Railway Property Indicated by Cross-hatching

the preliminary stages by ordinances establishing agreements between the city and the railroads involved. The first of these is the Union Station project which carries with it the construction of the Chicago Union Station and extensive freight terminal development by railroads west of the Chicago river. The second is the Illinois Central development concerned primarily with the construction of a large passenger station facing on Roosevelt road.

The railroads concerned with this third plan are those using the La Salle, Grand Central and Dearborn passenger stations, namely, the New York Central; the Chicago, Rock Island & Pacific; the Baltimore & Ohio; the Chicago Great Western; the Pere Marquette; the Minneapolis, St. Paul & Sault Ste. Marie; the Wabash; the Grand Trunk; the Chicago & Eastern Illinois; the Monon; the Atchison, Topeka and Santa Fe; the Erie; the Chesapeake & Ohio and the New York, Chicago & St. Louis. This plan is linked up closely with that of the Illinois Central development owing to the fact that the suggestion to eliminate the three passenger stations now used by these roads carries with it the proposal that they co-operate with the Illinois Central in providing a union station on Roosevelt road and the lake front of adequate size to provide for all of them.

interest and usually with little consideration of the interests of other railroads, or of the city. There are no topographical conditions in Chicago or in surrounding country that would serve to concentrate the lines of railroads approaching Chicago within narrow confines and as a result the lines of railroad approach the city from all directions except the side occupied by Lake Michigan. The result has been that there are railroad problems in all sections of the city and these problems increase in intensity as one approaches the center of the city where all of these lines converge and have their terminal facilities.

"This consolidation in entrance routes has resulted in the grouping of railroads in the territory immediately surrounding the business district on the north, west and south sides of the rectangle which includes the central business district. Since all of the railroad developments in each of these several districts referred to are contiguous one to the other it is impossible to apply any specific treatment or development to one railroad property without affecting the railroad property contiguous thereto, and therefore, it becomes a practical necessity for the railroads having their facilities in each of these several groups to work co-operatively on any plans for railroad development. This is particularly true where the

rearrangement of grades is necessary and it is a fact that no large improvement in the railroad property adjacent to the central business district can be made without changes in grade.

"On the south side of the rectangle enclosing the Loop District are grouped the terminal facilities of 14 railroads and the existence of the large area of railroad property in this district in its present state of development is a serious obstacle to the free flow of traffic to and from the central business district and is retarding the natural expansion of the business district to the south. In the preliminary report of the commission as well as in the reports furnished to the Railway Terminal Committee by Mr. Wallace and by Bion J. Arnold, it was shown that there was available in the property owned by the Illinois Central on the lake front, a station site of sufficient size to accommodate not only the traffic of the present Illinois Central station, but also the traffic at present using the Dearborn, La Salle street and Grand Central stations.

"It would undoubtedly be to the best interests of the city if all of the railroads now having their passenger terminals in the territory between State street and the Chicago river would make the station provided in this ordinance the terminal for their through passenger trains.

"In no location adjacent to the central business district can there be provided coach yards, engine terminals and other necessary facilities as convenient to the passenger terminal and in no other location can these facilities be provided with as small a capital expenditure. The location provided in this ordinance is readily accessible for vehicular traffic from all sections of the city without encountering the congestion in the central business district. Adequate railroad entrance routes are provided convenient for all of the railroads now using the Dearborn, La Salle Street and Grand Central stations to reach the station location provided in the ordinance, and there is an opportunity for the consolidation of entrance routes that would make possible a reduction of passenger train mileage and operating expenses.

"It should therefore be the policy of the city to encourage the removal of the passenger terminals of the railroads now occupying the Dearborn, La Salle Street and Grand Central stations to the Roosevelt Road Lake Front Station."

The report calls attention to the manner in which the property occupied by these railroads serves as an obstruction to free communication between the southern part of the city and the central business district as well as the manner in which it has served to restrict the normal development of the real estate adjoining these railway facilities. It is also suggested that many of these facilities are or will soon become inadequate and that provision for enlargement of the railway facilities in this territory cannot well be made as they are now occupied. With regard to this feature the following conclusions have been reached:

"Any future railroad development in this territory, therefore, should provide for: (1) The withdrawal, at least in part, of railroad penetration into the central business district; (2) a character of development that would permit joint railroad and commercial use of property; (3) the opening of additional street arteries between the 'loop district' and the south side.

"A study of the map of the territory immediately south of the central business district indicates that it will be extremely difficult to design a large passenger terminal in this district that would fulfill the three requirements given above."

The question of electrification is brought in as follows:

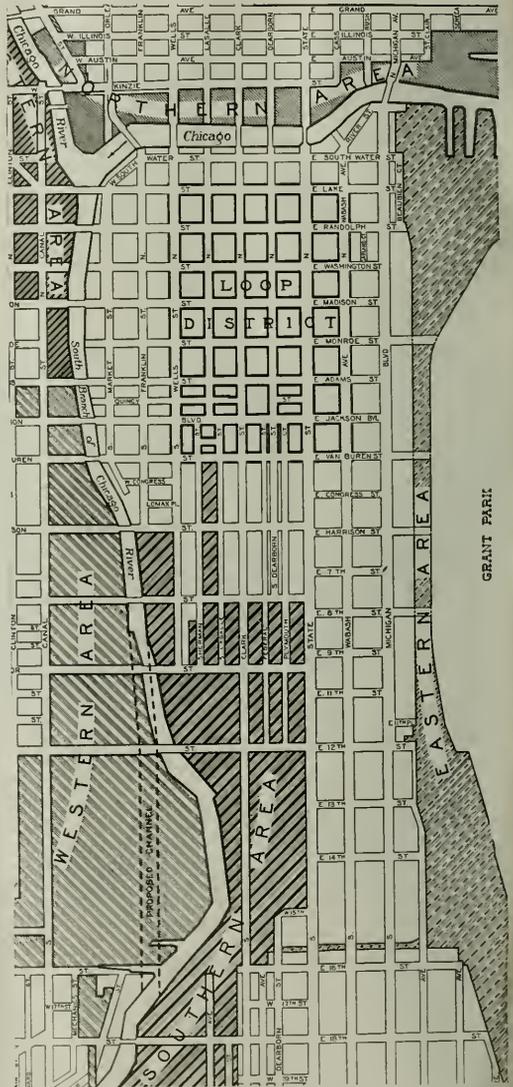
"Judging from past expressions of the city council and the sentiment of the public at large it is evident that no comprehensive railroad development in the territory immediately south of the central business district will be countenanced unless such improvement carries with it operation

of trains by motive power that will eliminate smoke and in the present stage of the art this means electrical operation."

Suburban and Freight Facilities

Also Taken Into Account

"In connection with the removal of existing passenger stations south of the loop district and the revamping of the



How Chicago's Business Center is Hemmed in By Railroads. The New Plan Affects the 14 Railroads Occupying Terminals in the "Southern Area"

freight facilities, provision could be made for a suburban passenger station to accommodate the suburban service of the railroads at present using the Dearborn, La Salle Street and Grand Central stations, in a location that would fit in

with the proper ultimate treatment of the suburban train problem and at a cost that would not be excessive.

"The objections to the development of a passenger terminal in the territory south of the loop district do not apply to the development of freight facilities. Freight facilities can be developed in a manner that will not interfere with the opening of streets through the district and also in a manner that will permit of the use of the space above that used by the railroads for commercial purposes.

"Linked up, however, with the question of the proper development of this territory, both in the interests of the city and of the railroads, is the question of river straightening. South of Van Buren street the south branch of the Chicago river makes a decided bend to the east, which narrows down the southern approach to the main business section of the city. The river being within 150 ft. of Clark street near Fifteenth street. North of Van Buren street there are nine north and south streets while south of Van Buren street, on account of the bend in the river and the railroad occupation there are only four streets, one of these being a boulevard from which heavy traffic is excluded, and of the remaining three, one has undulating grade, is restricted in width, and is a very unsatisfactory street for use of heavy team traffic."

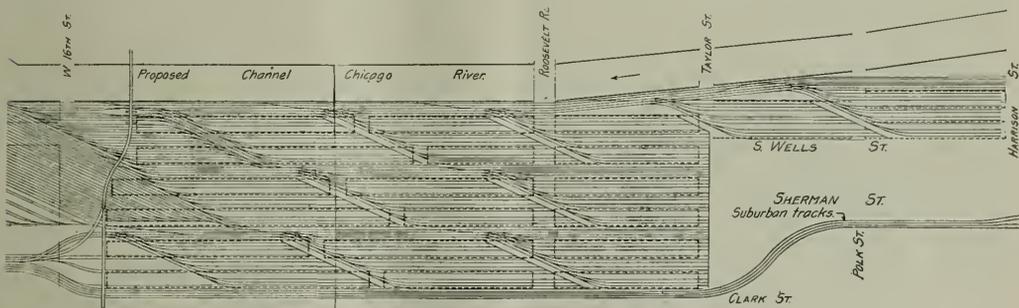
The report points out that the question of straightening the river was discussed for many years but no definite action

river and the revamping of the railroad property adjacent thereto.

"The best interest of both the city and of the railroads will be served if the railroads, in co-operation with the city, will work out a plan for the improvement and rearrangement of the railway terminals in connection with river straightening that will give the city the additional streets required and give the railroads the improvements and additional facilities which they require. It may be, however, that in order to bring this about it will be necessary for the city to be in position to serve notice on the railroads that it is proceeding to an active consideration of the river straightening project and its intention, either with or without the co-operation of the railroads to bring about this necessary improvement."

Proposes Vacation of Large Area

"Tentative plans prepared by the commission would indicate that the best results would be obtained if the railroad occupation was confined to the territory bounded on the east by Clark street, south by Taylor street and by Wells street between Harrison and Taylor streets. Under this plan the railroad tracks would be depressed to enable viaducts to be put over them through the territory. Fig. 2 indicates the area which the railroads would vacate (shown by cross hatching), while the additional streets which it is proposed



Suggested Intensive Development of Freight Terminals

was taken until 1914 when provision was made in the Chicago Union Station ordinance, whereby the railroads entering the Union Station and occupying property abutting on the river agreed to co-operate with the city in proceedings for straightening the river. A similar agreement was made between the city and the Baltimore & Ohio Chicago Terminal in an ordinance passed in 1915. This ordinance provides for a change of channel in the river, starting at Polk street, extending a little east of south to Roosevelt road, and thence due south. Under this channel change the distance from Clark street to the straightened river will be about 1,015 ft. All of the river frontage embraced within the change described above is owned by railroad companies. The total frontage on the river channel between the lines of change contemplated amounts to 9,580 ft.

Co-operation Between the Roads Necessary

The report demonstrates that a plan as comprehensive as this, which involves the interests of so many railroads, and involves a complicated exchange of real estate holdings can be worked out satisfactorily only if the railroads come to an agreement among themselves. Efforts to this end had been carried on with some progress until work was discontinued as a result of the war. After pointing to conditions which have served to obstruct action subsequent to the war, it is suggested that the present is a favorable time to undertake all action possible to bring about the straightening of the

to open through the railroad area are indicated by the heavy dotted line.

"It will be noticed that this plan provides for three additional streets between Clark street and the river and also provides for the opening up as a continuous thoroughfare of Dearborn street from Polk street south."

Fig. 3 illustrates a suggested development for the freight terminal in the railway area as restricted under the provisions of this plan. This provides for the railway tracks on a lower level and with a street vehicle development on the street level.

"It is possible in a plan such as outlined to give the railroads freight facilities of a car standing capacity of double the existing facilities in this territory and to work this out in a way that would enable the railroads to utilize the air space above their freight facilities for commercial purposes. This tentative plan (Fig. 3) shows the suburban tracks occupying the under level of Clark street south of Taylor street, thence extending through railroad property to a possible suburban station located at Van Buren street at the present site of the La Salle Street station.

"The present freight facilities of the railroads can only be increased in capacity by resorting to a double level development, and a development of this kind on the property at present occupied by the railroads between Clark street and State street would be found to be expensive because such a development would involve the raising of the level of State street with the consequent property damage along the east

side of State street and along each of the streets intersecting State street from the east in which ramps would have to be constructed to connect with the raised level of State street.

"On the other hand, if the river is straightened and the development is confined to the area between Clark street and the river, and does not extend farther north than Taylor street except between Clark street and Wells street, all of the connecting ramps would occur opposite property now owned by the railroads, and there would be available for the development the same area as is now used by the railroads for freight facilities."

The Cost

"The estimated costs of the improvement such as shown on this plan, based on 1920 prices, are as follows:

"Straightening of the Chicago river, including building of permanent dock walls; the moving of the Roosevelt road and the St. Charles Air Line bridges; temporary construction; track alterations, etc. \$3,000,000

"Viaducts and ramps for new streets opened through the district including adjustment with the Roosevelt Road viaduct \$17,000,000

"Railroad facilities including removal of old structures; excavation; track work; changes to St. Charles Air Line and connections; building freight house; thoroughfare suburban tracks and station..... \$23,000,000

"To construct a 10-story commercial development over the railroad freight houses would provide about 20,000,000 sq. ft. of rental space and would cost about..... \$95,000,000

(This feature of the plan would be carried out only as the need for it developed.)

In considering this cost, attention is drawn to the fact that the plan provides for the release by the railroads of 3,000,000 sq. ft. of land which, at an average value of \$20 per sq. ft. would represent a total of \$60,000,000 which the railroads could reasonably be expected to realize in disposing of this property. In addition to this it would be possible to design the freight house facilities west of Clark street so that the area over the freight houses would be available for commercial purposes and this would give the railroads about 2,500,000 sq. ft. of air rights which they could sell. This at a value of \$10 per sq. ft. would represent \$25,000,000. This amount subtracted from the \$43,000,000 because of the railway and street improvements and river straightening would leave an investment of \$20,000,000 which the railroads would have to finance. In commenting on this, the report states:

"Offsetting this net expenditure would be the value of the lands released from railroad occupation which has been conservatively placed at \$60,000,000, so that even if the entire cost of river straightening and the constructing of viaducts were borne by the railroads, the full development would still show a credit of \$40,000,000."

Payroll for 1920 \$3,733,816,186

WASHINGTON, D. C.

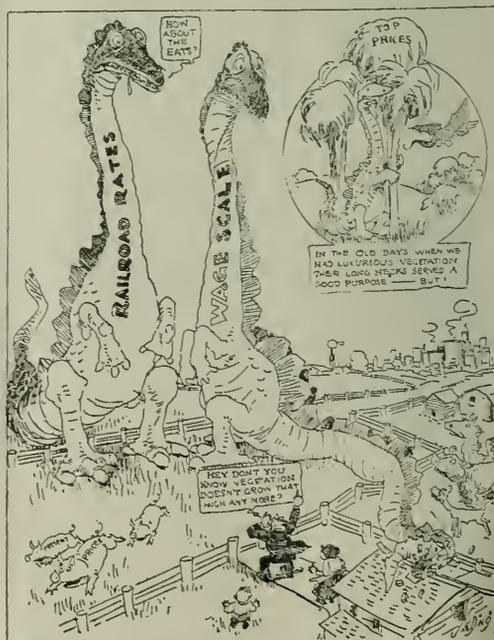
THE RAILROAD PAYROLL for 1920, according to the official statistics just made public by the Interstate Commerce Commission, was \$3,733,816,186, to which a small amount is to be added for back pay for May and June, for which the reports are not yet quite complete. This exceeds previous estimates which had placed the total payroll for the year at \$3,600,000,000, including eight months of the wage increase, and for a full year at the increased rates of pay awarded by the Railroad Labor Board last July at \$3,800,000,000. The commission's report covers only the Class I roads, and its total for the year is made up as follows:

First quarter, old basis.....	\$795,616,330
Second quarter, old basis.....	801,063,938
May and June back pay.....	102,419,680
Third quarter, new basis.....	1,052,109,451
Fourth quarter, new basis.....	982,606,787
Total, 1920.....	3,733,816,186

The commission says the carriers were asked to exclude from the reports for the third and fourth quarters of the year the retroactive payments for May and June in order not to distort the comparison of averages. The amounts so excluded appear in foot notes, but the reports are not quite complete, and therefore the total payroll above shown is somewhat below what will appear in the final annual report for 1920.

The number of employees shown in the commission's report for the fourth quarter of 1920 was 2,136,259 for October, 2,068,454 for November, and 1,976,429 for December. The average for the quarter was 2,060,368, as compared with 1,933,525 for the first quarter of the year, 2,004,760 for the second quarter and 2,157,989 for the third quarter. The average for the year was 2,054,000. The number of employees is that for the middle of each month. The number for December was about 6,000 greater than that for February, but it represents a reduction of 221,395 as compared with August.

The average compensation per employee for the fourth quarter was \$159 per month, as compared with \$166 for the third quarter, and \$133 for the first and second quarters. The average compensation per employee for the year, as shown by the report, was approximately \$1,818. In 1917 the pay roll was \$1,739,482,142 for 1,732,876 employees, or an average of \$1,004. In 1918 it was \$2,613,813,351 for 1,841,575 employees, or an average of \$1,419. In 1919 it was \$2,836,800,000 for 1,993,524 employees, an average of \$1,483. The pay roll for 1920 reflects not only the increase in the number of employees and the wage increase awarded by the Railroad Labor Board last July, which was in effect for eight months, but also some of the increases made by the Railroad Administration in the latter part of 1919.



Ding in the Chicago Post

Relics of an Extinct Past

How One Road Plans to Reduce Loss and Damage

An Outline of the Steps Taken to Show Employees How They Can Diminish This Heavy Drain

TH. BEACOM, vice-president and general manager of the Chicago, Rock Island & Pacific, is the author of some interesting circulars recently issued by the Rock Island to enlist the co-operation of its employees in a campaign for the elimination of causes for loss and damage claims. These pamphlets are entitled: "How You Can Help to Prevent Causes for Claims" and "Suggestions on How to Prevent Claims," and have been distributed throughout the system and are being supplemented by articles in the company's magazine. The campaign is conducted by a newly-formed organization functioning directly through the operating department of the road and headed by O. Maxey, who has been appointed general supervisor of claim prevention. Mr. Maxey will be assisted by a district supervisor on each of the two Rock Island districts, and by seventeen division supervisors who will have direct charge of the work of educating the Rock Island employees in matters of claim prevention.

In launching the new organization, Mr. Beacom stated his belief that this education will secure the co-operation of Rock Island employees who have a part in the handling of freight, and that this co-operation in turn will have a two-fold effect. In the first place, a large part of the \$2,400,000 which the Rock Island paid out in freight claims in 1919 will be saved. In the second place, reducing this waste will benefit shippers and receivers of freight by improving the service which they receive.

Campaign Takes in All Departments

In addition to the special organization for the prevention of freight claims, a detailed plan has been worked out to carry the campaign into every department of the road. This work will be under the active direction of the district and division supervisors of claim prevention who are to devote their entire time to the campaign. To obtain the maximum efficiency, the division supervisors have been placed on the staff of their respective superintendents and report both to them and to the district supervisor. The district supervisors, in turn, are on the general manager's staff, and report jointly to the general superintendent and the general supervisor of claim prevention.

Furthermore, arrangements have been made whereby every supervising employee is to be actively engaged in claim prevention. To facilitate the work an outline has been prepared demonstrating the manner in which every supervisor and inspector can best assist. The superintendents are charged with the responsibility of enlisting the active co-operation of all subordinate officers in the work of claim prevention. They also act as the organizers and chairmen of claim prevention meetings at which causes of claims are discussed and remedies proposed.

In the case of trainmasters, the plan provides that in traveling over their districts they are to give necessary supervision to claim prevention and are to take immediate action to correct wrong practices in the "handling of freight, baggage, mail and express" wherever such practices may be found. The trainmasters also employ as much of their time as may be necessary in securing the complete co-operation of all employees.

Yardmasters are reminded that many claims are caused by "improper diversion, failure to comply properly with refrigeration instructions, mishandling of way-bills, failure to handle cars promptly through yards, and failure to exercise proper supervision over car inspectors," and neglect in choos-

ing the proper cars to apply on orders. The yardmasters, therefore, are given the task of making all yard employees thoroughly familiar with the rules for handling freight properly and of seeing to the observance of the rules. They also take necessary measures to prevent damage through the rough handling of cars by yard switchmen and enginemen.

Officers Instruct Employees

Chief dispatchers are expected to organize their dispatchers, car distributors and other employees in order to keep close check on all important shipments so that any cars which are "set out" on account of bad order may be moved again with the least possible delay. Under the direction of the chief dispatcher efforts are to be made, not only to issue explicit instructions covering car orders so that the proper cars will be furnished, but also to maintain published schedules and to prevent delay of trains with perishable shipments.

Master mechanics are to conduct a constant campaign to obtain more prompt repairs to equipment and are to see that the work is thoroughly done. These officers are to co-operate with superintendents, trainmasters, and chief dispatchers in giving preference for repairs to cars of the class most needed. In addition to these duties, master mechanics are to supervise the education of shippers as to the proper methods of cooping cars. Road foremen of equipment are given the task of instructing enginemen in handling trains and cars carefully. They are to check repairs made both by company forces and by shippers to see that the work is being done to insure a "minimum loss to freight in transit." Road foremen are to observe conditions under which freight is being handled at stations in their territories and are to put into force practices which will work to prevent all class of claims.

On Look-Out for Pilferage

Division engineers have been instructed to pay special attention to the condition of all buildings through which "freight, baggage, mail and express" is moved. The purpose of this work is to keep at a minimum all loss and damage claims resulting from pilferage and injury while freight is being handled in these structures. Hand in hand with the work of the division engineers in checking up the condition of buildings, are the functions of the master carpenters who are to assist in cutting down losses from pilferage and damage by making prompt repairs to railroad structures.

Roadmasters, during normal routine periods, are to observe, and where necessary correct, methods of handling freight in and around stations. In case of accidents, however, they are to supervise the collection of damaged freight and are to provide police protection adequate to prevent thievery while the freight is being gathered and checked.

Bridge and building foremen, like master carpenters, are to take steps to prevent damage to buildings housing freight, and are to make necessary repairs to these structures promptly and thoroughly.

Will Educate Shippers

Traveling freight claim adjusters are to take an active part in educating shippers to a realization of the importance of their part in the prevent-claim movement. The adjusters are to make use of every opportunity to impress upon the shippers the necessity of delivering their freight, no matter in what quantity, properly packed in containers sufficiently strong and well-marked to carry it through to its destination.

The adjusters will not only take an active part in educating shippers; they are also to instruct agents and other employees in the proper method of handling freight. In making reports and handling correspondence these officers are to work both to prevent new claims and to give prompt disposition of those claims which are filed so that patrons of the company will receive satisfactory service.

Refrigerator service inspectors are to specialize on the prevention of claims resulting from the improper handling and disposition of freight which requires "protective service against heat or cold." Fuel supervisors will assist road foremen of equipment in educating enginemen as to proper methods of handling their trains, and will correct any bad practices in loading and unloading cars which they may observe. Scale inspectors are to make every effort to see that correct weights can be obtained in all stations and yards. Demurrage inspectors are to give necessary prevent-claim instructions to all conductors and agents with whom they come in contact.

Correct Bad Car Loading Practices

An important function is given to the cooperage inspectors who are to exercise careful supervision and correction of any careless practices which may obtain in preparing cars for loading, particularly when shipments of small grain are being made. In districts where shippers are cooping cars themselves, these inspectors are instructed to travel on local freight trains to see that this work is done correctly. They are to make similar observations where car repairs are being made by company forces, and are to report immediately to the proper authority whenever they find evidence of insufficient or improper repairs. In the same way, local car inspectors are to assist in claim prevention work by making certain that only cars in good condition are furnished for loading. When inspections of cars are made at terminals, these employees are instructed to give special attention to cars received from connections to make sure that both cars and lading are in condition to carry the shipment through to its destination without damage. The inspectors are to keep cars moving, particularly through yards, by making minor repairs without putting cars on repair tracks.

The police and special service department employees are instructed not only to be on the lookout for improper methods of handling freight, but to watch for pilferage no matter how small it may be. The directions to these employees emphasize the fact that robbery of entire packages and of a part of the contents of packages is one of the largest sources of loss and damage claims. It is the particular province of the company's police to prevent claims of this character.

Traveling freight agents are to act as instructors of shippers in proper methods of delivering freight to the railroad, and of employees in the correct way to handle freight when it has been received by the company. The company believes the large number of causes for claims which originate either in the agent's office, in warehouses, in stations, or on platforms, can be greatly reduced by personal attention from the individual agents. Accordingly, these employees are instructed to supervise any acts which might cause a claim. The agent is also directed to refuse to accept freight, baggage, mail or express unless "it is properly marked, packed and in good condition." Freight conductors are instructed to supervise the proper loading and unloading of freight at stations. They are to see that freight improperly marked and packed is not accepted for transportation, and that once freight has been accepted it is properly stored. Train baggagemen are to exercise the greatest care in preventing damage to freight while it is en route or being unloaded at its destination.

Other classes of employees including claim agents and

personal injury adjusters, traveling auditors, traveling car agents and transportation inspectors, water and motor service inspectors, train rule examiners, service and special inspectors, traveling yard supervisors, supervisors of safety and fire prevention, and district car inspectors, all have been instructed to observe and report existing conditions, and to take steps wherever possible to carry on the prevent-claim movement.

In concluding his directions to Rock Island employees, Mr. Beacom said: "Our patrons are entitled to safe and reasonably prompt movement of the business entrusted to us and I am confident that with full co-operation on the part of the railroad employees, the Rock Island system can make a marked improvement in the handling of its business. Let us adopt as our slogan, 'Prevent Claims' and keep it before us at all times."

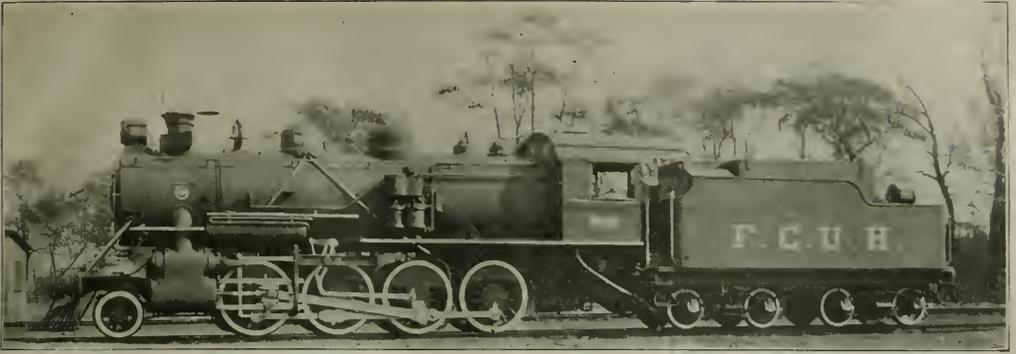
Freight Car Loading

WASHINGTON, D. C.

ANOTHER DECREASE in freight car loading, due principally to a reduction in the coal traffic, was reported by the Car Service Division of the American Railway Association for the week ending March 26. The number of cars of revenue freight loaded during the week was 687,852 as compared with 900,386 in the corresponding week of 1920 and 713,275 during the corresponding week of 1919. This represents a reduction of nearly 4,000 cars as compared with the week of March 19, but the loading for four weeks in March is still greater than it was during four weeks in February. The total car loading since the first of the year, however, is 14 per cent less than for the corresponding period of 1920. Declines as compared with the previous week were shown in the loading of grain and grain products, live stock, coal, coke and forest products, while increases were shown in ore and merchandise and miscellaneous freight combined. Loading of merchandise and miscellaneous freight showed an increase of 6,259 cars, and this item has been increasing since the first of the year, but the coal loading set a new low record of 122,189 cars for the week. The reduction in the total loading is accounted for largely by reductions in the Central Western and Southwestern districts as compared with the previous week. Other districts show increase.



The Treatment of Smugglers in Upper Silesia. This Train, in Which 100 of Them Were Riding, Was Burned, with the Loss of Many Lives



The Pershing Consolidation, a Popular Type for Export

New Power for the United Railways of Havana

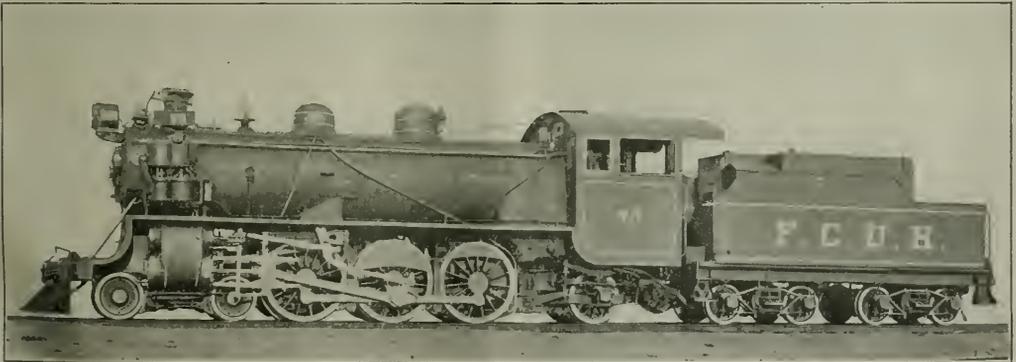
Baldwin Works Make Quick Delivery on Large Export Order
Comprising Three Locomotive Types

THE UNITED RAILWAYS of Havana, Cuba, have recently received and are now placing in operation three distinct types of superheated oil burning locomotives manufactured by the Baldwin Locomotive Works. These locomotives include 10 eight-coupled side tank locomotives for switching service, 12 Consolidation type locomotives for freight service and 10 Pacific type locomotives for express passenger service.

The Cuban Railways deferred placing orders for addi-

and the Cuban Central Railways. These combined lines operate approximately 375 locomotives and 11,225 cars over 1,168 miles of standard gage track.

There are approximately 650 locomotives and 16,000 cane cars in operation on 1,500 miles of railroad which are owned and operated by the 193 sugar centrals scattered throughout the island. During the rush season when the sugar cane has been transported to the mills and the sugar carried to the various ports for foreign shipment, this rolling stock is



Designed for Express Passenger Service Between Havana and Santiago

tional motive power during the four years of the war with the resulting condition similar to that which confronted the railroads of the United States, that their operating departments have been compelled to transport a large increase of passenger and freight traffic with a negligible increase in motive power units. This condition has taxed their ingenuity to make ends meet and at the same time give satisfactory service. Brigadier General Jack, formerly director of British Military Railways in France, was recently made general manager of the United Railways of Havana and subsidiary lines, comprising the Western Railway of Havana

permitted to use the public service railways on a ton-mile basis. In 1920 960,000,000 lb. of sugar was moved for export.

A Compact and Sturdy Switcher

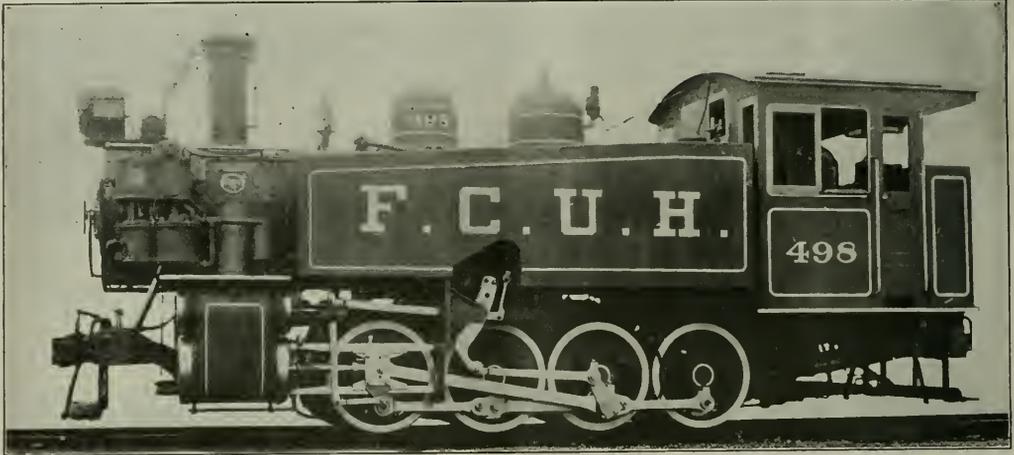
The Eight-wheel switching locomotives are compact and modern in every respect. They are to be utilized in railway yard work in and around Havana, Santiago and other points. In order to eliminate all rocking motion this engine incorporates comparatively small oil and fuel tanks in its design as large tanks are unnecessary due to the engine being within

reach of water and fuel supply at all times. The total weight of the engine, 142,200 lb., is evenly distributed on the four pairs of coupled driving wheels, which are placed as close together as possible, permitting the locomotives to traverse curves of about thirty degrees.

Although the engines are compact the various parts are accessible for adjustment or repair; for example, the air pumps are fitted on the side of the smokebox, while the electric headlight generator is on top of it. The injector check is fitted on the top of the boiler, the valve motion is on the outside and sufficient space is allowed between the

able petticoat pipe. The smokebox front is made of pressed steel carefully fitted with a dove-tailed asbestos joint ring.

These locomotives are equipped with air brakes, electric headlights, air bell ringers and air sanders. The injectors, lubricators and safety valves are of the latest approved types. The tenders for these engines are substantially constructed of steel channel frames erected on two four-wheeled, center bearing trucks of the arch-bar type. On this frame is attached a steel flooring upon which is mounted a U-shaped water tank with a capacity of 5,000 U. S. gallons and an oil tank of 3,200 U. S. gallon capacity. These locomotives



All Appliances Are Conveniently Located on This Eight-Wheel Switcher

boiler and frames for the inspection of all parts between the frames. These locomotives are equipped with superheaters having a heating surface of 237 sq. ft., which is exceptional for engines of this type, especially for switching engines in foreign service. The cab is large, allowing the engineer plenty of room and a clear view both front and back. These switching locomotives are capable of exerting 31,860 lb. tractive effort, at which the factor of adhesion is 4.5.

Pershing Type Consolidations

More space has been provided for the operators in this design by the cab being widened and the top raised. The coupler lug height has been raised so that the tenders now in use by the railways may be interchangeable with their old and new motive power units. The boiler is exceptionally large and has sufficient steaming capacity to operate the engine and its rated load at a constant speed of twenty miles an hour. The maximum tractive effort exerted by these locomotives is 35,625 lb. These locomotives are modern in every respect, being equipped with air brakes, air sanders, air bell ringers and electric headlights. They are equipped with superheaters having 420 ft. of heating surface. The smoke stack is supplied with a damper which prevents, to a certain extent, a quick cooling of the engine at the end of a run.

Pacifics for Through Passenger Service

The Pacific type locomotives were designed to haul the Havana-Santiago express, a train of six to eight cars, at a maximum speed of thirty miles an hour. All parts of each engine are interchangeable. These locomotives are equipped with superheaters having a heating area of 487 sq. ft. The smokebox is of the extended type and fitted with an adjust-

develop 25,700 lb. tractive effort and will negotiate 20 degree curves and 2 per cent grades.

The principal dimensions for the three locomotives are tabulated below:

	Eight-wheel Switching	Consolidation	Pacific
Gage	4 ft. 8 1/2 in.	4 ft. 8 1/2 in.	4 ft. 8 1/2 in.
Cylinders	20 in. by 24 in.	21 in. by 28 in.	20 in. by 26 in.
Valves	Piston type	Fiston type	Piston type
Boiler:			
Diameter	56 in.	70 in.	65 1/2 in.
Working pressure....	180 lb.	190 lb.	180 lb.
Firebox:			
Material	Steel	Steel	Steel
Staying	Radial	Radial	Radial
Length	84 1/2 in.	122 1/2 in.	84 1/2 in.
Width	42 3/4 in.	38 1/4 in.	65 1/4 in.
Grate Area	25 sq. ft.	32.5 sq. ft.	38.2 sq. ft.
Tubes and Flues:			
Flues	15 5/8 in.	26 3/8 in.	22 5/8 in..
Tubes	107 2 in.	165 2 in.	151 2 in.
Length, tubes and flues	13 ft. 1 in.	13 ft. 9 1/2 in.	18 ft. 6 in.
Heating Surface:			
Arch			16 sq. ft.
Firebox	118 sq. ft.	181 sq. ft.	158 sq. ft.
Tubes	728 sq. ft.	1,181 sq. ft.	1,456 sq. ft.
Flues	300 sq. ft.	500 sq. ft.	570 sq. ft.
Total	1,146 sq. ft.	1,862 sq. ft.	2,200 sq. ft.
Superheater	237 sq. ft.	420 sq. ft.	487 sq. ft.
Wheels:			
Diameter, outside....	46 in.	56 in.	62 in.
Diameter, center....	40 in.	60 in.	56 in.
Journals, main.....	8 in. by 9 in.	9 1/2 in. by 10 in.	9 in. by 11 in.
Journals, others.....	8 in. by 9 in.	9 1/2 in. by 10 in.	9 in. by 11 in.
Wheel Base:			
Base, driving.....	11 ft. 9 1/2 in.	15 ft. 6 in.	11 ft. 0 in.
Base, total engine....		23 ft. 8 in.	30 ft. 0 in.
Base, total engine and tender		55 ft. 1 1/2 in.	57 ft. 2 3/4 in.
Weight:			
On driving wheels...	142,200 lb.	152,500 lb.	104,500 lb.
On truck, front.....		16,700 lb.	41,000 lb.
On truck, back.....			31,000 lb.
Total engine.....	142,200 lb.	169,200 lb.	176,500 lb.
Total engine and tender		273,900 lb.	294,000 lb.
Tank capacity	2,000 U. S. gal.	5,000 U. S. gal.	5,000 U. S. gal.
Fuel oil capacity.....	700 U. S. gal.	3,200 U. S. gal.	3,200 U. S. gal.

Hearings on National Agreements Continue

More Railway Executives Cross-Examined—Employees' Representatives Present Economic Studies

DEVELOPMENTS during the past week in the dispute over the continuation of national agreements have been many and varied. They include (1) the presentation of an historical volume regarding railroad working conditions and national agreements; (2) the presentation of analytical studies by W. Jett Lauck, consulting economist of the labor organizations, who is attempting to portray the necessity for national agreements in the railroad industry by voluminous economic studies of similar developments in other industries; (3) the cross-examination of W. G. Besler, president of the Central Railroad of New Jersey; H. E. Byram, president of the Chicago, Milwaukee & St. Paul, and Frank McManamy, formerly assistant director, mechanical department, Division of Operation, of the United States Railroad Administration; (4) the decision by the board not to admit representatives of shippers as parties to the dispute over working conditions; (5) the calling of Judge R. M. Barton, chairman of the board, to a conference with President Harding and Edgar E. Clark, chairman of the Interstate Commerce Commission, at Washington; and (6) the dispatching of another long telegram to the President by Mr. Jewell.

While these numerous and various developments indicate that the Labor Board has spent an especially busy week, there is nothing to indicate that the long controversy over the employees' demands for perpetuation of their "national agreements" is nearing its close.

B. M. Jewell Continues Rebuttal

The rebuttal of B. M. Jewell, president of the Railway Employees' Department of the American Federation of Labor, and spokesman for the "Associated Standard Recognized Railroad Labor Organizations," the opening statements of which were described in the *Railway Age* of April 1 (page 845), took three and a half days to complete. All of the board's sessions on March 24, 25 and 28 and part of the session on March 29, were taken up by Mr. Jewell in reading volumes of correspondence showing the cordial relations existing between the Railroad Administration and the Railway Employees' Department of the American Federation of Labor, the co-operation extended to the railroad administration by the various shop crafts organizations and the negotiations leading up to the disputes over wages and working conditions which have been before the board since its creation.

W. J. Lauck Presents Economic and Historical Exhibits

W. Jett Lauck, consulting economist of the labor organizations, on March 29 began the presentation of a series of exhibits which will establish, according to Mr. Lauck:

1. The policy of establishing national agreements, or uniform rates of pay and working conditions, is in conformity with custom and precedent in the transportation industry, and in accordance with the best public policy as shown by the awards of boards of arbitration, and the acts and recommendations of other official agencies during the pre-war period.

2. In other leading basic industries of this country, collective bargaining on a national scale, and national agreements as to working conditions and relations, have been found to be the best means of stabilizing conditions, promoting industrial peace, and accelerating production.

3. That in Great Britain these facts have become so clearly recognized by both employers and employees that national agreements are encouraged by the Federated Industries and the Federation of Trade Unions as a whole, and the effort is being exerted

to make them compulsory upon all employees in a given industry.

4. That the former railroad administration in entering into national agreements, therefore, merely recognized a tendency which had almost reached complete development prior to the war and which was sanctioned by enlightened opinion both within and without the transportation industry.

5. That the representatives of the railroads have practically given their sanction to national rates of pay and working conditions of engine and train crews. These classes of employees have uniform rates of pay and working conditions embodied in agreements with individual railroads, but *underwritten* by the national organizations of these employees and concurred in by the railroads on a national basis. This is just as much a national agreement or standardization as it would be to agree upon wages and working conditions nationally and then embody the agreement into agreements with individual railroads.

6. We shall show further that the arguments of the railroads are the same which have been urged in all past years to prevent the establishment of humane standards in industry, and shall demonstrate that the railroads are now consciously and deliberately taking advantage of a temporary industrial depression to destroy humane standards which are sanctioned by the thought and practice of the leading industrial nations of the world.

"The root of the railroad difficulty, we shall show, is not in national agreements but in the inadequacies of the management," Mr. Lauck said. "Conservatively stated, if railroad management was characterized by reasonable efficiency and had available for its proper use a proper amount of credit or capital, labor costs would have shown a radical decline under national agreements, and savings in operating expenses of at least one billion dollars annually would be made.

"The claim of General Atterbury that the national agreement produces inefficiency and waste we shall answer in our next series of exhibits," he continued. "We shall submit evidence to show that the output of the employees, or their productive efficiency, has greatly increased as compared with the pre-war period. That a much greater volume of traffic has been handled by fewer employees working a fewer number of hours.

"To our minds the policy of all the comparisons that are made is that they are made with 1917 when the railroad industry had been practically depleted by the tendencies which have been drawn forward since 1914 following the industrial depression at that time and the loss of forces which were not recruited up to 1917, when the railroad administration took control. When you study the number of employees at the present time you see that practically we have not got back to a normal basis as yet on the railroads, instead of having an excess over, and when that is compared with the work actually done we find that a much greater volume of traffic is handled by fewer employees working a fewer number of hours now as compared with the pre-war period.

"Our conclusion is that labor has been more productive, but it has not had a proper chance; it has not met with the proper response on the part of the managements, and especially the railroad industry being depleted of capital or credit practically since 1910—without going into the cause of that whatever the cause may be—it is handicapped by the inadequacy of managements. We are not especially charging the managements with incompetency or inefficiency, but we are speaking of the inadequacy rather than the inefficiency."

These exhibits were not made a part of the record in the case but were filed as separate exhibits, Mr. Lauck pointing out their salient features, taking so far three and a half days for this purpose. On March 30, in describing part of his

exhibit which was concerned with the agreement formed between the manufacturers of clothing and their employees, Mr. Lauck charged, in reply to a question, that the forces which are alleged to be back of the clothing manufacturers in their attempt to nullify this agreement in New York are the same forces which are behind the railroads in their attempt to abrogate the national agreements. This remark brought forth the statement from J. G. Walber, a member of the Conference Committee of Managers of the Association of Railway Executives, that Mr. Lauck was probably "suffering from a mental hallucination."

The Movement Toward National Agreements

In presenting his first exhibit, entitled "The Movement Toward National Agreements," Mr. Lauck said, "The logic of events has demanded that national organization of labor and the negotiation of national agreements. Organization of the employees, as well as organization of the unions, has become nation-wide because the industries themselves have become nation-wide, markets have become at least nation-wide, competition or consolidation has expanded, the fields of finance have widened, migration of labor has increased, and the trade associations of employers have become national in scope."

Mr. Lauck explained that the exhibit dealt particularly with conditions in other industries which had led to national agreements, the experience in working out such agreements and the results achieved through their being placed in operation.

He traced the development of labor organizations from a local to a national scale and quoted labor historians as stating that no change in industrial technique, not even the utilization of steam as a motive power, had ever had so simultaneous an effect upon all industries as had the sudden extensions of markets due to the railroad consolidations of the fifties.

"The national agreement averts industrial interruption," he continued. "The consensus of the evidence adduced shows that in the rapid expansion of our industries we have reached the point where nothing but discord results from independent action by shop committees and local unions. The national labor organizations, like the national associations of employers, can view policies from a national standpoint, they have greater responsibilities and therefore give all questions more careful thought before acting. The testimony on the part of employers where the national agreement has been in effect shows conclusively that it opens the way to industrial peace."

Mr. Lauck then reviewed the genesis and operation of national agreements in the stove industry, in the glass bottle industry, in the pottery industry, between the workers and the international association of electrical contractors and the dealers, between the typographical publishers' association, in the bituminous coal mining industry and in the clothing manufacturing industry. All these agreements, he declared, had been productive of beneficial results both to capital and to labor and he outlined the views of employers, economists, government investigators and arbitrators, all of which, he said, tended to show (1) that industrial peace is attained by national agreements; (2) that the establishment of uniformity is socially important; (3) that unions do observe their contracts; (4) that it is important that national agreements cover working conditions; (5) that trade agreements are not inconsistent with the genuine open shop, and (6) that trade agreements humanize the industrial situation. The document also included a discussion and account of the historical experience of England in the matter of collective bargaining and national agreements. The British experience, he said, parallels substantially the same principles which have been developed in American progress in industrial relations.

The Unity of the American Railway System

Mr. Lauck's second exhibit, an analytical summary of "The Unity of the American Railway System," was presented to show, Mr. Lauck said, the substantial unity of the American railway system by the following facts:

1. The basic roadways and rail systems of America's railways have become virtually inter-connected and unified into one great system of continental extent, substantially uniform in character and standard in construction throughout, the differences obtaining being matters not of primary importance.
2. The equipment is essentially national in the range of its movement and use, and substantially uniform in its character, except for secondary differences.
3. The American railway system, in its national scope, is operated under a system of uniform time, uniform train rules, signals, etc.
4. The entire system is controlled under substantially one system of accounting, nation-wide in its application.
5. The public service requirements of the railway system have become essentially general in character—the shipper requires and receives through rates and through billing of goods, or passenger transport from any point to any point.
6. The entire system operates, with certain regional variations, under highly unified and standardized systems of freight and traffic classification and with largely identical rates.
7. The system is controlled by a highly unified system of financial organizations, and operative and administrative associations.
8. A nationally unified system of operating intelligence, car-service information, traffic statistics, is maintained and cleared through the American Railway Association, and a more general railway information system is maintained through the Bureau of Railway Economics, besides the unifying information and control exercised through the Interstate Commerce Commission.
9. Governmental recognition of the unity of the American railway system, in matters essential and fundamental, is expressed in the legislative, the administrative, and also in the judicial pronouncements of the United States government.

"This exhibit," he said, "relates particularly to the matter of the elimination of inequalities in treatment upon the railway system, to the question of who should be parties to agreements and who may be parties to this dispute."

"It tends to show," he continued, "between what parties the question of working conditions is normally joined. It may have a bearing also upon 'the respective privileges, rights, and duties of carriers and their employees, and may relate to the making of regulations necessary for the efficient execution of the functions vested in the board, to the end that interruptions of traffic shall be avoided.'"

Ex-President Taft's Interpretation Attacked

During the presentation of this last exhibit an interesting discussion was started by G. W. W. Hanger, public member of the board, who called attention to the interpretation of the Transportation Act which has recently been made by ex-President William H. Taft and which has been widely circulated in the press. Mr. Taft's interpretation of the principle of collective bargaining as defined in the act, is contrary to that of the brotherhoods, and was characterized by Mr. Lauck as being founded on partial information furnished by railway executives. Mr. Lauck admitted, however, that material regarding the present controversy had been sent to Mr. Taft in an effort to present the employees' interpretation of collective bargaining. Both Mr. Jewell and Mr. Lauck stated definitely that they did not agree with Mr. Taft's interpretation.

The next exhibit presented by Mr. Lauck was entitled, "Railroad Boards of Labor Adjustment," the purpose of which is that national agreements are closely inter-related in principle and therefore practically inseparable, and that the Transportation Act itself contemplated national adjustment boards.

At various times throughout the hearing the introduction of much of this evidence was objected to by Messrs. Hanger, Park, Elliott, Walber and others, but in the majority of cases these objections were over-ruled after representatives

of the employees had protested against interfering with the presentation of their cases.

At the close of the public session on April 1 Mr. Jewell stated that the preliminary presentation on behalf of the employees had been completed, but that they had several additional exhibits in the course of preparation and these would be filed with the board after completion of the cross-examination of the executives summoned to appear before the board on April 4.

Cross-Examination of W. G. Besler

W. G. Besler, president of the Central Railroad of New Jersey, summoned to appear before the board at the behest of Frank P. Walsh and Mr. Jewell, like his predecessors on the witness stand, proved a tartar when he consistently met Mr. Walsh's attack with the apt expression, "circumstances alter cases." Mr. Walsh, in his examination of the witness, followed the same line of attack pursued in questioning T. DeWitt Cuyler, General W. W. Atterbury and Carl R. Gray two weeks ago. The points he attempted to establish at that time were outlined in the *Railway Age* of March 25 (page 303). The effort and the failure at that time were repeated in the examination of Mr. Besler.

Mr. Besler freely admitted that certain rules in the shop crafts' national agreement were in effect on the Central of New Jersey prior to federal control, but the attempt of Mr. Walsh to infer that therefore the rules were applicable nationally failed on the stand that "circumstances alter cases." The only rule upon which Mr. Besler and Mr. Walsh agreed as a fair rule and fit for national application was the Golden Rule, which the former stated he had tried to apply on his road and which both agreed could easily be applied on all roads.

In going through the rules of the shop crafts agreement Mr. Besler pointed out that many were silly, others unnecessary and still more unfair. Regarding many of the rules, Mr. Besler said: "Many of the rules have no place in the book. They are properly a function of management and of far more interest to an intelligent, efficient management than they are to the employees. The managerial function presupposes an agreement between the company and its employees and perhaps agreement among the employees, but the one is not contingent upon the other."

The original proof of the Central of New Jersey plan, which Mr. Besler's employees advocated heartily at the end of federal control until interfered with by national union officials, was introduced into the records. Mr. Besler also went on record as believing without prejudice in the right of men to organize or belong to any organization they wish, and said no one should be discriminated against by reason of his affiliations. Mr. Besler's opinions on the right of the majority to represent the minority were contrary to the stand taken by General Atterbury that the minority had a right to direct representation. Mr. Besler not only conceded majority representation as regards all employees, but also granted the right of the majority of each craft on each road to select a committee to represent them.

When the subject of the eight-hour day was taken up by Mr. Walsh, Mr. Besler replied that the length of the day depended entirely upon circumstances, and that it was conceivable that a ten or twelve-hour day might be preferable under certain circumstances. To this Mr. Walsh returned the verdict, "that is unethical, if not immoral."

"But," said Mr. Besler, "the farmer has never regarded the eight-hour day. Is that unethical?"

"Not at all," replied Mr. Walsh.

"Why isn't it?" asked Mr. Besler.

"That's the sad condition of the farmer," returned Mr. Walsh. "The farmers desire leisure like the next man, but there are a great many factors which enter into consideration. Were it not for the machinery at work, principally

the railroads, the farmer would not have to work from sun-up to sun-down."

The examination at one time touched upon government ownership, when Mr. Besler asked if a man were not worse off to ask wages so high that the industry could not pay them and so have to shut down than he would be if he accepted a lower wage and more permanency.

"The industry then should turn to government ownership," said Mr. Walsh, but the whispered advice of one of the labor leaders ended the discussion as quickly as possible.

E. E. Loomis Declines to Testify

Immediately preceding the cross-examination of Mr. Besler a letter was read into the board's records from E. E. Loomis, president of the Lehigh Valley, who had been summoned to appear with Mr. Besler and Mr. Byram. Mr. Loomis declined to testify on the grounds that "he had no information that would throw any light on the workings of the rules of the national agreements." On the strength of this assertion the labor leaders waived their request for his cross-examination. At the same time they requested the summoning of Frank McManamy to appear on April 6.

At the opening of the session on April 6 Mr. McManamy and Mr. Jewell began the presentation of their direct rebuttal to the testimony presented on behalf of the carriers regarding the Shop Crafts' Agreement. Mr. Jewell's testimony was largely in commendation of the work performed by Board of Adjustment No. 2 during the period of federal control and he cited as evidence of this the fact that there was no legal strike on any railroad under federal control while this Board was in existence. When Mr. McManamy appeared Mr. Jewell permitted him to take the witness stand and he opened the examination by reading a long list of questions which were to be asked. These questions all aimed to establish facts in opposition to the carriers' stand as expressed by several witnesses, viz. that the Railroad Administration was coerced into entering into National Agreements and that the establishment of these agreements has resulted in decreases in efficiency and destruction of the morale of individual workers. Several of the questions indicated one of the employees' contentions that the uneconomical and inefficient practices brought about by the application of the National Agreements and cited by Mr. Whiter in this presentation are the result of a studied effort on the part of the railway executives who were in control of the carriers during the period of federal control. After presenting these questions Mr. McManamy was permitted to answer them without examination and in taking up the first 18 of these questions at this session his testimony throughout was in favor of employees' contentions. In general he contended that the National Agreements promoted efficiency and economy, removed unrest, reduced labor turnover and prevented competition for labor. Mr. McManamy's testimony will be covered more fully in next week's issue of the *Railway Age*.

Examination of H. E. Byram

When Mr. Byram was placed on the stand on April 5 Mr. Walsh was confronted with the same situation which has prevailed in the cross examination of all of the executives during the past two weeks. The same effort to get the witness to admit the applicability of some rules to national use was made and the same result was obtained; the reiteration that the only rules which are good rules and fair are those negotiated between the men who work under them and the men who are responsible for their proper application.

In reply to questions, Mr. Byram outlined the developments which took place in the meetings of the labor committee of the Association of Railway Executives and interpreted these developments. Following this Mr. Walsh tried to get Mr. Byram's sanction to all of the rules established by the arbitration board of six, under the Newlands

act in 1915, of which Mr. Byram was a member. These rules were adopted by ninety-eight roads west of the Mississippi river, but Mr. Byram made it clear he did not favor all of these rules, but had to agree in the arbitration.

Asked if the work day was not an important thing in industry, Mr. Byram said that it was a most important thing. "There should be an agreement on hours a man should work each day," he added, "not a rule or law."

"When you have agreed," asked Mr. Walsh, "do you think such agreements should be stated in some kind of rules?"

"I agree with that," said Mr. Byram, "but the parties who apply these rules should be the ones who made them. There is a great difference between what you mean and what you say. The great difficulty is in the application."

Before Mr. Byram took the stand, Mr. Besler was recalled. He immediately refused a request of Mr. Walsh for the notes from which he had previously read in commenting on national rules.

James M. Sheehan, counsel for the railroads, then cross-examined Mr. Besler, questioning him particularly on the rules of the National Agreement which Besler said yesterday were substantially in effect on the Central of New Jersey prior to government control.

Mr. Besler's answers were to the effect that if these rules were properly applied they were acceptable, but not as applied under interpretations placed upon them under the Railroad Administration.

B. M. Jewell Again Appeals to the President

On March 31, Mr. Jewell again appealed to the President asking him to use his influence to bring about a conference between the railway executives as they are organized nationally and the railway employees as they are organized nationally to compare the differences on all points in dispute. This request was predicated on President Harding's statement in his inaugural address when he said, "I had rather submit our industrial controversies to the conference table after conflict and suffering" and upon the employees' interpretation of the Transportation Act which "contemplates such a conference."

Reports from Washington indicate that the President will not act upon this request.

Board Denies New York Central's Petition

The Labor Board on April 7 denied the application of the New York Central for the granting of an immediate temporary decrease in wages of unskilled labor and set April 18 as the date for hearings on the justness and reasonableness of the rates of pay established by Decision No. 2. At the same time the Board set April 18 as the date upon which the hearings will be held on all of the disputes over wages so far referred to the Board or which may be referred in the meantime. The employees will be given eight hours for oral presentation and the carriers a similar period and the remainder of testimony is to be filed with the Board.

Hearings on the request of the New York Central for the authorization of a temporary decrease in the wages of its unskilled laborers were held by the Railroad Labor Board at Chicago on March 30 when Jacob Aronson, counsel for the road, presented briefly the carrier's request and data relative to the wages being paid unskilled laborers in outside industries along the New York Central. The dispute and the proposal of the road was described in the *Railway Age* of April 1, (page 846). In bringing the controversy before the Board, the New York Central asked that a temporary decrease be authorized effective on April 1, the final award of the Board to be retroactive to that date.

In outlining the reasons for this request, Mr. Aronson said:

"The policy of making awards of wage increases retroactive has heretofore been recognized. That policy has been

followed by this Board. Justification for this practice was undoubtedly that neither side should suffer or profit by the delay necessarily entailed in the deliberate consideration and determination of wage controversies. We submit that by virtue of the same logic any downward adjustment of wages should also be made retroactive. In the case of wage increases it is practicable to make the award retroactive because in such case there is only the employer to deal with, but because of the large number of employees involved it is manifestly impracticable if not impossible to make a reduction in wages retroactive merely by virtue of the ultimate award. The only feasible method by which reduction in pay can be made retroactive is by the establishment of the reduced rates provisionally upon the understanding that such establishment by the Board is without prejudice to its ultimate determination of just and reasonable wages and that the ultimate award of the Board shall be retroactive. In this way the employees are not financial losers below the basis that may be determined by the Board to be just and reasonable."

Following the presentation of this request, Mr. Aronson filed data regarding the wages being paid for unskilled labor in outside industry, the changes in the cost of living and other facts pertinent to the determination of a just and reasonable wage. In addition the following witnesses were called upon for data on the wages being paid for farm labor, Silas L. Strivings of the New York Farm Bureau Federation; Frank M. Bradley of the New York State Federation of Agriculture, and F. E. Warner of the Michigan Fruit Exchange.

B. M. Jewell, president of the Railway Employees Department of the American Federation of Labor, speaking for the employees, objected strenuously to the carrier's request, saying, "The employees waited for eighteen months, suffering under a rapidly increasing cost of living, for relief." His objections to the request were based on the grounds that rates of pay did not go up apace with the cost of living and that therefore they should not come down apace, that the present financial situation of the railroads is due to a temporary depression and that a temporary decrease is therefore unnecessary and that since freight and passenger rates were raised to meet the wage award of last July no reductions should be made in the wages of employees unless the savings therefrom be turned back to the public by lower rates.

The hearing was closed on March 30.

National Industrial Traffic League Petition Denied

On March 29 the Labor Board formally denied the petition of the National Industrial Traffic League to be made a party to the hearings on rules and working conditions now before the Board. The resolution holds that the league "is not entitled to be heard in this dispute."

"In the opinion of this Board," the decision said, "the hearing of the said petitioner as a witness would not be helpful and would not be in the public interest. If this petitioner is heard, other organizations of shippers, of which there are many, must be heard. If such organizations are to be heard, manufacturers, Chambers of Commerce, farmers, bankers, and other interests must also be heard. If these are to be heard, adverse organizations, such as labor unions and organizations whose members hold definite economic views opposed to the views of those named, must also be heard."

To this the Board objects on the ground that it would involve long delay, and adds, it is not unmindful of the public interest in the matters in dispute, "as it affects the interest of the public as well as the interests of the two parties directly concerned."

The league's answer to the Board's denial was an immediate challenge through its attorney, Luther M. Walter. He

wanted to know among other things how the three members of the Board, whose terms expire April 1, voted on the petition, in order that the league might fight reappointment of any of the three who voted against the public.

St. Louis Southwestern Case

On April 1 the St. Louis Southwestern came before the Board as a result of a resolution passed by the Board and stating that it had reason to believe that that road had violated Decision No. 2 in cutting the wages of employees in pile driver, bridge and building paint gang, house gang and tinner services on November 25. W. A. Webb, vice-president and general manager, denied the charges in toto and stated that the only modification of Decision No. 2 made by the road was made by contract with individual men. J. C. Smock, representing the employees, submitted letters and affidavits to prove that the road had violated the principle of collective bargaining as outlined in the Transportation Act and that no conferences have been held in conformity with the provisions of the Act. He charged the carrier with coercion and intimidation on the grounds that economic necessity made it necessary for the individual men to accept the contracts offered by the road for the work outlined above. The Board took the case under advisement.

Short Lines Get Postponement

The nineteen short lines which were to have appeared before the Board on April 4 and 6 have had their cases postponed until April 18 and 20. These carriers have reduced the wages of their employees without the authority of the Board and when the employees appealed to that body for redress, it advised them to accept the lower wage scales under protest until hearings could be held and a decision rendered.

The roads involved in these disputes are the Atlanta & St. Andrews Bay, Boyne City, Gaylord & Alpena, Brooklyn Eastern District Terminal, Butler County, Butte, Anaconda & Pacific, Canton Railroad, Georgia & Florida, Philadelphia, Bethlehem & New England, Waupaca-Green Bay, Tennessee, Alabama & Georgia, Alabama, Tennessee & Northern, Cornwall, De Queen & Eastern, Gulf, Texas & Western, Northampton & Bath, North Western of So. Carolina, Patapsco & Back River, South Georgia, Texas, Oklahoma & Eastern.

Many Roads File Wage Reduction Petitions

The conferences which have been held this week on many railroads between the management and the employees looking toward wage reductions have been no more successful than the conferences held previously, and it is evident that the number of cases before the Board will increase.

Among the roads which have wage reduction cases before the Board are the New York Central, the Boston & Maine, the Chicago, Indiana & Western, the Denver & Salt Lake, the Boston & Albany, the Ann Arbor, the Lehigh & New England, the Indiana Harbor Belt, the Maine Central, the Detroit & Mackinac, the Gulf, Colorado & Santa Fe, the Atchison, Topeka & Santa Fe, the New York, New Haven & Hartford, the St. Louis-San Francisco, the Pittsburgh & Lake Erie, the Gulf Coast Lines, the Buffalo, Rochester & Pittsburgh, the Toledo & Ohio Central, the Rutland, the Delaware, Lackawanna & Western, the Lehigh Valley, the Erie, the Chicago & Northwestern, and the Cleveland, Cincinnati, Chicago & St. Louis.

New York Times' Story on Lauck's Exhibits

Mr. Lauck's various exhibits mentioned above are expected to contain some rather interesting criticisms of railway management and operation, if a statement purporting to give some of the high points of what Mr. Lauck is expected to say, which appeared in the New York Times of Monday last, is any indication. The article shows that Mr. Lauck has in many cases taken his material from statements of railway

officers and other experts who have outlined acknowledged omissions in expressing their desire to remedy them, provided there were sufficient funds available to do so. The exhibits in question had not been made public up to the time of going to press. In other words, they do not form part of the testimony which had been presented to the Labor Board up to that time. The material which follows is an abstract of the story as it appears in the Times.

Mr. Lauck's evidence to support his charge that inadequacies and inefficiencies of railroad management add \$1,000,000,000 annually to the expenditures of the railroads of the United States is in the shape of an exhibit prepared by a "group of engineers." Parts of it are supported by statements of railroad executives and engineers. Technical journals, such as the *Railway Age* and *Railway Mechanical Engineer* also are quoted extensively. Some of the items of the estimated saving which efficient management might bring about, according to Mr. Lauck, are tabulated as follows:

Modernizing locomotives	\$272,500,000
Locomotive opr. firing methods.....	50,000,000
Shop organization improvements.....	17,500,000
Power plant fuel savings.....	10,000,000
Water consumption savings.....	12,600,000
Service of supply savings.....	75,000,000
Shop cost accounting savings.....	10,900,000
Labor turnover savings.....	40,000,000
Less and damage savings.....	90,000,000
Total estimated annual savings.....	\$578,500,000

Other items which will be enumerated in the exhibit as offering opportunities for additional savings include car equipment, operation and maintenance, engine terminals, permanent way improvements and maintenance, signal maintenance, train operation, research and engineering, miscellaneous overhead advertising, etc. Savings on these items, it is claimed, will bring the total well above the \$1,000,000,000 mark fixed by Mr. Lauck in his opening statement.

Twelve devices are listed in the exhibit as available for modernizing all of the present inefficient and uneconomical locomotives, and detailed figures are given to show that of the 65,000 locomotives in service only a small percentage are equipped with any of these devices. For example, the statement is made on the authority of an engineering expert that 22,000 locomotives are being operated without brick arches, which, it is asserted, could be economically installed in any roundhouse, with a reduction in fuel consumption of 10 per cent or an increase in boiler capacity of 11 per cent.

Another expert who is quoted on repair shops, says the railroads are \$140,000,000 behind in improvements which should have been made in the last ten years, and adds: "The railroads will not purchase a new outfit of lathes, but continue to use some over 50 years old, and are paying modern wages to watch those antiquated curiosities feebly fooling away their time. Meanwhile the operator is resigned to slow death. It is certainly poor reasoning to spend \$10 in labor when \$1 in tool service and \$4 in labor properly supported could have saved \$5 on the same job."

On the item of service of supply the exhibit says:

"The railroads spend over \$1,000,000,000 for supplies each year. They use nearly 50,000 different working parts and accessories. At any given time \$600,000,000 worth of supplies will be on hand, of which 40 per cent is scattered along the line. With a few outstanding exceptions, the companies are negligent in caring for these immense stocks. They have not co-ordinated their purchasing and storing functions. They do not budget requirements properly, lacking which, both purchasing and delivery are inefficiently administered. They do not care adequately for their stores; they pile them badly; they leave them without suitable shelter to rust and decay; their storehouses are poorly arranged and often poorly located; they do not properly reclaim worn out material; their stock records are seriously deficient and their accounting for stores primitive.

"The Railroad Administration has estimated that the

waste and abuse of materials amount to not less than \$75,000,000 a year, a figure which the *Railway Age* endorses."

On the subject of "miscellaneous losses" the exhibit says: "The question of operating efficiency of the railroads cannot be closed without reference at least to possible savings in various items of overhead expense. Millions are now being spent in propaganda advertising to secure the good will of the public. The same amount spent on scientific research would be many times as effective, and reduce costs into the bargain. The salaries of railroad officers are well known to be exorbitant in some cases.

"From \$12,000,000 to \$15,000,000 a year is spent for legal services. How much of this represents lobbying and special pleading? How far have the railroads burdened their expense accounts with the carrying charges of injudicious investments in non-railroad properties? How far are the great sums spent for competitive advertising and outside agencies in line with efficient service, even under private ownership? All these items need careful scrutiny from the standpoint of preventable waste."

Mr. Lauck proposes to discuss also economies that might be effected through consolidation of the railroads into a few large systems, the financing of the transportation industry on a permanent instead of a hand-to-mouth basis, with large, long term credits, and the operation of the roads on a cost of service plan. He estimates these possible economies at another billion annually, and by many illustrations points out that inadequate terminal facilities of the roads is almost entirely responsible for the large items of overtime and idle or non-productive labor costs of which the railway executives complain.

Brotherhood Leaders Confer with Securities Owners

ON APRIL 4 a committee representing the National Association of Owners of Railroad Securities, headed by S. Davies Warfield, president of the association, met in conference with the heads of the train and engine service brotherhoods, at the Hotel Astor, New York, to consider problems affecting the railroads. The conference was requested by Mr. Warfield.

The representatives of the organized employees present were Warren S. Stone, president of the Brotherhood of Locomotive Engineers; L. E. Sheppard, president of the Order of Railway Conductors; W. S. Carter, president of the Brotherhood of Locomotive Firemen and Enginemen; E. L. Cease, representing the Brotherhood of Railway Trainmen; W. H. Johnson, representing the shop crafts, and E. J. Mannion, of the Order of Railroad Telegraphers. The last two men were included in the conference at the request of Mr. Stone.

Following the announcement in the daily press that Mr. Warfield had asked for this conference with the heads of the "big four" brotherhoods, A. H. Smith, president of the New York Central, addressed a letter to Mr. Warfield stating that the board of directors of the New York Central had directed him to advise that the "board and the officers appointed by it represent the New York Central stockholders in all matters of management, including relations between the corporation and its employees." Copies of this letter were sent to the heads of the four brotherhoods. The letter follows:

The newspapers this morning print the letter dated the 30th instant addressed by you to the Brotherhood of Locomotive Engineers, the Brotherhood of Locomotive Firemen and Enginemen, the Brotherhood of Railway Trainmen, and the Order of Railway Conductors of America, in which you, as president of the Railroad Securities Owners Association, invite representatives of those brotherhoods to confer with a committee of your associa-

tion for the purpose of considering what should be done in regard to wages and other matters affecting the railroads.

The board of directors of the New York Central Railroad Company has directed me to advise your association and you, as its president, that the board and the officers appointed by it represent the New York Central and its stockholders in all matters of management, including relations between the corporation and its employees, whether those relations have to do with wages, working conditions or practices. The board further directs me to say that it regards as most unfortunate the attempt which you, and the association of which you are president, are apparently making to intervene in the present labor situation, and that it cannot recognize any right or propriety in your doing so.

Copies of this letter have been sent to the chiefs of the four brotherhoods so that they may understand that neither you nor the Security Owners Association speaks for the New York Central or the companies which it controls in asking for the conference which you propose to hold.

The representatives of the employees at the conference made plain their attitude with reference to readjustments of deficits "at their sole expense, unaccompanied by comprehensive methods that will lead to general economies." The conference was held behind closed doors and no definite decision was reached.

It is understood that further conferences will be held and that in the meantime the association will endeavor to enlist support for the national service plan proposed by Mr. Warfield which was summarized in the *Railway Age* of March 25.

The joint statement issued at the close of the meeting by Mr. Warfield and Mr. Stone follows in part:

The discussion took a wide range and covered all phases of the railroad situation, including the present difficulties involving employees' relations.

The conference did not deal in detail with wages and working conditions, the committee of the Association having stated that, as expressed in their letter suggesting the conference, it was the purpose and desire of the Association to be helpful in the situation to bring about better relations.

There was full discussion of the procedure up to date and of the viewpoint of the employees' representatives. All the conferees recognized the gravity of the situation and an earnest effort was made to approach it through a common understanding of the public interest involved. It was realized that all parties in interest, the public, the investor and the employees, can accept as satisfactory no solution which is not based upon efficiency and general economy in service. The employees' representatives made plain their attitude toward the adjustment of deficits at their sole expense, unaccompanied by comprehensive methods that will lead to general economies.

After full consideration of the position of the representatives of the employees and of the possible basis for solution of the outstanding difficulties, the representatives of the Association of Security Owners feel convinced that a solution is practicable, and through proper co-operation between all the parties in interest and the governmental agencies charged with the responsibility in these matters there should be avoided any further substantial delay in adjusting a situation that if continued is recognized by the conferees as being destructive and impossible.

The discussion was earnest and free from any suggestion that would indicate any fundamental impasse, and it was distinctly recognized by the participants that differences in economic theories have no immediate bearing on the existing emergency and should not prevent its immediate consideration on the merits, and that questions of procedure should not be permitted to intensify the extreme peril now confronting American transportation.

With a thorough understanding of the views of the representatives of the railway employees the representatives of the security holders expressed the opinion that suggestions should be promptly developed that would make possible a tangible and constructive result.

An additional bulletin said:

After the meeting the members of the committee of the Security Owners Association expressed themselves as well pleased with the co-operative spirit shown by the other parties to the conference. Those representing the various organizations of labor said that they were greatly pleased with the manner in which they were approached by those representing the great investments in railroad properties.

All through the proceedings there was a decided recognition shown of the purposes of those concerned in the conference to assist in meeting the situation.

The Container Car Applied to L. C. L. Freight Handling

THE CONTAINER SYSTEM of rail and motor truck transportation as applied to express matter was described in the *Railway Age* for February 4, page 315. A similar system applied to L.C.L. freight has now been put into opera-



The type of equipment used for this service is shown in the illustrations of the complete car and the individual container. The car itself resembles a low side gondola, the only novel features being the guide at the side for holding the containers in place and the transverse steel plates extending across the car which are designed to prevent the doors being opened in case the car is not carrying its full complement of containers. Each of the three compartments of the car is capable of holding one large or two small containers, thus permitting various combinations of the two sizes. The large containers are 14 ft. long and have a capacity of 7,000 lb. while the small containers are 7 ft. long and hold 3,500 lb. The body of the container is of wood with a steel frame. At the four corners pressed steel guides are provided which engage with the members on the car body to hold the container in place. The roof is of steel and the doors of heavy wooden construction, fitted with refrigerator car door fixtures. Hooks are provided at the upper corners for lifting the containers with cranes.

The container system as applied to the transportation of less than carload lots of freight has the same advantages that are realized in express service. The labor of checking and handling at intermediate stations is eliminated; injury to the goods in transit will be negligible and theft will be done away with entirely. Increased utilization of the cars will also be secured due to the speed with which a load of containers can be removed or loaded. From the viewpoint of the shipper, the container system has important advantages in handling L.C.L. shipments. The individual packages may be stowed in the containers with cardboard or even paper wrappings as it is only necessary to protect them from the weight of the load within the container itself. There is no possibility of damage due to heavy shipments shifting

One of the Large Containers Loaded on a Motor Truck

tion on the New York Central between Chicago and Cleveland, Ohio, and is being extended to include other cities.



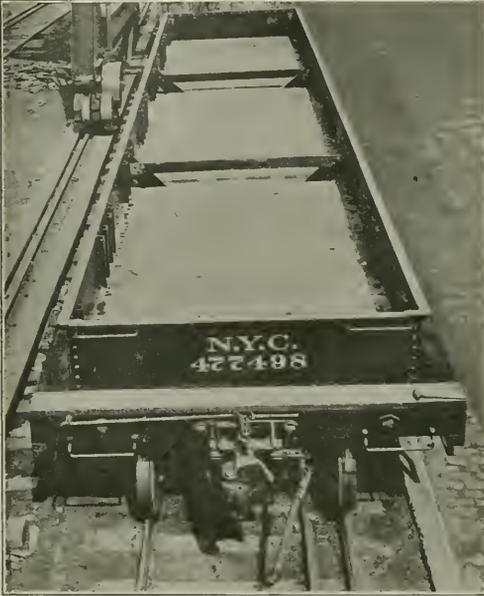
Car Loaded with Two Small and Two Large Freight Containers

against fragile materials and it is not necessary to provide costly wooden boxes or crates.

The container car for freight service was built by the Merchants Dispatch Transportation Company, East Rochester, N. Y., under the supervision of the New York

tory at Rockaway, N. J., where this industry is expending \$50,000 annually in experimental work. The director of this laboratory was formerly chief of the box testing section of the United States Forest Products Laboratory at Madison, Wis., and the work is conducted according to the established standards and practices for this form of investigation while the facilities of the laboratory include the revolving drum, compression and drop test.

One of the prime objects of the laboratory experimentation has been to provide the necessary data for the correct design and construction of the various forms of boxes and crates and with a view to this end the association has issued complete standard specifications for the design and construction of containers for a great variety of commodities. Another important result has been to demonstrate the necessity for the proper packing and closing of boxes constructed according to approved designs, and the association has directed much of its activities in educational propaganda to this end. The prime element in the strength of this particular type of box lies in the bands of wire which surround the package and resist the bursting stresses which result from almost any distortion accompanying severe usage. However, to be thor-



Car Arranged for Carrying the L. C. L. Freight Containers

Central. Plans are now being made for the handling of mail shipments between New York and Chicago in container cars of the express type, previously described.

How Box Manufacturers Aid Claim Prevention

THE DRAIN ON RAILWAY EARNINGS resulting from freight claims not only is a menace to the solvency of the carriers but it also constitutes a reflection on the effectiveness of private management which the railroads must exert every effort to overcome. So serious is the problem that it behooves them to take advantage of any agency designed to further this end. For this reason railway officers should be interested in the efforts being made by one group of box manufacturers to promote better packing and crating as a part of a campaign for the sale of a particular type of containers to the shippers.

This organization, the Four-One Box Makers' Association, Chicago, comprises a group of manufacturers in all parts of the country licensed to make boxes and crates embodying the use of a patented construction, whereby a wooden frame, veneer sheathing and wire bands are used jointly to make a container of unusual strength. But this original invention covers only the basic idea. The extension of this principle to the construction of boxes and crates for a wide variety of commodities and various classes of service has led to intensive scientific investigation to determine just how this principle should be applied to obtain the desired results with each requirement. This work is being carried on at a labora-



Using a Twister to Close and Seal a "Four-One" Box

oughly effective these bands of wire must be properly united in closing the box and the association has taken particular pains to call this to the attention of the shippers. To insure the proper twisting of the wires, two forms of wire twisters are recommended, either of which will perform this operation quickly and thoroughly.

One particular value of providing a neat, secure twist of the wires lies in the fact that it makes the package practically proof against concealed pilfering, since the package cannot be opened without breaking unless the wires are untwisted and it is next to impossible to refasten the wires without breaking them. Herein lies the opportunity for the railroads to co-operate in reducing loss and damage. Since security against breakage of the package in handling or tampering depends upon the wires being properly twisted, it is to the interest of the roads to insure that the boxes or crates have been properly closed when they are delivered at the freight house and also that the wires are examined whenever the packages are rehandled en route.

General News Department

The Western Railway Club at its meeting on April 18 will listen to a paper on Locomotive Terminal and Motive Power Management by L. G. Plant, associate editor of the Railway Review.

H. C. Chase, superintendent of telegraph of the Atchison, Topeka & Santa Fe, will present a paper on "Railroad Electrical Communication" before the Western Society of Engineers, Chicago, on April 21.

The Illinois Manufacturers' Association, on April 1, made a direct appeal to President Harding to reorganize the United States Railroad Labor Board in order that the public might be given hearings before that body. The Association had been denied by the Railroad Labor Board the opportunity of presenting the views of shippers on the question of national agreements and wages.

Thirty-three persons killed and as many more injured, was the total of casualties in a collision reported in press dispatches of April 4, as occurring between a freight and a passenger train on the Mexican National. The collision occurred at Villa Garta, between Parradon and Monterey. Fifteen were reported seriously injured in a derailment, on March 28, between Chihuahua City and Torreon, where a coach and a sleeping car were overturned.

New York Railroad Club Meeting

"Conditions on Foreign Railways" will be discussed at the meeting of the New York Railroad Club on Friday evening, April 15, at the Engineering Societies Building at 8 o'clock. The discussion will be opened by David Van Alstyne, of the American Locomotive Company, who recently returned from a seventeen months' trip around the world.

Signal Section—A. R. A.

The annual meeting of the Signal Section, American Railway Association, is to be held this year in the month of June, in accordance with the vote of the association following the action taken at the meeting held in New York City last December; and it is to be held at Hotel Drake, Chicago, on Monday, Tuesday and Wednesday, the 6th, 7th and 8th.

Another Deficit in February

Preliminary compilations of the returns of the railroads to the Interstate Commerce Commission are making a worse showing than that for January. For 195 roads, operating 229,000 miles, there was a net deficit of \$7,601,000 as compared with a deficit of \$14,509,000 for the same roads in 1920. The total operating revenues were \$396,000,000, a decrease of 4.7 per cent, and total operating expenses were \$376,000,000, a decrease of 7.3 per cent. The railroads of the Eastern district had a deficit of nearly \$10,000,000. The Southern roads earned net \$357,000 and the Western district had a deficit of nearly \$2,000,000. The returns indicate that most of the decrease in earnings was attributable to the falling off of freight traffic. Passenger revenues show an increase.

Will Reduce Passenger Fares

The Alabama, Tennessee & Northern desires the Alabama Public Service Commission to authorize a reduction of 20 per cent in passenger fares, this being the amount of increase that was granted under the Transportation Act of 1920, last August. President John T. Cochrane in making this announcement says that the surest way to get back to pre-war conditions, and revive business, is for every one to do his part. All railroads need all the revenue they can get; and while, in the main, the advanced rates

are a just charge and must necessarily be maintained to keep the railroads going, the increase has in some instances acted as an embargo on business. However, the A. T. & N. is a producing line, and nearly all of its freight business is handled in connection with other lines; and until the railroads in general are able to bring about material reductions in their expenses, no rates can be lowered. But this does not apply to passenger fares on the A. T. & N., and the company therefore has determined to do its part by making a start toward final adjustment.

Manager of Department of

Transportation and Communication

James R. Bibbins, has resigned as supervising engineer of The Arnold Company, Chicago, to become manager of the Department of Transportation and Communication of the United States Chamber of Commerce at Washington, D. C., on April 1. He was



J. R. Bibbins

ber of Commerce at Washington, D. C., on April 1. He was educated at Baltimore City College and the University of Michigan. After spending some time with the electric and railway utilities of Detroit, Mich., he entered the service of the Westinghouse Company, in whose employ he was promoted to commercial engineer. In this capacity he was engaged in economic research in the field of steam and gas power development. In 1909, Mr. Bibbins became associated with The Arnold Company at Chicago, and since that time has been

in charge of numerous technical investigations and reports undertaken for state, municipal and other public bodies, and for various corporations. The activities of the Department of Transportation and Communication include shipping, both ocean and on inland waterways; steam and electric railroad transportation; air transportation; cables and telegraphs; postal facilities, and highways.

Air Brake Tests

On March 26 there was operated over the Radford division of the Norfolk & Western from Bluefield, W. Va., to Roanoke, Va., a train of seventy 100-ton cars equipped with the Automatic Straight Air brake. The total weight of the train, exclusive of the locomotive, was 9,148 tons, which is the heaviest tonnage ever handled down this particular division which contains grades of 1.6 per cent. The demonstration of the action of the brake on these heavy grades formed the conclusion of a series of tests of the new type of brake equipment as applied to the Norfolk & Western cars and was witnessed by a large number of representatives of railroads from all parts of the country.

For the purpose of making the test, the equipment was assembled in the yard at Bluefield. Here contact gages were attached to the first, twenty-seventh, fifty-third and seventieth cars and wires were run to the dynamometer car at the head end to give a record of the time elapsing between the development or release of the pressure for which the gages were set. Electric recording devices in the dynamometer car gave a continuous record of the position of the engineer's brake valve. Trainographs recording the pressures in the train pipe, auxiliary reservoir and

brake cylinder were applied on the first, fifteenth, forty-fifth, fifty-seventh, sixtieth and seventieth cars.

A series of standing tests was also made in the Bluefield yard on March 24 and 25. These were intended to develop the rate of serial action, rate of build-up in brake cylinder pressure and the operation of the various functions of the brake. During the course of the tests, service and emergency applications were made with all valves set first in quick release position, and later in graduated release. The results of these tests were registered on a chart in the dynamometer car and are not available at this time.

So many factors enter into a test of this sort and the records which were taken were so extensive and voluminous that it is obviously out of the question to publish any satisfactory report of the test at this time; we shall defer further comment until the official report from the railway is available.

Storekeepers' Annual Meeting

The Division of Purchases and Stores of the American Railway Association (Division VI) will hold a convention in Chicago, at the Hotel Blackstone, on Thursday, Friday and Saturday, June 9, 10 and 11.

General Secretary J. E. Fairbanks has issued a circular which says that the general committee of this Division, because of the financial stress and serious business conditions, has determined that it is necessary to defer the annual convention scheduled for Atlantic City. The Chicago meeting will be strictly for business. The sessions will convene at 10 a. m., city time. The general committee and standing committees will be in attendance. Members are requested to have such representatives of their supply departments attend as can conveniently do so. The meeting will consider Committee reports which are ready and will formulate a constructive plan for the future activities of the Division. The endeavor of the meeting will be to handle such subjects as will produce economy in the operations of the supply departments of the railroads.

Arrangements will be made to exhibit a series of motion pictures illustrative of the reclamation work on our railroads.

International Railway Association—Ninth Congress

The program for the ninth congress of the International Railway Association, which is to be held in Rome, Italy, from April 18 to May 1, 1922, was given in the *Railway Age* of June 18, 1920, page 1925, including the names of the "reporters" who are preparing papers, so far as these names could be given at that time.

From a list published in the Bulletin of the Association, for March, we are able to give the names which were left blank in the earlier announcement. The number of reporters from America altogether is thirteen. The additional names now announced, with subjects, are:

- Construction of Roadbed and Track, C. H. Ewing (P. & R.).
- Maintenance and Supervision of Track, Earl Stimson (B. & O.) and G. Barbieri, Italian State Railways.
- Special Steels, W. C. Cushing (Penn.).
- Passenger Cars, W. J. Tollerton (C. R. I. & P.).
- Electric Traction, A. D. Donati, Italian State Railways.
- Operation; Passenger Terminals, A. S. Baldwin (I. C.) and L. MacCallini, Italian State Railways.
- Freight Stations, E. Ehrenfreund, Italian State Railways.
- Slow-freight Traffic, W. H. Williams (D. & H.) and V. U. Lamalle, Belgian State Railways.
- Locomotive Cab Signals, F. Villa, Italian State Railways (for all countries except France).
- Calculation of Costs of Passenger Service and Freight Service; an officer of the Northern Pacific.
- Interchange of Rolling Stock, C. W. Crawford, chairman of the General Committee of Division II (Transportation) American Railway Association.

Workmen's Dwellings, F. Lolli, Italian State Railways.

Types of Cars, Passenger and Freight, for Light Railways; C. Gaviraghi, Upper Valteline Railway, Tirano, Italy.

Mr. Weissenbruch, general secretary of the permanent commission of the association will make a special report on the wording of the statutes and the regulations of the association; and Sir Henry Fowler, Midland Railway of England, will present a discussion of the use of liquid fuel in locomotives.

Traffic News

The Transportation Club of Buffalo, N. Y., at its election for 1921, chose Kendall B. Hassard as president; J. M. Sells, first vice-president; Godfrey Morgan, second vice-president and Redmond J. Walsh, secretary.

The National Lumber Manufacturers, at the closing session of their convention at Chicago, on April 1, adopted a resolution requesting that the Interstate Commerce Commission and the railroads be asked to suspend for 60 days, in the interest of new building, the latest freight rate advances on lumber.

The Peninsular Railway, operating between San Jose, Cal., and other towns in Santa Clara county, has been authorized by the Railroad Commission of California to discontinue the handling of freight in less than carload lots. Since 1916, inroads by auto truck lines upon the freight business of the company have resulted in a decrease of 83 per cent in the tonnage handled. Gross revenue has fallen off approximately 60 per cent and is still declining, according to the testimony of the company. The company will continue to move freight in carload lots.

Dock operators from the Northwest and mine operators from every district in the eastern soft coal fields, at a conference held at Cleveland, Ohio, on April 1, framed an appeal to the presidents of eight eastern railroads for readjustment of freight rates on coal to lower lake ports, in order to stimulate the movement of bituminous coal to the northwest. A difference of 58 cents a ton, as compared with the Illinois field, is given as the dominant reason why the shipment of coal from the eastern field to the northwest has been practically suspended.

Survey of Present Coal Stocks

The Geological Survey has undertaken a survey of the stocks of coal in the hands of consumers on April 1, the opening of the new coal year, for the purpose of a report to the Secretary of the Interior along the lines of the one made a year ago. It will cover public utilities, railroads, industrials and retail dealers. Production is down to the lowest point since April, 1914, and exact information is desired as to whether the consumption has fallen off or whether consumers are holding off buying and burning up their stocks as they did in 1919.

Production of soft coal continued to decline during the week ended March 26, according to the Geological Survey bulletin. The total output, including lignite and coal coked, is estimated at 6,412,000 net tons as against 6,506,000 during the week preceding.

President Willard, of the Baltimore & Ohio, has called on Judge McGee, formerly fuel administrator of Minnesota, for suggestions looking toward prevention this year of a repetition of last year's difficulties in supplying the fuel requirements of the Northwest. In a letter Mr. Willard, referring to the last half of 1920, said:

"I am very much afraid that we may have the same condition again unless steps are taken by those in authority or with influence to prevent such a recurrence.

"There is no doubt at all that the railroads of this country are quite able to carry within 12 months all the coal that can possibly be consumed in this country, or put over our tidewater docks for export, provided only the movement is somewhat uniform throughout the period, and I am just as certain that they cannot satisfactorily meet the transportation requirements in connection with the fuel program if the shipments are concentrated too greatly within a too limited period. * * * There are in the United States today more than 400,000 idle freight cars, and considerably over 100,000 of the number are open-top cars suitable for the movement of coal.

"There seems to be a growing fear that the movement of coal to the Northwest by lake will be again postponed or delayed, resulting in a condition later in the season similar to the one which existed a year ago; in which event shippers in other regions would very strongly oppose and resist any arrangement intended to give preference to the Northwest to the detriment of other regions."

Commission and Court News

Interstate Commerce Commission

The Commission has further suspended until May 19 the operation of certain schedules which provide for the cancellation of the commodity rates on mixed shipments of lithopone and zinc oxide.

The Commission has suspended until July 30, the operation of certain schedules which propose to increase the existing rates on grain and grain products from Missouri River points to points in Illinois.

The Commission has further suspended until May 28 the operation of a Cincinnati, New Orleans & Texas Pacific tariff providing for increased class and commodity rates between Ohio River crossings, etc., and Cumberland River landings.

The Commission has suspended from April 15 to August 13 the operation of a supplement to an Atchison, Topeka & Santa Fe tariff proposing to increase loading and unloading charges on live stock at stock yards at Fort Worth and Oklahoma City.

The Commission has further suspended until May 14, the operation of certain schedules which provide for the cancellation of rates on cement from points in Missouri and Kansas to Garfield, Avoca, Bentonville and other places on the St. Louis-San Francisco.

The commission has suspended from April 1 to July 30 the operation of certain schedules which propose to increase from 19 cents to 25 cents per 100 pounds the carload commodity rate on lumber from Memphis to Chattanooga, Tenn., and points taking same rates.

The Commission has further suspended until May 7 the operation of certain schedules shown in F. A. Leland's tariff, I. C. C. No. 1289 applicable on manufactured iron and steel articles carloads from Houston and Galveston, Texas, and intermediate points to destinations in Louisiana.

The Commission has suspended from April 1 to July 30, the operation of a proposed reduction from 60,000 lb. to 33,000 lb. in the carload minimum weight in connection with commodity rates on sugar from points in Colorado, Idaho, Kansas, Nebraska and Utah to destinations in Arkansas, Colorado, Iowa, Kansas, Louisiana, Missouri, Nebraska, New Mexico and Oklahoma.

The Commission has further suspended until May 10 the operation of certain schedules which provide increased class and commodity rates, the cancellation of commodity rates, errors in minimum weights, reference to tariffs for future rates, indices of station numbers and commodities, resulting in the application of erroneous rates, the operation of which was suspended until April 10.

The Commission has suspended from May 1 until August 29, the operation of a supplement to a Southern Pacific Atlantic Steamship Lines tariff, providing increased class and commodity rates from New York, N. Y., and points in Atlantic seaboard territory, to points in Louisiana and Mississippi purported to be established in conformity with order of the Commission in the Murfreesboro case.

The Commission has suspended from May 1 until August 29, 1921, the operation of a supplement to a Clyde Steamship Company tariff proposing changes in class and commodity rates from Eastern points to destinations in Mississippi, Alabama and Florida, via the Mallory Steamship Company through the Port of Mobile, Ala., and rail connections beyond, constructed on basis of established differentials under the rates applicable through the South Atlantic Ports, the latter being now under suspension in Investigation and Suspension Docket No. 1303.

The Commission has further suspended until May 14 the operation of certain schedules providing class and commodity rates, purporting to be established in conformity with order of the

Commission in Docket No. 9190, 55 I. C. C., 648, from Ohio and Mississippi river crossings and related points to Nashville and other points generally in southeastern territory, and from Chattanooga, Tenn., Montgomery and Birmingham, Ala., and other points generally in southeastern territory, to Nashville, Tenn., Ohio and Mississippi river crossings and points related thereto, the operation of which was suspended to April 14 by an order previously entered.

The Commission has suspended from April 6 until August 4 the operation of schedules providing that where no through published rates are in effect from point of origin to final destination, the proportional rates on petroleum and petroleum products will apply without deduction in constructing combination rates on all shipments originating beyond or destined beyond the points from or to which the proportional rates are applicable, whereas at present, rates 2½ cents less than rates published in tariff are applicable on shipments originating at points north of the Ohio river or west of the Mississippi river or in the state of West Virginia from which no through rates are in effect.

The Interstate Commerce Commission has rendered a decision finding the rates on coal from the head of the lakes to various points in the states of Minnesota, North Dakota and South Dakota unreasonable and unduly prejudicial and has prescribed a distance scale of rates which it declares will be reasonable for the future. The case results largely from discriminations involving the application of state rates put into effect by state authorities, as a result of which some of the roads published separate lines of rates applicable respectively to interstate and intrastate traffic. The commission's order in many cases will result in increases in rates held down by the state rates.

The Commission has suspended until July 30 the operation of certain proposed changes in the application of proportional rates on lumber and other forest products from Minneapolis, St. Paul, Minnesota Transfer, Cologne and Hills, Minn., Sioux Falls, S. D., and Council Bluffs and Sioux City, Iowa, on traffic originating west of the Montana-Dakota state line to points in C. F. A. and Western Trunk line territories. This proposed change would cancel the provision requiring surrender of inbound freight bills in order to secure the benefit of proportional rates outbound. On shipments stored at points named and subsequently reshipped the rate to apply would be that in force at date of reshipment.

Changes in State Rates Allowed

The Interstate Commerce Commission has found a method to prevent some of the so-called "freezing" of intrastate rates, as a result of its orders ordering the railroads to increase intrastate rates by the amount of the increases applied to interstate traffic, by issuing supplemental orders in the various state rate cases providing as follows:

"It is further ordered, That nothing in this order shall be construed as requiring any common carrier to establish or maintain any rate or charge for the transportation of passengers or property in intrastate commerce which is greater than its corresponding charge applicable to transportation in interstate commerce from, to, or at the same points in effect on March 8, 1921, or greater than its corresponding charge contemporaneously in effect and applicable to interstate commerce."

One of the principal arguments made by the state commissions is that the federal commission's orders in the state cases were effective until further notice and this they claimed made it impossible to change a local rate without appeal to the Interstate Commerce Commission. The supplemental orders will relieve one source of difficulty in this respect.

State Commissions

The Public Service Commission of Alabama announces that any citizen of the State may have his freight bills audited and checked by the commission and, if overcharges are shown, the commission will order the railroad or express company to refund the amount and to pay the costs of auditing the account. This service is authorized by special statute and the announcement virtually makes the commission a "traffic bureau" for the whole State.

Foreign Railway News

England's Exports of Railway Material

According to the Board of Trade returns, the exports of railway material for the month of January, 1921, were as follows:

	January 1921	January 1920
Locomotives	\$2,189,712	\$1,304,588
Rails	1,819,548	787,812
Passenger cars	425,772	625,488
Tires and axles	626,460	489,332
Wheels and axles	996,456	669,788
Chairs and metal ties	811,612	63,776
Miscellaneous track material.....	902,588	742,808
Total track material	5,513,572	2,403,720

The weight of the rails exported was 17,953 tons as against 6,707 tons for January, 1920. The value of the exports shown above is converted to dollars and the prevailing rate of exchange.

January Exports of Track Materials

During the month of January 4,630,222 lb. of track spikes, valued at \$251,926, were exported. There were also 59,739 tons of rails, valued at \$3,906,441, and switches, frogs, splice bars, etc., valued at \$1,161,126, shipped from American ports. These totals all show a marked improvement over similar totals for December. Cuba received more of this equipment than any other country. The detailed figures by countries, as compiled by the Bureau of Foreign and Domestic Commerce, are as follows:

	Spikes		Steel rails		Switches, frogs, splice bars, etc.
	Pounds	Dollars	Tons	Dollars	
Azores and Madeira Is.			12	\$702	\$15
Belgium			1,103	73,801	26,788
Denmark			153	9,383	
Finland	13,200	\$836	275	19,323	5,274
France			365	16,401	
Germany			38	2,837	
Italy			30	2,457	
Malta, Gozo and Cyprus Is.			549	38,043	
Netherlands	10,500	269	358	24,367	18,518
Norway			162	9,266	942
Norway	1,500	10	1,379	92,021	18,944
Roumania	9,200	409	852	59,253	8,968
Sweden	2,000	92	500	39,608	6,317
England			995	64,967	40,175
Scotland			188	11,802	4,332
Ireland	420	15			
British Honduras	75,067	3,841	3,189	176,529	20,039
Canada					2,174
Costa Rica			57	3,088	10,727
Guatemala	91,200	4,091	1,056	69,829	12,601
Honduras	80,000	3,615			10,752
Nicaragua	4,000	243			3,936
Panama	318,864	15,381	745	48,858	35,369
Mexico					5,048
Newfoundland and Labrador	14,800	539	180	13,633	11,700
Jamaica	17,300	1,362	109	7,775	557
Trinidad and Tobago	3,590	297	30	2,501	
Other British West Indies	500	76			186,484
Virgin Is. of U. S.	1,456,851	64,414	8,539	536,296	357
Dutch West Indies	200	15			120
French West Indies	11,780	1,251			75
Haiti					59,438
Dominican Republic	122,248	5,370	2,399	160,473	123,818
Argentina	89,828	6,256	3,375	229,456	35,733
Brazil	568,066	27,192	9,707	664,333	36,528
Chile	195,831	4,485	1,576	99,067	33,710
Colombia	46,710	2,907	1,774	118,171	1,170
Ecuador	49,630	2,613	24	2,600	44,667
British Guiana			212	12,176	2,190
Paraguay	146,700	7,980	467	31,654	25,924
Uruguay			265	15,369	2,924
Venezuela	3,724	240	253	15,369	35,733
China	18,270	765	5,715	149,538	17,704
Kwantung leased territory					40,017
British India	7,600	627	717	45,821	10,550
Straits Settlements			99	6,268	308
Other British East Indies			24	1,871	104
Dutch East Indies	997,461	75,843	4,430	321,350	64,331
Japan	148,560	10,457	4,596	288,653	144,983
Siam			1,089	74,896	346
Australia					248
New Zealand			380	25,249	854
Philippine Islands	148,000	7,775	677	45,800	38,183
British South Africa			173	11,467	3,945
Portuguese Africa	67,982	2,560	1,367	76,961	60,964
Total	4,630,222	\$251,926	59,739	\$3,906,441	\$1,161,126

Equipment and Supplies

Car Deliveries in February

The number of freight cars delivered in February by the 25 car building companies reporting to the Railway Car Manufacturers' Association, totaled 6,276 for domestic service and 500 for export. The passenger cars delivered totaled 50 for domestic service and 14 for foreign service. On February 28 the companies had on hand undelivered orders for 26,685 freight and 750 passenger cars for domestic service and 3,225 freight and 28 passenger cars for export.

The figures for the month are as follows:

New Cars Delivered			
	Domestic	Foreign	
Freight	6,276	500	
Passenger	50	14	
On Order and Undelivered			
Freight	26,685	3,225	Total
Passenger	750	28	29,910
			778
Car Repairs			
Delivered—February			4,499
On order and undelivered February 28			18,303

Locomotives

The PEKIN-MUKDEN has ordered 19 locomotives from English builders.

The F. C. DEL SUR, of Colombia (South America), has ordered 2, 2-6-6-2 type locomotives from the Baldwin Locomotive Works.

The F. C. DEL NORTE, of Colombia (South America), has ordered 2, 2-6-0 type locomotives from the Baldwin Locomotive works.

The LAURENTIDE COMPANY, Ltd., Grande Mer, Quebec, has ordered 1, 2-6-2 type locomotive from the Montreal Locomotive Works.

The ATCHISON, TOPEKA & SANTA FE, reported in the *Railway Age* of March 4, as inquiring for 10 Pacific, 15 Mikado, 15 Mountain and 10 Santa Fe type locomotives, has ordered this equipment from the Baldwin Locomotive Works.

Freight Cars

The NEW YORK, ONTARIO & WESTERN is inquiring for 12 to 15 caboose cars.

The GREAT NORTHERN is inquiring for 500 60-ton refrigerator cars, 40 ft. in length, with wooden underframe, metal draft arms and steel roof.

The UNITED FRUIT COMPANY, New York, reported in the *Railway Age* of March 18 as inquiring for 50 all steel ballast cars for the Praxillo Railroad, Honduras, has ordered this equipment from the Magor Car Company.

Passenger Cars

The SOUTH AFRICAN RAILWAYS are inquiring through the car builders for 26 first class and 26 third class electric motor coaches.

The NEW YORK, NEW HAVEN & HARTFORD, reported in the *Railway Age* of October 15, 1920, as inquiring for 8 steel motor cars and 14 trailer cars, has ordered this equipment from the Standard Steel Car Company.

Iron and Steel

The DELAWARE, LACKAWANNA & WESTERN has ordered 390 tons of fabricated bridge material from the Shoemaker & Satterthwait Bridge Company.

The PEKIN-MUKDEN has ordered 12,000 tons of rails from English manufacturers.

The SOUTH MANCHURIAN RAILWAY Company has ordered 10,000 tons of rails from the United States Steel Products Company. The rails will be rolled in the works of the Tennessee Coal & Iron Company.

Machinery and Tools

THE FLORIDA EAST COAST has bought a 150-ton wrecking crane mounted on 6-wheel trucks, from the Industrial Works, Bay City, Mich.

Miscellaneous

THE DELAWARE, LACKAWANNA & WESTERN is asking for bids until noon April 11, for a type 0 turntable center.

THE NEW YORK, SUSQUEHANNA & WESTERN is asking for bids until 12 o'clock noon, April 14, 1921, for 77,100 gross tons anthracite coal for use during the period ending April 1, 1922.

THE NEW YORK CENTRAL and subsidiary lines are asking for bids until 12 o'clock noon, April 19, for the requirements of said companies for one year commencing April 1, 1921, of incandescent lamp bulbs, aggregating in excess of \$300,000 in new value.

THE ERIE RAILROAD is asking for separate bids until 12 o'clock noon, April 14, 1921, for from 1,000,000 to 1,200,000 net tons bituminous coal; also for from 150,000 to 200,000 net tons of bituminous coal and for 138,600 gross tons anthracite coal, all for use during the period ending April 1, 1922.

Signaling

ATCHISON, TOPEKA & SANTA FE.—This company will install automatic block signals between Las Vegas and Sands, N. M., a distance of 33 miles, at a cost of \$150,000.

THE RICHMOND, FREDERICKSBURG & POTOMAC has awarded a contract to the Union Switch & Signal Company, Swissvale, Pa., for the installation of an electro-pneumatic interlocking plant at Seminary, Va., to use alternating current for both track circuits and functional control. The machine will have a 39-lever frame and a spotlight track model.

Railway Construction

AMERICAN NIAGARA RAILROAD CORPORATION.—This company, which was recently incorporated, proposes to build a line from the New York Central near its junction with the Lehigh Valley at Tonawanda, N. Y., to connect with the proposed railroad and bridge of the Canadian Niagara Bridge Company which has been organized under an act of the Canadian Parliament.

CHICAGO UNION STATION.—This company, which was announced in the *Railway Age* of April 1 (page 864), as accepting bids for the construction of a new railway mail terminal, Chicago, will close bids for this work on Monday, April 11. The company will shortly accept bids for the construction of a viaduct on Harrison street between Canal street and the Chicago River, Chicago.

GRAND TRUNK.—This company contemplates improving its yard facilities at Pontiac, Mich.

TEXAS & PACIFIC.—This company, in co-operation with the International & Great Northern, will construct a new union station at Logview, Tex., in accordance with a recent order of the Texas State Commission.

A RECENT REPORT of Commercial Attaché Cunningham, of Madrid, on the exportation of automobiles from Spain shows that during the year 1919 the exportations amounted to 58, as compared with 26 in the previous year. During 1915, 1916, and 1917 the exportations amounted to 42, 29, and 43, respectively. Ceuta and Cuba are the chief destinations of the exports.—*Commerce Reports*.

Supply Trade News

W. H. Holdorf has been appointed railroad representative of the Western Electric Company, with headquarters at St. Paul, Minn., succeeding A. L. Frankenberger.

The General Railway Signal Company, Rochester, N. Y., will, on May 1, remove its New York office from 30 Church street to the Canadian Pacific building, 342 Madison avenue.

H. C. Brown, assistant general sales manager of the Chicago Bridge & Iron Company, with headquarters at Chicago, has been transferred to the New York City office of the company, effective March 15.

The Standard Paint Company on April 1 changed its corporate title to the Ruberoid Company. There will be no change in the management or policy of the company, whose general offices will remain at 95 Madison avenue, New York.

William H. Bassett has been appointed special railroad representative in charge of railroad sales and development work of the Elliott-Fisher Company, Harrisburg, Pa. Mr. Bassett has been engaged during the past 15 years in accounting organization work and in mechanical accounting sales and organization work. He became associated with the Delaware, Lackawanna & Western in 1909 in the accounting department and during a period of six years made an intensive study of railroad accounting and statistical problems, particularly as to the mechanical accounting devices best suited to the requirements of general offices and freight stations. Some large installations of mechanical equipment were evolved and carried to a successful conclusion under his direct supervision, with resultant economies and increased efficiency. In April, 1915, Mr. Bassett went to the Powers Accounting Machine Company, New York, as metropolitan district manager. He later became assistant general manager, and for the past two years has been general sales manager, which position he resigned April 1 to become special railroad representative of the Elliott-Fisher Company.

Charles M. Chamberlin, secretary and director of A. M. Castle & Co., Chicago, for the past 20 years, retired from all active business associations on April 1. Fred C. Conners has been elected a director and secretary to succeed Mr. Chamberlin.

The Pressed Steel Car Company, Pittsburgh, Pa., will remove its New York City office on May 1, from 24 Broad street, to the Seaboard National Bank building, corner of Broad and Beaver streets. The stockholders of this company at a recent meeting ratified an increase of capitalization from \$25,000,000 to \$50,000,000.

Wallace W. Glosser, of the Maintenance Equipment Company, Chicago, has been appointed district sales manager of the Verona Tool Works, with headquarters at New York City, effective April 1. W. C. Dawkins, who has been associated with the Verona Tool Works for some time, has been appointed assistant district sales manager at New York.



W. H. Bassett

Robert B. M. Wilson, sales engineer in the Indiana district for the **Conveyors Corporation of America**, Chicago, has been appointed sales engineer of the Chicago district and **E. W. Wolfe**, who has been for several years with the company in a sales capacity, becomes an assistant to Mr. Wilson, with headquarters in the corporation's main office at 326 West Madison street.

A. P. Van Schaick has been appointed general manager of sales of the **Page Steel and Wire Company**, New York, succeeding **E. C. Sattley**, resigned. **W. T. Kyle** has been appointed assistant general manager of sales. The headquarters of both Mr. Van Schaick and Mr. Kyle will be at the Grand Central Terminal, New York. The appointments were effective March 31.

A. E. Lee, general freight agent on the Chicago & Alton, has been appointed general sales manager for the **Union Fuel Company**, with headquarters at Chicago, and **George W. Hatch**, general sales manager, with headquarters at Springfield, Ill. The Chicago offices of the company have been moved to 123 W. Madison street, while the Springfield offices are in the Reich building.

Ralph G. Coburn, president of the Stone Franklin Company, New York, has been elected also a vice-president of the **Elvin Mechanical Stoker Company** with headquarters at 50 Church street, New York, and **E. W. Englebright**, who became associated with the Elvin Mechanical Stoker Company in December, 1920, has also been elected a vice-president of that company. Mr. Coburn was born in Boston in 1882 and was graduated from Harvard in 1904. He then served, until 1909, with the American Glue Company in charge of its western territory, with headquarters at Des Moines, Iowa, and Chicago. On May 1, 1909, he opened the Chicago office of the Franklin Railway Supply Company as resident sales manager and in June, 1911, was appointed assistant to the vice-president in charge of eastern-southern territory, with headquarters at New York. In December, 1913, he was appointed eastern sales manager of the same company. In May, 1919, the Stone Franklin Company, New York, was organized to market the Stone Franklin car lighting system in the United States and Canada and Mr. Coburn was elected president of the new company, which position he still retains in addition to his new duties as vice-president of the Elvin Mechanical Stoker Company.



R. G. Coburn

William T. Lane, district manager of the Pacific Coast territory of the **Franklin Railway Supply Company, Inc.**, New York, has been transferred from San Francisco to Cleveland, Ohio, as district manager of the Cleveland territory, and **James McLaughlin**, assistant to the vice-president at Chicago, has been transferred to San Francisco as district manager of the Pacific Coast territory to succeed Mr. Lane.

Haskell & Barker Car Co., Inc.

The annual report of the **Haskell & Barker Car Company, Inc.**, for the fiscal year ended January 31, 1921, shows net profits after deducting charges and estimated federal taxes of \$2,278,319, equivalent to 20.71 per cent on the \$11,000,000 capital stock, compared with \$1,727,653, or 18.51 per cent, on \$9,332,000 capital stock in 1919. Gross earnings increased chiefly as the result of estimating federal taxes at \$700,000, compared with \$1,100,000 in the preceding year. The capital stock account was readjusted

and a corresponding increase made in the property account. The financial statements follow:

INCOME ACCOUNT			
	1920-21	1919-20	
Gross earnings.....	\$3,789,390	\$3,743,131	
Maintenance, etc.....	511,070	534,185	
Amortization.....		81,293	
Net earnings.....	\$3,278,319	\$3,127,653	
Reserves.....	350,000	300,000	
Dividends.....	880,000	880,000	
Surplus.....	\$2,098,319	\$1,947,653	
BALANCE SHEET—ASSETS			
	Jan. 21, 1921	Jan. 31, 1920	
Plant, etc.....	\$7,266,127	\$5,307,768	
Cash.....	1,275,553	8,224,276	
Accounts receivable.....	3,891,507	573,256	
Liberty bonds.....	47,400	57,300	
Other securities.....	394,586	713,553	
U. S. contract.....		19,648,600	
Inventories.....	6,608,767	1,850,967	
Total assets.....	\$19,483,342	\$36,375,662	
LIABILITIES			
Capital stock.....	\$11,000,000	\$9,332,000	
Current liabilities.....	2,123,403	728,623	
Reserves.....	1,181,921	1,850,541	
Surplus.....	5,177,957	4,145,922	
U. S. contract.....		21,211,204	
Total liabilities.....	\$19,483,341	\$36,375,662	

The Westinghouse Air Brake Company

The financial results of the operations of the **Westinghouse Air Brake Company** for 1920, after providing for dividends, show a net addition to surplus of \$1,249,122. **H. H. Westinghouse**, chairman of the board, in his report to the stockholders for the year ended December 31, 1920, said:

"During the year under review the volume of orders received and product shipped was satisfactory. The year closed with a fair amount of unfilled orders on hand, but owing to the unprecedented condition of the railroads of the country and their necessary policy of curtailing purchases, current orders show a marked falling off as compared with the same period of previous years. Manufacturing operations thus far this year have been at an almost normal rate, but obviously they must be materially reduced unless there is a marked increase in new business.

"The increase in accounts and bills payable for the year of approximately \$8,300,000 as compared with the previous year, is accounted for by the increase in accounts and bills receivable of almost \$8,000,000 and \$2,800,000 in inventory.

"It is hoped that the remedial legislation recently enacted by Congress, known as the Winslow Bill, will result in payments that will reduce outstanding accounts to normal proportions."

The financial statements for the year include the operations of the following companies: **Westinghouse Traction Brake Company**, **Westinghouse Friction Draft Gear Company**, **Westinghouse Pacific Coast Brake Company**, **Westinghouse Air Brake Home Building Company**, **Union Switch & Signal Company**, **Union Signal Construction Company**, the **American Brake Company**, **National Brake & Electric Company**, **National Steel Foundries**, **Milwaukee Locomotive Manufacturing Company**, **Safety Car Devices Company**, **Locomotive Stoker Company**, **National Utilities Corporation** and **Westinghouse Union Battery Company**.

The consolidated balance sheet for 1920 follows:

ASSETS		
Cash.....		\$2,947,664
Accounts and bills receivable.....		15,350,169
Liberty loan bonds.....		1,991,399
Inventories.....		15,628,812
Investments.....		8,734,348
Factories.....		11,232,271
Real estate, other than factories.....		2,161,679
Patents and goodwill.....		4,941,040
Deferred charges to operation.....		233,534
		\$61,390,916
LIABILITIES		
Bills payable.....		\$7,210,000
Accounts payable.....		2,187,909
Taxes, royalties, etc., accrued, not yet due.....		156,135
Contingent liabilities on account of sales, subject to future settlements.....		150,027
Estimated federal taxes for 1920 and prior years.....		1,653,886
Sundry reserves (including amount held against patent and goodwill account).....		4,726,321
Capital stock, at par, of subsidiary companies not held by the Westinghouse Air Brake Company.....		38,708
Capital stock, issued.....	\$29,165,400	
Less held in treasury.....	38,450	
Surplus.....		29,127,350
		16,140,550
		\$61,390,916

Railway Financial News

ATCHISON, TOPEKA & SANTA FE.—Authorized to operate line in Oklahoma.—The Interstate Commerce Commission has issued a certificate authorizing this company to operate the property of the Buffalo Northwestern, including 52½ miles of line in Oklahoma, which the Santa Fe has leased.

BALTIMORE & OHIO.—Authorized to Issue Bonds.—The Interstate Commerce Commission has authorized this company to issue \$2,782,000 of refunding and general mortgage bonds, to pledge and repledge from time to time all or any part of the bonds as security for short term notes, and various subsidiaries have been authorized to issue various bonds and deliver them upon the order of the Baltimore & Ohio to trustees under certain mortgages.

BERGEN COUNTY.—Authorized to Extend Maturity of Bonds.—This company has been authorized by the Interstate Commerce Commission to enter into extension supplements with the holders of \$200,000 of first mortgage bonds, extending the maturity date from April 1, 1921, to April 1, 1931, and increasing the rate of interest from 5 to 7 per cent.

CHICAGO GREAT WESTERN.—Annual Report.—The annual report for the year ended December 31, 1920, shows a deficit after taxes and charges of \$2,530,682. This compares with net income in 1919 of \$1,263,669 equivalent to \$2.87 a share earned on the \$43,926,602 preferred stock.

The income account for the year 1920 follows:	
Two months ended February 29, 1920, under federal control:	
Balance after expenses.....	\$471,653
Six months ended August 31, under guaranty period:	
Net deficit from railway operation.....	\$3,406,271
Compensation under transportation act.....	1,700,000
Other income.....	69,328
Deficit.....	1,636,943
Four months ended December 31, 1920:	
Net income from railway operation.....	214,724
Other income.....	81,613
Total income.....	296,337
Deficit.....	\$868,953
Interest and other deductions.....	1,661,729
Total deficit.....	\$2,530,682

The operating revenues and expenses in detail and the principal traffic statistics of the Chicago Great Western Railroad compare as follows:

	OPERATING REVENUES	
	1920	1919
Freight.....	\$15,990,231	\$14,555,496
Passenger.....	5,692,494	5,979,147
Mail and express.....	1,309,885	687,359
Miscellaneous.....	603,381	906,187
Total.....	\$23,596,191	\$22,128,139
	OPERATING EXPENSES	
	1920	1919
Maintenance of way.....	\$5,987,678	\$3,525,827
Maintenance of equipment.....	6,736,579	5,010,519
Traffic.....	520,661	320,930
Transportation.....	12,338,454	9,745,333
Miscellaneous.....	955,871	711,197
Transportation for investment—credit.....	7,036	8,665
Total.....	\$26,452,243	\$19,305,163

	TRAFFIC STATISTICS	
	1920	1919
Tons revenue freight carried.....	6,067,713	5,962,507
Tons carried 1 mile.....	1,663,983,000	1,649,093,000
Revenue per ton per mile.....	0.961 cents	0.837 cents
Number passengers carried.....	2,498,822	2,714,422
Number passengers carried 1 mile.....	190,126,076	221,637,486
Revenue per passenger per mile.....	2.994 cents	2.698 cents

The annual report of the Chicago Great Western will be reviewed editorially in an early issue.

CHICAGO JUNCTION RAILWAY.—Hearings on acquisition by New York Central. See New York Central.

CHICAGO, MILWAUKEE & ST. PAUL.—Asks Authority to Acquire Road.—This company has applied to the Interstate Commerce Commission for authority to acquire the property and stock of the Chicago, Terre Haute & Southeastern.

CHICAGO & EASTERN ILLINOIS.—Reorganization Plan.—Kuhn, Loeb & Co., reorganization managers, have announced the de-

tails for the organization of a new company capitalized at \$91,033,750. The capitalization of the old company, exclusive of unpaid interest, was \$94,204,448. Fixed charges of the old company were \$3,759,996, while those of the new company will be \$2,327,051.

According to the announcement the new company will not acquire the coal properties formerly embraced in the mortgage dated February 1, 1912, made to secure the purchase money first lien coal bonds of the Chicago & Eastern Illinois Railroad Company, nor the lines of railroad formerly owned by the Evansville & Indianapolis Railroad Company, which have been sold under foreclosure of the respective mortgages thereon, nor the lines of railroad formerly owned by the Chicago & Indiana Coal Railway Company. In case delay should occur in acquiring any of the mortgaged lines of railroad or any of the properties embraced in the plan, the execution of the plan will not necessarily be thereby postponed, but existing bonds upon such lines deposited under the plan may be pledged under the mortgages of the new company until such lines of railroad shall be acquired by the new company.

New securities to be presently issued include \$35,500,000 general mortgage bonds, \$22,051,050 preferred stock and \$24,135,100 common stock. Prior lien mortgage bonds amounting to \$5,262,500 will be used as collateral for notes amounting to \$4,210,000 covering indebtedness to the United States. The general mortgage bonds will be limited to the total authorized principal amount of \$35,500,000 at any one time outstanding. They will mature not later than 1951, and will bear interest from May 1, 1921, payable semi-annually, at the rate of 5 per cent per annum. They will be secured by mortgage which will embrace all of the lines of railroad, franchises, equipment, terminals, securities and other property which may at any time be included under the prior lien mortgage. The general mortgage will be subject to the prior lien mortgage on all property covered by the latter. The preferred stock will be at the rate of 6 per cent per annum, cumulative from January 1, 1924. Each share of preferred stock shall have the same voting rights as a share of common stock.

Securities to remain undisturbed in the reorganization amount to \$9,347,600, and include Chicago & Eastern Illinois Railroad Company first extension mortgage 6 per cent bonds due 1931, \$91,000; Chicago & Eastern Illinois Railroad Company first consolidated mortgage 6 per cent bonds due 1934, \$2,736,000; Evansville Belt Railway Company first mortgage 5 per cent bonds due 1940, \$142,000; Chicago & Eastern Illinois Railroad Company equipment certificates, Series "I," 5½ per cent maturing serially from September 1, 1921, to September 1, 1925, \$1,477,000; receiver's equipment notes to Director General of Railroads maturing serially to 1935, \$691,600; loan from United States Government, 10 years 6 per cent, \$3,425,000; loan from United States Government, 15 years 6 per cent, \$785,000.

Cash requirements estimated to carry out the plan amount to \$16,110,370, and include \$6,000,000 as payment of receiver's certificates; \$3,000,000 for payment of Evansville & Terre Haute first consolidated mortgage 6 per cent bonds maturing July 1, 1921; \$4,003,292 on account of \$3,478,909 C. & E. I. general consolidated and first mortgage 5 per cent bonds, and \$524,383 Evansville & Terre Haute first general mortgage 5 per cent bonds, and \$3,107,078 to pay other claims of receiver.

The cash required will be provided as follows: \$10,300,000 available in the hands of the receiver and \$5,810,370 from the sale of 5 per cent general mortgage bonds of the new company to stockholders of the old company or underwriters.

The report of the receivers made to the reorganization managers shows that the average annual net railway operating income, under normal conditions and after the segregation of the Chicago & Indiana Coal Railway, can be conservatively estimated at \$5,300,000, and net railway operating income for the year ending December 31, 1921, estimated at approximately \$4,100,000, such estimate being predicated on a gradual resumption of business during the year. The last half of the year normally produces approximately two-thirds of the year's earnings.

The capitalization and fixed charges of the new company are as follows:

		Fixed Charges
Outstanding.....		
\$2,736,000 C. & E. I. first consolidated 6s.....	\$164,160	
91,000 C. & E. I. first extension 6s.....	5,460	
142,000 Evansville Belt Ry. 5s.....	7,100	
1,677,000 C. & E. I. equipment notes, Series H 5½s.....	81,233	
691,600 Equipment notes to Director General.....	41,496	
4,210,000 Notes secured by \$5,262,500 prior lien mortgage 6s.....	252,600	
35,500,000 General mortgage 5s.....	1,775,000	
22,051,050 Preferred stock.....		
24,135,100 Common stock.....		
\$91,033,750.....		\$2,327,051
Capitalization of old company (exclusive of unpaid interest).....		\$94,204,448
Capitalization of new company.....		91,033,750
Fixed charges of old company.....		\$3,759,996
Fixed charges of new company.....		2,327,051

The lines of railroad formerly owned by Chicago & Indiana Coal Railway Company, and Evansville & Indianapolis Railroad, and the coal properties formerly embraced in the purchase money first lien coal mortgage will not be acquired by the new company.

Foreclosure Sale.—The Chicago & Eastern Illinois, in the hands of receivers since May 27, 1913, was sold at foreclosure on April 5, at Danville, Ill.

George M. Murray and Joseph P. Cotter, attorneys of New York, representing Kuhn, Loeb & Co., bid in all parcels except Parcel D, extending from Mokenzie, Ill., to Brazil, Ind., for \$13,285,000. There were no bids on Parcel D, and another sale date was fixed.

CHICAGO & NORTH WESTERN.—Bonds to Be Paid.—The \$10,000,000 30-year 5 per cent debentures, due April 15, 1921, will be

paid upon presentation on and after that date at the office of the company, 111 Broadway, New York City.

DENVER & RIO GRANDE.—Stockholders' Protective Committee to Push Suit.—The protective committee has received the text of the decision of the federal court at Denver on the motion of Western Pacific interests to dismiss two suits attacking the legality of the judgment to satisfy which the road was sold recently. Two suits were filed identical in text, the committee says, and one was dismissed Saturday. The court held that the stockholders had the right to prosecute the other suit, and the court would grant leave to amend the bill in that case to bring in additional or supplementary matter relating to the confirmation of the sale.

EUREKA NEVADA.—Expiration of Lease.—This railway operated under lease by the Nevada Transportation Company since May 8, 1912, will, after March 31, 1921, be operated by the Eureka Nevada Railway Company, the lease having expired.

FONDA, JOHNSTOWN & GLOVERSVILLE.—Bonds Extended.—The \$200,000 6 per cent bonds which fell due April 1, were extended until March 29, 1922, with interest at 6 per cent.

GEORGIA & FLORIDA.—Loan Approved by Commission.—The Interstate Commerce Commission has authorized a loan of \$800,000 to this company to assist it in meeting maturing indebtedness and paying for additions and betterments. This loan is for three years.

GOLDEN BELT.—Certificate of public convenience denied.—The Interstate Commerce Commission has denied this company's application for certificate of public convenience and necessity for the construction of a new line of railroad between Great Bend and Hays, Kan., on the ground that the record does not develop an economic justification for the proposed line nor indicate reasonable prospect of a substantial return on the estimated investment.

HOUSTON & BRAZOS VALLEY.—Board reports just compensation.—The board of referees appointed by the Interstate Commerce Commission has rendered a report to the President finding this company entitled to just compensation for the period of federal control in the amount of \$65,368.05. The company had claimed \$144,343 and had failed to agree with the Railroad Administration.

LOUISVILLE & NASHVILLE.—New Directors.—J. R. Kenly and Frederic W. Scott have been elected directors to succeed Warren Delano and M. H. Smith.

MARSHALL & EAST TEXAS.—Certificate of public convenience held unnecessary.—The Interstate Commerce Commission has rendered a decision that this company having ceased operation under order of a federal court prior to the passage of the transportation act, the issuance of a certificate of public convenience and necessity applied for by the receiver to permit the abandonment of the line is not within the commission's jurisdiction and is not required.

MINNEAPOLIS & ST. LOUIS.—Authorized to Issue Bonds.—This company has been authorized by the Interstate Commerce Commission to issue \$1,382,000 of refunding and extension mortgage 5 per cent gold bonds and to pledge them with the Secretary of the Treasury as partial security for a loan.

NEW YORK CENTRAL.—Hearings on Acquisition of Chicago Junction Railway.—Hearings were begun on April 5 at the Great Northern Hotel, Chicago, before W. H. Colston, director of the department of finance of the Interstate Commerce Commission, upon the application of the New York Central for authority to acquire the terminal properties of the Chicago Junction Railway and the Chicago River & Indiana Railroad. A. H. Smith, president of the New York Central, has made the following statement concerning the application:

The plan proposed in the application will, of course, continue wholly tentative until the Commission has investigated its merits and announced conclusions. It would be inappropriate for me to make other than general comments upon what we seek to accomplish by leasing the Junction terminals. The New York Central has long since been in need of an extensive amplification of its terminal facilities at Chicago. The opportunity to relieve this situation to the mutual advantage of the public, our connections and ourselves, has now been discovered in a surprisingly natural way.

In 1907 the Lake Shore road, through the medium of a switching subsidiary, acquired the outer belt line of the Chicago Junction Railway. This property is now operated as part of the Indiana Harbor Belt, which performs service in the outer Chicago switching district as an interchange connecting link between the trunk lines entering at Chicago. Its railroad complement is the railroad of which it was formerly a part, namely the Chicago Junction Railway has unlimited opportunity in the development of River & Indiana Railroad, comprises an extensive inner network of tracks spread through the heart of central manufacturing Chicago and serving a highly industrial territory.

Railroad expansion in this thickly settled industrial district has about reached its limit. These properties are bottled up, so to speak, within the community which they serve. Conversely the former outer belt line of the Chicago Junction Railway has unlimited opportunity in the development of railroad facilities but no means of reaching, except indirectly, interior Chicago. Each of these properties therefore lacks important facilities which the other has and which neither could secure for itself. Handled together they will serve all the industrial territory tributary to each with higher efficiency. Furthermore to identify the Chicago Junction Railway properties with the New York Central Railroad ought to increase exceedingly their value to the industrial public and, on the other hand, such identification will enable the New York Central and its affiliated line, the Michigan Central, to greatly improve and extend their Chicago terminal service.

Should the Interstate Commerce Commission approve of our plan it would be our policy to continue the operating and traffic relationship now existing between the Chicago Junction Railway and other carriers operating at Chicago.

On opening the hearing, Luther Walter, counsel for the Pennsylvania, Baltimore & Ohio and six other lines reaching Chicago, opposed the application stating that the proposed acquisition would give the New York Central monopolistic control of the traffic of a great industrial portion of the city. He said that the roads he represented proposed to file an intervening petition suggesting a joint ownership of the junction lines, if they must be sold.

Certain shippers also protested, alleging that the acquisition would deprive them of certain rights, facilities and services now enjoyed and would greatly injure them and others. Another group of shippers filed an intervening petition, asking that if the Commission approve the petition of the New York Central, they do so in such terms and conditions as will fully and permanently protect shippers in their present rights, privileges, facilities and services or others to which they may be lawfully entitled, in which case they would have no particular interest in the matter.

The New York Central presented a petition at the hearing which it was said was signed by 395 of the 400 shippers on the junction lines, urging that the New York Central be permitted to buy the property.

The filing of the formal application with the Interstate Commerce Commission by the New York Central for authority to base and ultimately purchase the Chicago Junction terminal properties was noted in the *Railway Age* of January 7, 1921, page 32.

NORFOLK & WESTERN.—Annual Report.—A review of this company's annual report for 1920 appears on another page of this issue.

New Director.—A. C. Needles, vice-president in charge of operation and traffic, has been elected a director, and also a member of the executive committee.

Asks Authority to Sell Bonds.—The Norfolk & Western has applied to the Interstate Commerce Commission for authority to issue and sell \$269,000 of 4 per cent convertible bonds, \$1,213,000 of 4½ per cent convertible bonds, and \$522,000 of 6 per cent convertible bonds now held in its treasury, to reimburse the treasury for expenditures.

RENNSELAER & SARATOGA.—Asks Authority to Issue Bonds.—This company has applied to the Interstate Commerce Commission for authority to issue \$2,000,000 of first mortgage 6 per cent, 20-year gold bonds, dated May 1, 1921, to be delivered to the Delaware & Hudson, which leases the road and which has also asked authority to guarantee the bonds, and which proposes to sell them to pay off first mortgage bonds of the Rennselaer & Saratoga, which mature on May 1.

SEABOARD AIR LINE.—Loan Approved by Commission.—The Interstate Commerce Commission has approved an additional loan to this company of \$1,451,500 from the revolving fund, in addition to \$1,173,500 previously approved.

VALDOSTA, MOULTRIE & WESTERN.—Sale.—This road will be offered for sale in Savannah for the second time on April 9. There were no bids made at the first sale on February 22.

WESTERN PACIFIC.—Asks Authority to Issue Securities.—This company and the Denver & Rio Grande Western, the new company organized to take over the properties of the Denver & Rio

Grande, have filed a joint application with the Interstate Commerce Commission for authority for the issuance by the Denver & Rio Grande Western of 300,000 shares of common stock of no par value, representing the property of the Denver & Rio Grande. The Western Pacific Railroad Corporation of Delaware, the Western Pacific holding company, is to provide the funds necessary for the purchase of the properties of the Denver & Rio Grande and the proposed stock issue is to be assigned to the holding company, which will then control both the Western Pacific and the Denver & Rio Grande Western. The Western Pacific has also applied for authority to issue \$4,180,000 of its first mortgage 5 per cent gold bonds to be sold to the holding company at 85 and to be exchanged by it for the bonds of the Sacramento Northern, whose stock is to be purchased for cash.

WHEELING & LAKE ERIE.—*Authorized to Issue Bonds.*—This company has been authorized by the Interstate Commerce Commission to issue \$884,000 of refunding mortgage 6 per cent bonds, and to pledge them with the Secretary of the Treasury as partial security for a loan. The company has also been authorized to issue \$1,351,000 of refunding mortgage 5 per cent bonds maturing September 1, 1966, to be pledged as collateral security.

Guaranty Certificates Issued

In addition to those mentioned in previous issues, the Interstate Commerce Commission has issued certificates to railroads for partial payments on account of their guaranty as follows:

		Previously advanced
Oregon Trunk.....	\$40,000	
Minneapolis & St. Louis.....	100,000	\$2,350,000
Wabash.....	1,500,000	5,077,000
Live Oak Perry & Gulf.....	12,000	
Wheeling & Lake Erie.....	455,000	500,000
Bennetsville & Cheraw.....	10,000	
Gainesville & Northwestern.....	7,000	8,400
San Antonio & Aransas Pass.....	475,000	
Charleston Terminal Co.....	50,000	
Pittsburgh, Cincinnati, Chicago & St. Louis.....	4,000,000	6,100,000
Gulf, Florida & Alabama.....	356,360	200,000

The Treasury Department is paying the certificates as fast as they are issued and up to April 4 had paid out \$103,000,000 in partial payments under the Winslow law.

Dividends Declared

- Atchison, Topeka & Santa Fe—Common, 1½ per cent quarterly, payable June 1 to holders of record May 6.
- Boston & Providence—2½ per cent, quarterly, payable April 1 to holders of record March 19.
- Delaware, Lackawanna & Western—5 per cent, quarterly, payable April 20 to holders of record April 9.
- Georgia Railroad & Banking—3 per cent, quarterly, payable April 15 to holders of record April 2 to April 14.
- Meadville, Conneaut Lake & Linesville—2 per cent, payable April 2 to holders of record March 21.
- New London Northern—2½ per cent, quarterly, payable April 1 to holders of record March 16 to March 31.
- Northern Railroad of N. H.—1½ per cent, payable April 1 to holders of record March 14.
- Norwich & Worcester—Preferred, 2 per cent, quarterly, payable April 1 to holders of record March 16 to March 31.
- Pere Marquette—Prior preferred, 1¼ per cent, payable May 2 to holders of record April 14.
- Pittsburgh & West Virginia—Preferred, 1½ per cent, quarterly, payable May 31 to holders of record May 6.

Railway Officers

Executive

W. C. Morse, formerly superintendent of the Missouri Pacific with headquarters at Poplar Bluff, Mo., has been elected vice-president and general manager of the Louisiana Railway & Navigation with headquarters at New Orleans, La., effective April 5.

Operating

J. Bruner has been appointed trainmaster of the Colorado & Southern with headquarters at Cheyenne, Wyo.

George Geiger, assistant superintendent of the Virginian with headquarters at Princeton, W. Va., has resigned, effective April 10.

J. A. Gleason, whose appointment as superintendent of telegraph of the Chesapeake & Ohio was announced in the *Railway Age* of March 11 (page 576), was born February 10,



J. A. Gleason

1859, at Portsmouth, Va. He was educated at private schools and at the Charlotte (N. C.) Academy. He entered railroad service in 1874 at Charlotte as a clerk and assistant operator for the Charlotte, Columbus & Augusta and the Atlantic, Tennessee & Ohio (both absorbed since by the Southern). In 1876 he went with the Richmond, York River & Chesapeake (also a part of the Southern). The following year he became personal telegrapher to President Rutherford B. Hayes and later served as chief operator on the government lines in Texas with headquarters at San Antonio. In 1882 he became a train dispatcher on the Richmond & Danville (now a part of the Southern). He went with Norfolk & Western in 1887 in a similar capacity at Lynchburg, Va. The following year he became a dispatcher on the Chesapeake & Ohio at Lynchburg and was later transferred to Clifton Forge, Va., and was promoted to chief dispatcher at Cincinnati, Ohio. From 1891 to 1898 he served the Norfolk & Western at Lynchburg, Roanoke, Va., and Crewe, Va., as a train dispatcher and night chief dispatcher. In 1898 he went to the Chesapeake & Ohio again as a dispatcher and, in turn, occupied the positions of chief dispatcher, division superintendent and special assistant to the general manager until, in February, 1921, he was appointed to his present position.

D. W. Thompson has been appointed acting superintendent of dining cars and hotels of the Los Angeles & Salt Lake, with headquarters at Los Angeles, Cal., effective March 28, succeeding **W. M. Sceman**, deceased.

E. F. Lott, formerly superintendent of the Ft. Worth & Denver City with headquarters at Wichita Falls, Tex., has been appointed superintendent of the South Park division of the Colorado & Southern with headquarters at Denver, Colo.

D. P. Gerety has been appointed trainmaster on the Colorado division of the Missouri Pacific, with headquarters at Council Grove, Kan., with jurisdiction over the Council Grove district and the Salina branch, Central Kansas division, and the Great Bend branch and Hoisington, Kan., Yard, on the



Photo by Underwood & Underwood

A Street Railway, Port-au-Prince, Haiti

Colorado division. **D. W. Hickey**, assistant superintendent on the Colorado division, with headquarters at Pueblo, Colo., has taken over the duties of trainmaster on the Hoisington district and that position has been abolished. The appointments and changes are effective April 1.

Frank O'Brien, superintendent of the East Iowa division of the Chicago & North Western, with headquarters at Belle Plaine, Iowa, who has been on an extended leave of absence, has resumed his duties, effective April 1, and **F. F. McCauley**, acting superintendent, has resumed his position as superintendent of the West Iowa Division, with headquarters at Boone, Iowa. Mr. McCauley succeeds **S. A. Morrison**, who has resumed his position as superintendent of the North Iowa division, with headquarters at Eagle Grove, Iowa. **G. E. Bonner**, acting superintendent of the North Iowa division, has resumed his duties as trainmaster, with headquarters at Eagle Grove, Iowa.

Financial, Legal and Accounting

Henry L. Stone, general counsel of the Louisville & Nashville, with headquarters at Louisville, Ky., will retire from active service, effective April 21.

George N. Yard, paymaster on the Gulf, Colorado & Santa Fe, with headquarters at Galveston, Tex., has been appointed acting treasurer, succeeding **A. C. Torbert**, whose death was announced in the *Railway Age* of April 1 (page 870).

G. W. Lamb has been appointed general auditor by the Association of Railway Executives under the provisions of Article No. 18 of the uniform express contract to audit the accounts of the American Railway Express Company. **C. H. Waterman** has been appointed assistant general auditor. The auditing bureau has its headquarters at 65 Broadway, New York.

Traffic

E. N. Todd has been appointed general foreign freight agent of the Canadian Pacific with headquarters at Montreal.

Thomas Y. Morris has been appointed commercial agent on the Atlantic Coast Lines, with headquarters at Chattanooga, Tenn., effective March 22.

R. Vaughan-Lloyd has been appointed district passenger agent of the Seaboard Air Line with headquarters at Richmond, Va., effective April 1, succeeding **H. E. Bickel**, resigned.

Z. M. Kincaid, district passenger agent on the New York, Chicago & St. Louis with headquarters at Buffalo, N. Y., has been transferred to Erie, Pa., in a similar capacity, effective April 10.

F. L. Talcott has been appointed general agent on the New York Central, with headquarters at Erie, Pa. The division freight agencies at Erie and Hillsdale, Mich., have been discontinued.

W. H. Andrews has been appointed general agent, freight department of the Toledo, St. Louis & Western with headquarters at Los Angeles, Cal. **J. R. Holcomb** has been appointed to a similar position with headquarters at San Francisco, Cal.

Engineering, Maintenance of Way and Signaling

R. D. Stewart has been appointed chief engineer of the Denver & Salt Lake, with headquarters at Denver, Colo., succeeding **V. B. Wagner**, who has been assigned to other duties.

Special

J. A. McGrew has been appointed superintendent of maintenance of the Delaware & Hudson with headquarters at Albany, N. Y., effective April 1. The maintenance department was formed, effective April 1, by consolidating the maintenance of way and structures, the motive power and the car departments. The superintendent of maintenance will be responsible for all maintenance work and will report to the general manager. The following officers will report to the superintendent of maintenance: Engineer maintenance of

way, superintendent of motive power, master car builder, signal engineer and efficiency engineer.

Obituary

E. B. Crosley, vice president in charge of traffic of the Philadelphia & Reading died on April 3 at Philadelphia. Mr. Crosley was born June 27, 1865, at Clinton, Ill., and began his railroad career as a clerk on the Indiana, Bloomington & Western (now a part of the Cleveland, Cincinnati, Chicago & St. Louis) at Indianapolis, Ind. In 1890 he entered the service of the Philadelphia & Reading Coal & Iron Company as chief clerk to the general manager. After holding various positions with that company he was appointed assistant general freight agent of the Philadelphia & Reading in 1898. In 1907 he was appointed coal freight agent and subsequently general coal freight agent. During the period of federal control Mr. Crosley was a coal traffic manager and, when the roads were returned to their owners, he was appointed vice president in charge of traffic.

J. F. Keegan, general superintendent of the Baltimore & Ohio, with headquarters at Pittsburgh, Pa., died at Pittsburgh on April 1. Mr. Keegan was born at Cleveland, Ohio, on March 29, 1870 and was educated at St. Columbia's Academy in that city. He entered railway service in 1885 with the Cleveland, Columbus, Cincinnati & Indianapolis (now a part of the Cleveland, Cincinnati, Chicago & St. Louis). In 1890 he became a telegraph operator and car distributor on the Cleveland, Lorain & Wheeling (now a part of the Baltimore & Ohio). The following year he was promoted to train dispatcher at Uhrichsville, Ohio, and served in that capacity until 1902 when he became chief dispatcher of the Baltimore & Ohio at Cleveland. In 1903 he was promoted to assistant trainmaster and, in 1906, to trainmaster. In 1911 he was appointed division superintendent and served in that capacity until 1916 when he became general superintendent.

Rolla J. Parker, general manager, Western Lines, Atchison, Topeka & Santa Fe, died in the Santa Fe Hospital at Topeka, Kan., on April 1. He was born on June 27, 1857, at Roscoe,



R. J. Parker

Minn., and entered railway service in 1872 as a brakeman on the Chicago, Milwaukee & St. Paul. In 1877 he was promoted to conductor and held this position until 1881. In 1884, after three years of service as a conductor on construction trains on the Northern Pacific, he entered the service of the Atchison, Topeka & Santa Fe, and has been with this road continuously for 34 years. In May, 1887, he was promoted to division road master. He was made general road master, with headquarters at Topeka, Kan., in December, 1892, and five years later was promoted to superintendent of the Middle division, with headquarters at Newton, Kan. From February, 1900, to January, 1901, he served as superintendent of the Western division at Pueblo, Colo.; from January, 1901, to April, 1903, he was superintendent of the Colorado division; from April, 1903, to June, 1905, he was superintendent of the Missouri division, with headquarters at Marceline, Mo., and on the latter date was promoted to general superintendent of the Western Grand division, with headquarters at La Junta, Colo. He was transferred to Newton, Kan., in August, 1907, but returned to La Junta in April, 1909. Mr. Parker served as general superintendent, Eastern lines, with headquarters at Topeka, Kan., from October, 1910, to September, 1916, on which date he was promoted to general manager, with headquarters at Amarillo, Tex.

EDITORIAL

Railway Age

EDITORIAL

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The adoption of cars of high capacity has been one of the most notable recent developments in operating practice on the roads serving the Eastern coal fields. The Norfolk & Western has taken a leading part in developing equipment especially suited for the handling of export coal traffic and at the beginning of the year had in service 1,669 one-hundred-ton gondola cars. After several years' experience with these heavy cars the road has developed a new design which is described in an article by John A. Pilcher, published in this issue. A careful reading of the description of the cars will show how thoroughly the business aspect of operation has been kept in mind by the officers of the road. There are three principal opportunities for saving in the use of large capacity cars. The tonnage per train can be increased due to the lessened number of units and decreased length for the given weight. The number of movements in handling a given tonnage and the number of parts to be maintained is reduced. Last, and perhaps most important, the ratio of load to gross weight can be increased. By the adoption of a truck which supports the load on side bearings, instead of at the center plate, the weight of these cars has been decreased and the ratio of paying load to gross weight increased to 78.9 per cent, an extremely high figure. This equipment is notable, not merely for the engineering features of the design, but also for the manner in which the economic problem has been analyzed and steps taken to insure maximum earning capacity per car, per train and per dollar expended.

Economic Aspects of Car Design

It might well be expected that labor on the British railways would be well pleased with the government's plan for the return of the roads to their owners inasmuch as, under this plan, labor is to be given a hand in the management of the properties. Such, however, is not the case. The National Union of Railwaymen, it appears, is extremely hard to please, and its representatives are now seeking an interview with the Minister of Transport with the view of laying before him their plan for the future organization of the carriers. The union's scheme provides for government ownership and operation under the administration of a board consisting of an equal number of representatives of the government and of the employees. This proposal goes even farther than our own Plumb Plan in its provision for operating the railroads for the benefit of the employees. In a country where organized labor is as strong politically as it is in Britain it would be strange indeed if at least one of the government's representatives were not a strong sympathizer with the unions. A majority on the board, and consequent control of the railroads, could well be expected under such an arrangement. The union proposes further that employees discharged as a result of reductions in force should be given "adequate compensation." It would be difficult for any one to surpass in audacity this proposal, involving as it does the virtual turning over of the railways to the employees to be run as best suits their interests. Fortunately, however, for the railroads and the people of Great Britain, there is little likelihood that

The Plumb Plan in England

the present government will approve any such proposal. It is to be hoped that the government will, before the return of the carriers to their owners, provide legislation which will protect the shareholders and the public against the unions which are manifestly looking out for their own interests regardless of anyone else.

Transition curves are as little discussed today as the relative merits of the "practical man" and the technical graduate in railway engineering service. The reason is the same in each case—the subject has ceased to be controversial. Although the spiral curve was developed and put to some practical use many years ago, it served for a long time as a fruitful source of contention between those who recognized the necessity for an accurate means of obtaining the gradual change from the tangent to the curve and those who deemed the use of mathematics in this connection as the height of unnecessary refinement. As years have passed by, however, less and less has been heard of this branch of railway engineering so that at present it is almost never mentioned outside the routine of office and field. Believing that a review of this subject could not but develop some interesting and valuable facts the *Railway Age* sent a questionnaire to 42 of the larger American railroads, making inquiry concerning present practices in the use of the transition curve. The result of this is published elsewhere in this issue and goes to show that there is now a very common agreement on the necessity of this refinement in the railway alignment. Railway engineers, including those who responded cheerfully in answering the questionnaire, will find much of interest in this report.

The Transition Curves in General Use

One of the great difficulties in making progress with the improvement in the bad order car situation is the large number of old cars of weak construction which are still in service, many of which should be retired and replaced by equipment of more modern design. The detrimental effect of these cars has been particularly evident during the past year because of the tendency to keep them in service, in the face of the acute shortage of equipment, long after they would normally have been retired. But if the effect of this condition is particularly acute now, the condition itself is by no means a new one. It was the same condition which led to the adoption by letter ballot, following the 1914 convention of the Master Car-Builders' Association, of the provision in Rule 3 of the Interchange Rules which read, "After October 1, 1916, all cars of less than 60,000 lb. capacity, having wooden or metal draft arms which do not extend beyond the body bolster, will not be accepted in interchange." And if we look forward a few years into the future, there is no reason for believing that similar conditions will not then exist. It seems evident that legislation against the recurring specific manifestation of the evil does not remove the cause. One of the strongest incentives for raising the average structural strength of the freight cars of the country which could

Structural Improvement of Freight Cars

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be offered would be the establishment of standard billing prices for labor and material high enough to include a fair commercial profit above the average outlay for labor, material and overhead expenses. During periods of equipment shortage there is little direct inducement to the owner of such equipment to reconstruct it to meet modern conditions because a large percentage of its time is spent on foreign lines where such repairs as it receives are paid for at prices often below the owner's costs for doing the same work, and where failures in transit cost the owner nothing in delays to train movement. An adequate scale of prices established to include a profit, by increasing both the amount and cost of repairs to such equipment, will unquestionably raise the limit beyond which its operation becomes too expensive to be considered.

Intensive studies of fuel conservation, tonnage loading, freight handling, track capacities, the location of facilities, and many other items, are constantly being made in order to obtain the most efficient service at a minimum of cost. It is pertinent to raise the question, however, whether such studies are not

being conducted by the heads of various departments in a more or less unrelated manner, in contrast with their concentration under the direction of one person who is in a position to co-ordinate these results to the greater benefit of the system as a whole. The busy operating officer is not in a position to prosecute such studies or to gather the facts to support any change or improvement in present day practices. Consequently someone in the organization should be charged with this duty. Such a man should of necessity be familiar with operating, engineering and mechanical problems inasmuch as these are the three departments which are most directly affected by such studies. He must be familiar with train operation over the entire system, the proper utilization of motive power and the effect which various additions made by the engineering department to track facilities will have on train operation and track capacity, if he is to handle the work successfully. Such studies, however, could no doubt better be handled by a committee, with a chairman who may be a signal engineer, as on one road, a mechanical engineer, as on another road, or an operating or engineering officer. It would appear that such a man or committee should be in a position to co-ordinate results obtained by the various departments for the greatest benefit of the road. The preparation of such data for the busy executive officers should prove profitable in a number of ways.

On nearly every railroad in the United States there are widely varying conditions that will and do affect the maintenance of the track structure. In one case, it may be unstable soil, in another drainage; and in others the character of the ballast, the rail, the traffic, etc. Under such circumstances

The Uniform Maintenance of Track

no two sections, for instance, can be maintained with the same amount of material or the same labor effort, nor can identical results be secured for the same unit cost per mile or per section. Expanded, this is equally true of sub-divisions and divisions. Thus it would seem that, ordinarily, the best sections, sub-divisions and divisions would be those whose natural conditions made it most easy to maintain them. But it is doubtful if this is actually the case in many instances. It is frequently true that the sections that are nearest 100 per cent have reached that condition because of the advantages of better and closer supervision as well as

perhaps a slight "edge" on the prompt delivery of materials and a more adequate supply of labor at most needed times. With such the case the best sections of a road generally continue to remain the best, for it is a natural inclination to favor that which is good, progressive or successful. Thus there is a tendency to continue the wide spread between the best sections and the poorest and this is especially true during periods of limited funds available for maintenance of way expenditures. Such a spread is not desirable from the standpoint of economical railroading, for a railroad is but a correlation of working units and its efficiency depends upon the uniform efficiency of those units. It is chiefly a question of which makes for the better in the long run, a few 100 per cent or nearly 100 per cent sections and many mediocre ones, or as nearly 100 per cent uniformity as can be maintained in practice, on all. In this respect, it is interesting to note, though perhaps not entirely relevant, that a few roads whose maintenance of way slogan has been "Uniformity" have also had uniformly low costs per mile of road when compared to others in the same section of the country.

Huge Deficit of Canadian Government Railways

THE ARTICLE by J. L. Payne on results of government operation of railways in Canada which appears on another page discloses a situation which should be very interesting and extremely instructive to the people of the United States at the present time. Owing to the excessive operating expenses and the unprecedented decline of freight business the railways of the United States have been doing very badly financially since the present freight and passenger rates were fixed. Many persons have persuaded themselves and are trying to persuade others that the only solution of the problem presented is to return our railways to government control.

In Canada, 52 per cent of the railway mileage is owned and operated by the government, and the other 48 per cent, which is made up almost entirely of the mileage of the Canadian Pacific, is privately owned. The same advances in wages and increases of rates have been made in Canada as in the United States. The Canadian railways, fortunately, have not had applied to them the national agreements with the labor unions that are in effect in this country. Under these conditions, as Mr. Payne shows, not a single railway of the system owned and operated by the Dominion Government earned its operating expenses last year. Their expenses were from 109 cents to 410 cents for every dollar they earned. While the Minister of Railways has conceded that the government system had a deficit of over \$70,000,000, Mr. Payne, who was formerly controller of statistics of the Department of Railways and Canals, shows that a proper allowance for interest on the total cost of the railways would make the deficit \$140,000,000. This is \$17.50 for every man, woman and child of the country's population. An equally large deficit per capita for the railways of the United States would be \$1,837,500,000. It must be borne in mind, also, that this deficit was incurred by only half of the railways of Canada.

All the railways of Canada have been very adversely affected by the increases in operating costs, unaccompanied by proportionate advances in rates. The Canadian Pacific, however, under private operation succeeded in keeping its expenses down to 85 cents for each dollar of earnings, and had net earnings of \$33,000,000. The present management of the Canadian government lines is not responsible for the bad financial results. They are partly due to unfavorable conditions which are affecting all the railways of the United States and Canada, and partly to the extremely unwise policy which the Canadian government has followed for fifty years

in building and operating state railways in disregard of sound business principles. Certainly, however, the comparative results of government and private operation in Canada suggest anything but the desirability of consideration of a return to government operation in the United States. What they do very forcibly suggest is the imperative need, in both countries, of government aid to the railways, whether under public or private management, in bringing about a reasonable relationship between operating costs, on the one hand, and earnings on the other hand.

The Menace of the Dust Explosion

THE DESTRUCTION of the large grain elevator of the Chicago & North Western at Chicago on March 19 has directed widespread attention to a menace that has long given deep concern to the owners and operators of these great grain storage structures. The dust explosion represents a hazard against which modern fireproof construction is no protection. The greater and more costly the installation, the greater the potential loss.

The dust explosion is becoming increasingly common in American industry owing primarily to the production of dust in greater volume with the more intensive use of high-speed, automatic machinery and the fact that minute particles of any inflammable material, if suspended in the air in proper proportions, will produce an explosive mixture with tremendous potentialities. The dust explosion does not differ greatly from the gas explosion. In fact, some chemists believe that the process involves the formation of combustible gases by the action of heat on the dust particles, followed by the ignition of a mixture of these gases with air. Very small quantities of dust will suffice to produce an explosion. Experiments show that the explosion of one sack of flour, when mixed with an adequate quantity of air, will develop an amount of energy equivalent to that required to lift 2,500 tons 100 ft.

The study of these explosions demonstrates that they seem invariably to embrace a series of detonations or the progressive ignition of successive clouds of dust stirred up by the preceding detonations. Consequently, deposits of dust serve as a reservoir of enormous reserve energy which intensifies the destructive effect resulting from the initial ignition of the dust suspended in the air. The ignition of this initial blast may be accomplished in so many ways that an attempt to safeguard a structure by measures to prevent the introduction of any spark or flame to set off the explosion is at best an insecure protection.

Casual consideration would point to the wisdom of keeping the structure as free as possible of any accumulation of dust deposits, but this would not solve the problem since it is the dust in suspension which represents the real danger and in the opinion of David J. Price, engineer of dust explosions for the Department of Agriculture, the only effective means of eliminating the hazard of explosions in grain elevators lies in the introduction of dust exhausting appliances at all points in the plant where the grain is in motion. This remedy has been advanced with a full realization of the obstacles imposed to its execution. Not only would this involve drastic alterations of existing elevators and marked changes in the designs of new installations, but still more formidable are the problems of grain weights which would be introduced by the removal of a portion of the weight of the grain in the form of dust. Trade customs with respect to these weights involving the interrelations of the shipper, the carrier and the consignee are circumscribed by rules and statutes that obviously cannot be changed without the united co-operation of a great many diversified interests. In view of all these difficulties it is not surprising that this problem

has not yet been solved, but the situation is realized fully by those who are most intimately concerned with it and active measures are being taken to obtain a solution. This movement should receive the hearty support of the railway managements.

Chicago, Rock Island & Pacific

THE ANNUAL REPORT of the Chicago, Rock Island & Pacific for 1920 is but the story of the railroads of the country as a whole for that year written with the particular problems of the Rock Island in mind. The report shows that the Rock Island in 1920 did the largest freight and passenger business in its history. In view of this fact and the increase in rates during the year, it naturally had the largest gross earnings in its history. On the other hand, as in the case of the larger part of the roads, the net earnings were considerably less than in 1919. The net operating revenue per mile of road was only about one-third or one-half the average for almost any previous year for an extended period.

The report gives some interesting details as to the reason for these results. They are chiefly epitomized in the following statement: "The startling feature of the present situation is that after the government has had your property for nearly three years it comes back to you saddled with an increase in payrolls of approximately \$44,000,000 per annum over the payrolls December 31, 1917, when the property was taken over. Your company now must pay in wages and salaries \$44,000,000 a year more than it paid in 1917. This is about 59 per cent on the outstanding common stock."

The Chicago, Rock Island & Pacific system in 1920 received a total freight revenue of \$94,451,558, an increase of 22.42 per cent over 1919; a passenger revenue of \$35,472,938, an increase of 9.14 per cent, and total railway operating revenue amounting to \$141,946,973. This last figure compared with a total of \$116,624,684, and represented an increase of 21.71 per cent over 1919. The total operating expenses in 1920 were \$133,535,832 as compared with \$101,497,733 in 1919. There was thus an increase of 31.57 per cent in operating expenses as compared with an increase of but 21.71 per cent in operating revenues. The operating ratio in 1920 was 94.07 per cent; in 1919 it was 87.03 per cent, whereas in 1916 it was but 68.10 and in 1917 but 73.70. The total railway operating income in 1920 was \$2,500,565, whereas in 1919 it was \$10,071,099, a decrease of 75.17 per cent.

Referring now to the corporate income account, where are shown the results after the inclusion of the standard return for January and February and the guaranty for March to August, it will be found that the system had a balance of income for 1920 available for dividends amounting to \$4,663,155 as compared with \$4,887,891 in 1919. Full dividends were paid on both the 7 per cent and 6 per cent preferred stocks in 1920 as in 1919, leaving a surplus in 1920 amounting to \$1,095,670, equal to 1.46 per cent on the common stock as against a surplus of \$1,320,988 in 1919, equal to 1.76 per cent on the common stock.

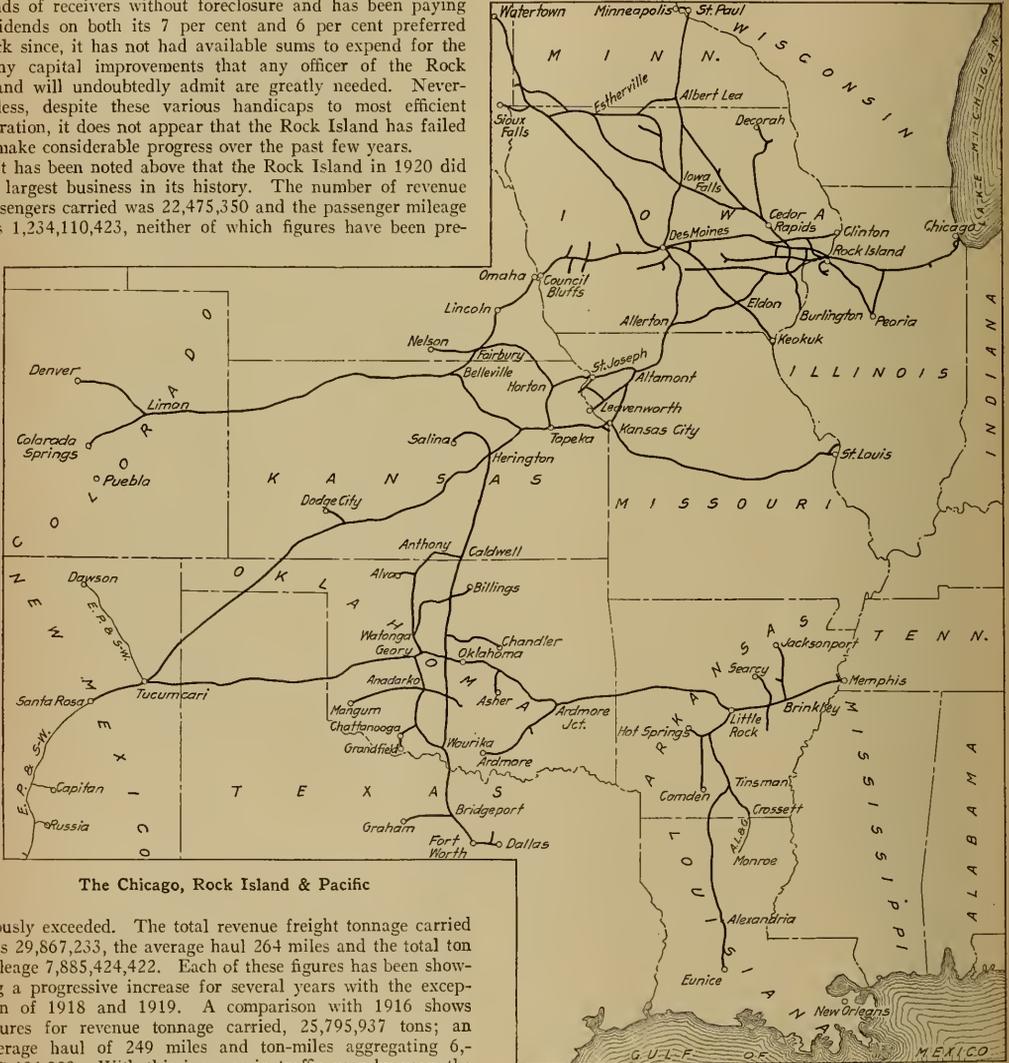
The Rock Island is a system of 8,102 miles, most of which is owned either by the Chicago, Rock Island & Pacific itself, or by its Texas subsidiary, the Chicago, Rock Island & Gulf. Included in its 8,102 miles, outside of the mileage owned there are 262 miles of leased line and 449 miles of line operated under trackage rights. The system's lines extend over a widely extended area; as will be seen from the map this area includes parts of no less than 14 states. Naturally, under these conditions the traffic of the road is quite varied; in 1920, the tonnage consisted of 24 per cent products of agriculture; 21 per cent bituminous coal, or 37 per cent

products of mines, and 22 per cent manufactures. Some of the main lines of the Rock Island carry only a light traffic, while there are also many branch lines which further bring down the average of traffic density. The system is competing with lines, many of which are stronger financially and which, in a number of cases, have more direct routes between important traffic centers. The road has been in the hands of receivers as late as 1916, and although it got out of the hands of receivers without foreclosure and has been paying dividends on both its 7 per cent and 6 per cent preferred stock since, it has not had available sums to expend for the many capital improvements that any officer of the Rock Island will undoubtedly admit are greatly needed. Nevertheless, despite these various handicaps to most efficient operation, it does not appear that the Rock Island has failed to make considerable progress over the past few years.

It has been noted above that the Rock Island in 1920 did the largest business in its history. The number of revenue passengers carried was 22,475,350 and the passenger mileage was 1,234,110,423, neither of which figures have been pre-

tion, however, of 1918, it represents an increase over any previous year.

One of the principal factors in determining train loading, of course, is locomotive capacity. The Rock Island at the end of 1916 had on its lines 1,595 locomotives with a total tractive effort of 47,722,500 lb. and an average traffic effort of 29,921. On December 31, 1920, it had 1,633 locomotives



The Chicago, Rock Island & Pacific

viously exceeded. The total revenue freight tonnage carried was 29,867,233, the average haul 264 miles and the total ton mileage 7,885,424,422. Each of these figures has been showing a progressive increase for several years with the exception of 1918 and 1919. A comparison with 1916 shows figures for revenue tonnage carried, 25,795,937 tons; an average haul of 249 miles and ton-miles aggregating 6,427,424,220. With this increase in traffic year by year, the road has been able also to maintain a similar progressive increase in revenue trainload and with the exception of one year in revenue car load. The revenue trainload in 1920 was 431 tons; in 1919 it was 421 tons; in 1916 but 370 tons. The trainload given for 1920 is not particularly heavy as trainloads go; the steady increase, however, may be regarded as a good indication. The average revenue load per loaded car in 1920 was 21 tons. This is not high. It is not as high as it was in 1918 when the figure was 21.65; with the excep-

tion of a total tractive effort of 52,436,100 and an average tractive effort of 32,110 lb. No one can safely say that the Rock Island is noted as having on its lines the best motive power in the country; nevertheless, as in the case of progressive increase in train loading, this progressive increase in total and average tractive effort of locomotives is interesting. The Rock Island acquired from the United States Railroad Administration but 20 light Mikados and 10 switching

locomotives. In 1920, however, it purchased and has since put in service 10 Mountain, 15 Santa Fe and 10 Mikado locomotives.

The increase in freight car capacity on the Rock Island has not been as marked as the increase in motive power. The total number of cars owned on December 31, 1920, was 52,757 with a total capacity of 1,799,705 tons and an average capacity of 76,122 lb. The number of cars owned on June 30, 1916, was 50,315, the total capacity was 1,750,630 tons and the average capacity per car 75,634 lb. The Rock Island accepted from the U. S. R. A. 2,000 double sheathed box cars and later purchased from the Administration 500 additional cars.

J. E. Gorman, president of the Rock Island, has some rather interesting remarks concerning the maintenance, or rather lack of maintenance, of the property while it was under federal control. The report shows that the maintenance of way expenses in 1920 were 35 per cent greater than in 1919. The figures of work done, while they indicate considerably more accomplished than in 1919, are hardly to be called excessive as compared with more normal years such as 1916 or 1917. Mr. Gorman's remarks relate to the deferred maintenance of the federal control period (26 months) as compared with an average for 26 months of the test period. He gives a number of details of which the following is an abstract:

For maintenance only	Test Period.		Federal control 26 mos.	Deficit
	Average 26 mos.	26 mos.		
Cross ties	\$5,125,564	\$3,348,075	\$1,777,489	
Switch ties, F. B. M.	10,026,542	6,937,215	3,089,327	
New steel rails laid, miles.....	430.49	230.73	199.76	
Ballast, cubic yards placed.....	1,315,196	965,652	349,544	
Pile trestle bridges built, lineal feet.	49,220	17,455	31,765	

Locomotives.—In 26 months of test period, general repairs made to 2,024 locomotives; federal control, to 1,765; a decrease of 259 or 13 per cent. Excess mileage of locomotives between general shoppings 7,872,549 miles greater under federal control than in test period.

Freight Cars, difficult to estimate. During federal control 33.8 per cent on home lines as compared with 61.9 per cent in test period. Cars away from home neglected; estimated increase of 6,705 cars in bad order as compared with beginning of federal control.

Passenger Cars.—During 26 months of test period, 1,424 passenger cars given general repairs as against 1,206 during federal control—decrease 15 per cent.

Mr. Gorman says, "The property was in such splendid physical condition when taken over by the government that even the deficiency in maintenance work shown above has not seriously affected efficient operation, although sooner or later the former high standard of maintenance must be restored." A claim for deferred maintenance has been prepared approximating \$12,000,000.

Mr. Gorman in his report has a great deal to say about the present high wage scales and the handicaps to efficient and economical operation resulting from the National Agreements. It is unfortunate that lack of space prevents the use of some of the pointed examples brought out. However, there is one paragraph that can hardly be passed over; it says, "We believe that railway service should be well compensated, because it requires intelligence, energy, watchfulness and patience of a high order. That the policy of the Rock Island towards its employees has at all times been a fair and liberal one is illustrated by the large number of men who have been in our service for many years—who, so to speak, have grown up on the railroad and have become honored and respected citizens of the communities in which they live. At the same time the present situation, which is not the result of anything done by the company or by its officers, is most burdensome and must be corrected."

The following gives the results of operation in 1920 as compared with 1919:

	1920	1919
Mileage operated	8,102	8,055
Freight revenue	\$94,451,558	\$77,153,311
Passenger revenue	35,472,938	32,502,435
Total operating revenue.....	141,946,973	116,624,684
Maintenance of way expenses.....	26,694,843	19,791,122
Maintenance of equipment.....	34,517,238	26,671,916
Traffic expenses	1,843,282	1,331,860
Transportation expenses	66,708,244	50,347,834
General expenses	3,483,831	2,926,962
Total operating expenses.....	133,535,832	101,497,733
Net from railway operations.....	8,411,141	15,126,950
Taxes	5,894,857	5,046,922
Total operating income.....	2,500,565	10,071,100

The corporate income account is as follows:

	1920	1919
Balance of income (available for dividends)	\$4,663,155	\$4,887,891
Dividends—		
7 per cent preferred.....	2,059,547	2,059,547
6 per cent preferred.....	1,507,938	1,507,356
Total dividends	3,567,485	3,566,903
Balance surplus	1,095,670	1,320,988

Louisville & Nashville

LIKE MOST OF THE RAILROADS of the country the Louisville & Nashville did not have as good net earnings in 1920 as it did in 1919. Perusal of its annual report, issued this week, indicates, however, that it succeeded in coming through the year rather better than most railroads. Taking into consideration the standard return for the first two months of the year and the guaranty for the following six months, the road had a surplus of \$7,758,368 which permitted it to pay quite handsily the usual 7 per cent dividends, amounting to \$5,040,000 on its common stock. The surplus available for dividends in 1919 was \$11,086,869. These results, as good as they may be as compared with those of most other roads, cannot, of course, be called satisfactory. Nevertheless they would seem to indicate that the Louisville & Nashville, once the present handicaps in the form of high wage scales and the national agreements are removed, should be able to continue in the future as one of the more prosperous and efficiently operated railroads of the country.

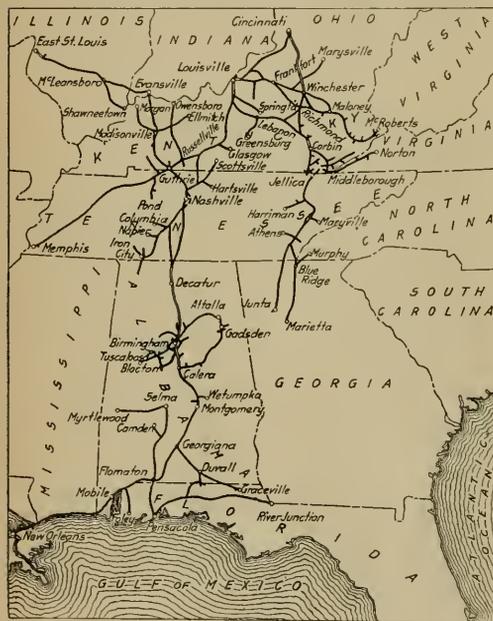
The Louisville & Nashville annual reports do not give a great amount of detail as to the operations of the property during the year covered by a particular report. The lack of these details prevents a detailed analysis of the operating results such as we are able to give in these editorial reviews for most other roads. However, such details as are available either in the annual report or elsewhere go to show what is perhaps already well known—namely, that the Louisville & Nashville is an efficiently operated property and is continuing to show real progress in operating efficiency.

The Louisville & Nashville is a system of no less than 7,696 miles. This does not take into consideration the Atlantic Coast Line, which owns a majority stock interest in L. & N. It does, however, take into consideration the Nashville, Chattanooga & St. Louis, a line of 993 miles which the Louisville & Nashville controls by majority stock ownership; the Chicago, Indianapolis & Louisville, a line of 658 miles, and a majority of the stock of which is owned jointly with the Southern Railway, and also the Georgia Railroad and subsidiary lines in which the Louisville & Nashville is interested as joint lessee. The lines mentioned are each separately operated. The mileage operated by the Louisville & Nashville itself amounts to 5,044. The lines are shown on the map. It will be seen that they extend from Cincinnati and St. Louis south through Kentucky and Tennessee and through the Birmingham district to the Gulf of Mexico with various corollary lines. They cover an extended and pros-

perous area and through their entrance on the Gulf of Mexico at the important ports of New Orleans, Mobile and Pensacola give the Louisville & Nashville a favorable position in traffic from the Birmingham and other districts through the Panama Canal, traffic to South America, etc.

The road is conservatively capitalized. Its investment in road and equipment and in investments in other companies was given as of December 31, 1920, at \$339,463,062. Its outstanding stock, on which it has been paying of late 7 per cent, amounts to \$72,012,117 and its long term indebtedness to \$182,574,282. The company had a corporate surplus as of December 31, 1920, amounting to \$80,489,584. Its interest charges annually amount to slightly over \$8,000,000.

The total freight revenue of the Louisville & Nashville in 1920, as shown in the December monthly statement to the Interstate Commerce Commission, amounted to \$90,686,170, and the passenger revenue to \$26,725,621. The total oper-



The Louisville & Nashville

ating revenues were \$126,371,693 as compared with \$107,514,965 in 1919. The total operating expenses in 1920 were \$121,395,811 as compared with \$92,544,137 in 1919, the operating ratio in 1920 being 96.06 per cent. The net railway operating income in 1920 was \$3,321,221; in 1919 it was \$11,791,845. The standard return for the property while it was under federal control was \$17,310,495; the Louisville & Nashville was one of the few roads which earned its standard return in 1918, when the net railway operating income amounted to \$19,568,935.

The Louisville & Nashville has been doing rather better than most of the roads in southern territory when it comes to average car load, average train load, etc. It has not succeeded, however, in rivaling the Illinois Central, which of late has been making some rather enviable records. The average train load on the Louisville & Nashville in 1920 was 531 tons; the average number of tons per loaded car amounted to 30.5; the car miles per car per day to 30.6 and the ton miles daily per car to 613. These figures all represent in-

creases over 1919. In most cases they exceed the figures for the other roads running in the same territory with the exception, as above stated, of the Illinois Central.

The standard equipment allocated to the Louisville & Nashville by the Railroad Administration included 1,300 50-ton composite gondola and 1,000 55-ton hopper cars, and 18 light Mikado, 50 heavy Mikado, 6 light Pacific and 10 Eight-wheel switching locomotives, all of which were financed through the equipment trust arranged between the railroad, the director-general and the Guaranty Trust Company. In 1920, the road ordered also two Six-wheel switching, 31 Mikado, 12 Eight-wheel switching, and 18 Pacific locomotives, the larger part to be built in its own shops. It ordered also 2,000 55-ton hopper cars and 56 passenger train cars. When this equipment is received the road should be in a favorable position from this standpoint.

H. Walters, chairman of the board, and W. L. Mapother, president, in their remarks reviewing the year's results have this to say concerning the conditions which now confront the property:

"Under the Adamson Act and federal operation, the Louisville & Nashville's actual operating labor payrolls increased \$51,216,022 from \$24,427,677 in 1916 to \$75,643,699 in 1920, equal to 209.6 per cent. During this same period all other expenses increased \$30,239,643, or 172 per cent. Of these other expenses \$19,740,439 are estimated as the increases in the cost of materials and supplies, among which coal increased \$9,790,808 and cross ties \$2,140,277. Since September 1, 1920, all the railroads have suffered from a continuing shrinkage in business. This has become more intense since January 1, 1921, and has reached a point of decline far beyond anything ever experienced before. They are all endeavoring to meet this shrinkage by the exercise of the most rigid economy. The Louisville & Nashville management has seized every opportunity to make savings in the cost of materials and supplies, including coal, lumber and cross ties. Wherever possible train service has been and is being curtailed. Forces of all departments have been reduced by 10,000 men, which still leaves a surplus of more than 5,700 men above those employed in 1916."

The operating results for 1920 as compared with 1919 follow:

	1920	1919
Mileage operated	5,040	5,033
Freight revenue	\$90,686,170	\$76,828,467
Passenger revenue	26,725,621	24,842,673
Total operating revenue	126,371,693	107,514,965
Maintenance of way expenses	22,607,961	16,098,488
Maintenance of equipment	34,750,294	27,828,958
Traffic expenses	2,108,749	1,454,563
Transportation expenses	38,283,655	44,455,752
Total operating expenses	121,395,811	92,544,137
Net from railway operations	4,975,882	14,970,827
Taxes	3,647,448	3,008,063
Net railway operating income	3,321,221	11,791,845

The corporate income account is as follows:

	1920	1919
Standard return 1919		\$17,298,920
Compensation, January and February	\$2,885,082	
Guaranty, March 1 to August 31	9,194,719	
Net railway operating income, September 1 to December 31	2,062,920	
Gross income	16,877,199	19,979,120
Net income	7,863,651	11,176,281
Dividends (7 per cent)	5,040,000	5,040,000

TRADE COMMISSIONER Louis E. Van Norman reports that the Polish government, with the object of encouraging home industries, has recently signed contracts with a number of engineering firms in Poland for the delivery of large quantities of rolling stock for the Polish railways within the next 10 years. Obviously, these firms will need foreign capital and assistance to enable them to carry out the orders. For their first deliveries they will have to rely on importation from abroad of wheels, springs, and locomotive parts. Eventually it is their intention to execute the orders completely in Poland.



New Norfolk & Western 100-Ton Coal Cars

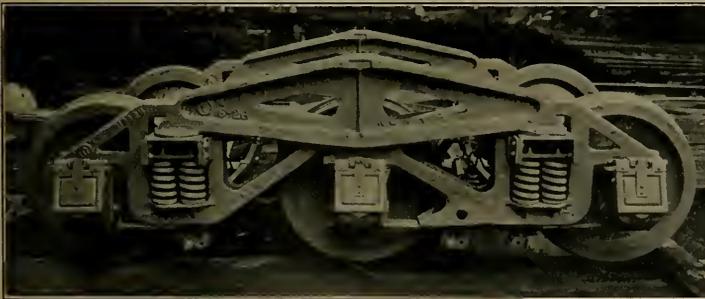
Body Supported on Side Bearings Instead of Center Plate—New
Type Six-Wheel Truck

By John A. Pilcher

Mechanical Engineer, Norfolk & Western

THE LIGHTEST CAR for its load carrying capacity ever built for heavy train service is illustrated in the accompanying drawings and photographs. An order of 500 of these cars is now nearing completion at the Roanoke shops of the Norfolk & Western, under the supervision of A. Kearney, superintendent of motive power. The advantages of a car of such light weight can be judged from an estimate of the cost of operation prepared in connection with this

ries the load on the side bearings instead of on the center plate. This arrangement not only gives perfect equalization of loads between the wheels at all times, but reduces the oscillation of the car to a minimum and contributes very materially to the lightness of both body and trucks. The average weight of car and lading is very near 253,500 lb., the A.R.A. limit for a six-wheel car with $5\frac{1}{2}$ in. by 10 in. journals. The general dimensions and weights of the car are shown in the tabulation. The



Side View of the New Type Truck, Which Carries the Load on the Side Bearings

design. It has been computed that if all these cars could be kept running at the same rate that the first one operated for the first three months, (about 90 miles per day), the additional earnings over those of the previous large capacity cars built by the Norfolk & Western, would pay for them in five years. This accomplishment is due in part to the light weight of the trucks and body and in part to the larger cubic capacity.

The special feature of the design is the truck which car-

ries the load on the side bearings instead of on the center plate. This arrangement not only gives perfect equalization of loads between the wheels at all times, but reduces the oscillation of the car to a minimum and contributes very materially to the lightness of both body and trucks. The average weight of car and lading is very near 253,500 lb., the A.R.A. limit for a six-wheel car with $5\frac{1}{2}$ in. by 10 in. journals. The general dimensions and weights of the car are shown in the tabulation. The equipment applied to this order includes wrought steel wheels. Miner friction draft gear, type A-18-S, with Farlow single key horizontal yoke draft attachments. Four hundred of the cars are equipped with Westinghouse K-2 triple valves and 100 with the Automatic Straight Air brake. The brake rigging has one brake beam per axle. The hand brake, arranged with a quick take-up, is geared to give braking power equivalent to the air brake.

The truck is of the three-axle, articulated type, mainly of cast steel, with two side frames on each side, secured together over the center boxes. The boxes used are the regular A.R.A. standard, although the design lends itself readily to the use of the semi-pedestal type of box, now in very general use. It is the lightest six-wheel truck of this capacity ever constructed. The pair of trucks weighs 24,480 lb.

The springs are so located in the frames as to give equal load distribution on the wheels when equal loads are applied to each group of springs. Beams made to straddle the frames

reach from one group of springs to the other, on each side of the truck, and support the weight of the car at their centers. This gives an equal load on each group of springs. The beams rest upon and are secured to spring caps, tying them

brake levers. A cable guard, to protect the brake beams from the cable used in hauling the cars up to the dumper, is attached to the under side of the diagonal braces, and is itself braced back to the center so that it can serve as a fulcrum for the dead end of one of the brake levers.

The brake is arranged with one beam per axle, using No. 2 beams. The pull from the cylinder rods comes to two of the brake levers set on opposite sides of the truck, eliminating any turning moment on the truck. The separation of the brake lever system on the truck into two parts gives independent adjustment for brake shoe and wheel wear, and prevents accumulating lever angularity. All of the adjusting points are readily accessible. The truck is open and can be easily inspected from alongside the car.

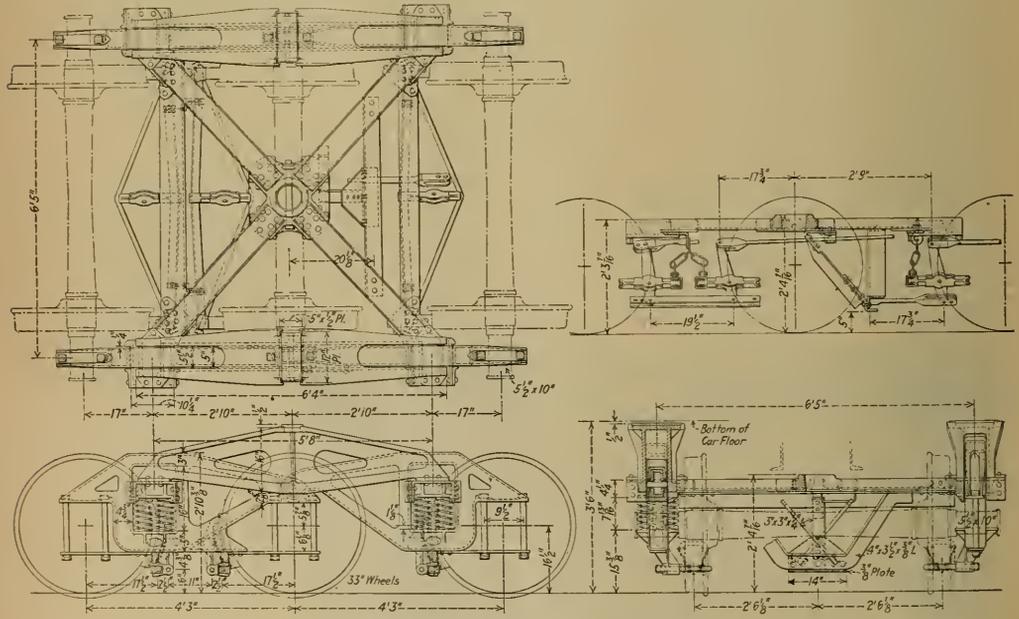
Since there is a possibility of low or soft spots in the track, the four points on the truck side upon which the four groups of springs rest, cannot always be kept in the same plane. The structure resting on the springs must, therefore, be either vertically strong enough to resist the differences in reaction at the four corners, produced by the differences in spring tension in case any one of the spring seats leaves the normal plane, or it must be vertically flexible enough for any corner to follow the spring seat out of the normal plane, without having set up within it destructive stresses.

This rectangular cross-braced centering spider has been

PRINCIPAL DIMENSIONS AND WEIGHTS OF NORFOLK & WESTERN 100-TON COAL CAR

Length over striking plates.....	43 ft. 9 in.
Coupled length.....	46 ft. 2 in.
Truck centers.....	31 ft. 8 in.
Truck wheel base.....	8 ft. 6 in.
Height from rail to top of car side.....	11 ft. 0 in.
Height of center of gravity (loaded with 200,000 lb.).....	81 in.
Inside length.....	42 ft. 7 in.
Inside width.....	9 ft. 6 in.
Outside width.....	10 ft. 1 1/4 in.
Cubical capacity—level full.....	3,122.5 cu. ft.
Cubical capacity—30 deg. heap.....	5,135 cu. ft.
Cubical capacity—including heap.....	5,636 cu. ft.
Revenue load.....	200,000 lb.
Weight of car body.....	29,020 lb.
Weight of two trucks.....	24,480 lb.
Weight of empty car.....	53,500 lb.
Total weight, loaded with 200,000 lb.....	253,500 lb.
Per cent revenue load of total weight.....	78.88 per cent
Weight per foot coupled length.....	5,491 lb.
Weight of one truck.....	12,240 lb.
Rail load per pair of wheels.....	42,250 lb.
Density of load of 200,000 lb.....	55 lb. per cu. ft.

together lengthwise of the truck, and are themselves side members of a rectangular, cross-braced centering spider, which serves to hold the two sides of the truck together and



General Arrangement of the Six-Wheel Truck

in proper relationship. The truck is thus held square. The cross bracing holds the guide for the centering pin on the car body. The keepers, riveted to the outside of the spring caps, and the projecting lugs cast on them coming inside the frames, are the guides to hold the frames together and apart. The carrying beams, straddling the frames, are riveted to the top of spring caps and serve in a like capacity.

The design, which is light in weight, readily gives the strength to resist forces in any horizontal direction. One of the cross-tie members is made of an angle to give it stiffness and permit the attachment of the dead end of one of the

designed to meet these conditions. Careful tests were made by fastening three corners to a rigid frame and raising and lowering the fourth corner by means of a rail gaging machine with a stroke of 1 1/2 in. Two corners were tested, being subjected to 80,000 and 100,000 reversals of stress respectively. Measurements of the stresses showed that only a relatively small differential of loading at the corners will overcome the vertical stiffness of the spider and the unit stress is so low that there is little danger of fatigue failures in ordinary service.

The use of the side bearings placed over the center of the

truck side frames for load carrying, obviates the necessity for the strong, heavy bolster members from side to side of truck, supporting the load at its center. This not only decreases the weight of the truck, but also decreases the weight of the car body bolster, in that it does not need the strength to carry the load from the car side all the way to the center, but only for the very much shorter distance to the points over the truck side frames.

The Car Body

The general drawing of the car and the arrangement of the body bolster show the location and details of the load carrying conical rollers. Only enough of the middle section

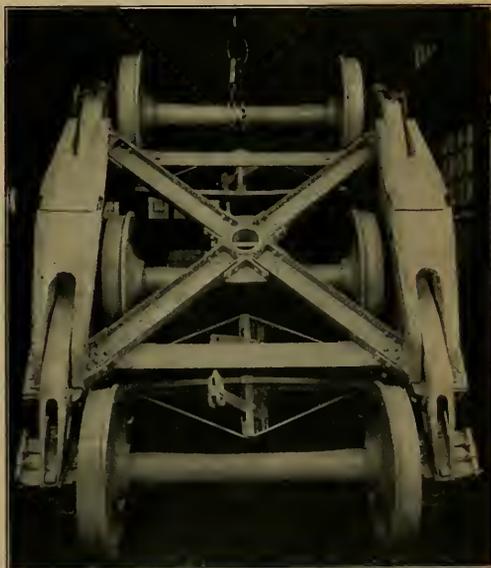


Interior of the Car Body

of the conical roller is used to provide sufficient lateral movement at the roller for the car to negotiate a 35 deg. curve. The bottom of the roller is limited in its lateral movement by the sides of the opening in the bottom of the car through which the roller projects. The body bolster is made hollow to allow room for the roller. The bottom face of the roller is set in a horizontal plane normal to lines of load forces, in order that there may be no horizontal components tending to displace the load-carrying side beams on the truck. The projections on the bottom side of the roller at each end serve as guides for proper placing. Normally these projections should not come into action for holding the bottom of the roller in place on the truck side beam.

The upper sides of the conical rollers incline toward the center. The lateral component of reaction against the inclined surface on the roller seat is taken up by compression in the body bolster and tension in the rod tying the two opposite rollers together. In case anything should happen to this rod, these reactions will all be within the roller seat itself. The outside end of the roller seat is made of sufficient strength to take care of these forces. The tie rod passing through a slotted hole in the inside projecting lug on the seat serves to hold the rollers in place in case the car is jacked off the trucks. The roller is guided on its top side by the pocket in the seat. It is cast of high carbon steel and bears against hardened-steel plates, top and bottom. It is made long and of large diameter, reducing to a minimum the probability of flattening the contact surfaces.

The use of conical rollers of large size makes this approximately an anti-friction bearing, and reduces to a minimum



A View of the Truck from Above, Showing the Centering Spider and Beams Spanning the Side Frames

the forces needed to rotate the truck under the car. Any slight flattening of the contact surfaces that might occur after a long period of service would only very slightly increase the forces needed for the turning. Even if after years of service the surfaces should flatten to an objectionable extent, the renewal of rollers and seats is a simple and comparatively inexpensive operation.

The roller seat at its top side conforms to the shape of the inside of the bolster plates and distributes the load over a large portion of the surface, requiring very little riveting to hold it. The holes in the sides of the car are used for entering and securing the tie rod connecting the rollers. They are reinforced on the inside of the side plates with bracket castings and furnish a place for a special hook provided with the wrecking outfits, for lifting the car body in any emergency. Some such arrangement is necessary since the use of ordinary hooks indiscriminately at any point on the loaded car would give such heavy concentration of loading as to tear and mutilate the car body.

A tee is used to increase the section of the top flange of

the bolster girder, and its top extending web serves for the attachment of the bolster gusset plate. This gusset plate connection with the side of the car, together with the beaded angle at each end of the bolster, connecting the bolster web plates with the car side, transfers the load coming from the car side through the body bolster to the roller seat, without undue concentration at any point. The car body bolster is placed above the car floor line so as to give room under the car for the supporting beam on the truck over the center box and truck side frames. This allows reasonable depth and economy in the design of the beam.

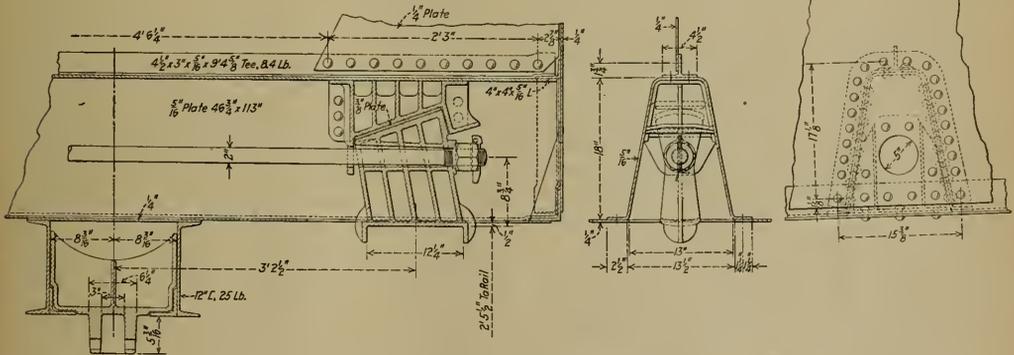
On a hopper car the hollow bent plate bolster can be placed in the same relative position to the truck without being placed above the inclined floor of the car. The centering casting on the car body is integral with the draft gear back stop. The holes receiving the pin fastening together the body and truck center castings are slotted in order to allow the necessary angular movement between truck and car. There is no normal vertical movement between these two parts.

The center portion of the car, between trucks, has the bottom placed on a line with the bottom of the center sills, thus gaining additional cubic capacity and slightly lowering the center of gravity. The cross diaphragms in the car framing become the ends of the depressed bottom. On the outside

the track, without undue stresses within itself, and without great differences in the load pressure on the four supporting points. This would not be possible with a closed-top, rigid car body. When such a rigid car body is used, a method of cross equalization on one end of the car must be introduced with a truck of this type.

Observations made on previously constructed large open-top cars, in connection with the adjustment of the side bearings, indicated there would be no difficulty in supporting such a car on four points. In fact, with the close adjustment of the side bearings, to prevent excessive rocking, the car body had, in a measure, to accommodate itself to the changes in the plane of the track, and has been doing this for a number of years without any apparent detriment.

Some experiments were conducted with the object of determining just to what extent such a car body could be warped out of its normal plane without detriment, and without excessive changes in the loading on the four points of support. The first tests were made on a flat bottom gondola, both empty and loaded. The car body was brought to a level plane resting on four groups of calibrated springs. By measuring the height of these springs, the load on each corner could be determined. Liners of various thicknesses were then placed on top of the springs at diagonal corners



Arrangement of Body Bolster and Conical Roller

of the car, short pieces of tee section, the same as the side stakes, are placed so as to come opposite the cross diaphragms and bear against the car dumper blocking, supporting the car at a strong point of reaction. The side stakes and top coping angles serve the same purpose.

The vertical corner angles connecting the side plates of the car with the end plates have the flanges attached to the end plates turned out, so that the projecting edge of this flange, together with the edge of the plate riveted to it, will bear against the dumper blocking, thereby helping support the weight of the car and lading and protecting the grab irons from injury. Both the corner push-pole pocket and reinforcing bracket casting, under the center of the body bolsters, furnish places for jacking and stooling the car. The general details of construction can be understood from the drawings:

Car Body Support

A car body resting, as does this one, on four points of support, two on each truck, on rollers, allows for the vertical angling between the plane of the truck and plane of the car in passing the sharp vertical curves of the tracks leading to the dumper. These four points of support also make it necessary that the car body be measurably flexible, in order that it may accommodate itself to the changes in the surface of

so as to bring the car body to a warped plane. Readings were taken with several different adjustments. The maximum warp in the car body for the light car was 3 in. off the plane of the other three points and on the loaded car, 2 1/2 in. The maximum change of load at any one point during the test was 5,834 lb., a little more than 10 per cent of the load on any one point. Similar tests were made on the empty body of a 100-ton hopper car. The results were similar to those made on the 90-ton car, but the readings indicated that this car body was erected with about 1 1/2 in. or 2 in. warp out of the true plane.

On the completion of the first new side bearing supported car an additional series of winding tests was conducted, both with the car on blocks and mounted on its own trucks. This car body also was found to have a warp of about 2 1/2 or 3 in. The results bear out the previous test for winding on the car body and show conclusively that an open-top car of this character can be carried on four points of support and conform itself to the changing plane of the track without undue stress and without marked change in relative loading on the four points. About 400 of these cars are now in regular service and nothing has developed to indicate other than the deductions given above.

Before the first car was delivered for regular service, it was tested for clearance between the truck and car in curving

up to curves of 35 degrees using for this purpose a conveniently located turntable. One truck was placed in a fixed position on the turntable, with the other truck moving along the track as the table was turned to the extreme point the clearance between the truck and car would allow. By using the diagram shown in the drawing, and reading the movement of the turntable in inches at its circumference, the angular difference between car and truck and the corresponding curvature in track over which the car could run without fouling, was readily determined.

Security Owners' Position Defended

THE ACTION of the National Association of Owners of Railroad Securities in meeting with representatives of the "big four" brotherhoods on April 4 was defended by Haley Fiske, president of the Metropolitan Life Insurance Company, in a letter addressed to A. H. Smith, president of the New York Central, which was made public on April 11. Mr. Fiske is a member of the sub-committee of the Association which met with the employees' representatives and his letter was in reply to a letter of the previous week from Mr. Smith to S. Davies Warfield, president of the Association, in which the action of the Association in calling the meeting was characterized as "unfortunate" (*Railway Age* of April 8, page 904).

Mr. Fiske in his letter warned that "the present truculent attitude of some railroad administrations toward the operatives and the unions" is a "mistake which may lead to disaster." Mr. Fiske stated further that it was "disturbing to find" Mr. Smith and the New York Central directors resenting the action of the Association to protect its interests. Furthermore Mr. Fiske said that his associates have met with "rather violent antagonism" in their "efforts to promote helpful legislation, which, now that it has been passed some of your people are taking credit for."

Mr. Fiske's letter follows:

When we read in the newspapers to which you sent it in advance of its receipt by the addressees your letter of March 31 to Mr. Warfield and Mr. Stone we were disposed to reply in as sharp a tone as that displayed by you. But it seemed better to take the matter under cool consideration. Now, after the lapse of a week, we feel that we should make protest.

This company holds securities of your railroad and its subsidiaries to the amount of nearly \$23,000,000 par value, and in addition has on its books loans and agreements to loan over \$9,000,000 on bonds and mortgage upon real estate to finance your operations in the neighborhood of your terminal. Altogether our financial interest amounts to \$32,000,000. This is about 15 per cent of our total investment in railroad securities.

Frankly, it disturbs us to have your board of directors say that they represent in their dealings with the present condition of affairs the stockholder, without any recognition of the superior obligations of the railroad companies. It may very well be that as matters are now threatening the stock will become a rather negligible quantity; the bonds will never become so. Our interest in your company is a vital one. It is very disturbing to read that you are disposed to ignore this interest. It is even more disturbing to find yourself and the board resent any action on our part to protect our interests. We have seen no disposition on your part to recognize our interests or to consult with those who in a sense own your property. On the contrary, we have seen in the past rather violent antagonism to our efforts to promote helpful legislation, which, now that it has been passed, some of your people are taking credit for. None of the railway managements has thought it wise to seek any counsel or to recognize in any way the serious situation in which we find ourselves. On the other hand, you are objecting—if you will pardon us for saying so—in an offensive, not to say impertinent way, to our endeavor to protect our own investments. We feel that we had a right to expect co-operation and help rather than opposition.

Your assumption that in seeking a conference with the labor representatives, the most important element in the present problem, we are pretending to represent you or your board was quite unwarranted. We very frankly put our real position before these organizations and the public. We think the present truculent attitude of some railroad administrations toward the operatives and

the unions a great mistake which may lead to disaster; and that it is time that all concerned in the properties should show some conciliatory disposition, at least to the extent of endeavoring to get the point of view of labor and to seek some method of negotiation to end the present impasse.

And now that our conference is over, we feel that we have accomplished much. In our opinion it is time that all of the interests—the investors, administrators and operatives—get together, and that it is not a time for recrimination.

New York Public Service Commission Law

THE LAW OF NEW YORK STATE reorganizing the public service commissions of the state was briefly noted in the *Railway Age* of April 1, page 862. A single commission has authority throughout the state except that a separate commission, the Transit Commission, has jurisdiction over elevated and subway railroads, surface railroads and stage or omnibus lines lying wholly within New York City; also, within the city, over street railroads whose lines may extend outside; and over local service, within the city, on all railroads.

The law consists wholly of amendments to the existing law as it was framed in 1910, which law, as affecting railroads, was based on the act passed in 1907. This last mentioned act was printed in full in the *Railroad Gazette* of May 31, 1907.

The new public service commission, sitting at Albany, and taking the place of the present commission for the second district, is to consist of five members, the governor designating the chairman. The term of a commissioner is ten years and he is removable only on the consent of the legislature by a two-thirds vote. The Transit Commission consists of three members with terms of five years each. These are removable in the ordinary way, by the governor. The salaries of all eight commissioners are \$15,000 each.

The public service commission is to regulate not only railroads, gas companies, lighting companies, heating companies, etc., as has been done heretofore, but also omnibus routes (except in New York City).

The public service commission is to maintain a branch office in New York City and the offices of both commissions, as now, are to be kept open from 8 a. m. to 11 p. m. The secretary of each commission is to receive a salary of \$6,000.

One of the important reasons for the enactment of these revisions at this time was to relieve the critical financial condition of the subway and elevated railroads in New York City; and the Transit Commission is empowered to authorize an "immediate, reasonable, temporary" increase in fares. This power is granted also to the public service commission as related to all carriers, and includes authority to fix rates for fares and freight "notwithstanding a higher or lower rate has been prescribed by a general or special statute, contract, grant, franchise condition, consent or other agreement." The Transit Commission, however, dealing wholly with New York City, is subject to restrictions requiring co-operation, with city authorities in the revision of any of the existing contracts between the railroad companies and the city.

The public service commission has power to revise prices of gas and electricity in general on the same terms as the authority granted in connection with railroad rates.

Article VI of the present act consists of ten pages setting forth additional powers and duties of the Transit Commission, and providing for co-operation with the city authorities.

THE ROUMANIAN GOVERNMENT has signed a contract with the government of Austria for the rental of 100 locomotives and 2,000 cars.

Canadian Government Railways Incur Heavy Losses

Deficit, Including Interest on Entire Investment, Over \$140,000,000
a Year—Operating Ratios 109 to 410 Per Cent.

By J. L. Payne

Formerly Comptroller of Statistics, Department of Railways and Canals of Canada

TO THOSE WHO READ the analysis which I offered in a preceding issue* of the deficit on the Canadian National Railways group for the current year it will be obvious that a capital liability of \$2,284,125,057 could scarcely fail to produce the fixed charges of \$106,301,744 assigned to it. That would represent an interest rate of but 4.65 per cent, which is rather low. There are, however, rents, taxes, interest on floating debt and so on, attaching to 22,500 miles of line to be added; so that suspicion of exaggeration could not reasonably arise. Moreover, it must be borne in mind that nearly \$400,000,000 has been contributed to the total liability since 1914 in government advances to acquired roads, apart from several hundred millions on account of the Intercolonial and Transcontinental, and probably half of that amount, if not more, will bear a rate up to or over 6 per cent. Late last year \$50,000,000 was borrowed on long term notes in New York at 7 per cent.

These more modern advances by the government suggest at once one of the most distressing features of this whole matter. Let us agree it is mere fatality, whatever some might be disposed to say as to other reasons, that the government has found the burden growing at a truly alarming pace year by year since this huge scheme of nationalization was given effect. Proof of that growth is found in the steadily rising volume of cash aid which the government has been obliged to give. The Minister of Railways is now before Parliament with a request for \$168,000,000 on this account, which omits \$35,000,000 borrowed a few months ago on notes. These two sums are equal to nearly 50 per cent of the total revenue of the Dominion. It is actually \$31,000,000 in excess of the total national receipts for 1916.

It is the swelling character of this load which makes the situation so grave and causes such acute apprehension for the future. Last year the deficit was nominally placed at \$47,000,000; this year at \$70,000,000. At that rate of progression the burden would soon be disastrous. It is unbearable now, and measures of relief must be found. If all other conditions remain stationary, it will be seen that the capital additions for the year alone will raise the deficit next year by upwards of \$12,000,000 by reason of new fixed charges.

Operation Ratios of 109 to 410 Per Cent

The weakness of the various units composing the Canadian National group may be gathered from one or two comparative statements which will be peculiarly enlightening to railway men. Take the operating ratio, for example. In the report of the deputy minister of railways, issued this year for the first time, the position of the various units is shown in that regard to have been as follows in 1919-20:

Canadian Northern.....	112.08	Moncton & Buctouche.....	231.86
Canadian Government.....	114.52	Elgin & Havelock.....	285.69
Canadian National.....	113.14	St. Martin.....	409.60
Intercolonial.....	108.95	York & Carleton.....	326.59
P. E. Island.....	167.55	Salisbury & Albert.....	257.61
International.....	280.78	St. John & Quebec.....	205.07
Transcontinental.....	125.63		

While these names will be a little puzzling to American readers, and it is not worth while trying to explain them, the figures which are opposite to them are significant. These roads are all included in the Canadian National system, and

the ratio of operating expenses to gross earnings as shown must be measured against, say, 75 per cent in determining the measure of unsoundness. That is to say, no road which goes beyond 75 per cent can be regarded as healthy, unless the conditions are quite exceptional. This adverse showing is in part explained by the fact that the moment a small line is taken over by the government, standard rates are charged instead of local, and an immediate shrinkage of revenue takes place. Of course, while that explains the cause in small part, it does not alter the financial aspect in the slightest; and we are here merely concerning ourselves with the facts in their relation to the total burden upon the people.

The situation is not bettered when earnings and operating expenses per mile of line are considered. Here are the facts for 1919-20:

	Earnings	Expenses
Canadian Northern.....	\$5,558	\$6,230
Intercolonial.....	17,735	19,344
Prince Edward Island.....	3,335	5,588
International.....	1,673	4,698
Transcontinental.....	5,804	7,292
Moncton & Buctouche.....	1,682	3,900
Elgin & Havelock.....	857	2,449
St. Martin.....	616	2,523
York & Carleton.....	1,458	4,761
Salisbury & Albert.....	1,350	3,426
St. John & Quebec.....	965	1,980

In fact, no matter from what angle the problem is approached the financial aspect shows up discouragingly. While that aspect has been peculiarly worsened as the result of exceedingly adverse conditions affecting all railways in North America, it is more serious on the government road than on others. I do not care to discuss probable reasons. That the people did not know how bad it was is due in part to the system of accounting which has been followed—or lack of system. A very large annual deficit, which should have been specifically assigned to the government railways, was scattered about in the public accounts, chiefly in the form of charges connected with the national debt. What has here been done in large part, has been to bring all such liabilities out of the places where they did not belong and put them where they did belong. This has not to the extent of a penny increased the actual loss. It has merely revealed and consolidated it in its proper place.

In keeping with the orthodox plan, sanctioned by ancient precedent, the minister of railways announced the other day that the deficit would be "about" \$50,000,000; but, he added, that figure "did not include certain fixed charges." He did not hint at the probable volume of those charges. He followed the pattern set by his predecessors and left the facts to be assumed. That has been the course followed for two generations. Several days later, and just as this article is being sent out, he has definitely placed the deficit for the past year at \$70,331,734. But his call for appropriations aggregating \$168,000,000 and the realization that this sum may bear some relationship to the real deficit on the Canadian National Railways when all factors have been reckoned, has profoundly stirred the whole country. There is an insistent demand for information. As has already been said, the newspapers have taken up the matter in a spirit of earnest enquiry. As many columns are being written these days about the railway situation as were lines in the times when this vast liability was in process of

**Railway Age*, April 8, p. 883.

accumulation. Just what may develop out of this new attitude of the public no one may say at this moment.

Business Men "View With Alarm"

The first shot has been fired by the Board of Trade of the ancient city of Quebec. At a meeting held on the afternoon of March 15, the following resolution was adopted and telegraphed to all sections of the country:

"That the Quebec Board of Trade views with alarm the recent declaration of the Honorable the Minister of Railways, in the House of Commons, to the effect that last year's operation of railways by the government would result in an increase of the public debt of Canada to the extent of \$140,000,000, to meet the deficits in the operation of these railways and to provide additions to their equipment and betterments.

"That this board, in common with other commercial bodies in Canada, has repeatedly expressed to the government its disapproval of the policy of government operation of railways.

"That the policy of the management of the government railways in diverting the grain trade of the west to New York for export, and, by means of prohibitory freight rates, preventing this grain from coming to Canadian seaports for shipment, is most reprehensible and unpatriotic, and has resulted in the payment of many millions of dollars of freight money to United States railways, that should have been earned by Canadian railways, and if so, would have gone a long way to reduce the alarming deficit under government operation which all now deplore.

"That it is impossible for Canada to go on meeting losses of this magnitude, which in a few years might seriously impair the credit of the country, and this board is of opinion that the government should seriously consider the future management of the Canadian Northern railway, before going any further with regard to the acquisition of the Grand Trunk."

The protests to which the foregoing resolution makes reference are not available at the moment. Under any circumstances, they were taken as a matter of course, and did not arouse any particular feeling in the country. It would seem that a great change has suddenly taken place in that regard. Today a marked spirit of inquiry, suggesting a determined desire to know the truth, whatever it may be, is in evidence. Out of this public awakening may come some new constructive policy. I am not disposed to speculate upon the probable character of that policy. All sorts of suggestions are heard, some of them extremely radical. There is even some hint from labor circles of the expediency of trying the Plumb plan, with which the people of Canada are wholly unfamiliar at the present time. There would not seem to be the slightest probability of that being done; but as to what else may be urged, as the matter more and more engrosses public thinking, I could only guess.

Government Ownership Never

Submitted to Public Consideration

That such stupendous events should happen without the question of state ownership having been submitted to public judgment will naturally surprise your American readers. Yet I have tried to make it clear under what extraordinary circumstances the present government railway system was brought into existence. While all well-informed men knew that it would be a costly business for a time, there was no doubt a general expectation that the weakness of the Canadian Northern would give place to strength as time proceeded. Few people realized how desperate was that weakness, or how much would be required to bring it up to a sound operating position. Its traffic density was exceedingly low, and it was one of the poorest equipped roads in the world. Equipment costs a great deal of money today. The Canadian Northern was not, however, essentially weaker than was the Grand Trunk Pacific, because of the tremendous capital cost per mile of the latter. It amounted to \$104,000 per mile, now greatly increased by government advances. These two roads ran parallel for hundreds of miles and competed for traffic which either could have handled.

If there is any one fact in connection with the whole Canadian railway problem which stands out as an example of state blundering it is to be found in the creation of these two rival systems. Neither could have been financed without public help, and to a large extent both were constructed on state credit and under state auspices. The volume of private capital put into these roads was relatively small. If there had been a careful survey of the transportation needs of the West, and a policy of progressive construction adopted as those needs became real rather than prospective, it is just possible these two systems could have found a place in western Canada. As it is they both occupy practically the same territory, showing slow development of traffic.

It has not been a pleasant task to write this story. It is dismal and distressing. But, if a personal explanation will be pardoned, it has been my life work to study matters of this nature, and it has seemed to me that I was in a peculiarly favorable position to present the facts. That has been my sole purpose. Not a syllable has been written about the broad principle of public ownership. That is an issue which has never arisen in connection with the Canadian railway problem—at all events not before the people. If there had been a deliberate choice of the present plan as against the corporate plan, then, quite properly, a great many pertinent conclusions would seem to be suggested; but I have left the drawing of deductions from the Canadian experience to others. As for myself, I have written wholly without prejudice. My own judgment as to what might have occurred under capable corporate management is decided; but has no place in this review.

Whole Country Is Aroused

It is perhaps unfortunate, in some respects, that my analysis of the situation had been completed, and much of the foregoing matter actually written, before the Minister of Railways presented his annual statement to Parliament on March 17. Had his figures been available to me, instead of merely the advance press abstract, I should have adopted them as more or less authentic—at all events as not being open to question by his department. Any difference that exists between his calculations and mine clearly shows that I have understated rather than overstated the facts, and I would rather have it that way. If what he omits is brought into the reckoning, as I have tried to do in a judicial spirit, it will be seen at once that the burden now resting on the Canadian people as the result directly and indirectly of railway nationalization is well over \$140,000,000 a year; for the press statement, which bore all the stamp of official authenticity, placed the operating deficit for the fiscal year 1920 at \$21,250,000, while the Minister later enlarged it to \$36,842,970. The difference between these two figures must be added to my calculation of the probable deficit for the current year, and it will be seen at once that it is thereby raised to considerably over \$140,000,000.

Parliament is in session, and it seems there is a movement on foot to take the matter out of all party controversy. It is felt that the situation is far too grave to be discussed in the ordinary way. One of our leading newspapers implies that the very life of the nation is involved in the finding of a practicable solution. The supporters of the nationalization idea have hitherto been discounting adverse results as due to conditions purely temporary in character, and it must be confessed that the fine optimism growing out of that view was shared more or less by the people at large. Now there is a great change. Until, however, time has been given for the evolution of some definite policy it would be idle to speculate. As a matter of fact, I have not the remotest idea what will even be proposed. All I know is that the whole country is aroused, and that everybody is convinced there must be a vital change. When the people take a hand something is likely to happen.

President Urges Reduction of Transportation Costs

Mr. Harding Continues Conferences—Meets Labor and Security Owners' Representatives

WASHINGTON, D. C.

PRESIDENT HARDING, in a brief discussion of the railroad situation in his address to Congress on Tuesday, probably disappointed numerous believers in legislative panaceas when he declared that "railway rates and the cost of operation must be reduced" without recommending any additional legislation to accomplish such a result. Probably a more definite feeling of disappointment was caused among those who have been shouting for rate reductions regardless of costs by the fact that he coupled the two in such a way as to carry the thought that a reduction of costs is perhaps a necessary precedent to a reduction in rates.

The President also made it plain, if there had been any doubt on the subject, that his mind has not been turning in the direction of another experiment in government operation as a possible solution when he said: "If we can have it understood that Congress has no sanction for government ownership, that Congress does not levy taxes upon the people to cover deficits in a service which should be self-sustaining, there will be an avowed foundation on which to build." He had previously referred to "government operation in heedlessness of cost" in referring to the period when railway deficits were being covered by taxation and in his reference to the merchant marine he had urged "government encouragement, not government operation."

He made clear, however, his opinion that freight carrying charges are too high—he did not mention passenger rates specifically—but he referred to the low tide of business as a cause of the present difficult transportation situation rather than as an effect, as so many have preferred to consider it.

The part of President Harding's address relating to railroads read as follows:

The great interest of both the producer and consumer—indeed, all our industrial and commercial life, from agriculture to finance—in the problems of transportation will find its reflex in your concern to aid re-establishment, to restore efficiency, and bring transportation cost into a helpful relationship rather than continue it as a hindrance to resumed activities.

It is little to be wondered that ill-considered legislation, the war strain, government operation in heedlessness of cost, and the conflicting programs, or the lack of them, for restoration have brought about a most difficult situation, made doubly difficult by the low tide of business. All are so intimately related that no improvement will be permanent until the railroads are operated efficiently at a cost within that which the traffic can bear.

If we can have it understood that Congress has no sanction for government ownership, that Congress does not levy taxes upon the people to cover deficits in a service which should be self-sustaining, there will be an avowed foundation on which to build.

Freight-carrying charges have mounted higher and higher until commerce is halted and production discouraged. Railway rates and costs of operation must be reduced.

Congress may well investigate and let the public understand wherein our system and the federal regulations are lacking in helpfulness or hindering in restrictions. The remaining obstacles which are the heritage of capitalistic exploitations must be removed, and labor must join management in understanding that the public which pays is the public to be served, and simple justice is the right and will continue to be the right of all the people.

President Continues Conferences

No suggestion was made that any plan of action which has been urged upon the President during his recent conferences on the railroad situation has yet commended itself to him and there was no indication as to whether he has more faith than some others have as to the willingness or ability of the Railroad Labor Board to function in time and in the

right way to help remedy the situation or as to whether he has in mind some plan not yet matured which he proposes to discuss later. He has consulted with the chairmen of the Interstate Commerce Commission and the Railroad Labor Board and with representatives of the labor organizations and of the bondholders but he was to begin his discussion with the representatives of the managerial chiefs of the roads on Wednesday with T. DeWitt Cuyler, chairman of the Association of Railway Executives.

President Harding has continued his conferences with labor leaders on the railroad situation and in addition to those previously mentioned, he conferred on April 6 with W. L. McMenimen, deputy president of the Brotherhood of Railroad Trainmen, and on April 9 with L. E. Sheppard, president of the Order of Railway Conductors. He had previously talked with B. M. Jewell, representing the organizations affiliated with the American Federation of Labor, and with W. S. Stone, representing the engineers, and W. S. Carter, representing the firemen. It is understood that the heads of the train service brotherhoods advocated the plan they had previously discussed with the railroad executives, for regional agreements and regional boards of adjustment, which was referred by the Association of Railway Executives to the railroads in the various districts.

Security Owners Representatives

Confer With President

Darwin P. Kingsley, president of the New York Life Insurance Company, and S. Davies Warfield, president of the National Association of Owners of Railroad Securities, conferred with the President on April 8 as members of the executive committee of the association. They were also members of the special committee that conferred with the heads of the train service brotherhoods and other organizations at New York on April 4 and they urged upon the President the plan that has been advocated by the "big four" brotherhoods for a discussion of the wage questions by bi-partisan regional boards. This differs from the plan proposed by Mr. Jewell and his associates, who have urged the President to call a conference of the railroad executives and of the labor leaders for the purpose of discussing a national adjustment. Mr. Warfield and Mr. Kingsley, however, insisted that wage adjustment is only part of the problem and called attention to the Warfield plan put forward by the association as a means of effecting other economies. After the conference a memorandum left with the President by Messrs. Warfield and Kingsley was made public, as follows:

In your intensive study of the railroad problem we respectfully direct your attention to these facts:

You are aware that for the months of January and February—and a similar result is forecasted for March—the railroads of the country, as a whole, are not earning, by many millions, sufficient to pay the interest on their bonds and other outstanding debt.

This condition cannot continue without numerous receiverships with far-reaching effect. The resulting reorganizations would cause great loss not alone to owners of railroad securities but in other values. The alternative of a legislative suspension of legal proceedings through a national railroad moratorium or of temporary relief through large additional government loans, are necessities to be avoided if humanly possible. Further suspension of earning power is fatal.

The situation is of peculiar concern to the investment institutions of the country, its savings banks and life insurance companies particularly. Many millions of people are dependent upon the current payment of interest on the railroad securities owned

by them. A prolonged suspension of the payment of interest on the bonds of a great number of railroads would materially lessen the ability of these institutions to meet their requirements.

If this emergency continues much longer, the bonds must be drawn actively into the situation; and bondholders' protective committees will become necessary for the protection of the various classes of securities affected by the conflicting equities of receiverships or suspended payments. This will add to already greatly disturbed conditions.

Representatives of the railway executives' association ascribe the trouble to wages and working conditions; representatives of the employees insist that the fault lies largely with inefficient railway operation.

The suggestion is heard that railway managements if left alone will produce results—meaning reduction in wages sufficient to enable the roads to meet their obligations.

There has been unnecessary delay, friction, and a sacrifice of the merits of the question to controversies over procedure. There is lack of co-ordination between railway managements and the employees. Policies have been adopted, reversed, rescinded and new policies started through the same process.

The National Association of Owners of Railroad Securities represents in its membership nearly \$12,000,000,000 of railroad securities, largely bonds. It is the means through which the security owners, as a body, are collectively heard. In the present crisis we could not stand by and await the inevitable result without an endeavor to ascertain at first hands the causes for the existing conditions before urging intervention upon your Administration which alone can secure immediate results. Since September 1, 1920, the drift toward the present difficulty has been constant and progressive.

To ascertain if the results indicated can be avoided, the association of security owners, through its executive committee, after reviewing the contentions of representatives of the railway executives' association and the general procedure advocated, named a special committee to confer with those who represent large numbers of railroad employees. One of the principal impediments to a settlement is the lack of proper understanding between the roads and those who work upon them. There has been wholly unnecessary delay and uncertainty as to procedure, with lack of appreciation of the real questions in controversy. We believe our known attitude toward intensive economies in railroad operation would guarantee to those we were to meet the sincerity of our approach.

The conference has been held. It covered a wide ground and the conclusions of the committee representing the security owners are that a solution can be found and a just settlement arrived at. We suggest that properly called meetings between the men and those representing the railroads be held, under the auspices, if you think proper, of the existing governmental agencies—the labor board and the commission. Perhaps these bodies will co-ordinate their efforts, in some degree, in this emergency.

We are on record that wage adjustment is only part of the problem. That this should be attained under circumstances carrying assurance to railway workers that whatever may be fairly brought about is reasonable and just. This was one of the reasons for presenting our statement to Senator Cummins on March 21, in advance of his proposed investigation.

It occurs to us that it is not an unreasonable position on the part of those representing the men that deficiencies in revenue should not be met by wage reductions alone unaccompanied by evidences of the definite intention to bring about obligatory general economies.

The association of security owners is now preparing the data for suggestions of economies to be laid before the committee of the Senate which will review existing railway conditions. We believe that fundamental economies can be effected. We feel that in justice to the shipper and railway labor, they must be inaugurated. We have stood definitely committed to that program since January, 1919. This however takes time. That program cannot become finally effective without the co-operation of the necessary governmental agencies, including Congress.

We believe that affirmative action on the part of the administration in calling upon the managements and the employees to discuss and settle differences that are not composed on the individual roads will be effective. A multiplicity of trials before the labor board will not accomplish the result in time to avoid major damage.

If assured that your administration will urge an adequate program of economies, accompanied by legislation to that end, we believe that in the cases in which an agreement cannot be reached with an individual railroad management, that the employees would enter into immediate discussion of their differences by regional boards, equally divided, formed by each of the four groups of railroads as now arranged by the commission for ratemaking purposes. Procedure of this character is encouraged and contemplated by the Esch-Cummins act. It would avoid endless hearings and clogging of the dockets of the labor board,

which means perhaps fatal delay. Your intervention, Mr. President, along the lines suggested can put an end to the impossible conditions that now exist and which threaten the financial structures of the railroads with serious consequences.

Thomas DeWitt Cuyler, chairman of the Association of Railway Executives, with Alfred P. Thom, general counsel of the association, called upon the President on Wednesday by appointment for the purpose of handing in the six names from which the President, as provided in the transportation act, will select one for appointment to fill the vacancy in the management group on the Labor Board, which will occur on April 15, and also to discuss with the President the general railroad situation.

After the conference Mr. Cuyler stated that he, of course, could not repeat what had occurred in the interview as it was manifestly proper that the President should not be quoted and should himself determine whether any and what statement should be issued; but that the President had discussed the railroad situation quite fully and had shown a complete grasp of the problem, to which he had evidently been giving most careful and earnest consideration. The President listened with interest to all the views which were presented, which necessarily covered the entire railroad situation, including revenues and expenses, wages and working conditions, and other matters vitally affecting the railroads and the public.

A group of employees' organizations has nominated J. J. Forrester for re-appointment to the Labor Board.

Banker Urges Regional Boards

The attention of President Harding has been called to the concern felt by the savings banks because "the railroads as a whole are not even making their bond interest," in a letter addressed to him by G. E. Brock, president of the National Conference of Mutual Savings Banks and president of the Home Savings Bank of Boston. This letter was made public on April 11. It is further stated that "we have had altogether too much red tape in procedure before the Labor Board" and that the attitude of the "representatives of a great number of railroad employees" is fair and shows "a desire of compromise." Mr. Brock closed his letter with a statement to the effect that "regional discussion between railroad officials and representatives of the employees will solve this problem."

The letter follows:

The railroads as a whole are not making their bond interest, so we savings bank people are much concerned. A great many of the workers on the railroads are depositors in savings banks and many millions of them have what are known as industrial policies of insurance on their lives. We believe they realize that what adversely affects railroads must adversely affect them. This is apart from the pay they receive from the railroad.

I have no sympathy for those who have in their keeping the billions of securities belonging to the people we represent who do not interest themselves in a crisis like the present to the extent of knowing from first hand what is going on and what the trouble is. We have had altogether too much red tape in procedure before the Labor Board. We now need co-operative suggestion and action.

The attitude of those we met who represented great numbers of railroad employees was fair and showed a desire of compromise and the distinct wish to prevent a catastrophe in the railroad world.

I was glad to see that Mr. Warfield wrote you and presented to you the views of those of us who are active in the situation in representing our institutions with their great investment and that something constructive was suggested by these two gentlemen to you, to which I trust you will give great consideration.

Regional discussion between railroad officials and representatives of the employees will solve this problem. For it will lead to regional boards created by the four groups of railroads which have now been formed by the Interstate Commerce Commission. This proposition is a fair one. Such regional boards would not be used until after the railroad manager of each road sees the road employees. It would secure prompt action and enable disputed points to be promptly taken up. Those not settled shall then go to the Labor Board at Chicago.



A RESUMÉ OF THE practice of representative railroads shows that the use of the transition, easement, spiral or taper curves, as they are variously called, is now almost universal for main line railroads. This is in direct contrast to the conditions 25 years ago when the prevailing differences as to the advisability of providing any form of easements gave rise to frequent controversies. From a study of the present attitude toward this matter, it would seem that the intervening years, during which the subject received decreasing attention in technical papers or articles, have witnessed a general acceptance of an accurately located taper, founded on more or less rigid mathematics, as the only satisfactory means of accomplishing the transition from a tangent with the rails on the same level to a circular curve properly super-elevated.

The present virtual unanimity of opinion in favor of easement curves has been brought out in a questionnaire recently addressed to the larger railroads of the United States and Canada to which replies were received from 39 systems, covering an aggregate mileage of 190,000 miles of line. It is entirely possible that this general acceptance of the easement curve as a necessary feature of railway alinement accounts for the scant attention which this subject has received in recent years, either in pages of the technical journals or by engineering societies.

An insight into the attitude of railway men a quarter of a century ago is obtained from an article in the *Railroad Gazette* of May 24, 1895, where Walter Loring Webb presented a summary of replies which he received from 18 leading railroads in answer to a questionnaire he addressed to them on this same subject. Other contributions and editorial comments appearing in the same volume of that periodical showed that this subject was then one of live consideration. Estimates based on information available at that time indicated that only about twenty-five per cent of the railroad curvature of the country had been provided with easements.

Believing that a knowledge of the present practices with respect to this particular feature of railroad engineering would be of interest and value to railway engineers and maintenance of way officers, the president of one of the eastern railroads, who in former days took an active part in the introduction of transition curves, suggested to the *Railway Age* that this subject presented a fertile field for investigation. In pursuance of this idea the following questionnaire was addressed to the chief engineers of forty-two railroads in this country and in Canada, replies to which were received from thirty-nine of the railroads which were addressed.

Questionnaire Regarding the Use of Easement Curves

To what extent do you employ easement curves?

What type of easement curve do you employ?

Do you use easement curves for all degrees of curve, or do you restrict their use to curves of a certain degree or sharper and if so, what degree?

Is the length of easement curve based upon the train speed as well as the degree of curve and if so, how?

Is the easement curve established by your engineer corps or by the supervisors?

Is the use of the offset method or the method by deflections given preference?

Do you employ the string method of establishing easement curves in existing tracks?

Are the limiting points of the easement curves defined on the ground by permanent markers and do these carry the date as to full elevation and rate of run-off?

Are easements introduced at the time a new line is constructed or subsequently?

The replies have been tabulated in the large chart in as near the form in which they were received as was possible. Practice as regards matters of this kind is not subject to abrupt modification. Consequently, we find that the replies received from three officers of the Canadian National reflect the individual practices of the several lines absorbed in this system. Similarly, it has been found desirable to tabulate the replies received from the four regions of the Pennsylvania system so as to show the practices as they have prevailed on the lines east and west of Pittsburgh.

Use of Spirals Almost Universal

By far the most pertinent fact disclosed by this chart is that all the roads reporting except one, the Chicago & North Western, make some use of transition curves. On one other road the use is characterized as "limited," this being the Pere Marquette, a road with a relatively high proportion of light traffic branch lines. The extent of the use of spirals, as reported by the 38 lines which use them, is somewhat varied, but in general it may be said that they are used on main-line, high-speed tracks in nearly all cases. The classification of these lines as tabulated is as follows: On all lines, 4; on practically all lines, 9; on main lines and important branches, 2; on main lines, 7; on high speed tracks, 6; "limited use," 1; replies indefinite, 9.

Another field for variation in usage relates to the minimum degree of curvature for which it is deemed necessary to provide easements. The replies to this question are classified as follows: On all curves of 1 deg. or over, 11; curves of 1 deg. 30 min. or over, 1; curves of 1 deg. 45 min. or over, 1; curves of 2 deg. or over, 11. The replies received from six roads indicated a more elaborate classification. Thus, the Canadian Pacific spirals all curves of 2 deg. or over on main

lines, but only curves of 4 deg. and over on branch lines. On lines of the Pennsylvania System west of Pittsburgh, all curves of 2 deg. or over are spiraled, but on lines carrying trains at speeds in excess of 40 miles per hour, the minimum limit of curvature is reduced to 0 deg. 45 min. Obviously, the faster the speed the greater the refinement necessary in easements. However, a study of the table does not show that the roads handling a larger proportion of high speed traffic

are given to providing spirals for flatter curves than roads with slower trains.

Many Forms of Spirals in Use

The spiral dates back to early days in railway building. Rankine made references to it. Wellington developed some simple approximations. In 1880 the Holbrook spiral was first made public and in 1882 Searles published the first

SUMMARY OF PRACTICE WITH RESPECT TO EASEMENT CURVES

Road	On What Lines	On What Curves	Type of Easement	Length Determined by	Laid Out By Whom	Offsets or Deflections	Is String Method Used?	Use of Markers With Curve Data	When are Easements Introduced
A.C.L.	-	2°+	Talbot	elevation	engr.	defl.	no	no	construction
B. & O.	main lines major br.	1°+	Talbot	elevation	engr.	defl.	for checking	yes	construction
B. & M.	generally	all	Cub.Per.	degree of curve	engr.	defl.	no	no	-
Can.Nat.East	wherever possible	1°+	Holbrook	degree of curve	engr.	defl.	no	no	construction
Can.Nat.East	-	1°+	four types	practices varied	engr.	defl.	no	no	construction
Can.Nat.West	practically all	2°+	Holbrook	degree of curve	engr.	defl. preferred	very seldom	when re-ballasting	construction
C.P.R.	-	2°+ (main) 4°+ (br.)	Parabolic	elevation	engr.	defl.	no	yes	new lines
C. & A.	all main lines	2°+	Searles	50' per in. elevation	engr.	defl.	no	stakes	construction
C. & E.I.	for speed of 30 m.p.hr.	1°+ to 2°+ dep.on speed	Crandall	60' per 1" elev.	engr.	defl.	no	without data	-
C. & N.W.	not used	-	-	-	-	-	-	-	-
C.B. & Q.	all new lines old where presc.	1°+ and 2°+	A.R.P.A.	1/4" to 3/8" per 33' rail	engr.	defl.	optional	without data	construction
C.S.A.	all lines	1°+	Cub.Per.	for 30 m.p.hr.	engr.	offset	no	without data	construction
C.N. & St.P.	main lines	1°+	Talbot Searles	L = VE	engr.	-	no	no	construction
C.R.I. & P.	all new lines realignment	2°+	Berry	speed	engr.	defl.	no	yes	construction
C.C.C. & St.L.	-	1°+	various	speed curvature	engr.	defl.	no	yes	construction ballasting
D.L. & N.	all main lines	2°+	Talbot Searles	speed and judgment	engr.	defl.	for checking	stakes	construction
D. & R.G.	nerly all lines	2°+	Searles	3/4" per rail	engr.	defl.	no	stakes	construction
Erie	all construc. & reconstruc.	1°+	Talbot	degree of curve	engr.	defl.	not gen.	without data	construction or reconstruc.
G.N.	all main lines	2°+	Cub.Per. Talbot	speed	engr.	offset	limited	yes	construction reballasting
I.C.	-	2°+	No standard	elevation	engr.	both	no	no	construction
M.V.	all curves	all curves	A.R.P.A.	elevation	engr.	defl.	emergent	no	construction
L. & N.	all main lines	1°+	Searles	40' to 60' per in.	engr.	defl.	for checking	without data	construction
M.C.	where speed over 40 m.p.hr.	all curves	Talbot	elevation	engr.	defl.	no	without data	construction
N.St.P. & S.S.A.	new lines and reconstruction	1 2°+ 1 30'+(spl)	Searles	degree of curve	engr.	defl.	no	no	construction
N.P.	all but minor branches	1 45'+	Talbot	degree of curve	engr.	defl.	exceptional cases	yes	construction
N.Y.C. east	almost all lines	1°+	Cub.Per.	degree of curve	engr.	defl.	no	without data	construction
N.Y.C. west	all lines	0 80'+ main 1°+ branches	Cub.Per.	usual 200'	engr.	offset	no	without data	construction
N.Y., N.H. & H.	high speed lines	1°+	Stephens & chord	L = VE	engr.	defl.	no	without data	construction
N. & W.	generally since 1905	2°+	Tenworth Searles	Searles & Tenworth	engr.	-	no	yes	construction
N.P.	generally	-	Searles	L = 1/2 VE	-	-	-	yes	construction
Penna.East	all high speed	not restricted	No standard	33' per 1" elev.	suprv.	offset	yes	no	when track is laid
Penna.West	all lines	all 2°+ (over 40 m.p.h.) 0° 45'+	Crandall	60' per 1" elev.	engr.	defl.	no	yes	construction
P.M.	limited use	2°+	Talbot	-	engr.	defl.	-	-	subsequently
P. & E.	main high speed	1°+	Cub.Per.	on elev.	engr.	both	no	without data	construction
St.L.-S.P.	class A	all	Talbot	60' per 1" elev.	engr.	defl.	no	yes	construction
Southern	main line	all	Sullivan	degree of curve	engr.	defl.	no	yes	after completion
S.P.	all new lines great part old	1° 30'+	Head	judgment	engr.	defl.	no	without data	construction
U.P.	-	-	-	30' or 33' per 1" elev.	engr.	-	-	-	construction
Webash	on major lines	2°+	-	degree of curve	engr.	defl.	no	no	subsequently

edition of his "Railroad Spiral"—"to reduce the well known theory of the cubic parabola or multiform compound curve to a practical and convenient form." Since then a multitude of variations have been developed and put to use on the different roads.

In 1911 the American Railway Engineering Association adopted for inclusion in its manual of recommended practice an easement curve devised by J. B. Jenkins, valuation engineer of the Baltimore & Ohio, which is known as the 10-chord spiral, but from the results of this investigation it would appear that this effort of the association to effect uniformity of practice has not been as successful as has been the case with some of the other standards published in the manual. Only two roads report the use of this particular form of spiral; of the other replies, 11 name the Talbot spiral; eight favor the Searles transition curve and 11 use the rather general term "cubic parabola." Three replies do not indicate a preference for any particular type of curve while the others report a variety of easement so that, in all, curves with 12 different names are mentioned.

This variety may be explained in part by the fact that the true cubic parabola is a matter of intricate mathematics, approximations of which are to be had in a variety that affords a most fertile field of operation for the mathematician. Without doubt the 10-chord spiral of the American Railway Engineering Association has not received as wide a use as is warranted by the merits of this particular form of transition curve. Failure to apply it must, therefore, be ascribed to other causes. For instance, it may be suggested that the presentation of this transition curve in the manual is not as attractive nor in as detailed a form as the characteristic expositions of easement curves commonly appearing in the handbooks of field engineering.

As the railroad taper is of necessity a matter of more or less intricate mathematics, it is not surprising that the replies from all roads favor the employment of engineers for the application of the tapers to the alinement. In noting that the answer of the Pennsylvania System, eastern lines, contains the word "supervisors," it should be recalled that on that road the supervisor is an engineer in nearly all cases. In the same connection it is of interest to note that under Method of Application, 28 of the roads favor the method of deflections, four the method of off-sets, two express no preference, while four give indefinite replies. On this point, William Hood, chief engineer of the Southern Pacific, states that careful work by the off-set method requires more time than the deflection method.

The question as to the use of the string method of lining spiral curves received only one unqualified affirmative reply and that from the Pennsylvania System, eastern lines. This method is not used at all on 25 roads, it is used only occasionally on five and it has supplemental or emergency use on four. Since the replies to the questionnaire were in nearly all cases received from the chief engineers of the railroads, it is entirely possible that "unofficial" use of the string method may be more extensive than these replies would indicate.

How the Length of Spirals Is Determined

Another important matter in the discussion of spirals is the determination of the length, which involves a number of considerations, among which the most important is the distance required for an easy run-off of the superelevation. On new location in easy country, there is no limit on the length to which the easements may be extended. In difficult country a long spiral introduces complications as will be explained later. There are also limitations on the lengths of spirals when they are being introduced on old lines, since long spirals increase the difficulty of fitting the curve to the old roadbed.

Broadly speaking, this problem involves the inter-relation of curvature, speed and superelevation which are not properly a part of this discussion. Consequently, the question concerning this matter in the questionnaire was stated simply as: "Is the length of the easement curve based upon the train speed as well as the degree of curve and if so, how?" Answers to this question showed that 25 railroads consider speed as well as degree of curve, while 9 determine the length of the easement from the curvature alone. Five replies were indefinite as to this question or reported varying practices. On three roads the length of the spiral is determined directly from the speed and curvature through the formula $L = K V E$, where L is the length of the spiral curve in feet, K is a constant, V is the velocity of the train in miles per hour and E is the superelevation of the curve in inches. The constant K was given in two cases as 1.0 and in one case as $1\frac{1}{2}$.

On a number of roads the length of the spiral is made directly proportional to the elevation of the circular curve, the rules to this end calling for 40 ft. to 66 ft. of transition curve to each inch of superelevation. For convenience these rules are commonly expressed as $\frac{1}{2}$ in. or $\frac{5}{8}$ in. for each 30 or 33-ft. rail length.

That the length of the spiral has an important bearing on railway location in difficult country is brought out very emphatically in a statement by Mr. Hood of the Southern Pacific which accompanied his reply to the questionnaire. This is as follows:

"The usefulness of the taper depends on the general maximum running speed of the trains in the several localities, and where speed restrictions result in slow speeds, as for instance either up or down steep mountain grades, the taper is not needed to a very great extent, and in such localities a very short taper is justifiable if its use will result in an appreciable saving over the cost of construction required by a longer taper.

"It is evident that when a train is once on the main curve, the taper has no further effect and it is no more appropriate to run too fast, for instance, on a tapered eight-degree curve than on an eight-degree curve that is not tapered. On valley lines, a taper beginning with 30 ft. of a 15-min. curve provides adequate easement for the use of the fastest trains. On a mountain side and similar lines with steep grades and moderate grades, a taper beginning with a 2-deg. 30-min. curve is found to give excellent results, and its use is entirely justified where a flatter (and longer) taper would involve increased cost of construction.

"Too flat a taper and too long a reversing tangent increases the cost of construction in a mountain country with steep transverse slopes, or in a confined river gorge where flood water is dangerous and the mountain sides are steep, to an extent not always fully appreciated. The effect of the taper and reversing tangent in increasing the cost of construction is indicated by the amount that the resulting distance, in a direct line between the centers of the corresponding main curves, is in excess of the sum of the main curve radii, the difference of these distances indicating the additional horizontal distance to be disposed of in excess of that involved in the case of reversed curves without tapers and without reversing tangents between them.

"The greatest effect of this sort results from the use of flatter tapers, indicating that more benefit is to be derived with the same expenditure in construction from the use of longer reversing tangents than from the flatter tapers. A reversing tangent 180-ft. long provides amply for the longest engine and tender now in use, including a suitable length at each end of the reversing tangent for handling the elevation of the track for the first 30 ft. of the taper curve.

"To illustrate this, take the case of two six-degree curves with tapers commencing with 30 ft. of one-degree curve and

with 120 ft. of reversing tangent. These curves will have their centers separated by a distance 21.7 ft. greater than the sum of their radii. Two six-degree curves with tapers commencing with 30 ft. of 30-min. curve and with 120 ft. of reversing tangent will have their centers separated by a distance of 63.1 ft. in excess of the sum of their radii. Thus in the latter case it is necessary to dispose of an additional horizontal distance of 41.4 ft. in excess of that in the first case and this 41.4 ft. might result in prohibitive or at least in extravagant cost of construction. This indicates the need of conservatism in deciding on the financially appropriate taper curve rate."

Spirals Are Inserted During Construction

It is clear from the replies received that the use of spirals has extended over a considerable period of years and that since their adoption the easements are being applied to the alinement at the time of construction in nearly all cases. The work of applying the easement to the lines built previous to the adoption of the easement curve has, of course, been carried out as opportunity afforded or as the increase in the traffic or the importance of the line demanded. Thus, the Canadian Northern reports that these easements are being introduced on old lines at times of re-ballasting, while other roads report that this is done during extensive reconstruction work. The replies with regard to this feature of the questionnaire are summarized as follows: On 32 roads the spirals are introduced at the time of reconstruction; on three they are applied subsequently; on one road they are introduced at the time that the track is laid and being lined; on another they are laid out just before ballasting. One road reports a varied practice.

No discussion of easement curves is complete without some consideration of the means provided for a permanent record of the spiral locations and of the information supplied to track forces for maintaining the alinement and superelevation. It was for this reason that the questionnaire included the question "Are the limiting points of the easement curve defined on the ground by permanent markers and do each carry the data as to the full elevation and rate of run-off?" To this question 12 roads replied that such permanent markers were provided with complete data; 11 stated that markers were provided without any data; 3 reported the use of stakes; while 10 roads replied that no markers were provided; one road reported a variable practice while another stated that the location of the spirals was carefully referenced and recorded.

Chairman Clark Discusses the Rate Question

WASHINGTON, D. C.

CHAIRMAN CLARK of the Interstate Commerce Commission is making it increasingly clear where the Interstate Commerce Commission stands on the question of rate reductions which is so prominent just now. He has stated it in letters to senators who have written to him voicing the complaints of constituents against high rates. He stated it in his speech before the Railway Business Association on March 31, and it was stated in the letter to the heads of the railway traffic committees regarding proposed reductions in grain rates, which the commission's director of traffic wrote under his instructions and which was made public last week. Mr. Clark stated again in a letter to Senator Shortridge of California, dated April 6, that "it is difficult to see how the railroads could be urged to reduce their rates" and that if shippers are experiencing difficulties their plight cannot well be much worse than that of the railroads. It is believed that

with all these expressions it should not be difficult to guess what he told the President at their conference on March 31. Mr. Clark also shows some skepticism as to the merit of numerous complaints that the rates themselves are the principal cause of the trouble. The letter to Senator Shortridge was in reply to one from the senator on behalf of shippers of California fruits and vegetables urging a conference or a hearing at Los Angeles on the subject of freight rates. Chairman Clark said:

The request grows out of the fact that we recently arranged to have our director of traffic hold an informal conference with representatives of the fruit and vegetable industry and of the railroads at Dallas, Texas. The purpose of the hearing was to have a full exchange of ideas, to give the shippers opportunity to present the difficulties which they encounter, and to have the railroad representatives consider carefully whether or not conditions were such as to justify a reduction in the freight rates on these commodities. We sent notices of the hearing to railroads and interested shippers in various sections of the south and southwest, including California. The Los Angeles people requested that a hearing be had at Los Angeles following the conference at Dallas, but it was not practicable to comply with that request.

We have had numerous communications from California interests on this subject, and, as I said over the phone, the question is under negotiation between the representatives of the railroads and representatives of the Citrus League. This league, as we understand, represents more than 90 per cent of the citrus shipments. I do not know what conclusions will be reached in the negotiations that are now progressing.

We have no authority to require the railroads to reduce rates except after a full hearing at which the propriety of the reduction is demonstrated. We would be obliged to find that the existing rates are unreasonable.

The freight rates are on a very high level. No one would be more pleased than we if conditions would permit general reductions therein. It is, however, difficult to see how the railroads could be urged to reduce their rates, when, as shown by the official reports, they are as a whole earning scarcely more than their operating expenses and taxes. It is obvious that the present condition can not long continue without bringing widespread bankruptcy to the roads. More than 90 cents of every dollar they earn is spent in the operating cost of earning it. Less than 10 cents of each dollar is left with which to pay taxes, interest and return on investment. Sixty cents out of each dollar earned are paid out in wages, and on some roads this runs as high as 64 cents.

At the time the increased rates were inaugurated in August last it was recognized that some readjustments would be necessary. Many readjustments have been made. In some instances investigation has demonstrated that some reduction in the rates would move a substantial volume of traffic, with some profit, which would not move under the then existing rates. Under those circumstances readjustments have been made and are under consideration. We have tried to be helpful in such negotiations and that was the purpose of the conference at Dallas. That conference, however, does not seem to promise any readjustment of the rates on fruits and vegetables. The railroad representatives have, so far at least, taken the view that the reduction would not increase the volume of movement and that in view of the financial conditions, to which I have referred, the roads cannot afford to reduce the rates.

We had some vigorous representations from interests in Florida that the rates were stifling the movement of fruits and vegetables from Florida; but upon investigation and ascertainment of all the facts it developed that the movement of fruits and vegetables for the period of November 1, 1920, to March 1, 1921, exceeded by several hundred cars the movement during the same period of 1919-1920.

We are in no wise insensible to the difficulties which shippers generally are experiencing, but, as I have said, the plight of the shippers can not well be much worse than that of the railroads. In many instances inquiry into a situation demonstrates that it is not high freight rates that is preventing the sale of goods at the prices that must be paid. We are passing through a period of readjustment following the convulsions of the war, and many hardships exist which are the result of the world-wide economic forces which it is hoped will progressively adjust themselves with steadily improving conditions.

It is not pleasant to have to write in this tone, and I do not want to be understood as pessimistic. I believe that the situation is clearing and will gradually clear, and that readjustment of the operating expenses of the railroads will produce a much brighter outlook and make it possible to effect more readjustments of rates with consequent benefit to commerce and industry generally.

National Agreements Case Decision to Come Soon

Twenty Rules Called Just and Reasonable—Employees Continue Testimony in Support of Rules

A DECISION IN THE controversy between the railroads and certain of their employees regarding perpetuation of the National Agreements has been practically completed by the Labor Board. This decision, offered by a member of the public group, adopts as just and reasonable about 20 principles regarding working conditions of railway employees. The negotiation of these principles into agreements is remanded to the individual carriers and their own employees. This briefly summarizes the action which the Board will take in this dispute within a few days. The effect of this action cannot be foretold at this time, inasmuch as the employees are still engaged in presenting rebuttal evidence to the Board. It is probable, however, that the employees' representatives will fight for their opportunity to complete the presentation and oppose the rendering of a decision until this presentation is ended.

The Week's Developments

Developments during the past week in the hearings before the Railroad Labor Board on the employees' demands for continuation of their national agreements have been colorless. The presentation of testimony on behalf of the employees continued in the form of (1) a rebuttal by B. M. Jewell, president of the Railway Employees Department of the American Federation of Labor and spokesman for the labor organizations; (2) exhibits by W. Jett Lauck, consulting economist for the unions, and (3) the cross examination of Frank McManamy, formerly assistant director, mechanical department, division of operation, United States Railroad Administration. Mr. Jewell's opening statements in rebuttal and the beginning of Mr. McManamy's examination were described in the *Railway Age* of April 8 (page 899). The list of questions submitted by Mr. Jewell to Mr. McManamy as a guide for his testimony in defense of the shop crafts' agreement, took the latter four days to answer due partially to the frequent interrogation of the witness by W. L. Park, a representative of the carriers on the Board.

The questions presented by the labor leaders and upon which Mr. McManamy based his testimony were intended to establish facts: (1) opposing the "charge that the Railroad Administration was ill-advised in negotiating national agreements, also that the director general was coerced by actual physical fear into making the agreement;" (2) opposing the charge that shop crafts' agreement has resulted in a great decrease in the efficiency of the individual employee working under the agreement and in the destruction of the morale of shop forces; (3) opposing the charge that national agreements prevent the carriers from conducting the transportation industry economically; (4) opposing the claim that national agreement rules are impossible of fair interpretation for all parts of the country and that the decisions of adjustment boards have made it possible for employees to extract a maximum of money from the railroads; and (5) opposing the carriers' assertion that the restoration of efficiency in railroad shops is largely dependent upon the restoration of piece work. The outline included approximately 60 questions, all directed at bringing out relevant facts.

Before entering upon his testimony, Mr. McManamy said: "In testifying before this board the director general desires that I make it clear that this is not the testimony of the present railroad administration; it is the testimony of myself, as an individual, based on the experience which I had

with the railroad administration during the period of active federal control."

Mr. McManamy's reply to the first question in general characterized all of his testimony during the four days he was on the witness stand. The question was: "What led the railroad administration to negotiate a national agreement with the shop crafts?" The answer was: "In general the national agreement was negotiated with the shop crafts because it was believed that it would promote efficiency and economy in shop operation, remove much of the unrest which at that time prevailed among the railroad shop employees, reduce the labor turnover at the various shops, prevent the practice on the roads which had favorable agreements and favorable rates sending men—usually some member of a labor organization—to other roads to solicit employees to come to work for them because of the more favorable rates and better working conditions. This I believe was an unnecessary expense and affected the efficiency of shop operation and in a measure stirred up discontent among the employees."

In answering the remaining questions, Mr. McManamy frequently reverted to this statement and stated that the placing in effect of the shop crafts' agreement resulted in accomplishing all of these purposes.

His testimony throughout was in favor of the continuation of the national agreement and supported at every turn the case which the employees' representatives are attempting to build up in support of their demands.

During the intervals of each day when Mr. McManamy was not on the witness stand, Mr. Jewell continued the presentation of his direct rebuttal in support of his demand for continuation of the shop crafts' agreement, taking up first, the scope of this agreement and citing various decisions by Railway Board of Adjustment No. 2, to support his contention that the workers covered by this agreement have not been improperly classified under its rules and the interpretations thereto.

Mr. McManamy's Examination

After Mr. McManamy had completed his response to the questions submitted by the labor leaders he was cross-examined by James M. Sheean, counsel for the Conference Committee of Managers, which is presenting the railroad's case. A large portion of this cross-examination dealt with Mr. McManamy's statements regarding the comparative efficiency and economy obtained under piece work pay as compared with the hourly system of pay. Mr. Sheean by his examination analyzed the import of the data on this subject presented to the Board by Mr. McManamy. The bases of the comparisons were attacked by Mr. Sheean, who maintained that they were not just in that they did not take into consideration a large number of variables.

Mr. Park and Mr. Sheean, in further questioning Mr. McManamy, developed the point that despite Mr. McManamy's assertion that the existence of agreements has tended to alleviate unrest and restrain employees from striking, many strikes occurred during 1919 on roads on which agreements were in effect. In support of this contention, Mr. Sheean submitted a list of roads upon which general or system strikes have taken place, and upon which agreements were in effect at the time of the strike.

Following this, Mr. Sheean established by examination that the committee of four, which acted upon the question of National Agreements, after a disagreement between the com-

mittee representing the regional directors and the employees, was composed of men, none of whom had ever had managerial responsibility and yet who represented the managements in the final negotiation of the National Agreements.

Mr. McManamy was then excused.

On April 12 Mr. Jewell continued his direct rebuttal to the evidence placed before the Board on behalf of the carriers, taking up the Shop Crafts Agreement rule by rule and outlining the employees' stand upon the application of each rule and upon the evidence submitted in opposition to its continuance.

To establish the authenticity of a letter read to the Board by Frank P. Walsh, counsel for the labor organizations on March 22, and declared a fake by representatives of the carriers, Mr. Jewell requested the Board on April 8 to summon five employees of the Pennsylvania who would be familiar with the contents of this letter if it had been written at the time and place indicated. The character of this letter was outlined in the *Railway Age* of March 25 (page 807). The Board has not acted upon this request up to the present time, although it is generally conceded that these witnesses will be called inasmuch as the letter has been submitted to the Board and proof of its authenticity demanded by representatives of the carriers. I. W. Geer, general manager of the Pennsylvania, Southwestern Region, alleged author of the letter, has denied any knowledge of its existence.

Wage Case Docketed

The order of the Board docketing hearings on the request of various carriers for wage reductions, as briefly described in last week's *Railway Age*, is as follows:

Whereas, There are reasonable grounds to believe that a number of other carriers parties to Decision No. 2 are about to file application for decision on disputes as to what shall constitute just and reasonable wages; and

Whereas, In the judgment of the Labor Board, it is desirable that this Board hear at one time and decide in one decision, so far as may be possible, the question as to what may constitute just and reasonable wages for all classes of employees of carriers parties to Decision No. 2 as to whose wages there may be disputes. Therefore be it

Resolved by the United States Railroad Labor Board, That 9.30 a. m., Chicago time, Monday, April 18, 1921, be set as the date of hearing when this Board will hear the representatives of the parties to disputes on the carriers named above and all other disputes filed and docketed prior to that time between carriers and employees of carriers parties to Decision No. 2 if ready for presentation.

Resolved, further, That the carriers will be allowed eight hours and the organization eight hours for oral presentation and argument. The carriers and organizations will arrange for representation accordingly. Evidence to any extent desired by either party may be submitted in writing, furnishing adverse party with copy thereof. All such written evidence must be submitted prior to April 20, 1921.

No action has been taken as yet upon the controversy between the St. Louis Southwestern and its employees, hearings on which were outlined in the *Railway Age* of April 8th (page 903).

"Human Standards and Railroad Policy"

The present industrial situation of paralysis is the result of a strike of organized capital against society, according to an exhibit on "Human Standards and Railroad Policy," submitted to the Board on April 14 by Mr. Lauck.

"Capital, nationally and internationally organized and concentrated," the exhibit declared, "takes the stand that the capital strike shall go on until labor comes to its knees and consents to sweeping reductions of wages and also consents to surrender its right to bargain collectively on a scale co-extensive with the organization of the employers."

The summary of the exhibit stated in part:

"The evidence presented in this exhibit, summarized, has the following purport: It shows that there is a capital com-

bine consisting of the major banks, the railroads and the industries controlling basic materials, and that this combine has and exercises a power over the economic destiny of the United States. It shows that this interrelated capital group deliberately 'deflated the farmers' and then undertook, by precipitating industrial stagnation, to 'deflate labor.' It shows that within the same capitalist group lies the power to adjust or misadjust relative prices in a manner that will stimulate or suppress industrial activity. It points out that this focal capitalist group has deliberately maintained high prices of steel, coal, cement and other basic materials and that the railroads, financed by the same interests, have refused to place the orders for plant maintenance, or even the orders necessary to prevent plant and equipment deterioration. The consequence of the general constrictive policy practiced by every branch of this capital combine has clamped a brake upon all industry and has precipitated the army of unemployment.

"The exhibit surveys the costs of national unemployment and shows that the wastes due to unemployment represent, in terms of products unproduced, an amount of goods and services fully equal to one-half of the total wealth that is produced.

"The exhibit shows that the greater factors in American industry, the railway equipment producers, the railway repair works, the steel interests, the coal, cement and other basic material producers—all are closely bound together by intercapital relations and interlocking directorates, and that the determination of their major policies centers in, and is controlled by a number of men scarcely larger than go to make up the administrative and executive staff of the government of the United States."

"The railway employees in their exhibit make no issue as to the propriety or the possible necessity of a centralized system of economic co-ordination and control in a highly industrialized and interdependent country like the United States," Mr. Lauck said. "The point of the employees' exhibit is its challenge of the misuse which the combine in this instance has made of its power. The employees call attention to the national responsibility which the possession of such power entails and note that this responsibility in the case of the railway industry has been legislatively and judicially recognized and written into the federal laws of the United States, and the employees specifically point out that this responsibility has been and is being unscrupulously evaded.

"The railroads are pleading poverty. The banks are making unprecedented profits and declaring unprecedented dividends and the same applies to steel, coal, railway equipment and similarly situated concerns. The capital combine, in preparing to precipitate unemployment, adopted the policy that the railroads 'should do it first.' Railway improvement programs were deferred; railway maintenance was reduced below minimum legal requirement; a kink was put in the purchasing power of the American people and industry sent 'head on' into stagnation.

"In exhibiting the enormous profits that have been 'plowed under' by the banks and basic industries, and in exposing the fact that the railways have been and are paying over 200 to 300 per cent excess profits to railway auxiliary supply concerns, the employees deny that there is any valid railway poverty necessitating retrenchment at the expense of the status of labor."

The exhibit, a printed document of 150 pages, outlines the opposing views of unemployment as they are interpreted by the employees' organizations, the employees themselves presenting the subject in its purely sociological phases, while the managements are pictured as regarding it purely as a means for the forcible "deflation of labor." The growth of unemployment on the railroads since June, 1920, said to aggregate

300,000 men of which about one-third were employed in railroad shops, is sketched and specific cases of equipment conditions on a number of railroads are cited to substantiate the claim that the curtailments of shop forces during this period were not justified by any reduction in the volume of maintenance work actually awaiting attention. One instance is cited where overtime, following the lay-off of six machinists at Raton, N. M., on the Atchison, Topeka & Santa Fe, is said to have accumulated during January, 1921, to an amount a few hours short of enough to have kept six machinists and four helpers employed during the entire month. Several specific cases are cited on the Norfolk & Western and the Baltimore & Ohio where bad order cars are reported to have been removed by foremen from cars having serious defects and the cars allowed to run in trains.

A large amount of evidence, in the form of copies of official correspondence and letters from railway employees, is presented to show that extensive contracts for repairs to equipment were in effect and in some cases have been extended during this period of reduction of the shop and repair track forces of the railroads. In this respect the New York Central and its freight car repair contracts have been singled out for especially detailed treatment, and correspondence is quoted tending to show that a flow of equipment to meet the requirements of this road's contract has at times been maintained with difficulty.

The development of the Hornell Repair and Construction Company to take over the Erie shops at Hornell, N. Y., the Owen Construction Company to take a contract for maintenance of way work on a portion of the Erie, and the Phoenix Transit Company to take over and operate the road's New York harbor equipment, are cited as further evidence of the beginning of a new policy in which it is alleged the railroads intend to sub-contract as many of their functions as possible in order to remove these operations from the "protection afforded to railroad workers under the Transportation Act by the Railroad Labor Board" and "to utilize the resulting uncertainty of employment to worry the remaining railroad employees into accepting by 'agreement' lower standards of wages and living conditions." The evidence presented, however, shows that so far as the Hornell Repair and Construction Company is concerned, its employees are working under the same conditions and rates of pay and have the same privileges as similar employees of the railroad.

The recent establishment or extensive development of a number of other contract repair shops was referred to in this connection, some of which are as follows:

The Buffalo Steel Car Corporation has been built up to handle the repair work for all roads running into Buffalo, N. Y. These include the Buffalo, Rochester & Pittsburgh, the Delaware, Lackawanna & Western, the Lehigh Valley, the Michigan Central, the New York, Chicago & St. Louis, the Pennsylvania, the Wabash, and the New York Central.

The Manitowac Shipbuilding Company has been taken over by a new corporation which will operate it for the railroads. New buildings have been erected and tracks laid to handle both locomotive and car repair work. The new plant for railroad work probably represents \$300,000 investment.

The Boston banking firm of Hornblower & Weeks is promoting a deal whereby the weak Laconia Car Company will lease and operate under contract, the shops of the Bangor & Aroostook.

The East St. Louis Locomotive and Car Company, capitalized at about \$5,000,000 has been created and has built a large plant in East St. Louis, Ill., to be given over exclusively to the repairing of locomotives and freight cars, serving the 24 railroads that converge in St. Louis. It is expected to start with 500 men and to increase its force to 2,000.

Financial publications continue to talk of the fact that Baldwin Locomotive will take over the big shops of the Pennsylvania and handle the repairs of that system under contract. It is also rumored that the same company will take over the Baltimore & Ohio shops.

The evidence presented in an attempt to show that the

railroads are using unemployment to subjugate their men is in the form of statements of several railroad employees, of a more or less hearsay character, to the general effect that the roads on which they were employed were "going to have piece work back if they had to lay off every man." These statements were supplemented with newspaper comments on the labor situation and rumors which have appeared in the public press.

In support of the assertion that the railroads could have kept all shopmen employed, the exhibit presents a large volume of data to substantiate the claim that "the total excess cost of equipment repairs made under contract by outside concerns has been sufficient to pay all the shop employees laid off throughout the country for full time work," the following statement is made: "Broadly speaking, the cost of locomotive repair work when done under contract by large equipment concerns costs the roads on an average four times as much as it would cost the roads to do similar work in their own shops. In other words, repair work which would under ordinary circumstances when done at the present time in railroad shops, cost from \$4,000 to \$5,000, tends when under contract with equipment concerns, to cost between \$19,000 and \$20,000."

A table is presented in which are shown by railroads a total of 617 locomotives repaired in outside shops, for 413 of which, what are said to be the actual contract prices are given. These are compared with the cost of similar work done in railroad shops which are said to be Railroad Administration figures.

The railroads are said to have contracted with outside concerns for the repair of at least 100,000 freight cars and on the basis of somewhat similar evidence the statement is made that "these outside repairs are costing the railroads all the way from \$700 to \$1,700 per car, and that this cost would average very nearly double the cost of similar work if performed by railroad mechanics in the railroad shops."

The second part of the exhibit is replete with charts showing the connection through directorships of the railroads, railroad equipment companies, coal companies and banks with the constant inference that these connections indicate a control of the basic industries by a financial group headed by J. P. Morgan & Co., New York. The "deflation of labor" referred to in the summary of the exhibit is attributed to this control.

Throughout this portion of the exhibit references are made to the *Railway Age* and other trade publications, in many cases complete editorials and articles being reproduced as evidence in support of the employees' contentions that this combine has created unemployment and stagnation in industry as part of a gigantic plan.

It will be noted that this evidence is exactly that which has already been ruled out by the Board on the grounds of irrelevancy. Threats that nevertheless this material would be presented have been frequent during the course of the hearings, the employees' representatives deviating from their plans only in presenting the evidence in the form of an exhibit instead of by cross examination.

The exhibit abstracted in the New York Times of April 4 and later in the *Railway Age* of April 8 (page 903) has not been presented to the Board so far but it is expected that this material, dealing with "the inadequacies of management," will be offered as evidence early next week.

THE TICKET SCALPING evil has been brought to the attention of the United States Treasury Department by the Railway Ticket Protective Bureau and internal revenue collectors have been notified to impose the provisions of the Revenue Act of 1918 strictly upon those engaged in the business. The department has directed internal revenue collectors to secure the names and addresses of ticket scalpers and brokers from the bureau and to collect the regular 8 per cent tax on all amounts paid.

Hearing on Great Northern-Northern Pacific Joint Bonds

WASHINGTON, D. C.

NO OPPOSITION DEVELOPED at the hearing before the Interstate Commerce Commission at Washington on April 11 on the application of the Great Northern and the Northern Pacific for authority to issue \$230,000,000 of joint 15-year, 6½ per cent convertible gold bonds, \$33,000,000 of Northern Pacific 6 per cent bonds and \$33,000,000 of Great Northern 7 per cent bonds, which with the stock of the Chicago, Burlington & Quincy owned by the two roads is to be pledged as collateral for the joint bond issue. The new issue is to refund the \$215,000,000 of joint 4 per cent bonds secured by the Burlington stock without the recent increase of \$60,000,000 which came due on July 1. In addition to the witnesses for the railroad companies, Ralph Budd, president of Great Northern, and Howard Elliott, chairman of the Northern Pacific, a number of bankers were called to testify regarding details of the proposed bond issue, the reasons for adopting this form of financing and the probable terms of sale. C. W. Bunn, general counsel of the Northern Pacific, said that no contracts for the sale of the bonds had yet been made and none would be until the application had been approved by the commission. The commission would also be asked to approve the terms under which it would be proposed to make sales.

George B. Whitney of J. P. Morgan & Co. said that the railroads, if the market for railroad bonds does not get worse, can probably realize from 90 to 91½ on the sale of the joint bonds, which would make the cost approximately 7.45 per cent. This would realize about \$210,000,000 and it would be necessary for the railroads to provide the additional amount in some other way. He thought they could probably be sold to the public at 96½ per cent. He was asked a number of questions as to why it would be necessary to allow 5 per cent for commissions and selling expenses and said that the purchasing syndicate would probably charge from ½ to 1½ per cent commission, while 3½ to 4½ per cent would be required by the distributors. He said that practically every bond dealer of the country would be called upon to assist in the distribution and he had a list of over 700. He said that even if the average sale of the bonds is \$5,000 it would be necessary to call on 46,000 people and perhaps several calls would be required to effect the sales. He also described some of the expenses incident to handling such a large bond issue, which represents the largest piece of corporate financing in the history of the railroads. He said that about \$54,000,000 of the joint bonds are held by insurance companies and trustees that are prohibited by law from buying bonds secured only by stock as collateral, but that these could convert the bonds at once into individual issues of the Great Northern or Northern Pacific. He said that it had been estimated that about \$60,000,000 of the bonds could be exchanged for the old bonds, but that this now appeared to be an overestimate. He said the plan of making the bonds convertible would increase their attractiveness to certain classes of buyers and the plan also provides for gradually releasing the Burlington stock pledged as collateral so as to divide it between the roads instead of continuing the joint holding. While no definite agreement had been made, he said that J. P. Morgan & Co. and the First National Bank of New York might contract with the railroad companies to purchase the bonds and simultaneously contract for the sale of the bonds to the distributing syndicate. Commissioner McChord asked whether the short term refunding issue, say for two years, at 7 per cent, would not temporarily tide the refunding over into a period of easier money. Mr. Whitney said the question was entirely hypothetical. If such a thing could be done, it might be wise, but he doubted very much

whether it could be done for only two years at seven per cent.

Mr. Whitney was followed by E. B. Sweezy, vice-president, First National Bank; H. L. Stuart, of Halsey, Stuart & Co., of Chicago, and John E. Oldham, of Merrill, Oldham & Co., of Boston, who said that the selling price of 96½ per cent was as high as could possibly be charged and who considered the commission of 5 per cent fair. Commissioner Potter asked the bankers to discuss the question as to whether it is to the interest of bankers to increase the rate of interest or to try to keep it down. They all testified that the bankers do not fix the rate and that it is to their interest that the rate be as low as possible, but all placed the greatest importance on fixing the terms of the issue in such a way that it would be sure to be successful.

Senator Cummins Asks Railroad Investigation

WASHINGTON, D. C.

SENATOR CUMMINS on April 12 introduced in the Senate his proposed resolution providing for a general investigation by the Senate committee on interstate commerce into the railroad situation with particular reference to the increase in expense since the return of the railroads to private operation and the best means of bringing about a condition that will warrant a reduction in rates. The text of the resolution, which was referred to the committee on contingent expenses of the Senate, also indicates that the investigation is likely to bring out some interesting comparisons of the efficiency of management under the Railroad Administration and under private operation. Senator Cummins has stated that he expects to begin hearings about May 1 and that he proposes to call first upon the railroads who have been preparing a large amount of statistical information on the subject in advance, at his request. Testimony will also be offered on behalf of the National Association of Owners of Railroad Securities, the labor organizations and the shippers, and the Interstate Commerce Commission will also be called upon for information and the views of the commissioners. It is also considered probable that various bills which are expected to be introduced by individual Senators bearing on the railroad question will be referred to the committee in connection with its investigation. The resolution introduced by Senator Cummins provides as follows:

That the Committee on Interstate Commerce is hereby authorized and directed to inquire into and report to the Senate as speedily as practicable upon the following matters, to wit:

First. The operating revenues and expenses of the railroads of the country which under the law make reports to the Interstate Commerce Commission, comparing these revenues and expenses with like revenues and expenses (including the period of Federal Control) since 1912.

Second. The reasons which led to the extraordinary cost of maintenance and operation from March 1, 1920, to March 1, 1921.

Third. The reasons which induced the diminished volume of traffic in the latter part of the year 1920 and first two months of 1921, and in that connection the influence of the increased freight and passenger rates prevailing during that period.

Fourth. The efficiency or inefficiency of railroad management during Federal control and during the year beginning March 1, 1920, and the efficiency or inefficiency of labor employed by the management during the same periods.

Fifth. The best means of bringing about a condition that will warrant the Interstate Commerce Commission in reducing freight and passenger rates.

The Committee is authorized to act under this resolution either as a whole or through any sub-committee appointed for the purpose; to subpoena witnesses, administer oaths, send for persons and papers; and to employ counsel, experts and stenographers. The expense incurred shall be paid from the contingent fund of the Senate, upon vouchers approved by the chairman of the committee.

Recent Slump in Traffic Worst in History

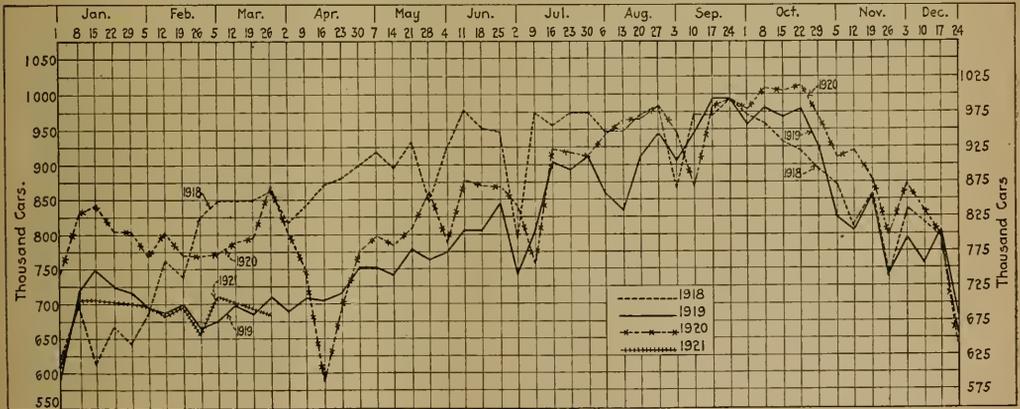
Drop in Freight Business, October to February, 40 Per Cent—Car Loading Since January First, 15 Per Cent Less Than for 1920

THE SLUMP in the volume of railroad freight traffic which has occurred since the peak of last fall, is probably the worst that has been experienced in the recent history of the railroads for which comparable statistics are available. It is rather difficult to show whether it is any worse than that which followed the so-called bankers' panic of October, 1907, and it closely parallels the experience following the termination of the war in 1918, but it is now apparent that the reduction in railroad freight business has fallen from a higher point in 1920 to a lower point in 1921 than was the case in 1918-1919.

The number of idle freight cars for the week of March 31, which was 495,904, was the largest ever recorded, and the percentage of the total cars owned, 21, was greater than the surplus of 451,739 in March, 1919, which was 19.77 per cent, or the surplus of May, 1908, which was 413,605,

for January, 1921, (estimated) were 26 per cent less than those for August, 1920, which was the peak month in that respect. From August, 1918, to January, 1919, the drop was also 26 per cent. From August, 1918, to February, 1919, there was a drop of 37 per cent. For February, however, the revenues were about 4½ per cent less than in 1920.

The ton miles for February are not yet available, but will show even lower figures than January. The car loading figures, however, are available to April 2. From the peak of October, 1920, to February, 1921, the drop in monthly car loading was 45 per cent as compared with 41 per cent from July, 1918, to February, 1919. To January, 1921, the drop was 31 per cent as compared with a drop of 25 per cent to January, 1919. The decrease from the peak week of 1920 to the low point of 1921 was 33 per cent, the same as the corresponding drop in 1918-1919. From Oc-



Car Loading from January, 1918 to Date

or 19.78 per cent. The total earnings and the freight earnings for January, 1921, were greater than they had ever been in any previous January, but that was largely because the rates were higher than ever before. The railroads in the fall of 1920 handled a larger traffic than ever before, but in January, even with the increase in rates, the operating revenues were only 5 per cent larger than in 1920, the freight earnings were about 4 per cent larger and the ton miles were about 15 per cent less, while the number of cars loaded with revenue freight was 16 per cent less. From January 1 to April 2, 1921, the number of cars loaded has been 9,012,795, as compared with 10,628,808 in 1920 and 9,158,457 in 1919.

As compared with the peak of 1920, October, the February earnings show a drop of 36 per cent as compared with a drop of 30 per cent from August, 1918, to February, 1919. From August, 1918, to February, 1919, the drop was 30 per cent, but the comparable figures for 1921 are not yet available. It is known, however, that February this year will probably make a worse showing than January. The freight revenues dropped 33 per cent from October, 1920, to January, 1921, as compared with a drop of 20 per cent from October, 1918, to January, 1919. From October, 1918, to February, 1920, the decrease was 33 per cent. The ton miles

tober, 1907, to January, 1908, there was a decrease in the gross revenues of 30 per cent but figures for ton miles and car loads for that period are not available. There was also a marked decrease in the volume of traffic between October, 1919, and April, 1920, when the switchmen's strike occurred, but the reduction was less marked than that of 1921 and the period of decrease was of shorter duration. Following the depression of 1908 a large number of railroads went into receivership but during 1919 and 1920 the effects of the slump in traffic were borne by the government because the railroads were then under a guaranty at the expense of the taxpayers while at the present time the railroads are operating on their own resources.

Fluctuations in Railroad Traffic

A study of the statistics of railroad earnings and traffic for the last few years reveals some remarkable fluctuations. There are wide fluctuations each year from fall to spring, usually from October to February, but in some years the variation has been much more pronounced than in others and the months which show the widest variation are not always the same. February is likely to be the low month for the year, partly because it has only 28 or 29 days, and it

includes a holiday on Washington's birthday, while October has 31 days. In a year of sustained heavy traffic August is sometimes the heaviest month, partly because it includes one more day than September or November. Sometimes the January results, when equated on a daily basis, are lower than those for February. In 1920 April made a worse showing than February, because of the switchmen's strike.

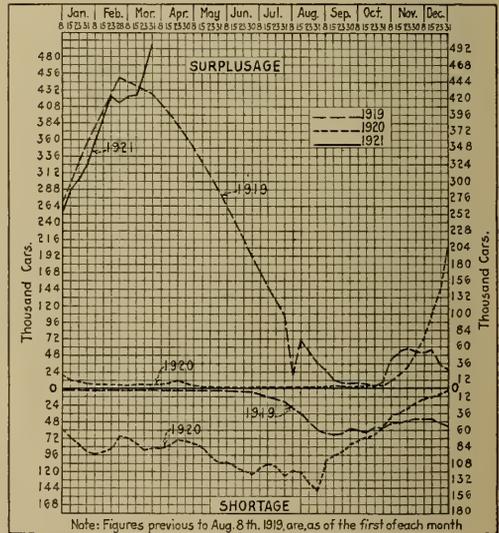
While in many quarters it is the fashion just now to attribute the present depression largely to the increase in freight rates put in effect on August 26, 1920, analysis of previous years shows that reductions in traffic almost as pronounced have occurred without such a cause. There was no particular change in rates in 1907 and the market depression in 1918-1919 came a long time after the increases in rates which were made in June, 1918. The analysis also indicates that pronounced periods of depression in the past have been followed by upward swings which have invariably reached higher levels and that in 1919 and 1920 the new high records were established in the same year that the low records were made.

There was a big increase in railway traffic in 1906 and 1907, accompanied by a large car shortage and followed by a sharp falling off in traffic after the panic. Statistics showing the volume of traffic by months are not available for periods earlier than 1916 but a fairly accurate index of the fluctuations by months is afforded by the total earnings of the railroads. After having reached a peak for that period in October, 1907, when the gross earnings of the railroads were \$250,000,000, there was a slump to \$161,000,000 for February, a drop of 35 per cent, although when the years 1907 and 1908 are compared as a whole the ton miles of freight fell off only from 236,000,000,000 to 218,000,000,000, a decrease of 7 per cent. Whereas in November, 1907, there was a shortage of 90,000 cars, this had given place by May, 1908, to a surplus of 413,000 cars.

Variations in Earnings

There was a general upward trend of traffic until the fall of 1913 when the gross earnings reached \$290,000,000 in October, but there was another marked period of depression in the early part of 1909 when the car surplus in January reached 333,000, although this was followed by a shortage of about 36,000 cars in November. In 1910 and 1911 there was a net surplus of cars, reaching 143,000 cars in the summer of 1910, and 196,000 in April, 1911, but there were also some shortages in both years, as well as in 1912 and 1913, and throughout most of 1914 and 1915 there were large surpluses, attaining a maximum of 242,000 in June, 1914, and 327,000 in April, 1915. In February, 1914, the gross earnings of the railroads had fallen to \$203,000,000, a decrease of 30 per cent as compared with October, 1913, but by September they had again increased to \$266,000,000. In February, 1915, they fell to \$205,000,000, a drop of 23 per cent, and in October, 1915, they were \$303,000,000. In January, 1916, the earnings were \$261,000,000, a reduction of 14 per cent from October, and in October, 1916, there was another gain to \$338,000,000 followed by a drop of 21 per cent to \$265,000,000 in February. In October, 1917, there was another peak, \$382,000,000, followed by a drop of 25 per cent to \$285,000,000 in January, 1918. There was a general advance in freight rates in the East in 1917 but it was in effect before October, so the comparison is not affected. In 1918 the largest monthly earnings were in August when they reached \$504,000,000, having been swelled by the general increases in rates put into effect by Director General McAdoo in June. Following the signing of the armistice in November, 1918, there was a sharp reduction in traffic, although it had begun to fall off earlier, and for February, 1919, the earnings were only \$351,000,000, a reduction of 30 per cent as compared with August. Car shortage had begun

to develop in 1915 and to increase in 1916. In November, 1916, about the time the country began to feel the effects of the war orders, there was a shortage of 140,000 cars and throughout 1917 there was a shortage, which reached its maximum with 164,446 in May. The car shortage continued through 1918 although it was steadily reduced after having reached about 160,000 in March, and in March, 1919, it had given place to a larger surplus than had ever before been recorded, 451,739. By the end of 1919 traffic had again increased until the earnings under the same rates which had been in effect during the latter part of 1918, in October reached \$509,000,000, and there was a shortage of about 60,000 cars during the fall months. In April, 1920, the earnings fell to \$401,000,000, a drop of 21 per cent, although traffic had been unusually heavy preceding the switchmen's strike which culminated in that month, and throughout most of the balance of the year it was of record-breaking propor-



Car Surpluses and Shortages

tions. In January the earnings were \$509,000,000. In October, 1920, under the influence of the heavy traffic and also the new increase in rates made effective on August 26, the earnings were \$642,000,000 but by January, 1921, they had fallen to \$470,000,000, a drop of 27 per cent, and by February to \$406,000,000, a drop of 36 per cent. Throughout the greater part of 1920 there was a car shortage beginning with about 54,000 in January and rising to 147,000 in September, but by November a slight surplus had developed which steadily increased until the week of March 31.

Freight Revenues

Gross earnings, of course, do not exactly reflect the changes in the volume of traffic because they include the reflection of the previous month's business, and the total earnings including passenger revenues often make a showing slightly different than the freight earnings. While the widest fluctuation in total operating revenues between 1918 and 1919 was from August to February, a drop of 30 per cent, the greatest fluctuation in freight revenues was from \$364,000,000 in October to \$242,000,000 in February, a drop of 33 per cent. While the total revenues dropped 21 per cent from October, 1919, to April, 1920, the freight revenues fell 18 per cent

from \$368,000,000 in October, 1919, to \$299,000,000 in February, 1920, but in April they were only \$268,000,000, a drop of 27 per cent. From October, 1920, to January, 1921, while the total revenues show a decrease of only 27 per cent, the freight revenues show a decrease of 34½ per cent, and to February, 1921, the drop was 40 per cent.

Ton Miles

For the period since 1917 statistics are available for the ton miles of freight by months. From May, 1917, to January, 1918, the drop in ton miles was 28 per cent; from August, 1918, to January, 1919, it was 26 per cent and from October to February it was 37 per cent. From October, 1919, to April, 1920, it was 30 per cent, while from August, 1920, to January, 1921, the drop was 26 per cent. The reduction from October to February, for which the figures are not yet available, will, of course, be greater.

Car Loading

Another measure of the falling off of freight traffic for recent years is afforded by the weekly and monthly reports of cars loaded with revenue freight compiled by the Car Service Division of the American Railway Association. In

2,090,612, (including those of Mexican and Canadian roads). In March, 1919, the total was 2,284,716 (excluding Mexican and Canadian) and in March, 1921, it was about 2,343,000.

During the last 16 years there have been net car shortages in some parts of nine years, 1906, 1907, 1912, 1913, 1916, 1917, 1918, 1919 and 1920, while in seven of the years there have been considerable surpluses. While in three years, 1908, 1919 and 1921, the surplus cars have reached approximately 20 per cent of the total cars owned, the maximum shortage, 164,446 cars in May, 1917, represented the equivalent of only 6.7 per cent of the 2,454,000 cars owned at that time. During and following the great car shortage of 1906 the railroads placed large orders for additional cars. According to the records of the *Railway Age*, 341,315 freight cars were ordered in 1905, and 310,315 in 1906. In 1907, 151,711 were ordered and in 1908 only 62,669. At the end of 1906 the railroads owned about 1,840,000 freight cars and the number shows a fairly steady increase to about 2,400,000 at the end of 1914. In 1909, 189,360 cars were ordered; in 1910, 141,024 and in 1911 only 133,117. In 1912 there was a car shortage, which amounted to about 70,000 cars in November and in 1912 the railroads ordered 234,758 cars. In 1913 the shortage continued to some extent and in that

	1920-1921		1919-1920		1918-1919
Total revenues:					
October	\$642,000,000	October	\$509,000,000	August	\$504,000,000
January	470,000,000	April	401,000,000	January	397,000,000
February	406,000,000			February	351,000,000
			21%		Jan. 21%, Feb. 30%
Decrease:					
January	27%	October	368,000,000	October	365,000,000
February	36%	April	268,000,000	January	278,000,000
			27%	February	242,000,000
					Jan. 20%, Feb. 33%
Freight revenues:					
October	481,000,000	October	40,343,000,000	August	40,776,000,000
January	323,000,000	April	28,208,000,000	January	30,178,000,000
February	284,000,000			February	25,474,000,000
			30%		Jan. 26%, Feb. 37%
Decrease:					
January	34½%	October	4,824,375	July	4,674,038
February	40%	April	2,837,330	January	3,504,352
			41%	February	2,747,363
					Jan. 25%, Feb. 41%
Ton miles:					
August	42,656,000,000	Last week September	995,901	Last week September	991,980
January	31,154,000,000	Third week April	584,089	First week March	675,704
			41%		32%
Decrease	26%				
Cars loaded:					
October	4,975,477				
January	3,418,257				
February	2,732,352				
	Jan. 31%, Feb. 45.5%				
Decrease					
Cars loaded:					
Week October 18	1,010,961				
Week February 12	681,627				
	32%				

1918 the peak was reached in the last week of September when 991,980 cars were loaded. Omitting weeks in which holidays occurred the greatest reduction from that peak reached in the following year was shown for the first week in March, 1919, when the loading was 675,704 cars, a decrease of 316,704 cars, or 32 per cent. In 1920 the peak week was that ending October 18, when 1,010,961 cars were loaded, a new record, and omitting the weeks in which holidays occurred, the lowest figure since recorded was that for the week of February 12, when the loading was 681,627, a reduction of 329,334, or also 32 per cent. For the week of April 2 the loading was 666,642.

The biggest freight month in railroad history was August, 1920, when the ton miles aggregated 42,656,000,000; the net ton miles per mile of road per day were 5,995; the total earnings were \$555,000,000, and the freight earnings \$369,000,000. The lowest month in recent years, taking into consideration the number of days, was January, 1918, when the ton miles were only 27,619,000,000.

Car Surpluses and Shortages and Car Purchases

The fact that the car surplus of March 31 is a higher percentage of the total than previous record-breaking surpluses is in spite of the increase in the number of cars owned. In 1906 the total was 1,840,005, and in May, 1908, it was

year the railroads ordered 146,732 cars, but throughout 1914 and 1915 there was a large surplus of cars and in 1914 only 80,264 cars were ordered and in 1915 only 109,792. During 1915 and 1916 the number of cars owned was reduced but after the appearance of the shortage which began in the latter part of 1915 the orders were increased and in 1916 aggregated 170,054, but in 1917, although the maximum shortage ever reached occurred in that year, 164,446, in May, only 79,367 cars were ordered. The number of cars owned apparently reached its maximum about April, 1918, when the number owned was 2,547,000, including Mexican and Canadian, which account for over 200,000 cars. Since June, 1918, the car statistics of the American Railway Association do not include Mexican and Canadian roads, but for January, 1921, the total owned is reported as 2,343,217. There were 123,770 cars ordered in 1918 but only 25,899 in 1919 and 84,207 in 1920.

The comparison between the peaks and depressions of the past three years is shown in the accompanying table.

TWELVE HUNDRED quart bottles of whisky were found in a car of hides, received by the Maine Central from Canada, when the car was examined after its arrival at Calais, Me., recently, and three men were arrested on charges of smuggling.

Freight Car Loading

WASHINGTON, D. C.

THE NUMBER OF CARS loaded with revenue freight again declined during the week ending April 2, according to the weekly report of the Car Service Division of the American Railway Association. The total was 666,642, as compared with 858,827 for the corresponding week of 1920 and 688,567 for 1919. This is the lowest figure reported for a week this year, with the exception of the week of the Washington's Birthday holiday, and represents the fourth successive decline since the increase during the first week of March. Although the holiday on Mitchell's day, April 1, in the coal mines, accounts for part of the decrease, it does not account for the drop in the loading of other commodities. The loading for the last five weeks is about the same as it was for the preceding five weeks, but the total loading since January 1, 9,012,795, is about 15 per cent less than for the corresponding period of 1920, when it was 10,682,808 and is also less than for 1919 when it was 9,158,457.

The principal decrease was in the number of cars loaded with coal, the total for the week being only 109,284 cars or 12,905 cars below the total for the previous week. It was more than 59,000 below the same week in 1920.

With the exception of grain and grain products, which showed a slight increase, decreases were reported in the loading of all other classes of freight as compared with the previous week. Next to coal, the greatest loss was reported in the loading of merchandise and miscellaneous freight which fell off 4,000 cars. This is the first decrease in the loading of this class of freight since January 1 last. A reduction of

2,600 cars was also reported in the loading of forest products, while ore dropped 970 cars. Compared by districts, the number of cars loaded during the week in each region was under that for the preceding week except in the central and southwestern districts. Decreases, however, were shown in all districts as compared with the corresponding week in 1920.

The freight car surplus for the week ending March 31, according to the weekly report of the Car Service Division of the American Railway Association, was 495,904 cars, the largest ever recorded in the history of American railroads and an increase of 36,493 over the total on March 23.

It is also an increase of 82,000 within a month, due almost entirely to the falling off in coal shipments. Of the total surplus slightly more than half, or 255,055, consisted of coal cars, compared with 172,850 on March 1. A steady decline in the loading with coal has been reported each week, the total for the week ended on April 2 being 109,284. The report also shows an increase in the number of surplus box cars, the total on March 31 being 171,119 or 6,900 more than on March 23. It is, however, about 2,400 below the total on March 1.

Increases in the surplus for all classes of cars, as compared with March 23, were shown in all districts except the Pocahontas and Southern. The former broke even while the latter showed a decrease of 3,000. In the Eastern district there was an increase of 13,000; Allegheny, 5,000; Northwestern, 6,000; Central Western, 11,000, and South Western, 4,000 cars. The percentage of freight cars on home lines on April 1 was 70.6, as compared with 21.9 on March 1, 1920, when the government relinquished the railroads. This is the highest percentage attained during the war period.

FOR WEEK ENDED SATURDAY, MARCH 26, 1921

Districts:	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Merchandise L.C.L.	Miscellaneous L.C.L.	Total revenue freight loaded		Received from connections			
										This year 1921	Corresponding year 1920	This year 1921	Corresponding year 1919		
Eastern	1921	5,162	2,150	35,264	757	5,945	704	52,900	61,001	164,283	227,365	165,879	181,061	266,432	182,826
Allegheny	1921	5,705	3,852	56,824	4,475	7,502	4,244	23,969	106,464	176,569	237,365	165,879	181,061	266,432	182,826
Pocahontas	1921	2,421	2,847	37,868	2,746	3,555	1,447	40,793	48,150	138,769	200,285	147,679	92,994	142,222	147,738
Southern	1921	155	67	13,554	42	1,530	18	2,975	5,421	23,762	35,923	31,662	13,132	18,604	23,349
Northwestern	1921	2,222	1,889	16,893	592	1,921	269	158	9,832	35,923	133,151	116,928	61,699	82,295	58,676
Central Western	1921	9,432	6,401	3,850	763	15,554	1,094	27,836	27,463	92,393	117,695	103,209	42,303	64,384	47,031
Southwestern	1921	9,884	8,171	9,370	1,285	22,195	1,859	27,739	42,192	117,695	120,789	91,280	45,992	64,384	47,031
Total, all roads	1921	6,680	8,896	116,532	145	3,517	2,068	30,086	30,872	95,919	900,386	651,778	475,835	531,186	448,223
Increase compared 1920	1920	4,066	28,456	142,928	.....	56,459	14,078	.....	430,689	.....	713,275	.....	.....	696,447	557,736
Decrease compared 1919	1919	1,035	6,004	78,785	.....	17,912	11,200	.....	125,433	.....	212,534	.....	216,812	.....	.....
Decrease compared 1919	1919	7,705	4,117	20,739	.....	6,943	7,598	.....	194,528	.....	25,243	.....	78,101	.....	.....

FOR WEEK ENDED SATURDAY, APRIL 2, 1921

Districts:	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Merchandise L.C.L.	Miscellaneous L.C.L.	Total revenue freight loaded		Received from connections			
										This year 1921	Corresponding year 1920	This year 1921	Corresponding year 1919		
Eastern	1921	5,357	2,299	27,930	964	5,864	367	54,623	62,351	159,755	210,655	163,744	173,383	258,225	183,362
Allegheny	1921	5,353	2,846	43,198	3,853	7,490	3,366	38,176	106,319	176,569	210,655	163,744	173,383	258,225	183,362
Pocahontas	1921	2,292	2,453	32,093	2,519	4,032	6,233	41,032	46,661	137,852	191,919	145,503	122,616	156,660	181,014
Southern	1921	145	63	12,799	37	1,398	36	2,513	5,566	22,667	30,994	29,133	59,917	79,410	64,904
Northwestern	1921	2,056	2,858	50,382	8,243	3,712	5,865	43,461	74,992	137,852	136,993	111,225	40,084	59,113	51,826
Central Western	1921	8,600	7,623	7,058	1,390	19,834	1,975	22,347	47,034	110,871	103,177	94,589	45,916	53,255	37,164
Southwestern	1921	3,554	2,453	16,414	492	12,850	783	38,054	37,320	98,769	119,837	89,293	69,916	69,916	52,212
Total, all roads	1921	4,546	1,913	3,626	479	6,299	484	16,593	22,783	56,370	63,608	46,492	45,916	53,255	37,164
Increase compared 1920	1920	4,586	59,392	10,013	.....	17,272	11,908	.....	129,214	.....	192,185	.....	210,711	.....	.....
Decrease compared 1919	1919	4,830	26,780	.....	.....	8,862	.....	.....	211,244	.....	187,205	.....	58,937	.....	.....

L.C.L. merchandise loading figures for 1921 and 1920 are not comparable as some roads are not able to separate their L.C.L. freight and miscellaneous of 1920. Add merchandise and miscellaneous columns to get a fair comparison.

Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Merchandise L.C.L.	Miscellaneous L.C.L.	Total revenue freight loaded	Received from connections
March 26, 1921	32,960	24,339	122,189	1,179	49,516	6,480	211,028	236,161	687,852	900,386
March 19, 1921	36,038	26,423	126,081	6,122	50,065	6,048	208,816	231,611	691,707	855,060
March 12, 1921	37,896	27,847	136,997	7,103	52,484	6,864	205,534	238,443	702,668	819,253
March 5, 1921	41,536	28,837	144,436	7,828	52,216	7,513	201,068	236,822	712,816	811,106

General News Department

The American Association of Engineers will hold its seventh annual convention at the LaFayette Hotel, Buffalo, N. Y., on May 9, 10 and 11.

Committee Reports to be represented at the meeting of the Signal Section, A. R. A., at Chicago, on June 6, 7 and 8, will be mailed to members on May 16.

W. O. Thompson, secretary of the Traveling Engineers' Association, has changed his headquarters from New York to 1177 East 98th street, Cleveland, Ohio.

Minnesota and New York have appealed to the United States Supreme Court from lower court decisions upholding the orders of the Interstate Commerce Commission increasing intrastate freight and passenger rates to correspond to the advances made in interstate rates.

The Southeastern Express Company will begin operations on May 1 over all the lines of the Southern. The general offices of the company are located at Atlanta, Ga. J. B. Hockaday is president of the company and G. H. Kerr is traffic manager.

The car records of the yards of the Pennsylvania Railroad and around Pittsburgh, Pa., are now kept in a single consolidated office, in charge of W. T. Wolff. Yards included in this arrangement are Pitcairn, Wilkinsburg, Forty-third street, Etna, Island avenue, Scully and Conway.

Six persons were killed and 30 injured when the Royal Palm Limited on the Southern was derailed near New River, Tenn., on April 6 while en route from Jacksonville, Fla., to Chicago. Three day coaches were overturned and three sleeping cars derailed. The accident is thought to have been caused by spreading rails.

The American Society for Testing Materials will hold its twenty-fourth annual meeting at the New Monterey Hotel, Asbury Park, N. J., on June 20 to 24, inclusive. Monday, June 20, will be devoted to committee meetings, and the first session of the annual meeting will be held on Tuesday morning, June 21.

The Underwriters' Laboratories, and their service to safety engineering, will be the subject for discussion at the meeting of the American Society of Safety Engineers, at 29 West 39th street, New York City, on Friday evening, April 22. The principal papers will be by Dana Pierce, vice-president of the Underwriters' Laboratories, and George B. Muldaur, general agent.

The Chamber of Commerce of the United States has announced the appointment of a committee of five, with five alternates, to co-operate with Secretary Hoover in working out a plan for closer relationship between business and the Department of Commerce. Included among the alternates are Howard Elliott, chairman of the Northern Pacific, and A. L. Humphrey, president of the Westinghouse Air Brake Company.

The four brotherhoods of railway train service employees have joined forces with the American Federation of Labor "to defeat legislation inimical to the rights of wage-workers," according to a statement given out by the Federation of Labor at Washington after a conference of labor leaders at which the legislative situation in Congress was discussed. A committee was appointed to consider labor legislation and to report at a meeting of the joint conference later.

Twelve hundred and fifty calls in 24 hours is the record recently made on one train dispatchers' telephone circuit, as reported by W. P. Cline, superintendent of telegraph of the Atlantic Coast Line. This is equal to over fifty calls an hour, and

illustrates in a striking way one of the advantages of the telephone for sending train orders. The statement was made in a brief address before the last meeting of the Southern & Southwestern Railway Club, at Atlanta, on the use of the telephone in train dispatching. Mr. Cline is satisfied that by the operations, with marked benefits to the general conduct of train movement on his division, but also does his work with less nervous strain and less fatigue, which, of course, makes for increased efficiency.

Master Boiler Makers' Convention Deferred

The executive board of the Master Boiler Makers' Association has voted to defer the annual meeting which was scheduled to have been held at St. Louis, Mo., May 23 to 26.

A Correction

In the article describing the special run made with a Pacific type engine on Erie train No. 3, which appeared on page 708 of the issue of March 18, an error occurred. The leaving time at Jersey City was given as 12:18 p. m., though it should have been 2:18 p. m. The mistake is evident from the context as the leaving time did not check with the time of arrival and the elapsed time.

More Than a Trillion Units of Traffic

At noon on Wednesday, April 13, every locomotive and shop whistle on the entire Pennsylvania Railroad System was blown continuously for thirty seconds, to signalize the seventy-fifth birthday of the Pennsylvania Railroad. The company was started in 1846 by an act of the Legislature of the Commonwealth of Pennsylvania. American flags were displayed throughout the day, Wednesday, from all of the road's station, shops and buildings. The accounting department estimates that in its 75 years of existence, the Pennsylvania system has rendered public service equivalent to the carrying of one ton of freight 950 billions of miles and one passenger 115 billions of miles.

Hearings on Cost of Locomotive Repairs

The Interstate Commerce Commission has announced that public hearings will be held on April 18 at Philadelphia and on May 9 at New York with reference to the cost of locomotive repairs made in outside shops, as to which charges were filed with the commission by the International Association of Machinists and other organizations of shop employees that the railroads were paying excessive prices as compared with the cost if the work had been done in their own shops. The hearings are to be held by Examiner Barclay. That at Philadelphia is to be in reference to the locomotive equipment of the Pennsylvania and affiliated lines and that at New York in reference to the locomotives of the New York Central. The commission some time ago announced a formal proceeding of investigation under the title "construction and repair of railroad equipment" and it has been making an informal investigation and obtaining information by the questionnaire method.

The Most Important Problem

The Fidelity & Deposit Company of Maryland has recently published a general survey of national business conditions, with an analysis by David F. Houston, formerly Secretary of the Treasury. The information is based on a questionnaire sent to a thousand selected representatives of the company in all parts of the country. In answer to the question, "What problem has the greatest bearing on business prosperity?" the reply from New England, Middle Atlantic, East North Central, West North Central and Pacific States was, first, taxation, and second, railroads.

From the South Atlantic, East South Central and West South Central the answer was taxation first and peace question second. From the Mountain states the answer was taxation first and tariff second. In reply to the question, "Are general transportation conditions good?" the answer from all sections was in the affirmative.

Business-Getting on the B. & O.

H. O. Hartzell, manager of the commercial development department of the Baltimore & Ohio, is holding meetings at prominent points on the lines of that company to interest employees of all classes in the importance of soliciting freight and passengers. It is desired that every employee be on the watch to do a good turn for the road, in this direction, whenever opportunity offers. The Veterans' Association of the road, acting on a suggestion made by President Daniel Willard some months since, has been active in this work; and now Vice-President Archibald Fries has initiated the present campaign, with rallies at the principal division points. All of the officers of the company are requested to attend the meetings and employees in all departments are called upon to post themselves. The first meeting was at Pittsburgh, Pa., on April 11. About twenty meetings will be held, the last one in the present schedule being set for Fairmont, W. Va., on April 29.

Accident Bulletin No. 77

The Interstate Commerce Commission has issued quarterly accident bulletin No. 77, dated February 28, containing statistics of railroad accidents occurring in the United States in the three months ending with September, 1920. During this quarter, 24 passengers, 126 employees and 26 other persons were killed in train accidents, and 1,246 passengers, 840 employees and 67 other persons were injured. In train service accidents 49 passengers, 524 employees and 1,295 other persons were killed, and 1,159 passengers, 12,273 employees and 2,362 other persons were injured; making a total for both classes of 2,044 persons killed and 17,947 injured. Adding to these, the casualties in non-train accidents and there is a total for the quarter of 2,168 persons killed and 47,003 persons injured.

The total number of train accidents in the quarter was 10,292, including 3,258 collisions and 5,922 derailments; and the total damage to cars, engines and roadway by these accidents was \$9,982,870.

Colonel Shaughnessey Appointed Second Assistant Postmaster General

E. H. Shaughnessey, assistant director of the Division of Transportation of the American Petroleum Institute, formerly trainmaster of the Chicago & North Western, and later an officer of the transportation corps of the A. E. F. in France, has been appointed second assistant postmaster general, in charge of the railway mail service, an office which Postmaster General Hays had originally offered to R. H. Aishton, formerly president of the Chicago & North Western, and now president of the American Railway Association. Mr. Shaughnessey entered the service of the Chicago & Northwestern in July, 1899, as a telegrapher. In 1917 he was trainmaster, and was given leave of absence to enter the military service. He assisted in the organization of the 13th Engineers, and later assumed command of Company E as first lieutenant and later as captain. After some service in the Verdun sector in France he was assigned to duty with the transportation corps, and was promoted to colonel.

Steam Heated Cars for Perishable Freight

A system of heating cars while transporting highly perishable food stuffs has recently been developed by Alfred L. Moorshead, industrial commissioner of the Erie Railroad. Instead of providing heaters operated with oil or charcoal in each car as is the usual practice, the new type of equipment derives its heat from the locomotive. A steam duct leads from the locomotive under each car with a connection to the interior. A thermostat is installed to prevent the car from becoming overheated and auto-

matically shuts off the steam when the interior reaches a predetermined temperature, varying with the commodity in the car.

The elimination of oil and charcoal heaters has numerous advantages, including the elimination of fire risk and damage to the lading resulting from the gases produced by combustion. It is stated that the initial cost of installation of the new type of equipment is low and that it is more effective than the ordinary type of heaters. Preliminary tests, in which the Department of Agriculture participated, have been conducted to determine the results that can be obtained. In one trip the outside temperature varied from 28 deg. F. to minus 20 deg. F., while the air inside the car was never below 52 deg. F. and never above 66 deg. F.

Revenues and Expenses for February

The railroads of the United States suffered a deficit in February of \$7,344,669, while 106 out of 200 reporting to the Interstate Commerce Commission failed to earn their expenses and taxes. In January 109 out of 202 roads failed to make expenses and taxes. Of the 106 roads in February, 46 were in the Eastern, 16 in the Southern and 44 in the Western districts. The carriers fell short about \$64,000,000 of earning the amount which it was estimated they should earn under the increased rates fixed by the Interstate Commerce Commission in accordance with the Transportation act. Total operating revenues for February were \$405,783,000, or a decrease of 4 1/2 per cent, as compared with February, 1920, while total operating expenses were \$385,443,000, a decrease of 7 1/2 per cent.

During the six months since the increased rates were made effective, the net railway operating income of the carriers has totaled \$218,311,800, which would be at the annual rate of return of 2 1/2 per cent on their tentative valuation. On the basis of an annual return of 6 per cent it was estimated they would earn during that period \$531,686,000. During the first four months of the increased rates, that is, from September 1 to January 1, their net operating income was at the annual rate of 3.3 per cent.

While the freight earnings show a decrease of 5.1 per cent as compared with last February, the passenger earnings increased 7.2 per cent.

Cash Fare Penalty

The Pennsylvania Railroad, to encourage the purchase of tickets and reduce the burden of collecting cash fares, which has become especially serious on suburban trains, proposes, beginning May 15, to assess a penalty of five cents for each fare paid on trains, on its lines east of Pittsburgh, Erie and Buffalo; and the five cents will not be refunded. Tariffs covering the new regulations have been filed with the regulative commissions. The tendency of passengers to pay cash fares, rather than take the trifling trouble of purchasing a ticket in advance, has increased greatly. In a single year more than four million passengers on the Pennsylvania System east of Pittsburgh paid cash fares in cases in which tickets could readily have been bought. The new rule applies only when and where ticket office facilities are available.

In some states west of Pennsylvania measures have already been taken by this company, with the approval of the regulative commissions, to discourage carelessness by imposing and retaining cash penalties. The new charge is not to be imposed with any desire to produce revenue, but solely for the purpose of affording an incentive to avoid the payment of cash fares when tickets may be purchased in advance. The company hopes that the five-cent penalty will prove adequate to accomplish the result sought, but if it does not, a higher charge may be imposed.

Graft in Chicago Railroad Construction

A committee of the state legislature of Illinois, which is inquiring into building conditions at Chicago, is said to have uncovered evidence, at the hearing on April 9, of a conspiracy which netted certain union labor interests in Chicago thousands of dollars in connection with the construction of the Union station. Although the hearings were held behind closed doors, it was reported that at various times it was necessary to pay fees in order to use material purchased from manufacturers outside of Chicago and to employ workmen not directly under the jurisdiction of the local unions. One witness is reported to have told of numerous strikes in

connection with the construction of the station and to have stated that a five weeks' tieup of excavation work was caused because the union hoisting engineer was not under the jurisdiction of the local union, although a member of a union affiliated with the American Federation of Labor. Another witness is said to have told the committee of the payment of an "insurance fee" of \$10,000 for the settlement of a strike on a roundhouse construction job on the Chicago & Alton in order that the work might proceed. According to the testimony, the use of material and labor obtained outside of Chicago was dictated by Chicago interests, who exacted a fee which, in the case of the material, increased the cost from 50 to 200 per cent.

Railroads to Collect from War Department

The office of the quartermaster general of the War Department has recently made arrangements with the finance officer of the department for expediting the payment of a large number of outstanding bills in favor of the railroads for past services in passenger and freight movement, as well as of current bills, which is expected to result in the payment of \$10,000,000 to \$15,000,000 to the roads this month. The government has owed the railroads some \$20,000,000 and owing to the reductions of force being made by the government for purposes of economy, the finance office has until very recently been getting further behind each day. Col. Hayes, chief of the rail transportation service, quartermaster general's department, has been interesting himself in the matter and has notified the railroads that arrangements have now been perfected both for the payment of a large proportion of the old accounts and the prompt payment of future accounts.

January Revenues and Expenses

The Interstate Commerce Commission has issued the following compilation of the operating revenues and expenses of 201 Class I roads for January:

	United States	
	1921	1920
Average number of miles operated.....	235,528.20	234,504.37
Revenues:		
Freight.....	\$324,825,450	\$311,565,615
Passenger.....	105,295,673	91,874,146
Mail.....	8,225,256	6,028,728
Express.....	7,443,572	13,899,174
All other transportation.....	13,469,135	10,946,507
Incidental.....	10,367,335	11,538,294
Joint facility—Cr.....	707,198	713,970
Joint facility—Dr.....	185,495	227,231
Railway operating revenues.....	470,148,124	500,839,204
Expenses:		
Maintenance of way and structures.....	61,318,932	57,891,205
Maintenance of equipment.....	124,376,673	117,755,937
Traffic.....	7,357,685	4,944,891
Transportation.....	231,440,606	218,913,350
Miscellaneous operations.....	4,496,530	4,361,883
General.....	15,285,224	12,887,473
Transportation for investment—Cr.....	575,108	336,545
Railway operating expenses.....	443,700,662	416,418,194
Net revenue from railway operations.....	26,447,462	84,421,009
Railway tax accruals.....	22,633,061	20,413,074
Uncollected railway revenues.....	83,247	117,630
Railway operating income.....	3,531,154	63,890,305
Equipment rents (Dr. bal.).....	3,227,569	2,429,765
Joint facility rent (Dr. bal.).....	1,261,984	1,820,842
Net railway operating income.....	958,399	59,639,698
Ratio of operating expenses to operating revenues..... per cent	94.37	83.14

Air Brake Meeting Cancelled

Because of the present depressed railway and business conditions now existing throughout the country, the executive committee of the Air Brake Association recently met in New York and decided to cancel the 29th Annual Convention regularly scheduled to be held in Chicago, May 3, 4, 5 and 6. A business meeting of the Executive Committee, however, will be held in the Hotel Sherman, beginning May 3 and lasting not more than two days, at which reports of the various committees will be received, and other business in furtherance of safety and economy in railroad air brake practice will be attended to. This meeting while primarily intended for the members of the executive committee and the chairmen and members of the committees reporting, will be made an open one to which all members who can attend without inconvenience to themselves and their railroads will be welcomed.

Two regular committee reports will be received on Recommended Practice and Air Consumption of Locomotive Auxiliary Devices. Also, papers prepared by the several air brake clubs of the country will be tendered as follows: Manhattan Air Brake Club, "Empty and Load Brake"; Northwest Air Brake Club, "Triple Valve Repairs"; Dixie Air Brake Club, "Hand Brake Efficiency"; Central Air Brake Club, "Installation and Maintenance of the Vent Valve"; St. Louis Air Brake Club, "Backing Trains into Terminals"; Montreal Air Brake Club, "Steam Heating of Passenger Trains"; Pittsburgh Air Brake Club, "Modification of Present Terminal Test to Insure an Effective Grade Brake as well as an Operative Brake."

Regular notices advising members of this change will be mailed from the secretary's office in a day or two.

Locomotive Boiler Code Adopted by A. S. M. E.

An important step in engineering standardization was taken at the Boston meeting of the council of the American Society of Mechanical Engineers, when it adopted in its final form that portion of the A. S. M. E. Boiler Code known as the Locomotive Boiler Code. This code contains the rules for the construction of locomotive boilers which are not subject to federal inspection and control.

The necessity for such an addition to the Boiler Code arose from the fact that, while the boilers of locomotives operated on railways engaged in inter-state service are covered by the construction and inspection rules of the Interstate Commerce Commission, there was found to be a vast mileage of industrial and short-line railroads in operation in the various states, which by virtue of their location, are not subject to the interstate requirements.

As a result of calls for a code to cover the construction of boilers of this class, the Sub-committee on Railway Locomotive Boilers was appointed in 1916. This committee consisted of F. H. Clark, chairman; F. J. Cole, chief construction engineer of the American Locomotive Company; A. L. Humphrey, vice-president and general manager of the Westinghouse Air Brake Company; S. F. Jeter, chief engineer of the Hartford Steam Boiler Inspection & Insurance Company; William F. Kiesel, Jr., mechanical engineer of the Pennsylvania, and H. H. Vaughan, vice-president of the Dominion Copper Products Company, Montreal. The work of this sub-committee was interrupted somewhat by the war, but its preliminary report was submitted to the Boiler Code Committee in April, 1919.

The preliminary report was printed and distributed at the Spring Meeting in Detroit where it was accepted by the meeting. It was thereupon published in the August issue of Mechanical Engineering. The sub-committee has been co-ordinating the points of view of all who would be affected by such a code and the final result approved by the main committee and the council is now ready for use. H. V. Wille, assistant to the vice-president of the Baldwin Locomotive Works, and Kenneth Rushton, chief mechanical engineer of the Baldwin Locomotive Works, were brought into the committee and with Mr. Cole and James Partington, estimating engineer of the American Locomotive Company, appointed in place of Mr. Humphrey, resigned, represented the locomotive manufacturers.

Constructive assistance was given by the Mechanical Division of the American Railway Association through its representatives, A. W. Gibbs, mechanical engineer of the Pennsylvania; W. I. Cantley, of the Lehigh Valley; and N. A. Ferrier, of the New York Central. A. G. Pack, chief inspector of the Bureau of Locomotive Inspection, Interstate Commerce Commission, has expressed great interest in the code and with his staff has been in frequent attendance at meetings of the sub-committee.

During the past two years Mr. Clark, the original chairman of the committee, has been in China as Technical Adviser to the Ministry of Communications at Peking. Mr. Vaughan has carried on the work of the committee as acting chairman.

The code, itself, follows the general form of the Code for Stationary Boilers. The materials to be used and methods of construction of the various braced and stayed surfaces are very carefully specified. Attention is given to the desire of the locomotive builders to maintain the lowest possible weight consistent with strength. As compared with stationary boilers with a safety factor of five the allowable factor for locomotive shells is four. Requirements in the use of safety valves and their method of test are rigid as are the hydrostatic tests specified.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF FEBRUARY AND TWO MONTHS OF CALENDAR YEAR 1921

Table with columns: Name of road, Average mileage operated during period, Freight, Passenger, Total revenues, Maintenance of way and equipment, Operating expenses, Traffic, Trans-shipment, Total, Operating ratio, Net from railway operation, Operating income (or loss), Net after rentals, Increase (or decrease) comp. with last year.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF FEBRUARY AND TWO MONTHS OF CALENDAR YEAR 1921—CONTINUED

Table with columns: Name of road, Average mileage operated during period, Freight, Passenger, Total (inc. misc.), Operating revenues (Way and structures, Equipment, Maintenance of way and structures, Traffic, Transportation), General, Total, Operating ratio, Net from operation, Operating (or loss), Net after rentals, and Increase (or decrease) last year.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF FEBRUARY AND TWO MONTHS OF CALENDAR YEAR 1921—CONTINUED

Table with columns: Name of road, Average mileage during period, Operating revenues (Freight, Passenger, etc.), Operating expenses (Traffic, Trans-portion, etc.), Net operating ratio, Net operating income (or loss), Net railway operation, Net after rentals, Increase (or decrease) comp. with last year.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF FEBRUARY AND TWO MONTHS OF CALENDAR YEAR 1921—CONTINUED

Table with columns: Name of road, Average mileage operated, Operating revenues (Freight, Passenger, Total), Maintenance of way and equipment, Traffic, Trans. portion, General, Total, Operating ratio, Net from operation, Operating (or loss), Net after effect, Increase (or decrease) last year.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF FEBRUARY AND TWO MONTHS OF CALENDAR YEAR 1921—CONTINUED

Table with columns: Name of road, Average mileage during period, Operating revenues (Freight, Passenger, etc.), Operating expenses (Traffic, Equip., etc.), Total, Operating ratio, Net operating revenue, Net comp. with last year, Increase after rentals, Operating income (or loss), Net operating revenue, Net comp. with last year, Increase after rentals, Operating income (or loss).

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF FEBRUARY AND TWO MONTHS OF CALENDAR YEAR 1921—CONTINUED

Table with columns: Name of road, Average mileage operated during period, Operating revenues (Freight, Passenger, etc.), Maintenance of way and structures, Equipment, Trans-portion, General, Total, Operating ratio, Net from railway operation, Operating income (or loss), Net after rentals, Increase (or decrease) last year.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JANUARY, 1921—CONTINUED

Name of road.	Operating revenues—			Maintenance of—		Operating expenses—		Total.	Operating ratio.	Net railway operation.	Operating income (or loss).	Net after rentals.	Increase (or decrease) with comp. year.
	Average mileage operated during period.	Freight.	Passenger.	Total (inc. misc.).	Way and structures.	Equipments.	Traffic.							Trans- portation.
Newburgh & South Shore.....	7	.....	.....	\$161,245	\$13,276	\$39,818	.....	\$89,430	91.31	\$14,020	\$3,882	-\$3,581	\$11,492
Cincinnati Northern.....	245	\$19,046	253,481	65,415	64,644	8,310	238,014	81.30	15,467	850	15,242	-\$2,675	296,780
Norfolk & Western.....	2,220	6,269,640	987,730	7,436,716	1,031,137	1,737,214	76,286	6,431,320	86.48	1,005,396	615,153	1,003,286	296,780
Northwestern Pacific.....	534	228,926	192,465	479,521	151,880	88,478	210,352	158,277	111.63	55,578	-86,207	-87,145	146,616
Long Island.....	398	\$39,532	1,060,742	1,772,494	245,671	428,582	21,283	1,232,523	114.06	-269,132	-363,446	-403,352	110,150
Omaha & Kansas City.....	255	70,470	28,000	105,521	32,809	22,581	826	80,898	132.48	-34,272	-38,421	-43,108	33,619
St. Louis-San Francisco.....	4,760	4,672,797	1,914,924	7,035,213	722,757	1,421,503	87,234	3,003,140	77.99	1,548,677	1,280,644	1,269,004	699,494
Fort Worth & Rio Grande.....	235	81,069	59,095	150,732	51,441	25,583	31,888	99,189	124.57	-37,039	-40,719	-73,213	-74,053
St. Louis, San Francisco & Texas.....	134	158,526	24,773	193,699	60,764	46,330	31,883	114,708	7.980	232,952	-41,344	-81,247	-42,680
San Antonio & Aransas Pass.....	738	352,305	96,659	477,519	165,478	93,922	10,816	279,518	22.960	571,455	-107,247	-94,879	-45,089
Southern Pacific—													
Arizona, Eastern.....	382	261,363	58,004	346,667	56,840	50,790	3,488	120,224	22.252	160,072	59,536	45,493	50,031
Atlantic S. S. Lines.....	.....	669,784	59,357	769,059	18,003	156,041	18,094	678,479	115.92	-122,431	-133,959	-132,045	123,607
Spokane, Portland & Seattle.....	549	360,780	154,652	564,779	83,761	107,955	9,342	246,176	25.147	482,811	81,968	-488	190,327
Terminal R. R. Assoc. of St. Louis.....	3	.....	.....	399,622	84,524	42,206	967	178,049	8.631	318,579	79,772	81,043	10,795
East St. Louis Connecting.....	36	.....	.....	141,330	23,514	8,310	336	126,726	89.67	11,979	-2,382	-55,354	61,065
St. Louis Merchants Bldg. Terminal.....	9	.....	.....	325,268	62,285	30,161	916	215,490	7.236	316,088	91,118	-3,636	7,708
St. Louis Transfer.....	6	.....	.....	133,536	10,299	4,749	192	102,632	2.311	68,183	65,059	60,041	51,520
Oregon Short Line.....	3,359	1,948,360	273,587	623,551	714,554	44,222	1,065,633	142,897	2,649,097	83,680	196,317	227,493	1,717,414
Oregon, Washington, R. R. & Nav. Co.....	2,223	1,300,131	550,887	2,490,485	571,293	551,026	53,664	1,091,291	2.437,081	119,48	-379,590	-457,267	-1,164,745
St. Joseph & Grand Island.....	238	207,817	36,365	257,949	46,658	61,358	2,138	141,891	105.51	-14,204	-27,944	-39,015	-70,411

Traffic News

Application of the Denver & Salt Lake for permission to continue tri-weekly passenger service instead of resuming daily passenger service, was granted by the Colorado Utilities Commission on April 4.

The Interstate Commerce Commission on April 11 vacated three service orders issued last year, which provided for priority for coal transportation, which have been under suspension for some time. These are Service Orders No. 5, No. 10 and No. 11, applying to lake coal and to New England coal.

The Car Service Division of the American Railway Association announces that the district embargo zone with headquarters at Fort Worth, Texas, will be consolidated on April 15 with the zone headquarters at Chicago. The roads now assigned to the Fort Worth district have been reassigned to the Chicago district. District embargo headquarters will thereafter be maintained at Washington, Montreal, Chicago and Winnipeg.

The University of California Traffic Association, at its meeting on March 28, in the Monadnock Building, San Francisco, listened to an address by Mr. Lowe, of the Freight Claim Department of the Southern Pacific, on the method of handling freight claims in the office of that company. He followed through a specific claim on a cantaloupe shipment from origin to settlement. The University of California Traffic Association was formed by the graduates of the Extension Division of the University of California upon completion of a ten months' course in traffic management and transportation. A second class is now going through the course. M. B. Baker, of the United States Rubber Company, of San Francisco, is president of the association.

At the annual banquet of the Chicago Traffic Club on March 31, the following officers were installed: president, R. B. Robertson, assistant freight traffic manager, Union Pacific; first vice-president, J. A. Brough, traffic manager, Crane Company; second vice-president, J. E. Weller, freight traffic manager, Pennsylvania; third vice-president, J. H. Walden, president, Chicago Railway Printing Company; secretary, E. S. Buckmaster, general agent, American Railway Express Company, and treasurer, J. F. Coykendall, treasurer, Chicago, Great Western; directors for two years, E. L. Dalton, general traffic manager, Montgomery Ward & Company; C. E. Barry, general western agent, Livermore, Dearborn & Company, Inc.; W. J. M. Lahl, traffic manager, American Seating Company, and T. J. Wall, general agent, passenger department, Canadian Pacific.

Anthracite Shipments in February

The shipments of anthracite in February, as reported to the Anthracite Bureau of Information, in Philadelphia, established a new record for that month, amounting to 5,966,101 gross tons. The nearest approach to this figure for February shipments during a normal year, was in February, 1912, when the shipments amounted to 5,875,968 tons, and the next nearest approach was in the war year of 1918, when 5,812,082 gross tons were shipped. The shipments last month exceeded the previous month of January, a long month, by 225,563 tons, and exceeded February of last year by over 900,000 tons.

Shipments by originating carriers were:

	February, 1921	January, 1921
P. & R. R.....	1,170,753	1,172,873
L. V. R. R.....	1,063,508	1,058,127
C. R. R. of N. J.....	515,551	470,704
D. L. & W.....	920,788	814,491
D. & H. Co.....	813,191	814,491
Penna. R. R.....	426,350	451,879
Eric R. O.....	633,706	606,602
N. Y. & W.....	153,017	156,564
L. & N. E. R. R.....	269,237	99,038
Total.....	5,966,101	5,740,538

Commission and Court News

Interstate Commerce Commission

The commission has suspended until August 7, the operation of certain proposed reductions in freight rates on crude petroleum in tank cars from 10 to 6½ cents per 100 lb. from Sabine, Port Arthur, Chaison and Beaumont, Texas, to Sulphur Mine, La.

The commission has suspended, from April 17 until August 15, the operation of certain schedules published in a Kansas City, Mexico & Orient tariff, proposing increased rates on grain from points in Oklahoma and Kansas to Algiers, New Orleans, La., and other points in Louisiana.

The commission has further suspended until May 14 the operation of schedules providing increased freight rates between Ohio river crossings, St. Louis, Mo., and points related thereto on the one hand, and Memphis, Tenn., lower Mississippi river crossings and Gulf ports and points related thereto and points in Mississippi Valley territory on the other hand between other points in Mississippi Valley territory.

The commission has suspended from April 8 until August 6 the operation of certain schedules, which provide for the elimination of the application of rates on lumber and other forest products from California and Oregon to various points in Minnesota via the Chicago, St. Paul, Minneapolis & Omaha and the Great Northern, leaving combination rates applicable instead, resulting in increases varying from 4½ to 9 cents per 100 pounds.

Personnel of Commissions

President Harding is considering candidates for appointments to the two vacancies on the Interstate Commerce Commission has before him communications from the Engineering Council of the Federated Engineering Societies urging the appointment of an engineer as a member of the commission and submitting the names of six prominent engineers as candidates. It is understood also that Herbert Hoover, Secretary of Commerce, who is president of the organization, has discussed the matter with the President. Other candidates who have been strongly urged upon the President, usually by congressional delegations or by commercial organizations from various sections, include E. I. Lewis, chairman of the Public Service Commission of Indiana; W. A. Wimbish, a traffic lawyer of Atlanta, Ga.; James B. Campbell, a traffic lawyer of Spokane, Wash.; Mason Manghum, counsel for the Virginia Corporation Commission, and Henry J. Ford, whose recess appointment as a member of the commission expired on March 4 and who has since been retained by the commission as an attorney.

Court News

Recovery of Connecting Carriers' Charges Notwithstanding Claims for Damages

A shipment was diverted from the original consignee to parties who ordered a further diversion, the railroad in possession of the goods agreeing to deliver the car in time for a certain train on the terminal road. The car was not so delivered, however, and the consignee suffered damage thereby. In an action by the terminal road against the last consignee for its and all prior charges, it was held that the plaintiff could recover those accruing to the railroad which had been in default in failing to deliver the car to the terminal road in time for its train; leaving the parties to bring action directly against the road in default to recover such damages as they could show they had sustained by the failure to keep its agreement to deliver.—Grand Trunk v. Satuloff, 182 N. Y. Supp. 81.

Equipment and Supplies

Locomotives

The GREAT WESTERN OF BRAZIL has ordered 4 4-6-0 type locomotives from the Baldwin Locomotive Works.

The HAWAII CONSOLIDATED RAILWAY, LTD., has ordered 1 4-6-0 type locomotive from the Baldwin Locomotive Works.

The CERVECERIA CUAUHTEMOC, Monterey, Mexico, has ordered 2 Consolidation type locomotives from the American Locomotive Company. These locomotives will have 19 by 26 in. cylinders and a total weight in working order of 138,000 lbs.

MITSUBI & Co., 65 Broadway, New York, representing a Chinese banking group and on behalf of the Chinese Ministry of Communications, are inquiring for 30 Prairie type locomotives for the Pekin-Hankow, and 2 Mikado and 3 Pacific type locomotives for the Pekin-Kalgan.

NATIONAL RAILWAYS OF MEXICO.—The General Equipment Company, New York, has sold to The Oliver American Trading Company, Inc., with New York City office at 61 Broadway, 65 rebuilt locomotives, including Mogul, 10-wheel and Consolidation type locomotives for use over the lines of the National Railways of Mexico in connection with the operation of the private freight trains of the Oliver company. This company, in addition to these 65 locomotives just purchased, also has leased within the past few days 20 locomotives from American railroads, which, with the equipment they are now operating, gives it a total motive power of about 95 locomotives. This sale of the General Equipment Company has been made possible by virtue of certain arrangements between Senor Francisco Perez, Director-General of the National Railways of Mexico and The Oliver American Trading Company, Inc., which plan provides a practical means of financing this equipment.

Freight Cars

The LEHIGH VALLEY is asking for prices on repairs on 1,000 box, 500 steel gondola and 500 hopper cars.

BETANZOS FERROL RAILWAY.—Bids will be opened on April 25, at Madrid, Spain, for 94 freight cars of various types.

The UNITED FRUIT COMPANY, New York, has ordered from the General American Tank Car Corporation 2 tank car tanks, to be used on the Truxillo Railway, Honduras.

Iron and Steel

The UNITED STATES STEEL CORPORATION on April 12, announced a change in prices effective April 13, lowering the price on bars from 2.35 cents to 2.10 cents Pittsburgh, and plates and shapes from 2.65 cents and 2.45 cents respectively, to 2.20 cents. It also reduced billets from \$38.50 to \$37; steel brass from \$42 to \$39; wire rods from \$52 to \$48, and tin plates from \$7 to \$6.25 per box.

Track Specialties

The NORFOLK & WESTERN will receive bids at Roanoke, Va., until 12 o'clock noon, April 20, for 51 kegs of track bolts, 14 switch stands, 5,000 rail bonds, 650 lbs. flux rods, 6 clamps for holding bonds to rail, 8 steel gate posts and 50,800 tie dating nails.

Miscellaneous

MADRID MUNICIPAL RAILWAY.—Bids will be opened on April 25, at Madrid, Spain, for 2,750 tons of steel rails and a large quantity of rails, plates, clamps, screws, ball extractors, and switches.

The NEW HAVEN, NEW HAVEN & HARTFORD will receive bids at New Haven, Conn., until 12 o'clock noon, April 22, for its requirements of locomotive and car couplers, to be ordered as required during the period from April 1 to and including December 31, 1921.

Supply Trade News

The **G. M. Basford Company** will remove its office on April 20 from 30 Church street to the National City building, 17 East Forty-second street, New York City.

The **Busch Corporation**, 13 North Seventh street, St. Louis, Mo., has been appointed agent in that territory for the **Track Specialties Company**, 29 Broadway, New York.

The **Rome Iron Mills, Inc.**, will remove its general offices on April 20 from 30 Church street to the National City building, 17 East Forty-second street, New York City.

The **Superheater Company** will remove its general offices on May 1 from 30 Church street to the National City building, 17 East Forty-second street, New York City.

The **Stone Franklin Company** will remove its general offices on April 20 from 30 Church street to the National City building, 17 East Forty-second street, New York City.

The **Franklin Railway Supply Company, Inc.**, will remove its general offices on April 20 from 30 Church street to the National City building, 17 East Forty-second street, New York City.

The **American Arch Company, Incorporated**, will remove its general offices on April 20 from 30 Church street to the National City building, 17 East Forty-second street, New York City.

The **Lima Locomotive Works, Incorporated**, will remove its executive and sales offices on April 23 from 30 Church street to the National City building, 17 East Forty-second street, New York City.

The **International Pulverized Fuel Corporation** will remove its general offices on April 20 from 30 Church street to the National City building, 17 East Forty-second street, New York City.

The **Brown Hoisting Machinery Company**, Cleveland, Ohio, has opened a southern office at 530 Whitney-Central building, New Orleans, La. The states of Texas, Louisiana, Mississippi, Alabama, Georgia and Florida will be covered from this office. **Charles H. White**, who has been with the Brownhoist company for a number of years, is manager of the new office.

The executive and general sales offices of the **Elliott-Fisher Company** will be removed from Harrisburg, Pa., to New York City early in May. The company will occupy the entire sixteenth floor of the new Canadian-Pacific building, at Madison avenue and Forty-third street, in the Grand Central Terminal zone. The sales offices of the New York City branch have also been removed from 217 Broadway to the same floor of the Canadian Pacific building.

The **National Steel Car Lines Company**, 34 Pine street, New York, has been incorporated with an authorized capitalization of \$1,000,000 preferred stock and 20,000 shares of common stock of no par value, to finance purchases of locomotives and cars. The officers and directors of the company are **Ernest L. Nye**, president; **Leon S. Freeman** and **E. Kirk Haskell**, vice-presidents; **S. Halline**, secretary; **R. J. Burton**, treasurer; **Southgate B. Freeman** and **James A. Cotner**.

The **Engineering Business Exchange** announces the opening of a Southeastern branch with **Marshall O. Leighton**, consulting engineer of Washington, D. C., as director, and with offices in the McLachlen building. Mr. Leighton was for 12 years one of the principal officers of the United States Geological Survey. During the past three years he has served as chairman of the National Service Committee of the Engineering Council and as leader of the national organization which has carried on the campaign to reform the government's business methods and establish a federal department of public works. Mr. Leighton graduated in 1896 from the

Massachusetts Institute of Technology. Associated with Mr. Leighton in carrying on the exchange will be **A. C. Oliphant**, who was also active in the work of the Engineering Council's National Service Committee. Mr. Oliphant is a graduate of Drexel Institute and Columbia University, and was engaged in electric central station work and industrial engineering until he entered the Ordnance Department of the Army during the war.

Page Steel & Wire Company

A. P. Van Schaick, whose appointment as general manager of sales of the Page Steel & Wire Company, with headquarters in the Grand Central Terminal, New York, was announced in the *Railway Age* of April 8, began his business career in 1903, at which time he left Williams College, Williamstown, Mass., to enter the railroad sales department of the Pittsburgh Plate Glass Company, with headquarters in Chicago. From 1906 to 1910 he was in the employ of the Universal Railway Supply Company, with headquarters in the same city, resigning from that position during the latter year to become district sales manager of the Lackawanna Steel Company at Chicago. In May, 1919, he went to the American Chain Company, Inc., Bridgeport, Conn., as special representative, with headquarters in Chicago, and subsequently was appointed assistant general manager of sales of the same company at New York. On January 1, 1921, he was promoted to general manager of sales of the American Chain Company and other subsidiary companies, and now becomes also general manager of sales of the Page Steel & Wire Company. Mr. Van Schaick has been active in the work



A. P. Van Schaick

of railway supply organizations and especially of the National Railway Appliances Association. He was elected a member of the executive committee of this association in 1910, vice-president in 1911, and president the following year.

W. T. Kyle, who has been appointed assistant general manager of sales of the Page Steel & Wire Company, was born in 1883, at Baltimore, Md. He was educated in the high schools and took academic courses in various academies, specializing in civil engineering. In 1901 he began an apprenticeship course with the Bell Telephone Company, at Philadelphia, Pa., and two years later went with the American Pipe & Construction Co., Philadelphia, as district superintendent, on general railroad construction work. He left that position in 1908, to go to the Duplex Metals Company, New York, as a salesman, and later became sales manager of the same company. In 1914 he went to the Okonite Company as special representative at New York. In 1916 he entered the service of the Page Steel & Wire Company as sales manager of its Armco wire department at New York,



W. T. Kyle

and on April 1 was promoted to assistant general manager of sales, with headquarters at New York. All the company's general sales are now handled at New York for both the Adrian, Mich., and the Monessen, Pa., plants. Mr. Kyle served in 1917 and 1918 as chairman of the Railway Signal Appliance Association, and is now chairman of the Railway Telegraph & Telephone Appliance Association.

The E. Horton & Son Company, Windsor Locks, Conn., has bought the chuck business of the American Company, Hartford, Conn. The American Company has specialized in the manufacture of a 3-jaw geared drill chuck known as the Ellison chuck.

Obituary

H. Kirke Porter, president of the H. K. Porter Company, Pittsburgh, Pa., died on April 10, at his home in Washington, D. C. He was born on November 24, 1840, at Concord, N. H., and studied at Newton Theological Institute and at Rochester Theological Seminary. He enlisted with the 45th Massachusetts Volunteers in 1862, and was mustered out of service in July, 1863. Mr. Porter served in the United States Christian Commission during the winter of 1864, and began his business life in 1866, as a member of the firm of Smith & Porter, manufacturing exclusively light locomotives. In 1871 the firm became Porter, Bell & Company. In 1879 it was changed to H. K. Porter & Co., and in 1899 was incorporated under the name of the H. K. Porter Company. During the past 20 years, the firm has been engaged in manufacturing heavy as well as light locomotives. This concern was the first to make compressed air locomotives for mine and general industrial use. Mr. Porter was a member of the 58th Congress from 1903 to 1905.



H. K. Porter

Robert Alexander Bole, vice-president, director and district sales manager of Manning, Maxwell & Moore, Inc., New York, died on April 2, at the age of 62 in the Schenley Hotel, Pittsburgh, where he made his home. Mr. Bole was widely known in the iron, steel and railroad circles. He was born in Old Allegheny City, and received his education in the Pittsburgh schools. In early life he became identified with the Westinghouse Machine Company and rose from the ranks to secretary of that company. Following his long service with the Westinghouse interests, he became identified with the manufacturing company of Niles-Bement-Pond Company, New York, and resigned from that company to become associated with Manning, Maxwell & Moore, Inc. At the time of his death, he had been identified with the latter company for a period of 26 years.



R. A. Bole

Trade Publications

FROM TREE TO TRADE.—The Long Bell Lumber Company, Kansas City, Mo., has issued a profusely illustrated 48-page booklet under this title which describes the operations incident to the manufacture of lumber. The book is elaborately illustrated with photographs in color of the various steps incident to logging, sawing and distribution of lumber, poles, posts and similar products of wood.

POWER UNITS FOR MOVABLE BRIDGES.—The Norwood-Noonan Company, Chicago, has issued a four-page leaflet illustrating and describing self-contained gasoline engine units and auxiliary appliances, designed and built especially for the operation of movable bridges. The leaflet also contains tables of sizes, weights and other physical proportions of this equipment and a list of railroad structures on which it has been used.

DUST COLLECTING EQUIPMENT.—A four-page bulletin (No. 12) has been issued by the Dust Recovering & Conveying Company, Cleveland, Ohio, which illustrates the development of this form of equipment from the simple cyclone separator to the modern Dracco filter cloth system. The bulletin explains the defects of the original equipment in that it failed to remove the finest particles from the exhausted air and introduced the hazard of explosions resulting from sparks developed by the fan blades striking foreign particles in the air. These defects are eliminated in the modern apparatus.

FREIGHT CARS AND APPLIANCES.—The Canadian Car & Foundry Co., Ltd., Montreal, Canada, has recently issued a series of bulletins describing cars built by the company and some of the specialties manufactured in its plant. The numbers of the bulletins and the subjects are as follows: No. 11, Simplex safety brake head; No. 12, A. R. A. standard D coupler; No. 21, box cars for the Canadian Pacific; No. 22, box cars for the Canadian National Railways; No. 23, composite underframe refrigerator cars for the Canadian National; No. 24, all wood stock cars for the Canadian National; No. 31, cars for foreign service.

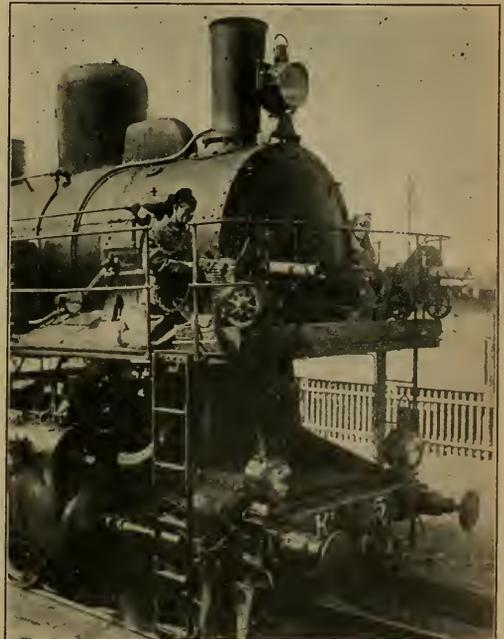


Photo by Kevstone

A Locomotive Commandeered by the Bolsheviks

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company which was noted in the *Railway Age* of April 1 (page 864) as accepting bids for the construction of a craneway building at Topeka, Kan., to cost approximately \$13,000, has awarded a contract for this work to Joseph E. Nelson & Sons, Chicago.

ATCHISON, TOPEKA & SANTA FE.—This company, in co-operation with the railroad Y. M. C. A. of Topeka, Kansas, will remodel the Y. M. C. A. building at Topeka and build an addition to cost about \$25,000.

CANADIAN NATIONAL.—This company is advertising for bids for the construction of a number of concrete structures in the Ontario district.

CHICAGO UNION STATION.—This company which was noted in the *Railway Age* of April 8 (page 911) as accepting bids for the construction of a new railway mail terminal, has awarded a contract for this work to R. C. Wiebolt, Chicago.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—This company contemplates the construction of an engine terminal at Jeffersonville, Ind.

ILLINOIS CENTRAL.—This company, which was announced in the *Railway Age* of March 4 (page 532), as contemplating the construction of a new 100-ft. turntable at Waterloo, Ia., has awarded the contract for this work to the Ellington-Miller Company, Chicago.

ILLINOIS CENTRAL.—This company, which was announced in the *Railway Age* of March 25 (page 821) as accepting bids for the construction of two bridges at Council Hill, Ill., to cost a total of \$60,000, has awarded the contract for this work to the Gould Construction Company, Davenport, Iowa.

INTERSTATE.—This company will shortly ask for bids for the construction of approximately 18 miles of single track line with passing tracks and an interchange yard. The proposed line will lead through mountainous country, and the work will involve the construction of three tunnels.

SEBOMOOK LAKE & ST. JOHN.—This company which is owned by the Great Northern Paper Company, Boston, has let a contract to J. T. Mullin, Bangor, Me., for the construction of a line 20 miles in length, from Sebomook Lake to St. John Lake, Maine. This line is all through forest land. The maximum gradient will be 2 per cent and the maximum curvature 6½ deg. All bridges will be of wood and there will be one piling trestle 1,100 feet long. A round house and repair shop will be built and some rolling stock and a few locomotives will be purchased, according to the company's announcement.

SPOKANE & BRITISH COLUMBIA.—The Interstate Commerce Commission has issued a certificate authorizing this company to abandon its entire line from Danville to Republic, Wash., 36.3 miles.

TEXAS & PACIFIC.—This company is accepting bids for the construction of bridges across Bayou-Plaquemine, La., and will award the contract for this work on April 20.

WHISTLE FOR CARELESS AUTOMOBILE DRIVERS.—The Chicago & North Western, in its campaign to reduce highway crossing accidents, has sent out a letter to the home address of every engineman on the system and another letter to the home address of each fireman. The attention of the enginemen is called to the heavy toll of lives lost by accidents at crossings and they are directed to be on the alert and to use their whistles more. Specific instances are cited and concrete examples are given of the causes of certain accidents; and it is shown how a continued use of the whistle would have avoided them. The letter to the firemen outlines the crossing accident problem from the firemen's side, directing them to be on the alert and to inform the enginemen of all approaches from their side of the engine.

Railway Financial News

BELT RAILWAY OF CHICAGO.—*New Directors.*—A. E. Wallace and L. W. Baldwin have been elected directors to succeed Mitchell D. Follansbee and A. S. Baldwin, respectively.

BOSTON & MAINE.—*Annual report.*—The corporate income account for the year ended December 31, 1920, compares as follows:

	1920	1919	
Operating revenues	\$75,539,327		
Operating expenses	76,346,024		
Net railway operating revenue (loss)	\$806,607		
Tax accruals	2,460,913		
Railway operating income (loss)	\$3,312,291		
Compensation accrued under federal control	1,583,441		\$9,382,527
Amount of certificates issued by the Interstate Commerce Commission account of Guaranty period claim	11,500,000		
Total non-operating income (including other)	\$14,536,286		
Gross income	\$11,223,995		\$8,453,456
Deductions from gross income:			
Hire of freight cars—debit balance	\$3,866,947		
Rent for leased roads	927,845		928,550
Interest on funded debt	5,272,223		3,419,337
Interest on unfunded debt	18,857		1,008,970
Total deductions from gross income inc. other	\$10,609,265		\$5,795,933
Net income	\$614,730		\$2,657,523
Disposition of net income:			
Income applied to sinking funds	410,978		96,559
Dividends (preferred stock)	1,227,948		2,035,716
Equipment trust installments (11½ months proportion)	340,496		
Total appropriations of income	\$1,979,423		\$2,132,275
Net balance transferred to profit and loss	Def. 1,364,693		525,247

The annual report of the Boston & Maine will be reviewed editorially in an early issue.

BUFFALO, ROCHESTER & PITTSBURGH.—*Annual Report.*—The corporate income account for 1920 as compared with 1919 is given as follows:

	1920	1919	Increase or Decrease
Operating income:			
Revenues	\$9,145,766		
Expenses	7,126,122	\$91,545	\$9,054,377
Net revenue	\$2,019,644	Def. \$91,545	\$2,111,189
Tax accruals	507,000	99,109	407,891
Uncollectible revenues	47		47
	\$507,047	\$99,109	\$407,938
Total operating income	\$1,512,597	Def. \$190,653	\$1,703,251
Non-operating income:			
Rental—U. S. R. R. Admin.	557,935	3,276,410	—2,718,475
Rental—Guaranty period	1,759,613		1,759,613
Other items	731,440	385,222	346,217
	\$3,048,988	\$3,661,633	—\$612,645
Gross income	\$4,561,586	\$3,470,979	\$1,090,606
Deductions:			
Rentals of leased lines, interest, etc.	2,235,825	2,407,012	—171,187
Net income	\$2,325,760	\$1,063,967	\$1,261,793
Appropriations:			
Fensions and fire insurance funds	30,711	28,602	2,109
Surplus available for dividends	\$2,295,049	\$1,035,366	\$1,259,684
Return on capital stock	13.91 per cent.	6.27 per cent.	7.64 per cent.

The annual report of the Buffalo, Rochester & Pittsburgh will be reviewed editorially in an early issue.

CAPE GIRARDEAU NORTHERN.—*Application for Loan Denied.*—The Interstate Commerce Commission has denied the application of this company for a loan of \$250,000 for the purpose of meeting maturing indebtedness, providing itself with equipment and additions and betterments, on the ground that its prospective earning power does not offer sufficient security.

CHICAGO, BURLINGTON & QUINCY.—*Hearing on Great Northern—Northern Pacific Bonds.*—See article on another page of this issue.

CHICAGO, INDIANAPOLIS & LOUISVILLE.—*Annual report.*—The condensed corporate income account for 1920 is given as follows:

	1920	1919	Increase or decrease
Gross operating revenues.....	\$13,611,131	\$13,611,131	
Net total operating revenues.....	13,210,542	\$65,719	13,144,824
Net operating revenues.....	\$400,588	Dr. \$65,719	\$466,307
Taxes, etc.	492,431	16,744	475,687
Net operating deficit.....	\$91,842	\$82,462	\$9,380
Other income.....	133,905	109,505	24,400
Standard return.....	270,000	1,620,000	—\$1,350,000
Guaranty U. S. Government.....	815,249		815,249
Total other income.....	\$1,219,156	\$1,729,505	—\$510,350
Total gross income.....	1,127,313	1,647,043	—\$519,730
Deductions from total gross income for fixed charges including interest on funded debt.....	2,261,207	1,203,384	\$1,057,822
Balance of deficit carried to debit of profit and loss.....	\$1,133,893		\$1,133,893
Balance of income, over charges, car- ried to credit of profit and loss.....		\$443,659	\$443,659
Dividends declared.....	370,223	199,622	170,571
Surplus (debit).....	\$1,504,117		\$1,748,123
(credit).....		\$244,007	

The operating revenues and expenses in detail and the principal traffic statistics for 1920 compare with 1919 as follows:

OPERATING REVENUES			
	1920	1919	
Freight.....	\$9,329,004	\$8,366,515	
Passenger.....	2,952,344	2,891,919	
Total operating revenues.....	\$13,611,131	\$12,355,827	
OPERATING EXPENSES			
Maintenance of way and structures.....	\$1,986,341	\$1,464,707	
Maintenance of equipment.....	4,030,894	3,304,501	
Traffic expenses.....	320,181	172,144	
Transportation expenses.....	6,336,517	5,384,032	
General expenses.....	361,731	314,946	
Total operating expenses.....	\$13,210,542	\$10,764,781	
Net revenue from railway operations.....	\$400,588	\$1,591,046	
Railway tax accruals.....	465,064	494,840	
Railway operating income.....	Def. \$91,842	\$1,094,704	
PASSENGER TRAFFIC			
Number of passengers carried.....	2,202,426	1,991,204	
Number of passengers carried one mile.....	116,889,061	106,166,134	
Average distance hauled per passenger (miles).....	53.07	53.32	
Average receipts per passenger per mile (cents).....	2.896	2.724	
FREIGHT TRAFFIC			
Number of tons carried.....	7,519,803	5,759,540	
Number of tons carried one mile.....	1,143,743,829	770,284,023	
Average distance hauled per ton (miles).....	152.10	133.74	
Average receipts per ton per mile (cents).....	3.86	1.085	
Average number of tons of freight in each train.....	601.18	536.65	
Average number of tons of freight in each loaded car.....	29.98	25.18	

President H. R. Kurrie in his remarks refers to maintenance as follows:

Cross ties renewed during the year was 160,486 as compared with 82,702 in the previous year. New 90 lb. section steel rail laid, replacing light rail was 2,917 tons, compared with 5,215 tons last year. New ballast placed in track was 165,669 cubic yards, as compared with 71,151 cubic yards, last year. In equipment maintenance, the average cost per locomotive repaired, excluding renewals and depreciation, was \$12,796, as compared with \$10,034. The average cost of repairs per passenger train car was \$2,822, as compared with \$1,643 in the previous year. Cost of repairs per freight train car excluding renewals and depreciation was \$279, as compared with \$160 last year. The difference in the cost of repairs to equipment arises from increased wages and more complete repairs.

CHICAGO JUNCTION.—Hearings on Acquisition by New York Central.—See New York Central.

CHICAGO, ROCK ISLAND & PACIFIC.—Annual Report.—A review of this company's annual report for 1920 appears on another page of this issue.

CHICAGO & NORTH WESTERN.—New director.—Marshall Field has been elected a director to succeed James Stillman, resigned.

CHICAGO & WESTERN INDIANA.—Annual Report.—The annual report for the year ended December 31, 1920, shows a net income for the year of \$516,411. The income account for the year 1920 compares as follows:

	1920	1919	
Total operating revenue.....	\$233,828		
Operating expenses.....	418,223		
Net operating loss.....	184,395		
Compensation from U. S. Government.....	317,873		\$1,880,737
Joint facility rent income.....	1,930,586		
Income from lease of road.....	1,980,167	1,863,943	
Total non-operating income inc. other.....	4,444,485		
Gross income.....	4,260,090	3,081,993	
Interest on bonds.....	2,365,000	3,871,250	
Interest on unfunded debt.....	814,776		
Total deductions from gross income, inc. other.....	3,743,679	3,490,114	
Net income for year.....	516,411	591,177	

OPERATING EXPENSES

	1920	1919	Increase or Decrease
Maintenance of way and structures.....	\$805,937	\$585,366	\$220,571
Maintenance of equipment.....	366,043	265,998	100,045
Traffic expense.....	3,492	3,546	146
Transportation expense.....	1,857,073	1,351,286	505,787
General expense.....	158,511	159,900	1,388
Total.....	\$3,202,932	\$2,379,164	\$823,769

The report in speaking of maintenance says:

The expense incident to maintenance of way and structures increased \$220,571, or 37.7 per cent, practically all of which was due to the increased rate granted in Decision No. 2 of the United States Railroad Labor Board effective May 1, together with the increased cost of materials. The total man-hours for the year in this department reflect a decrease of 3 per cent as compared with the man-hours worked in 1919 and approximately 40 per cent as compared with 1918.

Maintenance of equipment expense increased \$100,045, or 37.6 per cent, and as in the case of the maintenance of way department the increase was principally due to the higher wage rates made effective May 1 by the United States Railroad Labor Board Decision No. 2, as well as the higher cost of materials needed for the repair of locomotives and car equipment. Transportation expense increased \$505,786, or 37.4 per cent, and was principally due to the higher wage rates for all classes of employees made effective May 1 by United States Railroad Labor Board Decision No. 2, also the higher cost of materials.

The strike of the switchmen, which went into effect April 4, and which was not formally declared off until September 13, also contributed to the increased cost of operation in the transportation department. The work of this department also increased during the year as evidenced by the fact that the number of passenger trains at the beginning of the year numbered 119 per day, whereas at the end of the year a total of 125 passenger trains were handled in and out of Dearborn Station per day.

New Directors.—A. E. Wallace and Mitchell D. Follansbee have been elected directors.

ERIE.—Annual Report.—The corporate income account for 1920 as compared with 1919 shows results as follows:

	1920	1919	
Compensation accrued under federal control, January and February.....	\$2,630,861		
Guaranty, March 1 to August 31.....	7,892,563		
Net railway operating income, September 1 to December 31.....	3,288,620		
Total compensation, etc.....	13,812,044	\$15,841,263	
Total non-operating income.....	4,704,919	4,569,998	
Gross income.....	18,516,963	20,411,261	
Total deductions from gross income.....	14,078,397	14,284,156	
Net income.....	4,438,566	6,127,104	
Applied to sinking of other reserved funds.....	976,015	1,005,000	
Balance for year.....	3,462,570	5,122,104	

The annual report of the Erie will be reviewed editorially in an early issue.

GULF PORTS TERMINAL COMPANY.—Asks Authority to Issue Bonds.—This company has applied to the Interstate Commerce Commission for authority to issue \$300,000 of first mortgage, 5 year, 8 per cent bonds to finish the uncompleted line to Mobile, Ala., a distance of 7 miles.

GRAND TRUNK.—Defaults Bond Interest.—This company has defaulted interest payments due April 1 on one of its bond issues floated in London.

The Canadian Government has informed the Grand Trunk that it must turn over possession and control of the lines to the government to gain consideration of its application for further advances and an extension of time in the arbitration proceedings now pending on the physical value of the road.

LOUISVILLE & NASHVILLE.—Annual Report.—A review of this company's annual report for 1920 appears on another page of this issue.

NASHVILLE, CHATTANOOGA & ST. LOUIS.—New Director.—J. J. Gray, Jr., has been elected a director.

NEW YORK CENTRAL.—Hearings on Acquisition of Chicago Junction Railway.—The hearings before W. H. Colston, director of the division of finance of the Interstate Commerce Commission, upon the application of the New York Central for authority to acquire the terminal properties of the Chicago Junction and the Chicago River & Indiana, were adjourned on April 9 and another session of hearings is to start in three weeks. Testimony brought out during the last days of the first hearing concerned the financial condition of the properties and statements of shippers who are in favor of the purchase of the line by the New York Central. It was stated by L. D. Porter, assistant comptroller in charge of accounts of the New York Central, that the total annual switching revenue for the two belt roads in the year 1917 and 1918 was \$7,701,000. In 1920 the Chicago Junction showed a deficit of \$199,192 and the Chicago River & Indiana an income of \$432,228. The latter figure, it was shown, represents about 86 per cent re-

turn on the capital stock of \$500,000 and about 57½ per cent return on the \$750,000 investment the New York Central proposes to make to acquire the road. The total net on the two roads of \$232,000 is about 40 per cent. Other evidence introduced showed the car movement in tonnage, in different classes of freight handled by the Junction. A detailed analysis of the destination of such freight by roads in commodities was called for by Luther M. Walter.

Several witnesses for the New York Central testified the purchase would be advantageous to the shippers. When the hearings are again started shippers who oppose the purchase, it is claimed, will seek to show that the petitions signed by 98 per cent of the shippers on the Chicago Junction property favoring the New York Central plan, were obtained by representing to them that the Belt line was in such shape as to face imminent receivership and that it would shortly be operated by a receiver with a corresponding effect on service. Attorney Ballard, for the opposing shippers, declared he would produce testimony to show that the Junction net work of city tracks must be kept open to all roads or serious consequences to shippers will result.

NORTHERN PACIFIC.—Annual Report.—The corporate and federal income account for 1920 as compared with 1919 shows results as follows:

	1920	1919	Increase or Decrease
Operating income:			
Operating revenues	\$113,084,408	\$100,739,354	\$12,345,054
Operating expenses	100,983,874	78,672,509	22,311,365
Net operating revenue	\$12,100,534	\$22,066,845	—\$9,966,311
Tax accruals	10,108,686	9,000,737	1,107,949
Uncollectible railway revenues	18,469	23,940	—5,471
Total operating income	\$1,973,378	\$13,042,167	—\$11,068,789
Total operating income, inc. other	14,358,569	10,866,140	3,492,429
Compensation	5,301,309	30,089,692	—24,788,383
Guaranty under federal control act	14,760,606		14,760,606
Deduct, federal income included above	*4,002,970	*18,353,597	14,350,627
Gross corporate income	\$32,390,893	\$35,644,402	—\$3,253,509
Total deductions from gross income	13,558,634	13,880,509	—321,876
Less federal deductions	*261,924	*1,072,844	810,920
Net deductions	\$13,296,709	\$12,807,665	\$489,044
Net corporate income	\$19,094,183	\$22,836,737	—\$3,742,553
Disposition of net income:			
Dividend appropriations of income	17,360,000	17,360,000	
Income balance for year—transferred to profit and loss	\$1,734,183	\$5,476,737	—\$3,742,553

*In arriving at "Gross income," federal items for 1919 amounting to \$18,353,597 and in 1920 to \$4,002,970 have been added to corporate items. In arriving at "Total deductions from gross income," federal items for 1919 amounting to \$1,072,844 and for 1920 to \$261,924 have been added to corporate items. In order to arrive at the correct "Income balance" for each year it has been necessary to deduct from "Gross income" and "Total deductions from gross income" the amounts shown above.

The annual report of the Northern Pacific will be reviewed editorially in an early issue.

READING COMPANY.—To Hear Intervening Petitions.—Joseph E. Widener, a director of the Reading Company, has withdrawn his power of attorney given the Prosser common stockholders' committee and has presented a petition to the Federal District Court at Philadelphia to intervene in the matter of the segregation of the Reading Company properties, together with a separate answer to certain intervening petitions and cross petitions. The estate of P. A. B. Widener holds 100,000 shares of Reading common. Mr. Widener approves the plan as originally presented by the Reading Company, but desires to register a disclaimer and protest with respect to the "attempt of certain intervening interests to obtain a construction of the basic contracts between the different classes of stockholders of the Reading Company."

Federal Judge J. Whitaker Thompson at Philadelphia on April 13 set May 2 for argument in the United States Court of Appeals in the matter of the segregation of the Reading company properties as decreed by the United States Supreme Court. The court allowed eleven parties in interest in the case to file intervening petitions.

TENNESSEE CENTRAL.—Hearing on Order of Sale Postponed.—Judge E. T. Sanford in the federal court at Nashville, Tenn., on April 4, decided to postpone the order of sale for a hearing in Chattanooga on May 2.

VALDOSTA, MOULTRIE & WESTERN.—Foreclosure Sale.—This road, operating between Valdosta, Ga., and Moultrie, 42 miles, was sold at foreclosure on April 9 to Charles L. Jones, who put in a bid of \$87,000 for the stockholders. The road has been in the hands of receivers since November 5, 1920.

WATERLOO, CEDAR FALLS & NORTHERN.—Loan from revolving fund approved.—The Interstate Commerce Commission has approved a loan of \$1,260,000 to this company to assist it in meeting maturing indebtedness.

WESTERN PACIFIC.—Hearing on Application to Issue Securities.—The Interstate Commerce Commission has announced a hearing to be held at Washington on April 25 on the application of the Western Pacific for authority to issue \$4,180,000 of first mortgage bonds and of the Denver & Rio Grande Western to issue 300,000 shares of its common stock without par value.

WICHITA FALLS & NORTH WESTERN.—Authorized to Issue Receiver's Certificates.—The receiver has been authorized by the Interstate Commerce Commission to issue receiver's certificates in an amount not exceeding the indebtedness of the applicant to the United States arising out of federal control and to pledge the certificates with the director general of railroads as collateral security for notes by which the funding of the indebtedness shall be accomplished. A tentative statement of account shows a balance of \$311,816 due to the director general.

Guaranty Certificates Issued

The Interstate Commerce Commission has issued the following certificates for partial payments on account of the railroad guaranty for the six months following federal control:

		Previously paid
Big Fork & International Falls	\$25,000	
Gainesville Midland	25,000	\$4,300
Georgia, Florida & Alabama	40,000	90,000
Montana Western	3,000	
Knoxville, Sevierville & Eastern	9,540	
Mobile & Ohio	375,000	950,000
Minneapolis, St. Paul & Sault Ste. Marie	1,400,000	3,135,000
Minnesota & International	150,000	
Gulf, Florida & Alabama	370,000	200,000
Appalachia Northern	38,000	
Atlantic Coast Line	2,400,000	2,500,000
Nashville, Chattanooga & St. Louis	150,000	1,200,000
Texas Midland	100,000	
Western Allegheny	45,000	
Georgia Northern	4,000	
Wadley Southern	50,000	
Sylvania Central	10,000	
Central of Georgia	475,000	2,450,000
Pittsburgh & Lake Erie	3,000,000	

The MISSOURI-ILLINOIS RAILROAD, operating between Oakdale, Ill., and Kellogg, and between Little Rock, Mo., and Bismarck, resumed train service on Saturday, March 26, with mixed trains.



Photo by Kevstone
Prince of Wales Inspecting Guard of Honor, Portsmouth, England

Railway Officers

Executive

Robert L. Russell, freight traffic manager of the Philadelphia & Reading, with headquarters at Philadelphia, has been elected vice-president in charge of traffic, effective April 11,



R. L. Russell

succeeding E. B. Crossley, deceased. Mr. Russell was born in Howard county, Maryland, July 19, 1867. He began his railroad career in October, 1882, as a clerk for the Baltimore & Ohio, at Baltimore. Subsequently he was employed as a clerk with the Philadelphia & Reading Express Company, the Adams Express Company, the Woodruff Parlor Car Company, and the Long Island. He entered the service of the Philadelphia & Reading as a clerk in the transportation department at Philadelphia in October,

1887. He was transferred to the general freight office in March, 1888, and became chief clerk of that department in June, 1891. He was promoted to freight claim agent in April, 1894, and to assistant general freight agent in June, 1907. In December, 1909, he was appointed general freight agent, and in July, 1918, he was appointed assistant freight traffic manager of the Philadelphia & Reading; the Central of New Jersey, the Staten Island Rapid Transit, and the Baltimore & Ohio New York terminals. In December of the same year he was made freight traffic manager of the same roads. Upon the return of the railroads to private control on March 1, 1920, Mr. Russell was appointed freight traffic manager of the Philadelphia & Reading.

Ross Beason, whose election to vice-president of the Salt Lake & Utah, with headquarters at Salt Lake City, Utah, was announced in the *Railway Age* of March 25 (page 822), was



R. Beason

born on February 19, 1887, at Birmingham, Ala. He entered railway service in April, 1907, as a rate clerk in the freight offices of the Southern at Mobile, Ala. In 1908 he was employed as rate clerk in the division freight offices at Selma, Ala., and in 1909 was made chief clerk in the same office. During the same year Mr. Beason was transferred to Memphis, Tenn., as chief quotation clerk in the general freight offices. In 1910, he was promoted to chief clerk in the commercial office at Memphis. A year later he was made traveling freight

agent, with headquarters at Huntsville, Ala., but in 1912 he left railroad service on account of ill health. He re-entered railroad work in 1913 as traveling freight agent on the Chicago, Rock Island & Pacific, with headquarters at Salt Lake

City, Utah. In January, 1914, he organized the Traffic Service Bureau of Utah at Salt Lake City, and remained with that organization until November, 1914, when he was appointed traffic manager of the Salt Lake & Utah Railroad, which was then under construction. He was serving in that position at the time of his election as vice-president. During the past three years Mr. Beason has spent considerable time in Washington, D. C., with the American Short Line Railroad Association, of which organization he has been a member of the Committee on Legislation and the Western Freight Rate Committee.

H. C. Nutt has been elected president of the Monongahela, with headquarters at Pittsburgh, Pa., effective April 4. **J. A. McCrea** and **J. B. Yohe** have been appointed vice-presidents of the company.

E. R. Oliver, freight traffic manager of the Southern, Lines West, has been elected vice-president, with headquarters at New Orleans, effective April 15. Mr. Oliver was born in La Fayette county, Miss., February 25, 1883. He was educated in the public schools, and was graduated from the Jefferson Law School, Louisville, Ky., with the degree of LL. B. in 1910. Mr. Oliver began his railroad career in 1898 as a clerk in the traffic department of the Southern. He held various positions in that department until January, 1906, when he was appointed traveling freight agent at Chicago. The following year he was promoted to soliciting freight agent at Louisville. In 1910 Mr. Oliver was appointed chief clerk to the assistant freight traffic manager and, in 1912, to assistant general freight agent at Louisville, Ky. On January 1, 1916, he was transferred in a similar capacity to Washington, D. C., and on October 1 of the same year to Atlanta, Ga. He was promoted to general freight agent in Cincinnati in March, 1920, and to freight traffic manager in January, 1921. He was occupying this position at the time of his recent promotion.

Financial, Legal and Accounting

T. E. Trigg has been appointed auditor of the Christie & Eastern and the Kinder & Northwestern, with headquarters at Shreveport, La.

J. N. Ford, auditor of capital accounts of the Chicago, Rock Island & Pacific, with headquarters at Chicago, has resigned, effective April 9, to become associated with the Allied Dye & Chemical Corporation, New York City.

Operating

J. S. Adsit, general agent on the Chicago, Milwaukee & St. Paul, with headquarters at Kansas City, Mo., has been promoted to general southwestern agent, with the same headquarters, effective March 22.

W. K. Etter, assistant general manager on the Atchison, Topeka & Santa Fe, Western district, with headquarters at Topeka, Kan., has been promoted to assistant to the vice-president in charge of operation, with headquarters at Chicago, Illinois, effective April 11, succeeding **F. A. Lehman**, who has been promoted to the position of general manager, Western lines.

A. M. Umshler has resumed his duties as terminal superintendent on the Illinois Central, with headquarters at Chicago, effective April 10. Mr. Umshler, who has been on leave of absence, succeeds **A. Bernard**, who has been appointed superintendent of passenger service, with headquarters at Chicago. Mr. Bernard succeeds **D. E. Hilgartner**, who has been appointed passenger service inspector of the Illinois Central system.

E. W. Scheer has been appointed general manager, Eastern Lines, of the Baltimore & Ohio with headquarters at Baltimore, Md., effective April 15, succeeding **Stanton Ennes**, who resigned on January 1. **R. B. White**, superintendent of the Baltimore division, has been appointed general superintendent of the Maryland district with headquarters at Baltimore, succeeding Mr. Scheer. **F. G. Hoskins**, superintendent of the

Baltimore Terminal division, has been appointed superintendent of the Baltimore division, succeeding Mr. White.

Coincident with the reorganization of the operating forces of the Michigan Central, effective March 14, **B. H. Winans**, assistant superintendent, with headquarters at Detroit, Mich., has been appointed trainmaster, with the same headquarters. **L. J. Robbins**, trainmaster, North Toledo yard, has been transferred to Junction yards, Detroit, Mich. **F. McElroy**, trainmaster, Windsor, Ont., has been transferred to St. Thomas, Ont. **E. Holst**, trainmaster, North Toledo yard, has been appointed general yardmaster. **E. C. Beckwith**, **A. D. Williams** and **E. D. Heingway**, trainmasters at Detroit, have been appointed general night yardmasters. **E. J. Tallman**, trainmaster at North Lansing, Mich., has been appointed yardmaster at Saginaw, Mich. **G. W. Kemp**, trainmaster at Detroit, has been appointed assistant yardmaster. **T. J. Keenan**, assistant trainmaster at Chicago, has been appointed chief clerk to division superintendent. **W. B. Gibbs**, trainmaster with headquarters at Chicago, has been granted a leave of absence. The position of trainmaster and assistant trainmaster at Chicago have been abolished. The following trainmasters have been assigned to other duties: **G. L. Prehn**, Grayling, Mich.; **J. Purvis**, St. Thomas, Ont.; **A. R. Bailey**, Detroit; **C. G. Campbell**, Detroit; **J. A. Fahey**, Jackson, Mich.

F. A. Lehman, assistant to the vice-president in charge of operation of the Atchison, Topeka & Santa Fe, with headquarters at Chicago, has been promoted to general manager, Western lines, with headquarters at Amarillo, Texas, effective April 6, succeeding **R. J. Parker**, deceased. Mr. Lehman was born on May 31, 1871, at Masthope, Pa., and entered railway service in August, 1888, as a telegraph operator on the Atchison, Topeka & Santa Fe. In May, 1890, he was made clerk in the maintenance of way department and in January, 1891, he was promoted to chief clerk in the trainmaster's office. From November, 1891, to May, 1892, he served as telegraph operator and dispatcher and on the latter date returned to the maintenance of way department as chief clerk. In May, 1900, Mr. Lehman was made clerk in the office of the vice-president in charge of operation, with headquarters at Chicago, and seven years later was promoted to superintendent of transportation, with the same headquarters. In April, 1909, he was promoted to assistant to the vice-president and served in that capacity until November, 1914, when he was appointed acting general superintendent, with headquarters at Newton, Kan. In May, 1915, he returned to his position as assistant to the vice-president and was serving in that capacity on the advent of federal control. In July, 1918, he was appointed assistant to the federal manager, which position he held until March, 1920, when he resumed his duties as assistant to the vice-president in charge of operation.

A. A. Miller, whose appointment as superintendent of the Missouri division of the Missouri Pacific, with headquarters at Poplar Bluff, Mo., was announced in the *Railway Age* of April 1 (page 869), was born at Zanesville, Ohio, on September 28, 1879, and was educated at Ohio State University, graduating in 1902. He entered railway service in June, 1902, as a rodman on the Baltimore & Ohio at Wheeling, W. Va., and during the next five years served successively as assistant division engineer, with headquarters at Cleveland, Ohio; as assistant engineer at Baltimore, Md., and as division engineer with headquarters at Philadelphia, Pa. In September, 1907,

he accepted an appointment as chief engineer with the West Coast Company at Los Angeles, Cal., but returned to railroad service in June, 1909, as assistant engineer on the Missouri Pacific, with headquarters at St. Louis, Mo. In June, 1911, he was promoted to division engineer with headquarters at Kansas City, Mo., and in June, 1912, was transferred to Poplar Bluff, Mo. Five years later he was promoted to district engineer, with headquarters at Little Rock, Ark. At the time of his recent appointment, Mr. Miller was serving as district engineer with headquarters at Kansas City, Mo., where he had been transferred in August, 1918.

The following changes have taken place on the Northwestern Region of the Pennsylvania coincident with the abolishment of the Northern Ohio division and the consolidation of the Mansfield and Fort Wayne divisions, effective March 16: **J. B. Hutchinson**, junior general superintendent of the Northern Ohio and Mansfield divisions, has been appointed general superintendent of the Toledo division with headquarters at Toledo, Ohio. **Paul Jones**, superintendent, with headquarters at Toledo, has been transferred to the Grand Rapids division with headquarters at Ft. Wayne, Ind., succeeding **G. R. Barry** who has been appointed division engineer with headquarters at Logansport, Ind. **T. A. Roberts**, superintendent, with headquarters at Mansfield, O., has been appointed acting superintendent of the Ft. Wayne division with headquarters at Ft. Wayne, succeeding **B. H. Hudson**, transferred to Logansport, Ind. Mr. Hudson has succeeded **C. B. Reynolds** who has been appointed trainmaster with the same headquarters. Mr. Reynolds has in turn succeeded **G. W. Bradley** who has been appointed assistant trainmaster. **C. L. Hamilton**, superintendent of transportation, with headquarters at Chicago, has been appointed assistant superintendent of the Ft. Wayne division. The office of superintendent of transportation at Chicago has been abolished.

Traffic

F. W. Ditman has been appointed commercial agent on the Hocking Valley, with headquarters at Detroit, Mich.

W. E. Burnett, Jr., has been appointed commercial agent on the Norfolk & Western, with headquarters at Fort Worth, Texas.

R. H. Snead, assistant to the president of the Chesapeake & Ohio, has been appointed manager of mail and express traffic, effective April 1.

M. Broaddus has been appointed commercial agent of the Norfolk & Western, with headquarters at St. Louis, Mo., effective April 1.

F. L. Maher has been appointed district freight and passenger representative on the Baltimore & Ohio, with headquarters at Seattle, Wash.

T. J. Shelton has been appointed general freight agent of the Christie & Eastern and the Kinder & Northwestern, with headquarters at Shreveport, La.

M. S. Throne has been appointed general agent, freight department, of the Canadian Pacific with headquarters at New York. **F. T. Goodman** has been appointed district freight agent with headquarters at Philadelphia, Pa.

A. M. Dudley, division freight agent on the Chesapeake & Ohio, with headquarters at Cincinnati, Ohio, has been promoted to general Western freight agent, with the same headquarters. **Hilliard Russell** has been appointed commercial agent, with headquarters at Nashville, Tenn.

V. C. Baughn, traffic representative on the Detroit, Toledo & Ironton, with headquarters at Ironton, Ohio, has been promoted to commercial agent, with headquarters at Detroit, Mich., succeeding **W. G. Howard**, who has been transferred to Pittsburgh. **L. H. Welch** succeeds Mr. Baughn.

H. C. Stauffer, general coal freight agent of the Philadelphia & Reading, with headquarters at Philadelphia, has been appointed general freight agent with the same headquarters,



F. A. Lehman

effective April 11, succeeding E. D. Hilleary, promoted. **J. W. Hewitt**, division freight agent, Reading Terminal, Philadelphia, has succeeded Mr. Stauffer.

C. S. Morse, district freight agent of the Canadian Pacific with headquarters at London, Ont., has been transferred to a similar position with headquarters at Toronto, succeeding **W. B. Bamford**, who has been transferred in a similar capacity to Nelson, B. C. **H. G. Buchanan** has succeeded Mr. Morse at London. **R. W. Chateauvert** has been appointed chief of the tariff bureau with headquarters at Montreal, succeeding **R. J. Hunt**.

J. H. Carey has been appointed district freight agent on the Canadian Pacific, with headquarters at Memphis, Tenn. **C. P. McGhee** has been appointed district freight agent with headquarters at Los Angeles, Cal. **J. H. Fox** has been appointed district freight agent with headquarters at Edmonton, Alta. **J. Halstead**, district freight agent, with headquarters at Calgary, Alta., has been transferred to Winnipeg, Man., succeeding **A. T. McKean**, who has been transferred to Calgary.

Edgar D. Hilleary, general freight agent of the Philadelphia & Reading, with headquarters at Philadelphia, has been appointed freight traffic manager, with the same headquarters,

effective April 11, succeeding **R. L. Russell**, promoted. Mr. Hilleary was born in Frederick county, Maryland, on September 1, 1877. He is a graduate of St. John's College, Annapolis, Md., of the class of 1897, and holds the degree of Bachelor of Science. He entered the service of the Philadelphia & Reading as a clerk in the office of the foreign freight agent at Philadelphia on July 1, 1897. In the same year he entered the office of the assistant general freight agent in charge of export and import traffic. Later he was

appointed chief clerk of this department, and in June, 1905, he was appointed agent of the Central States Despatch Fast Freight Line at Philadelphia, and in January, 1906, was promoted to division freight agent of the New York division and the Atlantic City Railroad. On February 14, 1910, he was appointed division freight agent at Harrisburg; on December 1, 1918, assistant general freight agent; and on March 1, 1920, general freight agent, which position he held until his appointment as freight traffic manager.

F. S. Riegel, assistant general freight agent on the Southern, with headquarters at Cincinnati, Ohio, has been promoted to general freight agent, with the same headquarters. **W. Humphrey** has been appointed general Western freight agent, with headquarters at Chicago. **J. P. Tocher** has been appointed division freight agent, with headquarters at Louisville, Ky. **J. N. Templeton** has been appointed division freight agent, with headquarters at Lexington, Ky. **W. T. Keating** has been appointed commercial agent, with headquarters at Indianapolis, Ind. The promotions and appointments are effective April 15.

J. W. Bray, division freight agent of the Southern with headquarters at Greensboro, N. C., has been appointed assistant general freight agent with headquarters at Atlanta, Ga., succeeding **G. H. Kerr**, who has resigned to become traffic manager of the Southeastern Express Company. **P. A. Wright** has been appointed assistant general freight agent in charge of solicitation with headquarters at Atlanta, Ga. **Hamilton Baxter** has been appointed division freight agent with

headquarters at Norfolk, Va., succeeding **W. T. Turner**, who has been transferred to Greensboro, N. C., to succeed Mr. Bray, promoted. **E. R. Gardner** has been appointed commerce agent with headquarters at Washington, D. C. These appointments were effective March 15.

G. H. Kerr, assistant general freight agent of the Southern with headquarters at Atlanta, Ga., has resigned to become traffic manager of the Southeastern Express Company with headquarters in the same city. Mr. Kerr was born at Homer City, Pa., December 4, 1878, and was educated in the public schools. He entered railway service in 1900 as a clerk in the freight office of the Pennsylvania at Bessemer, Pa. In 1905 he became a rate clerk in the division freight office at Pittsburgh, Pa. He was appointed traveling freight agent for the Eastern & Southern Despatch in 1907 and, in 1909, agent for the Despatch at Pittsburgh. In 1913 he became a commercial agent for

the Southern with headquarters at Pittsburgh and, the following year, he was transferred in a similar capacity to Atlanta, Ga. In 1917 he was promoted to assistant general freight agent, which position he held until he resigned to enter upon his present duties.

Stuart A. Allen, whose promotion to freight traffic manager of the Baltimore & Ohio, Western lines, with headquarters at Chicago, was announced in the *Railway Age* of March 25

(page 822) was born at Oral Oaks, Va., on January 18, 1873. He was educated at the University School, Petersburg, Va., and at the United States Military Academy, West Point, N. Y., and entered railway service in 1891, as a clerk in the offices of the Savannah, Florida & Western at Gainesville, Fla. In 1892, he was employed by the Savannah, Americus & Montgomery in the clerical department at Americus, Ga., and in 1893 he became a clerk on the Central of Georgia at Albany, Ga. In 1894, he was appointed traveling freight and passenger agent on the Knoxville, Cumberland Gap & Louisville, with headquarters at Knoxville, Tenn., and in 1896 was made traveling freight agent on the Cincinnati, Hamilton & Dayton, now part of the Baltimore & Ohio system, with headquarters at Cincinnati, Ohio. He was promoted to general agent on the same road in 1898 and two years later was made general southern agent, retaining his headquarters at Cincinnati. In 1904, Mr. Allen was made southern agent at Cincinnati, and in 1907 was promoted to general southern freight agent. Three years later he was again promoted, becoming assistant general freight agent of the Cincinnati, Hamilton & Dayton, and in 1912 he was made general agent on the Baltimore & Ohio, retaining his headquarters at Cincinnati. After two years of service in this position, he was made manager of the



E. D. Hilleary



G. H. Kerr



S. A. Allen

Baltimore & Ohio Fast Freight Line, the Continental Line and the Central States Dispatch, at Cincinnati. He was promoted to general eastern freight agent on the Baltimore & Ohio and transferred to New York in 1916, and in 1917, he was made general freight agent, with the same headquarters. At the time of his recent promotion, Mr. Allen was serving as assistant freight traffic manager, with headquarters at New York, to which he had been promoted in 1920.

Mechanical

J. F. Speigle has been appointed assistant master mechanic on the Canadian National, with headquarters at Hornepayne, Ont., succeeding W. G. Strachan, who has been transferred to Capreol, Ont.

O. P. Reese, superintendent of motive power of the Pennsylvania, Northwestern Region, with headquarters at Toledo, has been transferred to Chicago, succeeding **O. C. Wright**, assigned to other duties.

G. T. De Pue, mechanical superintendent of the Erie, with headquarters at Chicago, has been appointed shop superintendent at Galion, Ohio, effective April 1. The office of mechanical superintendent at Chicago has been abolished.

Engineering, Maintenance of Way and Signaling

F. P. Sisson, division engineer of the Grand Trunk, with headquarters at Detroit, Mich., has been transferred to a similar position at Chicago.

C. W. Johns, engineer of construction of the Chesapeake & Ohio, has taken over, without change of title, the duties of **F. I. Cabell**, chief engineer, retired, effective April 1.

J. R. Sexton, regional engineer of the Erie, with headquarters at Chicago, has been appointed division engineer at Huntington, Ind., effective April 1. The office of regional engineer at Chicago has been abolished.

C. T. Jackson, principal assistant engineer of the Chicago, Milwaukee & St. Paul, with headquarters at Chicago, has been appointed district engineer of the Southern district, with the same headquarters, effective April 16, succeeding **D. C. Fenstermaker**, who has been granted a leave of absence.

D. S. Farley, division engineer of the Atchison, Topeka & Santa Fe, with headquarters at Dodge City, Kan., has been promoted to assistant general manager, Western district, with headquarters at Topeka, Kan., effective April 11, succeeding **W. K. Etter**, appointed assistant to vice-president.

In connection with the abolishment of the Northern Ohio division of the Northwestern region of the Pennsylvania, and the consolidation of the Mansfield and Fort Wayne divisions, effective March 16, the following changes have been made: **G. R. Barry**, formerly division superintendent at Fort Wayne, Ind., has been appointed division engineer, with headquarters at Logansport, Ind., succeeding **F. M. Hawthorne**, who has been appointed assistant division engineer. **W. R. Hillary**, engineer maintenance of way, with headquarters at Toledo, has been appointed division engineer, with the same headquarters, succeeding **J. K. Sherman**, who has been transferred to Grand Rapids, Mich., succeeding **T. L. Doyle**, who has been appointed assistant division engineer, with the same headquarters. **R. G. Jones**, division engineer at Mansfield, has been appointed assistant division engineer at Fort Wayne.

Purchasing and Stores

L. J. Green, formerly assistant general storekeeper on the New York Central at West Albany, N. Y., has been appointed storekeeper at Otis, N. Y., succeeding **F. C. Vroman**.

R. S. Huffman, assistant general storekeeper on the New York Central at West Albany, N. Y., has been appointed district storekeeper, with headquarters at the same point, succeeding **J. H. Seim**, transferred.

W. H. King, Jr., assistant to the vice-president in charge

of operation of the Seaboard Air Line, has been appointed general purchasing agent, succeeding **H. C. Pearce**, resigned to enter the service of another company.

B. W. Griffeth, former assistant general storekeeper on the New York Central at Collinwood, Ohio, has been appointed district storekeeper, third district, with headquarters at Collinwood. Mr. Griffeth succeeds **F. J. McMahon**, who has been assigned other duties in the stores department at the same point.

H. C. Pearce, general purchasing agent of the Seaboard Air Line, has resigned to become director of purchases and stores of the Chesapeake & Ohio with headquarters at Rich-



H. C. Pearce

mond, Va., effective April 10. Mr. Pearce was born on June 1, 1867, at Westberry, Quebec, and was graduated from St. Charles-Baromme College at Sherbrooke, Quebec. He entered railway service in 1885 as a clerk in the office of superintendent of the Minneapolis, Lyndale & Minnetonka and subsequently served as a material clerk and conductor on the same line. In 1887 he went with the Minneapolis, St. Paul & Sault Ste. Marie as a clerk to the superintendent of construction. He later served as a clerk in the auditor's office, chief clerk to general superintendent, general storekeeper and purchasing agent. He went with the Chicago, Rock Island & Pacific in April, 1903, as assistant purchasing agent. The following year he was appointed general storekeeper and remained in that position until 1906, when he resigned to enter the service of the Southern Pacific in a similar capacity. In 1913 he became general purchasing agent of the Seaboard Air Line and remained in that position until his present appointment. Mr. Pearce is chairman of the division of purchases and stores of the American Railway Association.

Special

John A. McGrew, whose appointment as superintendent of maintenance of the Delaware & Hudson was announced in the *Railway Age* of April 8 (page 916), was born June 8, 1873, at Bridgewater, Ohio. He was graduated in civil engineering from Ohio State University in 1895. He entered railway service in 1894 with the Columbus & Westernville Electric. Upon his graduation from college he became assistant superintendent of construction of that company and held that position until November, 1896, when he resigned to enter the engineering department of the Pennsylvania at Wellsville, O. From 1899 to 1901 he was assistant engineer, maintenance of way, at Logansport, Ind. From 1901 to 1903 he was engineer, maintenance of way, with the same headquarters. He then went to Pittsburgh, Pa., in the same capacity. For six months in 1904 he was special agent for the general manager of the Chicago, Rock Island & Pacific at Chicago. From 1904 to 1909 he was a consulting engineer and contractor at Columbus, Ohio, and subsequently president of the National Engineering Company. In September, 1909, he went with the Delaware & Hudson as inspector of maintenance on its lines, allied lines and controlled street railways. In 1910 he was appointed superintendent of the Saratoga and Champlain divisions, with headquarters at Albany, N. Y. In July, 1917, he entered the army as a consulting quartermaster in the construction division. In July of the following year he served as a major of engineers in the railway division of the American Expeditionary Forces. Mr. McGrew was discharged from the army on February 21, 1919, and returned to his position as superintendent of the Delaware & Hudson in April, 1920. He was holding this position at the time of his recent promotion.

EDITORIAL

Railway Age

EDITORIAL

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"If ninety per cent of the typewriters could be relegated to the scrap pile, and officials instead of being tied to them, as they are now, could go about and get acquainted with the employees, the grievance committee's work would be reduced to a minimum." This statement was made by a railway executive who has had unusual success in administering his department.

The Art of Working with Men

Reductions in wages and salaries or even prospects of such measures are sure temporarily to cause a serious reduction of the esprit de corps in any organization. Such an agitation affects officers and employees alike for it is disheartening to any man to curtail his plan for saving or his budget of living expenses. The situation becomes aggravated when the individual does not fully appreciate the conditions which enforce the retrenchment. This is a fact which the railroads cannot afford to overlook in carrying out their proposed wage reductions, because efficiency of operation will probably be affected in greater measure by the depressing influence on the subordinate officer and the loyal employee than on those who are affiliated with the stronger labor organizations. If nothing is done to combat this influence, it will serve largely to offset the efforts for increased loyalty which the managements have undertaken since the return to private control. The answer is education in the form of statements explaining in simple language the present financial predicament of the roads as a consequence of a disproportionate relation between revenues and expenses. But this alone will not suffice. It should be made clear that every possible effort is being made to introduce economies which do not entail the reduction of wages. The employee should be given to understand that the management will be pleased to entertain any suggestions which will effect further economies. A reduction in wages is a painful procedure and should be conducted in a spirit that manifests a realization of the sacrifices involved.

The railway manager is confronted under present conditions with two conflicting lines of thought as far as his passenger service is concerned. He is desirous, on the one hand, of taking such steps as he can to restore his road's pre-war passenger service and may even wish to improve on it. On the other hand, he is met with the necessity of reducing expenses and possibly has been called upon to consider the advisability of dropping from his time-table some of the less important and more poorly patronized trains. He is, of course, limited in a measure when it comes to dropping trains because there must always be a minimum service and because the state commissions are not particularly enthusiastic about reductions in service. Nevertheless, in working out the proper solution of his problem, he would be assisted measurably if he had some way in which he could estimate the earnings and cost of his individual trains with a view to seeing if they are carrying their proper share of the burden

of increased operating costs. To determine the cost in sufficiently detailed manner, for the purposes here in mind, of running an individual train does not offer great difficulty, inasmuch as to get a rough idea alone is sufficient. To determine its earnings, however, appears on the face to be a rather more complicated matter. Nevertheless, a method has been worked out and is now in use with various modifications on a number of roads which allows for the determination of the earnings of individual trains in a comparatively simple fashion and at comparatively slight expense. The method as it is used on one of the railroads is described on another page of this issue. The article is intended primarily for accounting officers, but we doubt not that the method outlined in it will be of more than ordinary interest to transportation officers also.

Time and again during the period when more traffic was being offered to the railroads than they could handle, their officers were urged to get out and see their shippers. In these circumstances the underlying idea has been to secure better co-operation from the shippers, particularly in the direction of better and heavier car-loading. Generally speaking, this was made a part of the duties of every railway employee who came in contact with or had anything to do with the shippers, the loading, and the moving of cars, etc. Distinct improvements were usually made and the concerted "drive" proved its worth. With the slump in traffic the drive lost its punch, though the benefits to be derived from it are still as important as ever. It can now be rejuvenated to great advantage by making it more applicable to present conditions, i. e., it should be more on lines directed toward the encouragement of increased shipping and heavy car loading. A better understanding of the problems confronting the shipper and the road also can be reached. A good example of a drive adapted to present conditions is afforded by the traffic department of an eastern road. On this line the higher traffic officers who, because of the rush of business and the complexity of their organization, seldom found time in the past to get in actual contact with their shippers were required to spend an entire week brushing up their acquaintanceships with the shippers, both old and prospective. The results more than justified the efforts and the program will be repeated at intervals. The old shippers were benefited and new shippers were interested. This road materially increased its revenues by being a "live wire" in dull times. The business today goes to those who go out and get it.

While the statement that there has not been a time when the railroads were more in need of additional facilities may at first thought appear widely at variance with the facts in view of the present acute slump in traffic, its accuracy has been demonstrated repeatedly by the experiences of the last four years and as late as last October. In spite of the large expenditures which were made for increased facilities between 1905 and

Get Out and See the Shipper

Preparing For the Future

1916 the capacity of the roads was taxed more severely during the periods of heavy traffic since 1917 than ever before. While the present is a period of acute depression railway men realize that a return to conditions even approaching normal will bring with it a demand for railway service which can only be satisfied by large increases in facilities. Engineering officers have therefore busied themselves in the preparation of plans for new shops and engine terminals, for freight facilities, for new and heavier bridges, for added tracks and all the various facilities which increase the capacity of a road. Undoubtedly a greater volume of work is covered by plans and estimates now awaiting authorization than at any previous time in the present generation. These plans will be revised and improved while the opportunity offers. Advantage is also being taken of the opportunity to revise standards and to bring them into conformity with the latest developments in materials and equipment, for during periods of widespread activity there is no time for such work, necessary though it is. In the preparation of plans for new work as well as in the revision of standards, the wide-awake engineer is studying intently the latest and most modern equipment and materials at his disposal with a view to incorporating such of them in his designs as will improve his structures. Manufacturers of railway materials and equipment adapted for such use are finding evidences of this interest on the part of engineers in the increased attention which these engineers are giving to their products, and they are securing audiences which it would be impossible to secure when the time of engineers is taken up in the rush incident to a large construction program. Engineers and manufacturers alike can afford to give the closest consideration to the materials and equipment available at the present time in order that the roads may be best prepared to launch their improvement programs when conditions permit.

Government control of the British railways will under present legislation terminate in August. As that time approaches

Railway Problems in England

analogy of certain phases of the railway situation in Great Britain with problems which have arisen in this country becomes more apparent. The railways were placed under the Ministry of Transport in 1919 for a period of two years during which time a plan for the final disposition of them was to be worked out. The government has not, however, advanced a plan as yet for meeting this situation, although it is understood that such a bill is now in course of preparation. In the meantime the railway unions have brought out in Parliament a bill of their own. This bill proposes government ownership under the administration of a board of seven commissioners, three to be from the ranks of labor and four representing the government. Purchases of the properties would be effected by an issue of 5 per cent stock and shareholders in the present companies would be paid at the average market price of their shares in 1913, less the average depreciation of railway securities since, or about 30 per cent. It is not generally believed that this labor bill will be enacted into a law. It is understood that the government will advocate the grouping of the carriers into a few large systems but just what methods will be adopted to secure an adequate return to the companies when the present guaranties cease are as yet a matter of conjecture. The British railways are faced with a labor situation in many ways like our own. Wages and working conditions are standardized for the whole country regardless of the varying conditions in each locality. Labor costs have increased tremendously, both because of increased rates and shorter hours. On one system alone, the London & North Western, the increase has been from approximately \$30,000,000 (£ to \$ at

par) in 1913 to approximately \$100,000,000 in 1920. Rates are so high now that further increases are not considered advisable. Recent labor troubles due to the alliance of the railway unions with the miners appear to have been avoided for the moment, but the general status of the employees and the companies under private operation presents a problem yet to be solved. It is to be hoped that Parliament will show the same appreciation of the railway problem that our Congress did when it passed the Transportation Act. It must be admitted, nevertheless, that the lack of progress to date is rather disconcerting.

The second article by Oliver F. Allen dealing with railway reconstruction in France and Belgium, which appears elsewhere in this issue, describes in some

Rebuilding the Railways in France

detail the problems met with in rebuilding destroyed bridges and tunnels. In many ways the difficulties encountered were peculiar. In rebuilding the Vauxillon tunnel, for instance, it was found that the earth around and over the tunnel was so disintegrated by repeated explosions that the internal pressure had increased to a point where timbering was very difficult and the side walls of the entire tunnel had to be rebuilt much stronger than before. In rebuilding bridges the engineers were greatly hampered by the lack of steel, brick and cut stone. Skilled labor, too, was difficult to obtain. Recourse was had, consequently, to concrete whenever it could be economically employed. In many cases the debris of old masonry structures was crushed and utilized as a part of the concrete mixture. The shortage of labor and the scarcity of lumber made the building of forms slow and expensive. The plan was finally evolved of pouring the concrete piers into a shell made up of concrete blocks. Because of the scarcity of timber, light wooden forms were used for the arches and the concrete poured about a foot thick. After standing about a week this concrete had set sufficiently to support a second pouring and the remaining portion of the arch rings was then poured with a thin layer of pure concrete applied first as a binder. All the new structures were provided with chambers for high explosives so located that their destruction would be a relatively easy matter should military necessity ever again require it. All the new bridges have been built from a point of view of appearance and harmony with the surroundings as well as utility, speed and economy. That all of these phases of the program have been realized and given full consideration in the reconstruction program makes the achievement of the engineers who had the matter in charge even more noteworthy. The next article in this series, which will appear in an early issue of the *Railway Age*, will deal with the rebuilding of the destroyed terminals.

It should be a source of gratification to every man in railroad service whose efforts are centered on the economical use of fuel, that with an increase of 11.3 per cent in the gross ton miles handled in 1920 as compared with 1919, and an increase of 5.1 per cent in the passenger train miles, the fuel consumption

A Good Fuel Record

of locomotives in road service showed an increase no larger than 13 per cent. But why, it may be asked, should any increase larger in proportion than the increase in the amount of traffic handled, be subject for congratulation? First, because the switchmen's strike during April and May and the enormous volume of traffic offered during the succeeding months up to November, of necessity made measures for economy minor considerations in comparison with the importance of keeping up with the demands of the country

at any price; and second, because local officers, many of whom for a time were required to take the places of the striking switchmen, were without the assistance of the Fuel Conservation Section of the Railroad Administration, which had just been abolished and for which on many roads no effective successor had been found. The temporary effect of some of these factors is clearly reflected in a month to month comparison of the fuel consumption for 1,000 gross ton miles in freight service. Comparing periods in 1920 with corresponding periods in 1919, there was an increase in the fuel consumption for March of 3.3 per cent, which had further increased in April to 11.2 per cent. Going on to June, a marked improvement was evident; during that month there was a decrease of about eight per cent, while during the month of September there was an increase of but one per cent and in December, about one-half per cent. The net result for the 12 months ending December 31 was an average increase in the fuel consumption per 1,000 gross ton miles of only two per cent. In passenger service the increase per passenger train mile was somewhat larger, averaging about five per cent for the 12 months. This figure, however, does not take into account the effect of the return to competitive conditions in passenger service. On the whole, considering the unfavorable conditions obtaining during most of the year, the result is one which should be a source of considerable satisfaction to officers and men, particularly those in the locomotive service, and to those who have ever doubted the loyalty of these men it furnishes a striking bit of evidence that their doubts are largely groundless. These results, in the face of most unfavorable circumstances, indicate the possibilities for real economy now that economy has again become one of the principal objectives of railroad operation.

Not many months ago when railroads were hard pressed to maintain an adequate number of locomotives in service, it was common to hear the complaint that repair shop capacity had not increased in proportion to the increased number and size of locomotives. This complaint was probably justified, but very much could have been done to relieve the situation by a more general use of systems for scheduling or routing work in repair shops. In view of the fact that shop scheduling has received such a thorough try-out on over fifteen railroad systems in this country, demonstrating its ability to increase shop capacity and output, it is surprising to find that some shop executives are not yet thoroughly convinced of its value. To these men the shop schedule is only a cumbersome system, designed to occupy the time of one or more clerks and increase the output on paper only. The exact opposite is true. It would be just as foolish for a general to advance his troops in battle without first mapping out objectives and methods of approach, as for a shop superintendent to order locomotives in for repairs without knowing what work is to be done, seeing that necessary material is on hand and scheduling the work through the various departments so that all parts are repaired in time for the locomotive to go out of the shop on a given day. The old-fashioned method of getting output was to bring in as many locomotives as a shop would hold, incidentally blocking passageways and flooding the shop with locomotive parts in various stages of repair. No one knew when a particular part would be needed; all was hustle and bustle; little was accomplished. In many instances a shop with 25 pits was made to accommodate 35 locomotives with a resultant decrease rather than increase in output. Beginning the repair of locomotives shown first on the list, a cylinder or a deck casting might be needed unexpectedly and work on this particular locomotive would be abandoned in favor of a more promising one. The result

—a big loss of time in transferring tools, robbing material from one locomotive to another and, in some cases, removing parts already bolted to planers or other tools for machining. This unscientific shop management demoralized foremen and men, caused a lot of unnecessary driving and resulted in an output not exceeding one locomotive per pit per month, or 25 locomotives per month. It has been shown conclusively that a shop schedule, under the direction of a competent supervisor, indicates what departments are weak, enabling them to be strengthened and so co-ordinates the work of all departments that the output in the case cited above could be increased to 35 or 50 locomotives per month.

Piratical Commission Merchants' Attacks on Freight Rates

ONE OF THE MOST DISHONEST and selfish propagandas we have ever observed is being carried on by commission merchants, and papers devoted to their interests, regarding the effect of existing freight rates upon the movement of fruits and vegetables. The producers of these commodities are receiving very low prices for them. The prices they are being paid are in many cases so low that they can hardly afford to market them. Through the columns of such papers as the Produce News, editions of which are published at New York, Chicago and Los Angeles, and The Packer, editions of which also are published in various cities, the commission merchants are trying to use this condition to promote a movement among the producers for reductions of freight rates.

Whether or not the freight rates should or should not be reduced, it is easy to show that it is the extortion practiced by the commission merchants and the retail dealers, rather than the present freight rates, which are responsible for the fact that a producer at present is being paid very low prices for his products, while the consumer in the cities is being forced to pay high prices for them. Recently much propaganda has been spread among the producers of vegetables in Texas, Florida, and other southern states, and also in California, regarding the present freight rates. It is time that a few cold facts regarding these important matters should be told.

On April 16 the average price paid to the producer for cabbage in Texas was \$7 per ton. The cost of transporting it to Chicago was \$26.30 per ton. This includes not only the freight rate, but also the cost of icing the refrigerator car and the federal tax on freight charges. The total amount that the producer received for producing it, and that the railroad received for hauling it about 1,300 miles, was 1.67 cents a pound or \$33.30 a ton. On the same date cabbage retailed in Chicago for 7 cents a pound or \$140.00 a ton, or \$106.70 per ton more than the total amount that the producer received for producing it, and that the railroad received for bringing it to Chicago. Where did this \$106.70 per ton—which was 75 per cent of the total retail price—go to? A very large part of it went into the pockets of the commission men who are carrying on the present propaganda, and the rest went into the pocket of the retailer. The toll taken by them was four times as much as the railroad received for hauling the cabbage from Texas to Chicago.

On the same date the producer in Texas received \$42 per ton for white onions. The cost of transportation to Chicago was \$29.64, and the total received by the producer and the railroad was \$71.64 a ton or 3.58 cents a pound. At the same time white onions sold at retail in Chicago for 10 cents a pound or \$200.00 a ton, or \$128.36 more than the amount that the producer received for producing them, and that the railroad received for bringing them to Chicago. Most of this

difference went into the pockets of the commission merchant and the retailer.

On the same date the producer in Texas was paid \$5.00 a ton for spinach. The cost of transportation to Chicago was \$30.36 per ton, making a total of \$35.36 per ton or 1.77 cents a pound that the producer and the railroad together received. At the same time the retail price of spinach in Chicago was 15 cents a pound or \$300.00 per ton, or \$264.64 per ton more than both the producer and the railroad received. Who got this \$264.64 per ton, which was almost 90 per cent of the retail price? Most of it went to the very commission merchants who are carrying on propaganda against the present freight rates.

On March 26 the Chicago Produce News published an editorial entitled "Your Business in Peril! Help Save It!" It was addressed to the producers of cantaloupes and vegetables in the Imperial Valley of California. It stated that "big distributors in that section are worried because of the prohibitive freight rates to the eastern markets." It added, "It is the duty of every receiver of cantaloupes in the east, and of every man or firm interested in this industry, to cooperate with the distributors in an effort to reduce the ruinous freight rates."

These "distributors" are the very same men who, on April 16, were getting most of that \$265.00 per ton from spinach, for the production and transportation of which the producers and railroads together had got only \$35.36. The inference might have been drawn from what the Produce News said that the cantaloupe crop in the Imperial Valley was ready to be moved but could not be shipped on account of the high freight rates. The fact is, that no cantaloupes grown in the Imperial Valley were then ready for transportation and that they probably will not move until about May 15. The crop was reported in good condition and a harvest of 10,000 or 11,000 cars was expected. Traffic experts stated that they knew of no reason why the cantaloupes would not freely move to market under present conditions and rates. The commission merchants started their propaganda against the present freight rates in the hope, no doubt, that they could get them reduced before the shipments of the cantaloupe crop began and thereby pocket as a part of their own profits the revenues which, in the absence of a reduction in rates, will go to the railways.

There recently have been loud complaints from the same general source upon the ground that the rates on fruits and vegetables from Florida have been so high as to interfere with their shipment. Chairman Clark, of the Interstate Commerce Commission, investigated the matter and ascertained that from November 1, 1919, to February 28, 1920, the number of carloads of fruits and vegetables shipped from Florida by rail was 26,886, while from November 1, 1920, to February 28, 1921, under the present freight rates, the number of carloads shipped was 28,420, an increase of 1,534 carloads.

It has long been known that the commission merchants dealing in fruits and vegetables have been among the most remorseless profiteers in this country. The above facts show that in addition to continuing their efforts to enrich themselves by paying producers as little as possible for their products, and charging consumers as much as possible for them, they are now trying to force down freight rates by a campaign of falsification. A Congressional investigation of the railroad situation is soon to be held. In view of the fact that these commission people are showing such earnest interest in the subject of freight rates, we suggest to the Congressional Committee the propriety and expediency of ascertaining not only the effect of the present freight rates upon the movement of perishable commodities, but also the effect upon the welfare of both the producer and the consumer of the exorbitant toll taken from them by the commission merchant and the retail dealer, especially the former.

The Decision on National Agreements

THE DECISION of the Railroad Labor Board in the National Agreements' controversy seems, on the whole, to be a sensible one. Neither the railways nor the labor unions can reasonably claim a victory. The final results of it will not be known until the negotiations between individual railways and their employees provided for have been finished and the rules agreed upon have been approved by the Board, or rules have been made by the Board itself to apply to matters regarding which no agreements shall have been reached.

At present it appears probable that the railways will gain more by the decision than the labor unions. We say "labor unions" rather than employees, because the carrying out in good faith of the principles laid down by the Board will increase the efficiency of labor, and while the labor unions may temporarily be strengthened by rules which promote inefficiency, their members have as much to gain in the long run from rules that promote efficiency as have the railways and the public.

The decision recognizes the principle of the eight-hour day. This is a victory for the unions. The Board adds, however, that it believes this principle "should be limited to work requiring practically continuous application during eight hours." This plainly implies that it should not be applied to work not requiring practically continuous application. Furthermore, the Board says very significantly, "for eight hours' pay eight hours' work should be performed" except by train service employees, who are paid on a mileage as well as on an hourly basis.

These statements, read in connection with others in the "principles" enunciated, make very clear that the Board has no sympathy with, and indicate that it will not tolerate, rules whose plain intent is to limit production or to cause men to be paid for work not done. The necessity for proper classification of employees and reasonable definitions of the work to be done is recognized, but it is stated that the classifications and definitions "should not unduly impose uneconomical conditions upon the carriers." The fact that the obligation "to render honest, efficient and economical service" rests upon each organization of employees as well as upon the management, is specifically recognized. While the principle of seniority is approved, "it should be so applied as, not to cause undue impairment of the service."

The Board clearly recognizes the right of employees to organize, and of the majority of each craft to be represented in negotiations by representatives of their own choosing. In other words, it recognizes both labor unionism and collective bargaining. At the same time it refuses to accept the views of the labor leaders as to what necessarily constitutes collective bargaining. They contended that the entire subject of rules and working conditions ought to be referred to a national conference of representatives of the railways and the labor unions, and implied that only in such conferences could true collective bargaining be carried on. By remanding the negotiation of rules and working conditions to conferences between the individual railways and their own employees, subject to the principles it laid down, the Board recognized bargaining between each railway and its own employees as true collective bargaining. The employees contended that rules and working conditions should be uniform throughout the United States. By remanding the determination of rules and working conditions to conferences between individual railways and their employees, the Board has recognized the principle that rules and working conditions should vary with and be adapted to the varying local conditions in different parts of the country.

It was estimated by General Atterbury that by restoring the rules and working conditions in effect on December 31, 1917, a saving of \$300,000,000 annually could be made. The Labor Board has refused to restore these rules and

working conditions, and has recognized the principle of the eight-hour day. It has thereby rendered it impossible to effect anywhere near as large a saving as General Atterbury estimated could be made. At the same time the Board has said that it "is unable to find that all rules embodied in the National Agreements, orders, etc., of the Railroad Administration constitute just and reasonable rules for all carriers and parties to the dispute." Therefore, while the eight-hour day and the increase in expenses caused by it must be continued, a wide field is left open for the framing of rules which will be much more reasonable and economical than those now in effect. Agreements may, and, indeed, must, be made by the individual railways and their employees by which the present large payments for work not done, and the pyramiding of wages for work done, will be abolished. Straight time for overtime may be substituted for time and a half. Piece work may be established.

These improvements can be effected, however, only, first, by agreements between the railways and their employees, or, secondly, if they do not agree, by orders of the Railroad Labor Board. It is to be feared that the representatives of the labor unions on all the individual railways will make a strong effort to retain most, or all, of the present unreasonable rules. To secure reasonable settlements railway officers will have to show great tact, skill and courage, and this it is vitally important that they shall do. Otherwise, little or nothing will be gained for efficiency and economy through the Board's decision.

It is to be hoped the employees can be made to see that it would not be to their permanent advantage to retain unreasonable rules, and that, as a matter of fact, they cannot be retained without directly violating the sound principles of efficiency and economy laid down by the Labor Board. On the other hand, it is to be hoped that railway officers will conscientiously and consistently observe the spirit of the principles laid down by the Board, recognizing the right of employees to carry on negotiations through representatives of their own choosing.

Firmness, reasonableness and fairness on both sides will result in the establishment of rules and working conditions which will be beneficial to the employees, the railways and the public; while unreasonableness or unfairness on either side will simply throw the whole matter back into the hands of the Labor Board.

The Audible Signal and Automatic Train Control

TRAIN ORDERS are issued to direct the movement of trains, a flagman is required to protect his train and the block signal system has been developed to safeguard and facilitate train movements. Still, with all these precautions serious accidents continue to occur, because a train order has been transmitted or transcribed incorrectly or a train crew has overlooked it, or a flagman has failed to perform his duty properly, or a signal indicating stop has been overlooked by an engineer, etc. As a consequence, railway men and others are looking for means to prevent accidents which result from such failures of the human element. One of the results of the consideration of this problem was the incorporation of certain provisions regarding automatic train control in the Transportation Act. There are, however, honest differences of opinion on this subject. Some feel, as indicated elsewhere in an article in this issue, that excellent results may be obtained by means of audible warning devices to call to the attention of enginemen and others the fact that a dangerous condition exists. In this article the writer well brings out the fact that no devices should be used which

will tend to take the control of the train away from the engineman and it is believed that all will agree that the control should *not* be taken away from an engineman when he is alive and "on the job."

Audible warnings have been advocated and used to some extent in this country, but more generally in Europe where fog conditions have made such warnings a necessity, although accidents have occurred because of the failure of the apparatus at critical times. It seems to have been due to this fact that automatic train control has been developed to the point which it has reached today in this country, and it is significant that it is receiving serious study in England and France, where the audible warning has been developed to a high state of efficiency. Any device which will reduce accidents should receive careful consideration, whether of an audible nature or automatic train control. It would appear that any audible device will have to "prove its case" in comparison with the record made with automatic train control systems already in service.

A Good Time to Study Terminal Operation

RAILWAY MEN ARE agreed that the present recession in railway traffic, although acute, will be of a temporary character and will soon give way to a volume of business heavier than ever before handled. This has been the history of past depressions, and there is nothing to indicate that the present will be an exception. The far-sighted railway officer will use this lull in business to study ways of improving his methods of operation so that he may be able to handle this increased business with the maximum economy when it comes to him.

No feature of the railway plant constitutes a greater tax on the capacity and on the net revenues of the roads today than the terminals. In many instances they are outgrown or antiquated, while in others methods are in vogue which unnecessarily complicate operations. While sound railroading demands that cars be kept out of the yards and in road movement as much as possible, the present condition of many of the terminals makes it even more necessary that this be done in the interests of economy.

As pointed out by Colonel E. H. Shaughnessy in a letter to the editor, elsewhere in these columns, there is too much switching of freight cars in intermediate terminals. This switching not only costs money directly, but it results in injuries to equipment and more particularly in delays in movement. It is still the common practice on many roads to reclassify the dead freight trains at each division point. This is done in spite of the fact that there are repeated illustrations of the economy of making up trains as near the point of origin of the traffic as possible for movement to remote points without breaking up and reclassification at intermediate yards. While this practice requires the holding of this freight somewhat longer at the originating terminal in order to concentrate it in trainload lots, the time so lost is made up several times over by the delays saved in intermediate yards where only routine inspection and switching are done.

An officer who has not studied this problem will be surprised to note the amount of freight which can be assembled in trainload lots in this way. This plan not only saves a large expense of switching at intermediate terminals but it greatly expedites the movement of freight, a consideration of as much importance to the railways as to its patrons, since it promotes a more intensive use of the railway plant by increasing the capacity of a line and by securing the more prompt return of the equipment for further loading.

Chicago Great Western

THE CHICAGO GREAT WESTERN operates 1,496 miles of line, of which it owns 1,035, operates under lease 375 and has trackage rights over 86. The main lines of the parent company extend from Chicago to Minneapolis and from Oelwein, Ia., to Kansas City, Mo. The lines of the Wisconsin, Minnesota & Pacific, a road formerly controlled by entire ownership of stock and by lease, but acquired on June 1, 1920, by the parent company, extend from Mankato, Minn., through Red Wing and Simpson to Osage, Ia., with a branch to Winona, Minn. The Mason City & Fort Dodge, controlled by entire stock ownership and by lease, has lines from Oelwein, Ia., and Hayfield, Minn., to Omaha, Neb. This resumé should be sufficient to show that the road runs through a highly competitive territory and that it has to compete with a number of larger systems, many of which have through lines of their own and some of which are in a much stronger financial position. In years past the Chicago Great Western has had some success in making a living under

ment of interest, of \$2,530,682. In 1919 there was a corporate net income of \$1,263,670.

The Chicago Great Western, when it was reorganized in 1909, was expected to be able to pay 4 per cent dividends on its preferred stock, which dividends were to be cumulative from June 30, 1914. An initial dividend of one per cent was paid December 1, 1915; one per cent dividends were also paid in May, 1916; October, 1916, and April, 1917. In August, 1918, one per cent was paid and again in January, 1919. In 1920, not only were no dividends paid on the preferred stock, but the company found itself unable to pay the unearned interest on the first mortgage bonds of the Mason City & Fort Dodge. It proposed not to pay this interest, but finally paid it after receiving a loan by the Interstate Commerce Commission from the revolving fund, covering the amount of interest due.

The story of the increase in gross earnings and the decrease in net in 1920 is the same in the case of the Chicago Great Western as it is in the case of most of the other railroads of the country. The freight revenue in 1920, amounting to \$15,990,231, represented an increase of 9.86 per cent over 1919 and the total operating revenues of \$24,032,435, an increase of 8.61 per cent. The operating expenses amounting to \$26,452,243, on the other hand, increased no less than 36 per cent. The increase in expenses for maintenance of way as between the two years was especially notable, being 70 per cent. The figures of maintenance work done in 1920, however, do not indicate that the charges for maintenance in 1920 were excessive nearly so much as that the maintenance work done in 1919 must have been insufficient. Detailed figures for 1919 are not given in the report; a comparison as between 1920 and of two years prior to federal control—namely, 1917 and 1916—gives us figures somewhat as follows:



The Chicago Great Western

Total miles of track rebalasted.....	1920	1917	1916
Linear feet of bridges, trestles and culverts re-built or replaced.....	274	67	125
Cubic yards of material moved—roadbed.....	6,575	7,576	11,969
Total miles of track relaid.....	129,187	138,660	238,520
Cross-ties put in track:			
Treated.....	60	124	120
Untreated.....	193,547	71,630	31,186
Total.....	381,541	486,837	571,335
New tie plates.....	575,088	558,467	602,521
New rail joints.....	88,796	36,698	246,149
New rail joints.....	10,420	31,233	101,799

The Chicago Great Western's best year since its reorganization in 1909 was in 1916, not only from the standpoint of business alone, but also from that of net earnings. In that year it earned its 4 per cent on the preferred stock (although it paid only 2 per cent) and its prospects of continuing to do so looked rather bright. The road, however, suffered acutely from federal control, particularly, as already stated, because it lost business, much of which was diverted to other lines and which has not been restored to its former channels. It is perhaps natural, therefore, that the progress that has been made since 1916 has not been as great as might be wished. The tons of revenue freight carried in 1920 and the total ton-miles were greater than in 1919; they were, however, less than in 1916.

A road in the position of the Chicago Great Western needs plenty of cars and can only be successful against the competition of longer through lines on the basis of superior service. Owing to the Chicago Great Western's financial disabilities, the total number of freight cars in service recently has been decreasing. No standard cars were received from the Railroad Administration, nor were any new cars ordered during 1920. The average capacity of the freight cars in service in 1920 was 35.36 tons; in 1916 it was 35.69 and in 1917, 36 tons. There has been some increase in the number of locomotives in the past few years. Ten Mikado and five switching locomotives were allocated by the U. S. R. A., although over the road's protest. Ten

these conditions. In 1920, however, it suffered from all the handicaps in general characteristic of the aftermath of federal control.

Under government control it had a large amount of its business diverted to other lines. After it was returned to private operation it tried, by giving scheduled and more frequent freight service, to win this business back. It succeeded in getting back only part of the business it had lost, and the changes in its freight service resulted in the reduction in its average freight train load, of which mention will be made later. In the latter part of 1920 it suffered early and more than most railroads from reduction of traffic, because it is a large grain carrier and the effects of the action of the farmers in holding back their grain were felt earlier and more acutely in its territory than in almost any other part of the country.

The operations of the property showed a net operating deficit for 1920 of \$4,158,344 as compared with a net railway operating income in 1919 of \$893,307. The corporate income account for 1920, after taking into consideration the standard return for operation by the Railroad Administration in January and February, and the guaranty for the six months ending August 31, showed a deficit, after the pay-

additional Mikados were ordered in 1920. The report does not give any figures as to locomotive tractive effort.

An index to a road's efficiency is most often found in the figure of the average revenue trainload. From 1910 to 1916 the Chicago Great Western succeeded in nearly doubling its figure for average revenue tons per train mile, increasing the average trainload in 1910 of 331 tons to 603 tons in 1916. In 1918 the average revenue trainload had been increased to 620 tons; since then, for reasons already indicated, there has been retrogression: the average revenue trainload in 1919 was 588 tons; in 1920, 587 tons.

The Chicago Great Western's business is rather varied; it consists of about 28 per cent products of mines; 27 per cent products of agriculture and 26 per cent manufactures. Its average haul for revenue freight in 1920 was 274 miles. The Chicago Great Western has a high percentage of loaded car miles to total car miles, running about 72 per cent. It had in 1920 an average load per loaded car of but 26 tons and a mileage per car per day of but 24. The ton-miles daily per car in 1920 were 433; in 1919, 427.

The following table shows the principal figures for operation in 1920 and 1919:

	1920	1919
Freight revenue	\$15,990,231	\$14,555,496
Passenger revenue	5,692,494	5,979,147
Total operating revenue	24,032,435	22,128,189
Maintenance of way expenses	5,987,678	3,525,827
Maintenance of equipment	6,736,579	5,010,519
Traffic expenses	520,662	320,950
Transportation expenses	12,258,484	9,745,333
General expenses	722,369	629,799
Total operating expenses	26,452,243	19,389,535
Net from railway operations	Def. 2,419,809	2,738,654
Taxes	1,010,657	798,590
Net railway operating income	Def. 4,158,344	893,307

The corporate income account was given in last week's issue, page 913. It showed figures as follows:

	1920	1919
Total income (or deficit)	Def. \$868,953	\$3,051,344
Deductions for interest, taxes, etc.	1,661,729	1,787,674
Net income (or deficit)	Def. 2,530,682	1,263,670
Dividends (preferred, one per cent)		439,266

New Books

British Railways and the Great War, Part I. By Edwin A. Pratt, 6 in. by 10 in., illustrated. 108 pages. Published by Selwyn & Blount, Ltd., 21 York Buildings, Adelphi, London, W.C.2, England.

This volume is the first of a series of ten which proposes to give as complete an account as possible of the workings of the British railways during the war years from 1914 to 1918. Approximately a half of this book, which is known as Part I, is devoted to a summary of the various steps which led up to the actual taking over of the railways by the government in 1914. The various plans proposed since as far back as 1847 for providing government control and unified operation in times of national peril are described briefly and the plan actually adopted is explained in some detail. With this preparation the author takes up the discussion of the situation which confronted the government's administration when it took over its work on August 4, 1914. The extent of government control, the methods adopted by the "executive" for handling its work, the financial arrangements with the carriers, the provision made for the handling of abnormal war time traffic, and other problems which were met with early in the war are set down here and described in painstaking detail. In view of the fact that the intensiveness of the work would tend to make it of great value for purposes of reference it is unfortunate that the material is not so organized that any particular phase of the situation is easily available to the casual reader. On the whole, however, if the remaining parts of this work follow the general plan of Part I, this series will be a remarkable contribution to the history of the British railways.

Letters to the Editor

Eliminating Rough Handling Of Passenger Trains

NEW YORK.

TO THE EDITOR:

With reference to the article by F. W. Dean in the January 21 issue of the *Railway Age*, on the rough handling of passengers, I wish to point out one way which would eliminate the uncomfortable "slam-bang" at the start of a passenger train.

By employing anti-friction bearings in place of the present journal bearings on passenger cars, the resistance at starting these cars is so reduced that from 10 per cent to 15 per cent of the pulling force required with journal bearings will set the train in motion. This figure is obtained from comparative tests made on the Swedish State Railways with ball bearings and journal bearings.

The reason why anti-friction bearings, of either the ball or roller-type, have not come into more extensive use on railroad cars, in spite of such a good showing, is no doubt the fact that the hitherto known forms of these bearings have proven insufficient in their carrying capacity, in either a radial or axial direction, or both, to make them an economic success in the railroad service.

However, there is now a new type of anti-friction bearing coming into use in this field, technically known as a disc bearing. The first bearings of this kind were installed about two years ago by the Swedish State Railways, and their tests have given such results that the use of these bearings is now being extended. These bearings combine the easy running of the ball bearing with the strength and carrying capacity of the roller bearing, thus contributing at the same time to an increased comfort for the passengers as well as to reduced operating expenses for the railroads. E. F. MAAS.

Terminal Operation Needs Constructive Study

NEW YORK CITY.

TO THE EDITOR:

The oil industry is very much concerned over the question of what the railroads are going to be able to do toward handling freight business in a prompt, regular way when good times return, and the terminals, perhaps the side tracks, will again be filled with loaded cars awaiting movement. No doubt other branches of industry are just as much concerned as the oil people about what is going to happen, but the fact that there are some 100,000 odd tank cars already in the service of the oil companies makes their case a pressing one and perhaps justifies a rather frank discussion of the situation.

It is a temporary conclusion that the present slump in business is temporary and sooner or later the wheels of industry will once more be turning at high speed. Our industries are continually growing, which means that the railroads will again be confronted with the necessity for handling a heavier traffic than they have ever handled before. When this time comes, what is going to happen? Are they going to carry on satisfactorily and be able to accept all the business offered or are they going to fall by the wayside and be obliged to resort to embargoes, priorities, permits and all that sort of dreadful expedience?

Everyone familiar with the mechanism of railroad trans-

portation knows that at the present time the railroad facilities of the country, as a whole, are far short of what they ought to be to handle the peak railroad traffic scientifically and economically. There is nothing to be gained in spending time trying to figure out why this is so; it is so, and what is more, there is no immediate relief in sight. At the very time when dirt should be flying we find the railway managements tied up with wage questions, and to a lesser extent, rate questions, and in most cases the great big question of keeping out of the hands of a receiver.

Accepting this situation as it exists, what can be done to make the best of it? With this thought in mind, attention is invited to the apparent necessity for studying terminal operation in a constructive far-reaching way, perhaps more attentively than ever before, because it seems that there is a lot of lost motion in that phase of railway operation that can be eliminated, thereby bringing about better service without additional expenditure on the part of the railroads.

We all know there is too much switching and reswitching of freight cars in intermediate terminals. We know that freight trains, particularly the so-called "dead freights" are reclassified wholly or in part at nearly every division point, or about every hundred miles, and sometimes oftener. (This statement is not literally true, for there are some notable exceptions, but it is close enough to serve the purpose.) Switching cars costs money and causes delay, therefore, extra switching causes unnecessary expense and delay, hence the possibility for benefiting both the railroad and shipper by keeping this intermediate handling to an irreducible minimum.

Following this thought further and in the light of past experience, we find the intermediate terminal handling of cars increases faster proportionately than the traffic does; the unnecessary expense and delay being compounded at a time when it should be avoided. In other words, the better business is, the poorer service is, until the saturation point is reached, when there is practically no service worthy of the name.

The way to maintain dependable service and to reduce the expense and delay mentioned, is to do the work in the initial terminal, assembling trains that will move long distances without reclassification. This, of course, is not a new idea at all. For years past every railroad of any consequence has had some sort of through freight service but at best the service so provided has been merely with the idea of handling the "preferred" freight which is but a small part of the general traffic. I want to submit for consideration the idea of handling all freight on through freight trains that will move from the point of origin to the logical breakup point without being disturbed enroute.

When I say further that these through freight trains should not be thought of as confined to restricted districts or even to railroad systems, but nation-wide in extent, some idea may be gained of just what is passing through the minds of those vitally concerned in this problem.

Of course real progress cannot be made along this line unless the railroad managements get together and co-operate among themselves to that end and call on the shipping interests to help out. Surely the responsibility rests upon them to take the initiative in this respect. There is need for real railroad statesmanship in formulating comprehensive plans not only in connection with the subject under discussion, but in other directions as well, wherein joint action would bring about better utilization of the existing railroad plant.

Short-sighted persons among the railway and shipping folks are enthused because the railroads are again putting up the competitive barriers and they put great stress on what is being done in the way of restoring the old time high speed "de luxe" freight service that makes a first, second or some such morning delivery between fortunately situated business

centers. It is common knowledge that some railroads are going into this sort of thing to such an extent that they are on the verge, if not already into, a freight speed war. Under the existing circumstances, could anything be more indefensible? Those who have been through the mill and can therefore see well into the future know what little bearing this frilly sort of service has upon the handling of the great bulk of freight traffic and how quickly it goes by the board when things break loose. The answer to the problem does not lie in that direction but in the less spectacular one of taking care of all the traffic fairly well instead of a small portion extremely well and letting the rest get along somehow or other.

During the war, that is to say during governmental control, I was in France helping the French army handle an extremely heavy and important railway traffic, which, by the way, was handled on through freight schedules without even a train dispatcher, but that is another story; so that I do not know from personal observation what took place here. Getting the story second-handed and noting the after results, I am convinced that governmental railway operation is a thoroughly unsatisfactory proposition to even think about. Yet some things were done during the governmental régime which appealed very much to the oil shippers. What impressed them was the way in which trainloads of petroleum products were assembled in mid-continent and handled through intact to the Atlantic seaboard at an average speed of around two hundred miles per day in spite of the blocked terminals and sidetracks and very severe weather conditions. Of course, the secret, if it was a secret, to such movement was merely keeping the trains intact and out of the terminals. The rest was comparatively easy. I understand that other commodities such as flour, grain, lumber and steel were put through in the same manner, running by similarly important cars that had started out singly and had been completely immobilized in the blockaded terminals and storage tracks.

The lesson learned at the time has not been lost sight of by the traffic managers of the oil companies. Ever since they have consistently worked towards the idea of shipping in trainload lots as long distances as they could possibly arrange for, and have, with the aid of the American Petroleum Institute and cordial support of their railroad friends, secured remarkably good results, in spite of the fact that the oil business is only a small part of the whole and the return to private control pretty thoroughly disrupted the through freight arrangements.

If this sort of thing can be done in a small way by one group of shippers, it certainly can and should be done in a big way by concerted action on the part of the railroads and shippers working as two groups. As I have said before, it is my judgment that the duty for taking the initiative rests with the railroads and they should assume the burden so that by no possible chance will the initiative pass from them to those who are not so well fitted for the task.

COL. E. H. SFAUGHNESSY,
Assistant Director, Division of Transportation, American Petroleum Institute.

THE UNITED STATES Civil Service Commission has announced an open competitive examination for shop apprentices. Vacancies in the Bureau of Standards at \$720 a year and positions requiring similar qualifications will be filled from this examination. Applications will be received by the commission at Washington, until August 1, 1921.

THE ANNUAL REPORT of the relief department of the Chicago, Burlington & Quincy shows that during the year 1920 the department paid \$627,148 in sick and death benefits. Employees contributed \$678,817, income from investments was \$20,625 and interest on cash advanced by the railroad was \$7,013. There was an excess of receipts over disbursements of \$65,279.



Fig. 1. St. Benin Viaduct Completed

Reconstruction of Bridges and Tunnels in France

Peculiar Difficulties Overcome—Reinforced Concrete Used Extensively—Rebuilding the Canals

By Oliver F. Allen

Formerly Major of Engineers, American Expeditionary Forces

IN THE FIRST ARTICLE of this series, which appeared in the *Railway Age* of April 8 (page 879), attention was called to the general state of destruction of the French and Belgian railways after the signing of the armistice and the plans which were adopted for rebuilding the lines. In this

ing illustrations. This is an important link connecting two valleys in a hilly country where it would be practically impossible to establish adequate railway communication for either civilian or military uses without a tunnel. It was utilized by the Germans in 1914, 1915, and 1916 and effec-



Fig. 2—Slaughter House Bridge

Left—March 1, 1919. Right—Temporary military structure, August 7, 1919. The abutment for the permanent bridge is nearly completed.

article it is proposed to describe in some detail the problems which were met with in the reconstruction of bridges and tunnels. This was one of the first difficulties encountered in putting the lines in order for the transportation of freight and passengers.

An example of tunnel reconstruction is the Vauxaillon tunnel between Soissons and Laon, shown in the accompany-

tively destroyed by them when retreating in 1917 by blowing in both ends and the middle. With the exposed northern end camouflaged the French military engineers, working with the staff of the Northern Railway, repaired the tunnel, using concrete in place of stone and brick and had it ready for service early in March, 1918, when the Boche drive came. Forced to abandon it, the French destroyed it. The Germans



Fig. 3—Slaughter House Bridge, March, 1920

Left—While the girder was being lowered into place the track was being laid and the bridge was actually put into service the same day.
Right—The rebuilt girder being put into place using the temporary military bridge as a support.



Fig. 4—Lock No. 6 at Cottigny, de Roubaix Canal

The canal in service with a self-propelled boat with tilting smoke-stack going under bridge on March 25, 1920.

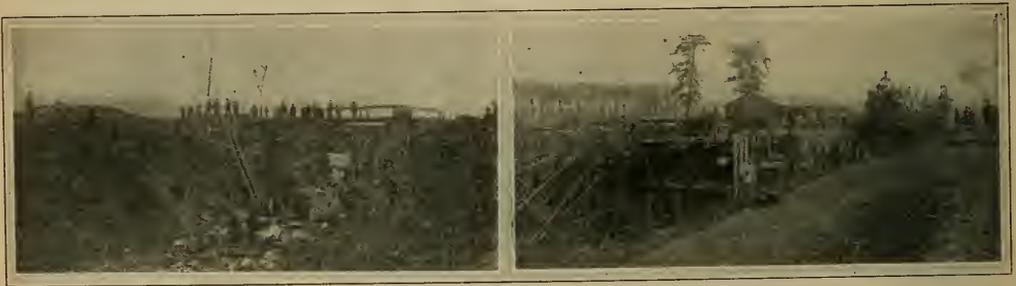


Fig. 5—Lock No. 6 at Cottigny, de Roubaix Canal

Left—February 18, 1919. Right—The new concrete lock and bridge being put in place, July 12, 1919.

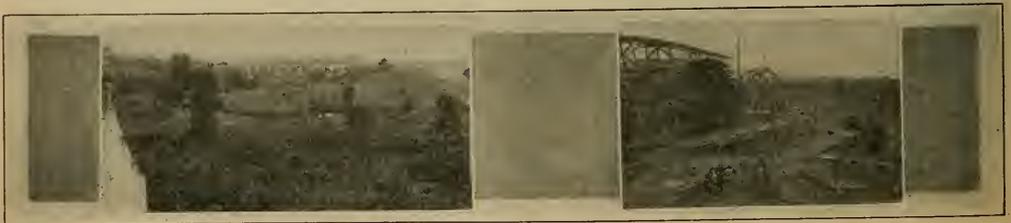


Fig. 6—Origny Viaduct, Soissons-Hirson Line

Left—The viaduct completed. Right—Viaduct under construction. The piers have been rebuilt, as described in the text.

immediately started reconstruction and were able to use the tunnel for some time before their evacuation in September, 1918, when they again blew in both ends.

The heavy rains of the winter of 1918-19 added to the

timbering very difficult. The best of lumber was used but, as the accompanying illustrations show, the tremendous pressure which the loose earth exerted made the work difficult. It was found necessary to rebuild the side walls very much



Fig. 7—Vauxaillon Tunnel

Left—Northern end being repaired by French following German retreat in 1917. Note sand bag camouflage. Center—October, 1917. Another view of same end. Right—Southern end, not exposed to enemy, under construction in 1917.

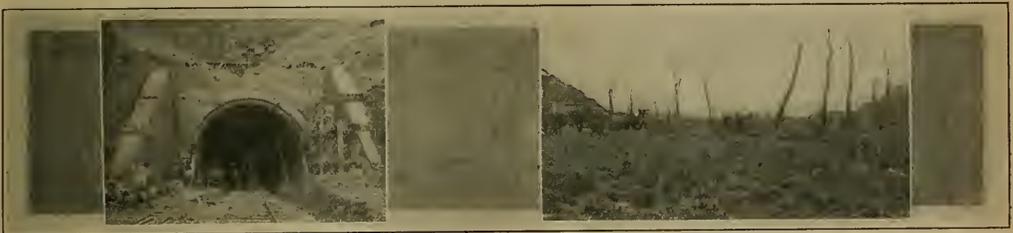


Fig. 8—Left, Vauxaillon Tunnel; Right, St. Benin Viaduct

The northern end of tunnel nearly completed in the spring of 1919. St. Benin Viaduct before reconstruction, May, 1919.



Fig. 9—Vauxaillon Tunnel

Left—Work in the top gallery, February, 1918. Center—Timbering during latter part of 1918, following third destruction of tunnel, showing pressure of disintegrated mass above. Right—The type of timbering used for the last stages of the work in 1918.



Fig. 10—St. Benin Viaduct

Left—Starting the concrete block shells on the pier foundations. Right—Building concrete block shell forms for the piers.

upheaval caused by the high explosives used in the several destructions and left the earth around and over the tunnel in a very spongy, granular, disintegrated condition. The French found the internal pressure so great as to make

stronger than they had been originally to a height of about 13 ft. (4 meters). These concrete walls were completed in March, 1918. Afterwards the headings were finished at the top and the whole arch was covered with concrete. This work

included massive concrete foundations under the reconstructed portions. Finally liquid concrete was pumped into the voids above the completed arch. Both tracks were in service in May, 1919, and the work was entirely finished a few months later.

Concrete Used Largely

In studying the question of rebuilding the destroyed bridges it was soon apparent that lack of time, manufacturing facilities and transportation combined to prohibit the use of bricks and cut stone to rebuild the masonry work as it had existed before, as well as the use of steel where there had been many steel bridges. Skilled labor was difficult to get. Full advantage was taken of the latest developments in the use of reinforced concrete which had proved so effective for many military operations and the majority of the bridges and viaducts were rebuilt of that material. In many cases the debris from the ruins of old piers, abutments, foundations, arches, buildings, etc., were collected, crushed and utilized for new concrete structures. Where possible old foundations were used. They were generally found sound after taking off a few feet of the top below the point where the explosion occurred.

The shortage of labor and the scarcity of lumber made the problem of forms a serious one. This was realized in the early days of the war when the reconstruction problem was first studied and experiments were carried on in an aviation field near Paris by railway and military engineers with a view to developing a method of pouring concrete piers and arches without the expense and delay of large and heavy timber forms.

Piers were built by putting up a shell of concrete blocks similar in appearance to the cut stone formerly used. This shell was used as a form into which the mass of concrete for the pier was poured. (See illustrations, Figs. 6 and 10.) A light structure of wooden forms, sometimes balanced on each side of the pier as for a cantilever truss, just strong enough to hold a concrete arch about a foot thick was next employed in place of the massive forms previously used. A ring of concrete was then poured on this fragile form and after standing about a week was hard enough to form a truss by itself upon which the rest of the arch could be built without any noticeable deformation of the original timber truss. (See illustrations, Figs. 6 and 10.) The faces of the arches are also of concrete blocks the same as the shells for the piers, the whole interior mass being filled into such forms. Cinder concrete was used sometimes. When filling in, the new material was bonded with the first rings by a thin layer of pure cement and no serious difficulty was encountered in making a perfect joint. A model arch built in this manner was wrecked by the engineers who built it and the cleavages did not follow the bonding line between the first and second pourings. The union of the parts was perfect. Subsequently two bridges which had been built in this manner following the German retreat of 1917 were destroyed by the Boches in 1918. In this destruction the central parts of the arches only were blown out. Parts of the arches on each side of the piers were left in position, cantilever fashion, and it was found that no cleavages appeared between the concentric rings forming the arch. This method not only effected an enormous saving in lumber costs, but permitted the same size working crews to carry on much faster than would have been possible in the old way.

Chambers for High Explosives

Accompanying illustrations of the Saint-Benin and other viaducts show this method of construction in its various stages. (Especially Figs. 4, 6, 8 and 10, and Figs. 2, 3 and 4 on page 878 of the *Railway Age* of April 8.) It is an interesting side light on the European situation to note

that all of these new bridges are provided with chambers for high explosives so located as to facilitate complete destruction in case of another invasion. Even steel structures are provided with shelves or pockets so that explosives can be placed easily and quickly if their destruction becomes a military necessity.

Attention is especially called to the artistic appearance of the finished concrete bridges. (See Figs. 1, 4 and 6.) Where outside facings are not of concrete blocks they are coated over with fine cement. Balustrades have been included. In some cases, where salvaged bricks were available or there were neighboring brick yards already restored, the shells of the piers and the surfaces of the arches were built of them. The bricks were used as forms the same as the concrete blocks.

At Lille six old steel-arch bridges over streets were destroyed with their abutments. This destruction was so complete as to eliminate any thought of rebuilding. The available height and the carrying capacity required by the new railway program prohibited ordinary masonry being used for reconstruction from the original designs. The unsightly steel lattice or webbed girders were ruled out from an aesthetic point of view, as well as because of the difficulty of getting material from which to make them. Here again reinforced concrete was taken advantage of and the debris utilized. The abutments and very flat arches were so carefully designed that there is only about a foot between the bottom of the arch at the center and the bottom of the rail. These bridges were finished with iron balustrades salvaged from the old bridges.

The illustrations, Figs. 6 and 8, of the St. Benin and Origny viaducts are not only typical of the type of reconstruction so generally employed, but show the rapidity of reconstruction work in the areas held by the enemy until the time of the armistice.

Canal Transportation

It is difficult for Americans to realize the importance of canal transportation in Western Europe. We are prone to picture canal shipments as slow and inefficient. But even in the rush of war work our American Army engineers found cases where canal transportation was the quickest and best from a military point of view, and all the Allied armies utilized canals very extensively during the war. They were even protected by little gunboats which were dispatched after the armistice to the Rhine by the way of the Marne and the Moselle. The destruction of the canals was of the same order as the railway destruction and the necessity for their rebuilding urgent. Here again, reinforced concrete was taken advantage of as illustrated by Lock No. 6 at Cottigny (Figs. 4 and 5). While many canals were restored to use by the spring of 1920, others will not be available for a long time, especially some of those in the coal regions, the streams which supplied them having been diverted into the mines by the Germans.

The next article of this series, which will deal with the rebuilding of terminals and transfer yards, will appear in the *Railway Age* at an early date.

THE NORTHWESTERN PACIFIC reports for the year 1920 eleven fewer casualties to employees than during the preceding year. This was a decrease in the number of casualties of 7½ per cent. This company operates 507 miles of road with 75 locomotives. The number of locomotive miles per train service casualty was increased 35 per cent and man hours per industrial casualty 29 per cent. During the year 10,156 man hours were devoted to safety committee work, and W. S. Wollner, general safety agent, estimates that the salaries and expenses of his department amounted to about \$30,000.

Train Operation and Automatic Train Control

Caution Signals, Properly Located with Audible Signals, Should Solve the Collision Problem

By J. B. Latimer

Signal Engineer, Chicago, Burlington & Quincy, Chicago

THE IDEA of automatically stopping a railroad train which has entered a danger zone is not a new one. It is certainly as old as the derail which was the first crude up to the present. The idea of speed control is of more recent origin and was never looked on as a practical possibility until electricity began to be used in railway signaling or, more specifically, after the use of automatic block signals had become a practical fact.

There is little to be written of the history of automatic train control prior to the adoption of the Kinsman system on the Boston Elevated railways in 1901 and on the New York subways in 1903, though it is the writer's recollection that the Intramural railway at the World's Columbian Exposition in Chicago in 1893 was equipped with such a safeguard of the Rowell-Potter type.

Investigations of Train Control

In 1907 the Block Signal and Train Control Board was appointed by the United States government to investigate safety appliances on railways and from that time on during the life of that board and thenceforth by its successor, the Safety Bureau of the Interstate Commerce Commission, a careful and painstaking study of the subject of automatic train control has been conducted under government supervision.

In 1914 a committee of the Railway Signal Association, at the request of the American Railway Association, drew up a set of requisites for the installation of train control apparatus which the latter body adopted on May 20th of that year; and in 1919 these were adopted by the Safety Bureau of the Interstate Commerce Commission. They are as follows:

An installation so arranged that its operation will automatically result in either one or the other or both of the following conditions:

First—The application of the brakes until the train has been brought to a stop.

Second—The application of the brakes when the speed of the train exceeds a prescribed rate and continued until the speed has been reduced to a predetermined rate.

Requisites of Installation*

1. The apparatus so constructed that the failure of any essential part will cause the application of the brakes.
2. The apparatus so constructed that it will automatically control the train in the event of failure by engineer to observe signals or speed regulations.
3. The apparatus so constructed that it will control the train in the event of a failure of fixed signals to give proper indications.
4. The apparatus so constructed that proper operative relation between those parts along the roadway and those on the train will be assured under all conditions of speed, weather, wear, oscillation and shock.
5. The train apparatus so constructed as to prevent the release of the brakes after automatic application has been made until the train has been brought to a stop or the speed of the train has been reduced to a predetermined rate.
6. The train apparatus so constructed that when operated it will make an application of the brakes sufficient to stop or control the train within a predetermined distance.
7. The apparatus so constructed as not to interfere with the application of the brakes by the engineer's brake valve or the efficiency of the air brake system.
8. The apparatus so constructed as to be operative when the engine is running forward or backward.
9. The apparatus so constructed that when two or more engines are coupled together or a pusher is being used the apparatus can be made effective on the engine only from which the brakes are controlled.

*These requisites are drawn for application in connection with a properly installed block signal or interlocking system.

10. The apparatus so constructed as to be operative on trains moving only with the current of traffic.
11. The apparatus so constructed as to conform to The American Railway Association standard of clearances of rolling equipment and structures.
12. The apparatus so constructed as not to constitute a source of danger to employees or passengers, either in its installation or operation.
13. The apparatus so constructed as not to interfere with the means used for operating fixed signals.

Adjuncts

The following may be used:

- (A) CAB SIGNAL; a signal located in the engine cab indicating a condition affecting the movement of the train and so constructed that the failure of any part directly controlling the signal will cause it to give the "stop" indication.
- (B) DETONATING SIGNAL APPARATUS; an apparatus located along the roadway and so constructed as to give an audible signal by means of a torpedo or other explosive cartridge.
- (C) SPEED INDICATOR.
- (D) RECORDING DEVICE; an apparatus located on the train and so constructed as to make a record of the operations of the automatic applications of the brakes and of the speeds of the train, and such other records as may be desirable.

It is the writer's belief that the committee which first drew up these specifications had in mind more the substitution of train control for existing block systems than the design of the apparatus to be used as an auxiliary and a check on the operation of an existing block system, and for that reason that the specifications are unnecessarily severe.

The Object of Automatic Train Control

In medio tutissimus ibis, "in the middle course we steer most safely," runs the old Latin proverb, and it has always appeared to the writer that this was a very good thought to have in mind in connection with the adoption of automatic train control.

Automatic train control seeks one object, and one only, and that is to add safety to the movement of trains on railroads; and the simplest and least expensive device which will do that is the device which ought to be adopted.

The running of a locomotive is an operation which requires considerable skill. It is safe to say that the average locomotive runner serves an apprenticeship of at least five years before he is entrusted with the charge of a train in main line service. Varying classes of trains, varying grades and curvature and varying speeds all require special handling of the brakes, and to equip a railroad with a device which makes a brake application of a uniform sort compulsory under certain conditions is likely to introduce elements of danger into train operation just as great as those it is the endeavor to eliminate.

To analyze the whole situation, we are confronted with the problem of preventing collisions between railroad trains. The methods most generally followed at the present time are the instructions to trainmen to protect their trains by flag, the issuance of orders to advise trains where they are to meet or pass each other and the action to be taken by them at the meeting points to guard against collision, and the use of block signals. It is a lamentable fact that these precautions have proved to be inadequate and that collisions continue to occur. Trainmen fail to flag properly, orders are forgotten, misread, garbled in transmission or improperly issued, block signals are improperly displayed or are overlooked. All this has forced the belief on thinking railway men and those interested in railway operation as representatives of the public that something further must be done to add additional safeguards to train operation.

The question now before us is, how is this to be done?

Shall we wipe the slate clean and start over again along

the line of the development of apparatus which leaves the runner of a locomotive a mere automaton, able only to start his train when conditions are favorable and entirely dependent on the control machinery to stop it when a stop is necessary?

Shall we reverse the practice which has hitherto prevailed and which requires the locomotive runner to be the most highly trained man in the train crew and, relieving him of responsibility, shift it to the shoulders of the man who maintains the control apparatus, or shall we take what 90 years of experience has developed and build on to it a little further?

To the writer the latter course seems by far the safest and the most likely to attain the desired end. Although it is admitted that flagging rule 99, that the most careful development of a system governing the issuance of train orders and that the best block system yet invented have failed entirely to eliminate collisions, the ratio of the times in which they fail to the times in which they succeed is very small. Neither the public nor the railroad officer really realizes the matter of train control than to add a fourth factor which will act when the present methods have failed?

The writer's observation covering an experience of 38 years in active railroad work has convinced him that the vast majority of collisions are due either to failure to flag or to non-observance of signals. An increase in the mileage of automatic block signals would be a remedy for the first and an adjunct to block signals, either automatic or mechanical, which would insure that an engine runner was awake and attending to business at the time he passed a caution block signal would come pretty near taking care of the other. It is the writer's belief that the current practice of allowing the block signal at the entrance of one block to act also as a caution signal for the signal of the next block ahead is a weakness in much of our signal practice today, unless the blocks are less than a mile in length.

The trouble with the train order system is that orders must be delivered some time in advance of the time they are to be acted on and the interval between delivery and action is often sufficient to allow of their being forgotten. The giving of a caution signal too far from the signal, approach to which it controls, is open to the same objection. It is not infrequent to find the practice just referred to in use in a block system where the blocks average two to two and one-half miles in length. The A. R. A. rule for a caution signal is: "Approach home signal with caution." Now, nobody expects the runner of an engine in such a system as we are discussing (one with blocks two to two and a half miles long) to slow down on passing the caution signal and to run slowly until he picks up the home signal for the next block, two miles away. What is expected of him is to realize that he may have to stop at a signal a couple of miles further on and to use his own best judgment in controlling his train so as not to pass this other signal if it is at stop when he reaches it. Is it any wonder under these circumstances that with his other duties an engineman does occasionally misjudge the point at which he should stop? Some railroads install their block systems with a separate caution signal for each home signal, placing the caution signal at a uniform distance from the home, this distance to be not more than good braking distance. It is a safe prediction that, other qualifications being equal, there are a good many less cases of signals being overrun on roads so equipped than on those where the former and more generally used system is in vogue.

Causes of Collisions

But to get back to the question of automatic train control. Admitting that the two most fruitful causes of collision are inadequate flagging and non-observance of signals, the third is the failure of the train order system. Here again the installation of automatic block signals is the cure; and right here I want to warn any reader of this paper who is

disposed to criticize my twice made statement that automatic block signals are the cure for two evils, poor flagging and overlooked, forgotten or erroneous orders, that he had better wait until I finish before he cries out that automatic block signals have failed to do this in the past; because I am going to suggest an addition to present automatic practice which will insure that engine runners will know in ample time to make a stop when they are approaching a block signal in the stop position.

There are a number of inventions covering apparatus which may be connected to a caution signal which will warn enginemen as they pass it that it is in the caution position. In some systems this warning is given by a brake application. In some by an audible or visual signal displayed in the cab of the engine. In others by an audible roadside signal. Some of these are arranged so that if the engine runner performs some action, such as pressing a button or moving a lever as he approaches the signal, thereby showing that he is awake and realizes the condition, the apparatus does not act; but if he fails to do this, as would be the case were he asleep or unconscious, the apparatus takes action.

As explained in the earlier part of this paper, there are many objectionable features to any apparatus which makes an arbitrary brake application and the use of such apparatus should be avoided if the object sought, the prevention of collisions, can be attained without it. Cab signals, or at least all of them that have come under the writer's observation, require a good deal of delicate electrical apparatus on the engine which it is hard to keep in working order. The failure of more than one theoretically good train control device has been because of this fact. In the writer's opinion, a good audible wayside signal is all that is necessary. This leaves the control of the braking system entirely in the hands of the engine runner, which is where it should be, and we have improved present conditions to the extent that if a train passes a signal displayed at caution without the engine runner's answering the caution signal, the fireman and everyone else on the train is informed of the fact at once. True, if the engine runner after receiving the warning continues to dash on at full speed at the risk of his life the apparatus will not stop him; but what is the chance of such an occurrence? Has the investigation of any collision on record ever even suggested the thought that the engineman willfully attempted to wreck his train? Has it not always been established that he was asleep, unconscious or had overlooked a signal? And should he be bent on suicide, is it likely that the fireman would care to join him?

Prevention of Collisions

As the first step towards the prevention of collisions it is the writer's recommendation that all lines of railroad carrying any considerable traffic be equipped with automatic block signals as soon as possible. That these block signals be so installed that there is a caution signal for each stop signal not more than 3,750 ft. from the stop signal, and that each caution signal be equipped with an approved type of audible signal which will sound the alarm not less than 3 consecutive times when an engine is within 300 ft. of it unless the engineman performs some action in the cab which he could not perform unless he fully realized what he was doing and why he did it. The writer will stake his professional reputation that on a road so equipped the word collision would be unknown.

No doubt this suggestion will be met with derision. It will be said that the plan herein suggested is too incomplete; that it leaves a possible chance for the apparatus to fail to give the warning. To this the answer is that no engineering construction guards against or can guard against possibilities. All we can do is to guard against probabilities. No one can design a rail, a wheel or an axle which cannot possibly break and cause a derailment. Our best efforts end when we have

designed them strong enough to bear all reasonable stresses that we can foresee, add a fair factor of safety and carefully inspect them at the factory and while in service.

With the arrangement proposed a flagman must fail to do his duty, a signal must fail to give its proper indication, the warning device must fail to operate or the enginemen (fireman included) must fail to obey the warning, for a collision to occur. Knowing as we do that none of these chances is likely to occur oftener than once in many thousand times, what is the probability of enough of them occurring coincidentally to cause a disaster? Not once in many millions of times.

We must consider this question from a practical point of view. To equip a few miles of important terminal with a train control device of the most elaborate sort is not going to accomplish anything. We must spread this additional safety over a vast amount of mileage if we are to get results, and therefore we must consider a device within a reasonable cost figure. Collisions are costly and disgraceful. We must stop them everywhere, not only at a few isolated places. The arrangement herein suggested can be added to an existing automatic block system where separate distant signals are already provided, at a nominal cost; to an existing automatic block system where additional distant signals must be provided at a cost greater but not prohibitive, and to a new installation of automatic block signals at practically no increase over what the installation would cost without it.

Administration Seeking Way To Reduce Rates

WASHINGTON, D. C.

PRESIDENT HARDING and members of his cabinet are still giving a great deal of consideration to the railroad question in its relation to the whole program of trying to bring about a "return to normalcy" in general business conditions. Following the cabinet meeting on April 15 it was stated that no definite plan has yet been formulated but that it was possible some idea as to a program might be made known in another week. The various branches of the government, particularly Congress and the departments of commerce and agriculture, are receiving numerous complaints of the high rates and many opinions are expressed that lower rates on some commodities would produce more revenue for the railroads, but it is apparent that those in a position of responsibility in the matter feel it necessary to go slow in the matter of rate reductions until the possibility of reductions in the cost of transportation has become more clearly apparent. The decision of the Railroad Labor Board on the national agreements, which proved so satisfactory a compromise that it was claimed as a victory by both sides, was received with great interest in Washington and the fact that the board was able to find a compromise in that case fostered more hope than had previously existed of a peaceable outcome of the wage reduction controversy. It had been rumored that the President intended to call a joint conference of the railroad executives and labor leaders but he has not yet indicated that he has been convinced of the value of such a plan.

The most insistent demand for rate reductions has come from the agricultural interests, whose prices have fallen so rapidly that the rate level has become a factor of more importance than it is in the case of most commodities, and the question has been discussed from varying points of view at a meeting of the executive committee and delegates of the American Farm Bureau Federation. At the meeting on April 15 the speakers were Herbert Hoover, Secretary of Commerce, and E. E. Clark, chairman of the Interstate Commerce Commission.

"Unless we can readjust our railroad rates we will have

to re-write the whole agricultural geography of the United States," said Mr. Hoover. "Railroad rates bear an intricate relation to our national prosperity and unless they are lowered quickly there will be a decided shifting of agricultural industry. Our present rates will soon move our granaries to foreign shores, for today it costs 30 cents per bushel to ship grain from Missouri to New York and the same amount can be shipped by water from Argentina for 10 cents. We should take a lesson from Europe and think of our agriculture. Those countries have developed industry to the detriment of agriculture; have imperiled their national defense and even their civilization. We cannot afford to depend upon overseas for our food, for it undermines our basic industry."

Chairman Clark pointed out, however, that "all the trouble does not lie with freight rates." Mr. Clark said:

Industries are entirely inter-dependent. If the Florida man did not grow oranges, the railroad in the orange belt would be of no value. If he did not have the railroad, his orange tree would be of no commercial value. These matters must be considered not only from the standpoint of the present,—the question of the movement of the crops of this year, but next year and future years must be considered. It is in the interests of the railroad that the fruit grower and the farmer should raise the largest crops possible, and should find a market for these crops. It is in the interests of the growers that there shall be efficient, well equipped railroads, able to provide a reasonable, adequate service when needed.

The California lemon grower is unable to sell his lemons in the east at prices that will pay him to produce, pack and ship his fruit. At first he blamed the freight rates, but as he looked further into the situation he found that the reason for this is the fact that the Sicilian lemon growers were bringing into this country and selling their lemons at \$1.25 per box. That Sicilian grower has this advantage—he can take that \$1.25 in our money back to Italy and it immediately is changed into a \$5.00 bill. So in this particular instance the only way in which the California lemon grower can successfully compete is through the levying by Congress of an import tax that will give him a reasonable degree of protection. Then it may be that within a few years or a short time it will be possible to reduce that import tax.

Mr. Clark also referred to the wide difference between the price that the grower gets and the price that the consumer pays.

We have made it our business to inquire considerably out of our line in order to get a correct understanding of the situation. We have had complaints about the rates on fruits and vegetables in great numbers, and we have studied the situation as far as we have been able. For instance, there were complaints on the rates on spinach from the south. The facts are that the retail dealer in New York is paying just one-half what he paid last year, but his price to the consumer is identical with that of last year. Obviously the freight rate in that case is not what is preventing the grower from getting the price he got last year, and under those conditions we do not see where a reduction in freight rates would benefit the grower. This is because those who control the market will not pay any more than they are compelled to pay. The farmer is back to almost pre-war conditions so far as the price he gets for his wheat is concerned, but we are paying the same price for the same loaf of bread.

We produce and we must continue to produce large volumes of agricultural products in excess of what can be consumed in this country. We must find markets for the surplus in other countries, and we must do that in competition with products of the same kind in other parts of the world.

Not long ago the cotton growers received 42 cents per pound for cotton, now it is about 12 cents. That isn't because there is any great reduction in the price of cotton goods to the American people, but because the principal market for that cotton has disappeared temporarily in Japan. The fact is, they stopped buying the goods from the spinner in Manchester, England, and he stopped buying cotton here.

Some things have been learned from the experiences of recent years with regard to the question of transportation. The serious war conditions were the cause of largely increased expenditures for operation of railroads, including very large increases in compensation to their employees. Before the war the general average of operating expenditures was in the neighborhood of 65 per cent of the revenue,—somewhere between 65 per cent and 70 per cent. Now it is a little over 92 per cent. As soon as the railroads were taken over by the government during the war the operating expenses began to climb. The question of compensation of employees came up. A commission was appointed by the director general, and it recommended increases that aggregated very large sums of

money, and these increases were retroactive for some time before the decision was handed down. Shortly before that the director general made what might be termed a 20 per cent increase in rates. This was effective about half of the year, and the increase in wages was effective throughout the year. The result was a deficit. The increase in wages went on, but no further increase in rates was made, with the result that the government paid out of the Treasury very large sums to make up the deficit in the course of operating.

After the return of the railroads to the owners there was a period of six months during which the government guaranteed them against any heavier losses, and it was understood by everybody that there would be a general readjustment in the rates. That was undertaken in a careful, methodical way. At first it appeared that there would be no occasion for increase in passenger fares, but an increase of 30 per cent in freight rates which would produce the desired revenue. However, after careful consideration, more increased wages were awarded, which necessitated a recasting of figures and an increase of passenger fares.

For the first two or three months after these rates became effective it looked as though everything would work out as had been anticipated. Then for some reason or other the volume of business began to drop off and the ratio of expenses to income began to increase, and that condition has progressed until at the present time about 90 per cent of our gross revenues is expended in operating expenses. There are not more than ten, and perhaps not more than six individual roads that are earning the interest on their bonds. About one-half of the railroads are at the present time failing to earn their operating expenses and taxes.

During the year ended December 31, 1917, a little over 42 cents out of every dollar earned by the railroads was paid in compensation to employees. The amount thus paid during the year ended December 31, 1919, was 42 cents and during the year ended December 31, 1920, 60 cents.

Secretary Wallace of the Department of Agriculture declared in a statement on April 18 that a substantial reduction in freight rates would be "helpful now and would produce more traffic for the carriers." Secretary of the Treasury Mellon is quoted as having told newspaper men that a reduction of rates on certain commodities would have a stimulating effect on business but that he did not believe there could be a general reduction in rates at this time.

Senator Harris and the Congressional delegation from Georgia called on Chairman Clark of the Interstate Commerce Commission on April 15 to urge reductions in rates on fruits and vegetables from Georgia. As a result of the conference Lincoln Green, vice-president of the Southern, arranged to send a representative of the railroad to accompany representatives of the shippers on an investigation of the conditions referred to to see if the trouble was with the rates.

A large delegation of representatives of the Farmers' Union, accompanied by members of Congress from the agricultural states, had a conference with members of the Interstate Commerce Commission on April 20, urging an immediate reduction in freight rates on farm products. Commissioners Aitchison, Esch, McChord, Meyer and Potter were present, together with W. V. Hardie, director of traffic of the commission. Some of the commissioners were interested in suggestions as to how rates could be reduced in the face of the high prices still being paid by the railroads for labor and materials and Commissioner McChord pointed out that the railroads had had a deficit of \$8,000,000 during the first two months of this year. After Representative Campbell of Kansas had insisted that rates be reduced at once, Commissioner Potter reminded him that the commission has no power to order summary reductions in rates and that at least 60 days would be required for action, using all the short cuts possible, even if the rates were proved to be too high.

Mr. Campbell suggested that the commission could call in the traffic officers of the railroads in three days and insisted that they would be very glad to reduce rates, but Director Hardie said that he had recently talked with some 30 railroad traffic managers on the subject and not one of them regarded the high rates as the most important factor in the present situation. He said that all admitted that they are a factor, but not the most important. Mr. Hardie also pointed

out that during the latter part of last year when the railroads were handling a maximum tonnage under the present rates they had only earned at the rate of 3 per cent on the valuation. After the conference it was stated that the request for lower rates will be taken to the White House.

Cost of Railroad Fuel in 1920

WASHINGTON, D. C.

THE COST OF FUEL to the Class I railroads of the United States in 1920 was approximately \$297,000,000 greater than the cost in 1919, according to a report made by the Interstate Commerce Commission to the Senate in response to a resolution calling for detailed information as to railroad fuel costs in the two years. A considerable part of the increase was on account of the increased quantity used in handling the increased amount of traffic. The cost, delivered, of bituminous coal was \$641,224,469 for 155,343,635 net tons in 1920, as compared with \$390,036,556 for 123,907,508 net tons in 1919. The cost at the mine was \$531,854,888. The cost of anthracite delivered was \$24,268,764 for 5,779,819 net tons in 1920, as compared with \$16,661,149 for 4,796,353 net tons in 1919. In addition 55,590,783 barrels of fuel oil cost \$97,874,094, as against \$61,515,473 for 42,961,406 barrels in 1919. Coke cost \$1,027,336 for 91,642 tons in 1920 and \$1,476,000 was paid for wood and fuel.

The information called for by the resolution was obtained by a special sworn report. For all regions the average delivered cost of bituminous coal was \$3.15 per net ton in 1919 and \$4.13 in 1920, an increase of 98 cents a ton. At the mine, the increase in the cost per ton was 66 cents for contract coal and \$1.70 for spot coal. The increases shown for New England are much higher. The increase in the delivered cost for bituminous coal in the New England region was \$2.92 per net ton. The increase in the mine price of the bituminous coal purchased for this region was \$1.27 per net ton, contract, and \$3.79 spot. Anthracite coal delivered cost the railroads 73 cents a net ton more in 1920 than in 1919. The increase in the cost of fuel oil delivered was 33 cents a barrel.

The report includes the following table among others:

QUANTITY AND COST OF FUEL PURCHASED BY CLASS I STEAM RAILS IN THE CALENDAR YEARS 1920 AND 1919 BY TERRITORIAL REGIONS

Region and year	Bituminous Coal		Delivered	Average cost per net ton		
	Total cost at mine			At mine		
	Contract purchases	Spot purchases		Contract	Spot	
New England, 1920	\$15,115,872	\$20,307,472	\$35,423,344	\$8.09	\$3.79	\$6.25
1919	9,221,145	3,851,068	13,072,213	5.17	2.52	2.46
Great Lakes, 1920	63,107,462	20,422,979	83,530,441	4.34	3.24	4.01
1919	38,278,765	7,648,985	45,927,750	3.27	2.40	2.69
Ohio-Indiana, 1920	91,970,518	39,058,060	131,028,578	3.78	3.22	4.46
Allegheny . . . 1919	64,417,866	11,550,993	75,968,859	2.68	2.36	2.70
Pocahontas . . . 1920	12,752,480	13,408,755	26,161,235	3.99	3.35	4.53
1919	10,530,553	4,635,893	15,166,446	2.69	2.49	2.75
Southern . . . 1920	61,140,731	13,782,880	74,923,631	3.73	3.08	4.68
1919	40,440,790	4,395,892	44,836,682	2.88	2.48	2.87
Northwestern, 1920	58,624,374	10,946,830	69,571,204	4.26	3.13	4.92
1919	37,816,694	5,567,524	43,384,218	3.57	2.89	3.66
Central West'n, 1920	69,689,470	7,875,027	77,564,497	3.52	3.22	3.38
1919	46,906,140	4,129,259	51,035,399	3.04	2.68	2.78
Southwestern, 1920	25,888,762	7,799,199	33,687,961	4.07	3.50	4.02
1919	20,144,612	4,040,755	24,185,367	3.65	3.02	3.15
Total 1920	395,759,686	133,595,202	529,354,888	4.13	3.72	4.53
All regions, 1919	267,756,565	45,820,369	313,576,934	3.15	2.56	2.83

Note—In computing the average cost per net ton certain tonnage for which the cost was not available was excluded. These exclusions, except as specifically stated in the footnotes below, are practically negligible in their effect and hence are not stated in detail.

¹Arrived at by excluding 1,952,017 tons for which the price was not furnished.

²Arrived at by excluding 2,599,153 tons for which the price was not furnished.

³Arrived at by excluding 153,679 tons for which the price was not furnished.

⁴Arrived at by excluding 48,168 tons for which the price was not furnished.

⁵Arrived at by excluding 1,993,058 tons for which the price was not furnished.

⁶Arrived at by excluding 2,787,622 tons for which the price was not furnished.

⁷Arrived at by excluding 354,774 tons for which the price was not furnished.

⁸Arrived at by excluding 183,471 tons for which the price was not furnished.

The Earnings of Individual Passenger Trains

Describing Simple Method for Determining Whether Selected Trains Pay Out of Pocket or Other Costs

By T. W. Mathews

Assistant Treasurer, Seaboard Air Line, Portsmouth, Va.

THERE WAS AN AVERAGE of over forty vacant seats in all passenger coaches in all passenger trains in the United States in 1919. When we recall the crowded trains and the difficulty in getting accommodations in 1919, we question the accuracy of this statement. The average number of passengers per passenger car in 1919 was 13.5; other figures show that the average number of seats per car is at least sixty. For every crowded passenger car, therefore, with 40 passengers, there were four cars with seven passengers each, running on some branch line of small traffic.

Certainly this statement of facts is sufficient to show that railway managers need information as to the net earnings

passenger service, and the still further sub-division to individual passenger trains.

It is sufficient for practical purposes in setting a standard to consider only those expenses easily assignable to individual trains. Even so crude an allotment of expense to individual trains when compared with the earnings of such trains will "spot" the unprofitable runs.

Such standards can be used from month to month, and be rechecked from time to time as may seem necessary. The out-of-pocket costs include in a large degree fixed items of expense, such as crew and fuel. If desired the annual repair charge for passenger equipment and per locomotive for the

CASH FARES COLLECTED								
FROM	To	CASH FARE RECEIPT NUMBER	No. Cash Fares Collected	RATE	AMOUNT	IF EXCESS IS NOT COLLECTED GIVE REASON	WAR TAX	

TICKETS HONORED BUT NOT LIFTED						
HONORED ON THIS TRAIN		NUMBER PASSENGERS				REMARKS
FROM	TO	LOCAL	LOCAL MILEAGE EXCHANGE GLEBEY PARTY, ETC	HOME COUPONS	FOREIGN COUPONS	

Fig. 1.—Passenger Train Report

of individual passenger trains. Of course, many passenger trains will be continued, even at a loss. Regulating bodies, the necessities of the public, and other considerations will make the continued operation of a large number of non-paying passenger trains unavoidable. It would not seem that such reasons make it unnecessary for a careful study of individual passenger trains to be made. Certainly, if there are already more than enough trains between certain points any attempt to put on additional service should be resisted. If there is service at a loss, some effort should be made to reduce it. On branch lines it may be possible with profit to substitute self-propelled cars with a much smaller crew. In some cases Ford bodies have been mounted on trucks and have furnished, at greatly reduced expense, sufficient service on branch lines.

A comparative study from week to week, or month to month, of cash collections on individual trains may reflect discrepancies worthy of careful investigation.

Expenses of Individual Passenger Trains

A competent analyst of operating costs can in a few days set standards of out-of-pocket costs for all of the individual trains of a large system. A thorough and technical study of cost of passenger train operation would include an elaborate apportionment of all items of expense as between freight and

types used can be added. Further charges for maintenance of track and for interest may be added, but are more difficult to develop.

Earnings of Individual Passenger Trains

We now come to the task which looks on the surface as possible only at prohibitive cost—to price and tabulate for individual trains the millions of tickets collected yearly, even on the smaller of the large systems. Several roads have developed the plan described in this article, and have had it in successful operation for more than five years. On one road it requires one clerk at minimum pay of \$115 per month for each 750,000 passengers. This means probably \$5 to \$10 per month per train. This does not seem a heavy charge when the advantages of having the information are considered.

The plan is based on systematic and orderly arrangement, and the use of mechanical devices. A form of conductor's report must be used containing report of "cash fares collected" and "tickets honored but not lifted," as shown in Fig. 1.

Instructions to conductors should be as follows:

The cash fare report must be made out complete in every particular as provided.

The summary at the foot of the report should be filled

tickets honored but not lifted. The two left hand keys of the adding machine should be used for this purpose. Half tickets should be counted as full passengers. The tickets should next be priced from the local passenger fare chart, using the right hand keys of the adding machine. Local tickets honored but not lifted should be priced along with the local tickets sent in. Half tickets should, of course, be priced at one-half of the full fare. Entry can now be made from the machine to Fig. 3 under "Local," showing the number of passengers and the value of tickets. The operator may then clear the machine.

In the same manner Fig. 3, "Home Coupons" and "Foreign Coupons," should be filled out. Two extra columns are provided for clergy, party and other special tickets.

The local passenger fare chart should be used for all classes of tickets. At the bottom of Fig. 3 the word "Reduced" appears to the left. A careful study should be made of home coupons, foreign coupons, and other special rates to ascertain what percentage relation each class bears to local rates. Percentages thus ascertained should be used to "Reduce" all columns necessary. No reduction, of course, is necessary for "Mileage," "Cash Fares" and "Local."

Some roads use distance mileages on the chart, and thus work a figure of passengers one mile for each class of tickets. Of course, to the figure of passengers one mile thus obtained the average rate for each class of tickets are applied.

Aggregate passenger train earnings for a year figured out as described above, as compared with an actual passenger revenue of \$10,000,000 have shown a variation of less than 2 per cent. This has been true year after year. In making monthly comparisons, due consideration must be given to the fact that passenger train earnings include actual passengers handled. Passenger revenue includes the entire revenue from round trip tickets when sold, although the return portion may not be used until some weeks later.

A statement of individual passenger train earnings (Fig. 4) is compiled from Fig. 3 monthly, and placed in the hands of the management ten days after the close of each month.

As by-products of the method described, weekly estimated passenger revenue and earnings by states are being compiled with very little additional work by using Fig. 3 as a basis.

Rails Should Be Tested Head Down

By M. H. Wickhorst

Engineer of Tests, Rail Committee, American Railway Engineering Association

WHEN THE NECESSITY of testing rails first dawned upon the minds of railroad engineers, the method that naturally first suggested itself was to lay a piece of rail on two supports and drop a heavy weight upon it. Naturally also the rail was placed with its base upon the supports as it is in the track. Since that time, and particularly during the last ten years, our information has become much more extensive and precise concerning the physical and chemical properties of rails and concerning the manner of development of rail failures. In the last analysis, the drop test is a test of the tensile ductility of the part in tension, and as the performance of the rails as regards failures is determined mostly by the condition of the metal in the interior of the head, the tests of the rails should therefore be made with the head in tension, that is, with the head down.

In the early work of the rail committee of the American Railway Engineering Association, tests were made to compare the results of bending rail pieces with the head in tension with those with the base in tension. Tests were made both in the drop machine and by slow bending in the laboratory test machine. It soon developed that when the rail is tested

with the head in tension, the ductility results obtained correlate well with the condition of the metal in the interior of the section as shown by chemical analyses, tensile tests and etchings. That is to say, the chemical segregation which is determined by comparing analyses of samples from the interior and outer parts of the head of the rail, has its counterpart in a low ductility when the rail is bent with the head in tension. Thus used, the drop test answers the purposes of the chemical segregation test. With the base in tension, the correlation between the chemical and bending tests is of the same trend, but the influence of interior segregation is not as definitely shown in reducing the ductility, particularly with thin base rails.

The shattering which sometimes occurs in the interior of the rail head causes a complete lack of ductility when the rail is tested with the head in tension but has no effect on the ductility with the base in tension. The writer recalls an instance where a rail specimen was tested base-down in the hydraulic bender, bending with considerable deflection and display of good ductility, but the recoil resulted in the specimen breaking into four pieces and revealing the presence of fissures in the head.

The non-parallelism of the results in the drop test with the base in tension with the interior condition of the ingot was also seen in some interesting and valuable work by the Bureau of Standards in which Hadfield sink-head ingots were compared with ordinary ingots. The interior of ordinary ingots contained considerable segregation of carbon and phosphorus which in the Hadfield ingots was confined to the top. This condition was reflected in the rails when tested by chemical analysis, tensile test and etching, but not when tested by the drop test. The drop tests were made with the base in tension but if they had been made with the head in tension, the rail committee's work indicates that the drop test results would have paralleled the results of the other tests.

A few remarks may now be made concerning the drop test, considered as a "shock" test. It has usually been thought that the drop test gave a "shock" that does not occur in slow bending as in the laboratory test machine, and would therefore be a more severe test. In order to determine quantitatively the difference between the two methods of bending, tests were made of companion pieces from several complete rail bars, using the entire ingots. The pieces were tested alternately by drop bending and by slow bending in the test machine and the outcome was that the ductility was the same in the two methods of bending. In other words, the ductility is not a function of the rate of bending between the limits of about 36 ft. per second as in the drop test and about 0.2 inch per minute as in the test machine. This difference in speed is as 129,600 to 1. There is, however, an important point of difference between the drop test and slower bending, in that in the drop test a break frequently starts in a seam in the base, either where it rests upon a support in base-down tests or where struck by the tup in head-down tests, and in such cases the full ductility of the material is not developed.

As bearing further on the question of the effect of the rate of bending on the results of the test, mention should be made of the work of the Pennsylvania Railroad with the hydraulic method of bending the rail, more usually called the "quick bend test" (the expression "quick" referring to the speed of the whole operation of testing and not the speed of the actual bending itself). That work likewise showed that the results of bending in the drop machine were about the same as those of bending in the hydraulic bender. The hydraulic bender probably has, however, several points of advantage as follows: the breaks are always normal and due to the exhaustion of the ductility of the part in tension, a record can be kept on an indicator card and then also the work of testing can be carried on much faster.

The reports of the investigations and other work on which

the above statements are based, are contained mostly in the proceedings of the American Railway Engineering Association from 1910 to the present time, but for the benefit of those who may be interested in looking up the basic data, a few of the references are mentioned below.

References

Comparisons of the head tension and base tension results are given in a number of reports, but probably the most convenient exposition is given in a diagram submitted in a report on the influence of size of ingots. (Proc. Am. Ry. Engrg. Assn. for 1912, Vol. 13, p. 702, fig. 18.)

The work of the Bureau of Standards mentioned above was described in Technologic Paper of the Bureau, No. 178, Steel Rails from Sink-Head and Ordinary Ingots, by George K. Burgess, December 15, 1920, p. 48. The paper was abstracted in the *Railway Age* for Feb. 4, 1921, and an abstract of the remarks concerning the drop test results appear on p. 334.

Several comparisons were made of the results of bending rails in the drop machine and by slower bending, the principal one being contained in a report on the influence of silicon. (Proc. Am. Ry. Engrg. Assn. for 1913, Vol. 14, p. 542.)

The hydraulic bend or "quick bend" method of the Pennsylvania Railroad was described and results of tests were given in the publications of the American Railway Engineering Association. (Proceedings 1917, Vol. 18, p. 1095, and 1919, Vol. 20, p. 591.)

Repairs in Outside Shops Defended

HEARINGS ON THE ALLEGED high prices paid by the Pennsylvania for repair work done in outside shops which were held by the Interstate Commerce Commission at Philadelphia the early part of the week have been adjourned until May 7. The hearings will be resumed at Washington. The hearings at Philadelphia were devoted principally to investigating the costs of repairs to 200 locomotives which were repaired under contract by the Baldwin Locomotive Company.

The position of the railroad in contracting for repairs by outside companies was defended by Samuel Rea, president of the Pennsylvania, in a statement authorized on April 17. Mr. Rea said that the "direct labor cost of doing this work in outside shops was much less than in railroad shops." He further called attention to the fact that at the time the contracts were entered into all the railroad shops were working to capacity and that "traffic demands upon the railroad necessitated getting outside assistance." His statement follows in part:

From March 1, 1920, when the Pennsylvania Railroad resumed the management of its property, to December 31, 1920, locomotive and freight car repair work done outside the railroad's own shops has amounted to about six per cent of the total cost of this work. Locomotive and car repairs, from March 1 to December 31, 1920, cost the railroad approximately \$140,400,000, of which \$8,200,000 was for repairs in outside shops. In other words, out of every dollar spent for repairing Pennsylvania Railroad cars and locomotives, about 6.2 cents was spent for outside work.

In newspaper articles published a few days ago, Mr. William H. Johnston, International President of the machinists' union, is reported to have said:

Only recently the Pennsylvania Railroad, in having 200 locomotives repaired in the Baldwin shops, spent \$3,500,000 in excess of the cost if the road had done the work itself. Between \$20,000 and \$25,000 were spent in rebuilding obsolete locomotives that originally cost \$9,000 thirty-three years ago.

The total number of Pennsylvania locomotives repaired under contract was 200. On the other hand, 5,160 locomotives were given classified repairs in the railroad's own shops in addition to a very much greater number of locomotives that were given

lighter repairs requiring more than twenty-four hours work each. All the locomotive repair work on the Pennsylvania Railroad during this period cost \$79,112,800, out of which approximately \$4,500,000 was for outside contract work.

The lowest bill for any single locomotive repaired in outside shops was \$12,661.13 and the highest \$29,836.10. The oldest locomotive repaired was thirteen years old, and the newest one year old, instead of being thirty-three years old and obsolete. The smallest locomotive repaired weighed 235,000 pounds, and the largest 435,000 pounds. The original cost of the cheapest was \$19,813; and the most expensive \$83,560 instead of \$9,000, as quoted above.

The number of freight cars repaired outside was approximately 3,600 as compared with a total of 1,415,435 freight cars repaired in the Pennsylvania's own shops. The cars repaired at outside plants were all heavy repairs, whereas the above figure for cars repaired at the shops of the railroad includes heavy and light repairs. All the repair work to Pennsylvania Railroad freight cars during this period cost \$61,300,000, of which approximately \$3,700,000 was for work performed under contract in outside shops.

The fact is that the direct labor cost of doing this work in outside shops was much less than in railroad shops. For instance: direct labor required to repair 3,066 of these cars in outside shops cost \$608,494. The same work in railroad shops would have cost the Pennsylvania Railroad \$1,000,360. The labor cost outside was 40 per cent less. Outside concerns paid their men on a piece work basis. Under the so-called "National Agreement," the Pennsylvania Railroad had to pay its men by the day.

This Company accepted such contracts as the United States Railroad Administration had made and which were not yet completed and let contracts of its own on which 826 cars were repaired at prices relatively the same as the costs on the United States Railroad Administration contracts.

Outside shop assistance was essential but it was kept down to a minimum. The 200 locomotives repaired under contract by the Baldwin Locomotive Works required the heaviest repairs and sending them outside, therefore, afforded the railroad shops greater capacity to handle more locomotives and return them to service more quickly.

To summarize: the situation confronting the Pennsylvania Railroad, as well as practically every other railroad on March 1, was one of abnormal business demands upon its transportation facilities and an abnormal percentage of bad order equipment on its lines. Secondly, the business of the country demanded that the work be done at the earliest possible moment and the Pennsylvania obtained the best terms possible on work it had to have done outside. Finally, aside from the facts of the case itself, the records of performance of the railroad in meeting this situation fully warrant and justify the steps taken to meet it.

Among the witnesses who appeared at the hearing, besides Mr. Rea, who testified on April 19, were J. T. Wallis, general superintendent of motive power of the Pennsylvania; P. G. Blecke, an examiner of accounts for the Interstate Commerce Commission, and H. Boltwood, a mechanical engineer for the Railroad Administration. F. P. Walsh, attorney for the Railway Employees' Department of the American Federation of Labor, cross examined the witnesses in his capacity as counsel for the employees' organizations which instigated the investigation.

Mr. Wallis in his testimony contended that the Pennsylvania was justified in contracting with the Baldwin Locomotive Company for repairs to locomotives in view of the inability of the railroad shops to put them in shape in time to help relieve the congestion in traffic which existed at the time.

THE FOLLOWING ESTIMATE of the national census of Brazil taken on September 1, 1920, was published in a Brazilian newspaper on December 6, 1920, and forwarded by Consul General Haerberle: State of Alagoas, 990,278; Amazonas, 435,448; Bahia, 3,372,901; Ceara, 1,436,309; Federal District, 1,130,080; Espirito Santo, 479,188; Goyaz, 528,879; Maranhao, 853,050; Matto Grosso, 274,138; Minas Geraes, 5,788,837; Para, 992,290; Parahyba, 785,344; Parana, 674,113; Pernambuco, 1,975,441; Piahy, 548,250; Rio de Janeiro, 1,501,969; Rio Grande do Norte, 552,071; Rio Grande do Sul, 2,138,831; Santa Catharina, 633,462; Sao Paulo, 4,823,100; Sergipe, 335,094; Acre Territory, 104,436. The total population was estimated at 30,553,509.—*Commerce Reports.*

Inefficiency Marks Government Operation Abroad

David Van Alstyne and F. H. Shepard Tell New York Railroad Club of Conditions on Foreign Roads

IN A PAPER read before the New York Railroad Club on April 15, David Van Alstyne of the American Locomotive Company, who has recently returned from a 17 months' journey around the world, discussed briefly some of the outstanding features of the many railroads with which he came in contact. The itinerary of this trip included South Africa, Portuguese East Africa, India, the Federated Malay States, Java, Australia, the Philippines, China and Japan. To Mr. Van Alstyne the most striking characteristic of a majority of the roads was that they were government lines and were, in his opinion, operated under conditions which were not at all conducive to efficiency, enterprise and loyalty to the service.

Evils of Government Operation

Of his impressions of government operation as he saw it abroad Mr. Van Alstyne said in part;

"With few exceptions, the railways traveled over were government owned and operated, the exceptions being some of those in India, which are government owned and privately operated. Many times I wished that the advocates of government operation, or the Plumb plan, might make the journey which I was making and hear what the railway officials had to say on the subject. The trend of their remarks to me was that there is interference from politicians, that it is difficult to maintain discipline, that there is a tendency to create useless positions and that in general there is a lack of enterprise, enthusiasm and loyalty to the service. For many reasons, chief of which is that in all countries where I traveled, with the exception of Australia, the railways employ mainly inefficient natives, it is impossible to make comparisons of statistics which would be fair to the government ownership side of the case, but the impression is that there are many more employees required on a government than on a privately operated road for a given volume of work.

"I cannot let this opportunity escape for observing that my travels have fully convinced me that government operation in this country would be a calamity from the standpoint of the public in general, of the railroad management and the supply and equipment people in particular, and especially of labor not in the service of the railways. If government operation of railways is as defective as it has seemed to me to be in countries where railways are small, what might we expect in this country where the mileage is greater than in all the rest of the world put together?

"However important the arguments of the shipping and employing classes against it may be, it seems to me that the laboring class not in the employ of the railways has even more to fear from it. From the very nature of the railway business, its organized employees are able to more nearly exact their demands than employees in other industries.

"To the extent that railroad labor increases unreasonably the cost of transportation other labor must bear the burden, either in the form of higher passenger and freight rates or higher taxes to pay for railroad deficits. This is what is now going on in most countries, including the United States, as a result of government control. I cannot see government ownership and operation, therefore, other than as rank discrimination between railroad and other classes of labor. Organized labor insists on uniform wages for everybody doing the same kind of work. It would seem that it has better arguments in favor of government control of everything or nothing."

A considerable portion of Mr. Van Alstyne's paper was de-

voted to a discussion of some of the peculiarities of construction, equipment and operation of the various roads which came under his observation. His impressions in this regard were published in the *Railway Age* of February 11.

Labor Conditions

From Mr. Van Alstyne's remarks it would seem that unionism has flourished everywhere; even the unskilled native workers have in many countries been organized. At Bulawayo, South Africa, he witnessed a conference between a general manager and 300 striking laborers of the semi-savage Matabele tribe. Regarding this conference he said: "A young Englishman translated for me as the conference progressed and explained that the general manager was trying to persuade the strikers to go back to work and send their committee to confer with him. The Matabele orators were willing to accede to the general manager's request but were trying to impress upon him that if the committee failed to get what they were sent for, they would probably be killed."

Of India, Mr. Van Alstyne said in part:

"The railway officials hold military rank and are subject to call for military service. All the mechanics, all the firemen and about half of the enginemen are natives. Skilled mechanics earn from 1 rupee 8 annas to 2 rupees a day (60 to 80 cents). One white mechanic is said to be worth about three natives except on duplicate work. Most Englishmen seem to think that traveling in India is the height of luxury. With the exception of one or two trains I was impressed quite differently."

Speaking of Australia he said:

"It is a white man's country with a labor government, minimum wage, arbitration, etc. Numerous strikes are going on continuously and the openly professed policy of labor is to limit output. The ratio of employees for the same output in railway and locomotive builders' shops was about three to one as compared with this country, as nearly as I could judge."

"The best judgment I could form for all countries, including Australia, where practically all labor is white," he said in conclusion, "is that in the shops and engine sheds they have about three times as many men for the same work as we do, but this, of course, would not mean that the cost is always higher because nowhere are wages anywhere nearly as high as ours."

Electric Traction in Foreign Countries

Railroad conditions in European countries as seen by an electric traction expert were outlined by F. H. Shepard, director of heavy traction, Westinghouse Electric & Manufacturing Company. Mr. Shepard has just returned from an eleven-weeks' trip through the more important European countries and he outlined his impressions as follows:

The high rate of exchange makes railroad development a difficult problem in almost all foreign countries. Efficiency of labor has fallen off and government operation has caused many undesirable conditions to arise. In addition a jealousy between some of the new countries has complicated the situation.

Traffic in England has fallen off to almost the same extent as it has in the United States. The equipment is in fair condition. In Sweden it was learned that a trip into Russia was a possibility but was extremely dangerous. Russia is in dire circumstances because of lack of transportation. The

absence of paint and lack of finish is particularly noticeable in Germany. Many employees are required for a comparatively small amount of work and some women are still employed in train service. Traffic movement is probably not more than 50 per cent of normal. The various electric plants are, however, in better general condition than the railroads and throughout most of the country there is evidence of a serious intent to get production started. Switzerland has suffered from the general depression, but is well off insofar as equipment is concerned. The depression has also had its effect in Italy and the situation has been complicated by strikes caused by Bolshevist propaganda. In France the railroads in the devastated regions have been fairly well restored. Business is slow in Belgium, but there are indications that there will soon be a resumption. Railroad equipment is in very fair condition. Holland has been doing a large amount of business.

The high cost of fuel and the difficulty of obtaining it have affected the railroads of most European countries and have made electric operation particularly desirable. Furthermore, each country is now more than ever desirous of being self-contained insofar as industry and transportations are concerned. The result of these conditions is an electrification program which is outlined roughly in this table:

	RAILROAD ELECTRIFICATIONS (ROUTE MILES)			Proposed
	In operation	Under construction		
Sweden	300	125	1,000	
Norway	60	50	500	
Germany	400	100	1,500	
Austria	200	...	1,000	
Switzerland	250	275	1,000	
Italy	600	...	3,000	
France	50	...	5,000	
England	300	...	1,000	
Holland	50	...	600	
Belgium .....	...	...	500	

New Members of Labor Board

PRESIDENT HARDING on April 16 sent to the Senate his nominations for three appointments to membership on the Railroad Labor Board, to succeed the three members whose terms expired on April 15. The new appointees are Ben W. Hooper, former governor of Tennessee, as a member of the public group, succeeding Henry T. Hunt; Samuel

in 1894, and practiced at Newport. He was a member of the Tennessee House of Representatives in 1893 and 1895, was assistant United States attorney for the eastern district of Tennessee from 1906 to 1910 and was governor of Tennessee for two terms, 1911-1913 and 1913-1915. He is a Republican.

Mr. Higgins was born February 19, 1860, at San Francisco. He graduated from Sheffield Scientific School, Yale University, in 1881, in which year he entered the service of the Erie at Susquehanna, Pa., as a special apprentice. He served in various positions in the mechanical department until April 1, 1892, when he was appointed assistant superintendent of motive power. In 1894 he became superintendent of motive power of the Lehigh Valley and on April 1, 1901, he was appointed superintendent of motive power of the Union Pacific. On July 1 of the following year he went to the Southern as mechanical superintendent and remained in that position until April 1, 1904, when he became general manager of the New York, New Haven & Hartford. On January 1, 1912, he left the New Haven and spent the following three years as a technical expert for various railroads in this country and in Europe. From February 25, 1915, until April 1, 1917, he was president of the Standard Heat & Ventilation Company and since the latter date he has been vice-president of the Vapor Car Heating Company, with headquarters at New York.

Mr. McMenimen was born at Cambridge, Mass., and is about 40 years of age. He was employed for several years as a trainman on the Boston & Maine and became state legislative representative of the Brotherhood of Railroad Trainmen in Massachusetts. For several years he has been in Washington as assistant national legislative representative of the Brotherhood and he was recently appointed deputy president.

The Senate committee on interstate commerce held a meeting on April 18 to consider a report to the Senate on the confirmation of the new members of the Railroad Labor Board but decided to withhold action temporarily because members wanted time to obtain additional information regarding the men. Senator Cummins said the committee would consider the matter again before Thursday. A protest against the confirmation of Mr. McMenimen's appointment by the



S. Higgins



W. L. McMenimen



B. W. Hooper

Higgins, former general manager of the New York, New Haven & Hartford, to succeed W. L. Park of the railroad group, and W. L. McMenimen, deputy president of the Brotherhood of Railroad Trainmen, to succeed J. J. Forrester of the labor group.

Mr. Hooper was born at Newport, Tenn., on October 13, 1870, and was graduated from Carson and Newman College, Jefferson City, Tenn., in 1890. He was admitted to the bar

Senate will be made by the United Brotherhood of Maintenance of Way Employees, according to J. B. Malloy, vice-president of that organization, who objected to Mr. McMenimen's appointment both because he makes the second representative of the train service brotherhoods on the board and on the ground that he was nominated by the Order of Railroad Station Agents, which includes some of the so-called "subordinate officers."

Labor Board Rules National Agreements End July 1

Hearings on Revision of Present Wage Scales Begun. —Carriers File Voluminous Data

THE LONG controversy over the railway employees' demand for the perpetuation of their national agreements was ended on April 14 by a decision handed down by the Railroad Labor Board which sustained some contentions of both the carriers and employees. The award abrogated national agreements, remanded the negotiation of new agreements to the individual carriers and their own employees, and upheld the railroads' interpretation of the principle of collective bargaining and their contention that varying local conditions should govern in fixing rules and working conditions. In these respects the decision was favorable to the railroads. The award also outlined 16 principles with which the new agreements should be consistent. This constitutes one of the chief points for which the employees' representatives have been fighting. And accordingly, both sides have expressed satisfaction with the terms of the decision.

Text of the Board's Decision on National Agreements

After outlining the history of the controversy the decision said in part:

The evidence and arguments submitted in this case support the following conclusions:

The duty imposed by Section 301 on all carriers and their officers, employees and agents to consider and if possible to decide in conference all disputes between carriers and their employees has not been performed by the parties hereto either with regard to the wage or the working conditions portion of this dispute. The record shows that the representatives of the carriers were unwilling to assume the responsibility of agreeing to substantial wage increases. Hence, the conference of March 10 to April 1 on the side of the carriers was merely a perfunctory performance of the statute. Nor was the action of the organizations with regard to the individual carriers more than perfunctory. Naked presentation as irreducible demands of elaborate wage scales carrying substantial increases, or of voluminous forms of contract regulating working conditions, with instructions to sign on the dotted line, is not a performance of the obligation to decide disputes in conference if possible. The statute requires an honest effort by the parties to decide in conference. If they cannot decide all matters in dispute in conference, it is their duty to there decide all that is possible and refer only the portion impossible of decision to this Board.

Although Section 301 has not been complied with by the parties, the Board has jurisdiction of this dispute as it is and has been one likely substantially to interrupt commerce.

The carriers parties hereto maintain that the direction of this Board in Decision No. 2, extending the national agreements, orders, etc., of the Railroad Administration as a *modus vivendi* should be terminated at once; and that the matter should be remanded to the individual carriers and their employees for negotiation and individual agreement.

The organizations maintain that the national agreements, orders, etc., with certain modifications desired by the employees should be held by this Board to constitute just and reasonable rules; and should be applied to all carriers parties to the dispute, except to the extent that any carrier may have entered into other agreements with its employees. They maintain that local conferences requiring necessarily the participation of thousands of railroad employees for several weeks would constitute an economic waste and would produce a multiplicity of controversies as well as irritation and disturbance. They also urge that to require local conferences would be to expose the local organizations on the several carriers to the entire power and weight of all the carriers acting through the Association of Railway Executives on the conferring carrier, that such a disparity of force would produce an inequitable result highly provocative of discontent and likely to result in traffic interruptions. They, accordingly, insist that the conference should be national.

The carriers maintain that rules negotiated by the employees and officers who must live under them are most satisfactory, that the participants in such negotiations know the intent of the rules agreed to and advise their fellow workmen and officers accordingly thereby avoiding a litigious attitude on both sides,

that substantial differences exist as between the several carriers with relation to the demands of the service, necessary division of labor and other factors which differences should be reflected in the rules, that these local differences can be given proper consideration only by local conferences. The carriers refuse to confer nationally.

The Labor Board is of the opinion that there is merit in the contentions of each party and has endeavored to take action which will secure some of the advantages of both courses.

This Board is unable to find that all rules embodied in the national agreements, orders, etc., of the Railroad Administration constitute just and reasonable rules for all carriers parties to the dispute. It must, therefore, refuse the indefinite extension of the national agreements, orders, etc., on all such carriers as urged by the employees.

This Board also deems it inadvisable to terminate at once its direction of Decision No. 2 and to remand the dispute to the individual carriers and their employees. Such a course would leave many carriers and their employees without any rules regulating working conditions.

If the Labor Board should remand the dispute to the individual carriers and their employees and should keep the direction of Decision No. 2 in effect until agreements should be arrived at, it is possible that agreements might not be arrived at.

The Labor Board believes, nevertheless that certain subject matters now regulated by rules of the national agreements, orders, etc., are local in nature and require consideration of local conditions. It also believes that other subject matters now so regulated are general in character and that substantial uniformity in rules regulating such subject matters is desirable.

The Board also believes that certain rules are unduly burdensome to the carriers and should in justice be modified. It may well be that other rules should be modified in the interest of employees.

To secure the performance of the obligation to confer on this dispute, imposed by law on officers and employees of carriers, to bring about the recognition in rules of difference between carriers where substantial, to preserve a degree of uniformity in rules regulating subject matters of a general nature, to prevent to some extent the operation in negotiations of a possible disparity of power as between the carriers and their employees, and to enable the representatives of employees of each carrier and the officers of that carrier to participate in the formulation of rules under which they must live, the Labor Board has determined upon the following action.

Decision

1. The direction of the Labor Board in Decision No. 2, extending the rules, working conditions and agreements in force under the authority of the United States Railroad Administration, will cease and terminate July 1, 1921.

2. The Labor Board calls upon the officers and system organizations of employees of each carrier parties hereto to designate and authorize representatives to confer and to decide so much of this dispute relating to rules and working conditions as it may be possible for them to decide. Such conferences shall begin at the earliest possible date. Such conferences will keep the Labor Board informed of final agreements and disagreements to the end that this Board may know prior to July 1, 1921, what portion of the dispute has been decided. The Labor Board reserves the right to terminate its direction of Decision No. 2 at an earlier date than July 1st with regard to any class of employees of any carrier if it shall have reason to believe that such class of employees is unduly delaying the progress of the negotiations. The Board also reserves the right to stay the termination of the said direction to a date beyond July 1, 1921, if it shall have reason to believe that any carrier is unduly delaying the progress of the negotiations. Rules agreed to by such conferences should be consistent with the principles set forth in Exhibit "B," hereto attached.

3. The Labor Board will promulgate such rules as it determines just and reasonable as soon after July 1, 1921, as is reasonably possible and will make them effective as of July 1, 1921, and applicable to those classes of employees of carriers parties hereto for whom rules have not been arrived at by agreement.

4. The hearings in this dispute will necessarily proceed in order that the Labor Board may be in position to decide with

reasonable promptness rules which it may be necessary to promulgate under Section 3 above.

5. Agreements entered into since March 1, 1920, by any carrier and representatives of its employees shall not be affected by this decision.

Sixteen Principles to Govern in New Agreement

Exhibit "B," mentioned above, sets forth the principles believed by the Board to be just and reasonable in governing working conditions as follows:

1. An obligation rests upon management, upon each organization of employees and upon each employee to render honest, efficient and economical service to the carrier serving the public.

2. The spirit of co-operation between management and employees being essential to efficient operation, both parties will so conduct themselves as to promote this spirit.

3. Management having the responsibility for safe, efficient and economical operation, the rules will not be subversive of necessary discipline.

4. The right of railway employees to organize for lawful objects shall not be denied, interfered with or obstructed.

5. The right of such lawful organization to act toward lawful objects through representatives of its own choice, whether employees of a particular carrier or otherwise, shall be agreed to by management.

6. No discrimination shall be practiced by management as between members and non-members of organizations or as between members of different organizations, nor shall members of organizations discriminate against non-members or use other methods than lawful persuasion to secure their membership. Espionage by carriers on the legitimate activities of labor organizations or by labor organizations on the legitimate activities of carriers should not be practiced.

7. The right of employees to be consulted prior to a decision of management adversely affecting their wages or working conditions shall be agreed to by management. This right of participation shall be deemed adequately complied with, if and when, the representatives of a majority of the employees of each of the several classes directly affected shall have conferred with the management.

8. No employee should be disciplined without a fair hearing by a designated officer of the carrier. Suspension in proper cases pending a hearing, which shall be prompt, shall not be deemed a violation of this principle. At a reasonable time prior to the hearing he is entitled to be apprised of the precise charge against him. He shall have reasonable opportunity to secure the presence of necessary witnesses and shall have the right to be there represented by a counsel of his choosing. If the judgment shall be in his favor, he shall be compensated for the wage loss, if any, suffered by him.

9. Proper classification of employees and a reasonable definition of the work to be done by each class for which just and reasonable wages are to be paid is necessary, but shall not unduly impose uneconomical conditions upon the carriers.

10. Regularity of hours or days during which the employee is to serve or hold himself in readiness to serve is desirable.

11. The principle of seniority long applied to the railroad service is sound and should be adhered to. It should be so applied as not to cause undue impairment of the service.

12. The Board approves the principle of the eight hour day, but believes it should be limited to work requiring practically continuous application during eight hours. For eight hours' pay eight hours' work should be performed by all railroad employees except engine and train service employees, regulated by the Adamson Act who are paid generally on a mileage basis as well as on an hourly basis.

13. The health and safety of employees should be reasonably protected.

14. The carriers and the several crafts and classes of railroad employees have a substantial interest in the competency of apprentices or persons under training. Opportunity to learn any craft or occupation shall not be unduly restricted.

15. The majority of any craft or class of employees shall have the right to determine what organization shall represent members of such craft or class. Such organization shall have the right to make an agreement which shall apply to all employees in such craft or class. No such agreement shall infringe, however, upon the right of employees not members of the organization representing the majority to present grievances either in person or by representatives of their own choice.

16. Employees called or required to report for work, and reporting but not used should be paid reasonable compensation therefor.

Following the announcement of the award, spokesmen for

the labor organizations hailed it as a complete victory, one vindicating their position before the Board. At the same time E. T. Whiter, chairman of the committee representing the railroads before the Board, said in commenting on the decision:

The Board has laid down certain principles which must be recognized, and subject to these principles, has abrogated the national agreements and remanded the negotiation of rules and working conditions to conferences between the individual railroads and representatives of their own employees. While the representatives of the railroads would have preferred that all the questions involved should be referred to conferences between the individual railroads and their own employees, the decision reached has given opportunity for arrangements between individual railroads and their employees which can be made much more reasonable than the rules and working conditions established by the national agreements, and which in a large measure can be adapted to the local conditions of each carrier.

The extent to which it will be practicable, under the principles laid down by the Board, to increase the efficiency and economy of railway operation is problematical. The decision will not permit the restoration of the rules and working conditions in effect on December 31, 1917, and to the extent that it prevents this it will prevent restoration of the efficiency and economy which formerly prevailed under private operation.

The Board approves the principle of the eight-hour day, but states that "it should be limited to work requiring practically continuous application during eight hours." This plainly indicates that the principle need not be applied to work that does not require such continuous application. The Board also says that "for eight hours' pay eight hours' work should be performed by all railroad employees" except those in train service, who are paid on a mileage as well as on an hourly basis.

These and other statements in the principles laid down by the Board clearly indicate its disapproval of rules which representatives of the railroads have shown result in employees being paid for time greatly in excess of that actually worked. The entire tenor of the Board's decision is that the railroads should be economically operated, that employees should render efficient labor for all the time for which they are paid, and that the artificial "pyramiding" of wages, which under the present rules has resulted in large waste, shall cease.

The Board has recognized the principle of collective bargaining but it does not recognize the interpretation placed upon it by the spokesmen of the labor unions. The spokesmen of the labor unions have taken the position that collective bargaining meant national bargaining between all the railroads and the national labor unions. The Board, by remanding the determination of rules and working conditions to conferences between the individual railroads and representatives of the majority of its own employees of each craft, has recognized the fact that true collective bargaining consists of negotiations between each railroad and its own employees.

If both the carriers and the employees act in good faith in accordance with the spirit of the Board's decision, rules and working conditions will be established which will be more reasonable than those now in effect, and which to a large extent will have the merit of meeting the local conditions which vary widely throughout the country.

Wage Hearings Begin

In accordance with an order of the Board, announced in the *Railway Age* of April 15, (page 938), the wage question was reopened on April 18 when hearings were started to determine what constitutes a just and reasonable wage under present conditions for various classes of employees. At the time the Board's announcement was made, disputes between 26 railroads and their employees had been certified. When the hearings began the Board had docketed 92 disputes. These were consolidated into one case although each carrier was granted the right to make a separate presentation.

The fact that the three new members of the Board were not present at the beginning of these hearings led to vigorous protests against the opening of the case on the part of representatives of the employees. Only five members of the Board, including but one representative of the employees, were present. W. S. Carter, L. E. Sheppard, W. S. Stone and W. G. Lee, of the train service organization, speaking for the sixteen railway organizations, objected strenuously to hearings before the three new appointees had taken their seats.

They asked, in addition, for more time to prepare and present their cases and a separate hearing for the train service employees on the grounds that their pay and relationship to the transportation industry are entirely different from those of the shop crafts and other organizations and because there is no work in other industries comparable with the work of the train service employee. After a short recess the Board refused to yield its authority to hear the case immediately. It did, however, grant a time concession in allowing the carriers and unions, instead of one day each for the presentation of their cases, as it had announced, five days each for this purpose. The Board also ruled that there would be a week's intermission between the carrier's presentation and that of the unions and that an additional week would be allowed for rebuttal.

The railroad's arguments for wage reductions were opened by J. G. Walber, speaking on behalf of the eastern carriers and taking up those arguments which are common to all of the roads in that territory.

He presented a memorandum and statistical exhibits showing the reductions in wages in other industries and in the cost of living which have occurred since the present railway wage scales were fixed by the Board in July, 1920.

Mr. Walber showed by bulletins issued by the Bureau of Labor Statistics of the United States Department of Labor dealing with wage rates in a dozen important branches of industry, that very substantial reductions of pay were made in these industries in the period from January to March, 1921. The statistics cited, Mr. Walber pointed out, "indicate a general and widespread reduction in wages from 10 to 30 per cent—the majority of reductions are 15 per cent or over."

With reference to the cost of living, Mr. Walber said:

"It is common knowledge that about July 1, 1920, prices of commodities entering into the cost of living began to recede; also that the falling off in the demand for commodities generally began to be reflected in curtailment of the forces and reductions in wages paid in other industries. This situation became more and more pronounced toward the end of the year, and has been continuing steadily up to the present time. These conditions contributed to adjustment in the scales in other industries."

Mr. Walber also submitted statistics regarding the reductions in the cost of living, based upon compilations made by various commercial agencies and also by the Bureau of Labor Statistics and the National Industrial Conference Board.

"The latest figures available from the Department of Labor," he said, "are for the period ending December, 1920, while the National Industrial Conference Board has compiled its figures to March, 1921. By reference to the declines from the peak (July, 1920, when the present wages were fixed) to December, 1920, as shown by these tables, it will be observed that the Department of Labor Statistics indicate a decline in the cost of living of 7.4 per cent, and the figures of the National Industrial Conference Board a decline of 7.1 per cent. The decline to March, 1921, according to figures of the National Industrial Conference Board, is 17 per cent, and if the Department of Labor figures for March, 1921, were available it is reasonable to assume that the similarity in the results obtained by both organizations would have continued."

In substance, the exhibits filed by Mr. Walber showed that when the present railway wages were fixed in July, 1920, the cost of living was 104.50 per cent more than it was in 1914, while in March, 1921, it was only about 67 per cent more than in 1914, and is still declining. These exhibits also indicated that the average railway wage per annum is now about 133 per cent more than it was in 1914.

Following Mr. Walber's general presentation on behalf of the eastern lines, a statement was made on behalf of the railways in New England by C. L. Bardo, general manager

of the New York, New Haven & Hartford. In this statement the changes which have occurred in the cost of living in New England, as disclosed by the report of the Special Commission on the Necessaries of Life in Massachusetts, were particularly dealt with. This showed that in July, 1920, when the present wages were fixed, the cost of living in Massachusetts was 102.6 per cent more than in 1913, while in March, 1921, it was only 66.4 per cent more than in 1913. The reduction shown in the cost of living since the present wages were fixed was 35.3 per cent. The statement on behalf of the New England lines says in part:

"From the evidence as to the reduction in the cost of living and rates of pay for positions of like service and responsibility in outside industries, which will be fully covered in the briefs submitted by individual roads, the New England roads believe that your Board is fully justified in fixing as maximum and reasonable wages the rates requested by the several lines. Your petitioners believe that the financial condition of the employers is worthy of some consideration. The regular reports of results of operation of the New England lines, which are matters of public record, show that even with the recent increase in rates your petitioners are failing by a substantial sum to meet costs of operation, to say nothing of fixed charges. This situation exists notwithstanding the most drastic economies which can be exercised, having due regard for the safety of operation."

It was shown that on the New England lines the hourly wages of track and work train laborers have increased since 1914 from 15 cents to 48½ cents, that the rates of shop and enginehouse laborers have increased from 16 cents and 17 cents to 48½ cents and 53 cents, and the rates of freight house laborers from 15 cents to 54 and 55 cents. The standard hours of work per week in 1914 were 60 hours, while since September, 1918, they have been 48 hours.

"The attention of the Board is invited to the fact that the increase in the basic hourly rates and weekly compensation vary between 140 and 240 per cent, whereas the increase in the cost of living at its peak was 102.6 per cent over 1913-1914 and at the present time is 66 per cent higher than in 1914."

Individual Carriers Present Their Cases

Following the presentation of these two general statements, the individual carriers began the submission of volumes of statistical analysis, charts and data relating largely to decreases in the cost of living and the wages being paid by outside industries for both skilled and unskilled labor at various points and comparisons between this data and respectively the increases which have taken place in the wages of railway employees and the present scale of railroad wages. The enormous amount of evidence presented to the Board during the past week makes its analysis at this time impossible. However, the character of the testimony being given by the carriers in support of their pleas for lower wage scales can be seen in the following brief abstracts of two of the presentations which have already been made.

One of the first large roads to present its case was the Pennsylvania whose statement and brief to the Board said in part:

In arriving at the amount of reductions we requested the employees to accept, exhaustive studies were made of the cost of living and the rates paid in outside industries located along the Pennsylvania. In connection with the reductions we desire to make in the cases of maintenance of way and structures and unskilled forces, shop employees and freight handlers, we direct the Board's attention to the fact that we have recommended that rates of pay proposed be varied territorially, according to the rates paid generally in the territories in question. In the case of certain signal department employees and shop employees, we also propose certain spreads of rates for the various crafts varying with the skill required for the particular operation performed.

We further call the attention of the Board to the fact that

prior to 1918, the spread of rates on the railroads for shop employees was very much greater than it is at present and attach an exhibit which shows the spread of rates on the Pennsylvania prior to 1918 as compared with now. It is the desire of the management eventually to expand the differentials recommended and adjust all of their rates in accordance with the skill required and with respect to conditions in the territories where these rates are applied.

We desire to call particular attention to the studies made of wages paid in outside industries marked Exhibit No. 8 which is the result of a study of 1235 plants and covers over 155,000 employees, or approximately three times as many employees as in these trades on the Pennsylvania. This exhibit clearly shows that the prepondering rates paid in outside industries are generally below those proposed in the carrier's submission and in addition, it is shown that there have been further reductions since the information was first obtained.

The exhibit referred to in the preceding paragraph shows that in comparison with the prevailing rate of 85 cents an hour now being paid by the Pennsylvania to shop employees and 62 cents an hour to helpers, the weighted average rates of pay in 1235 outside industries for similar work are as follows:

Number of men	Occupation	Weighted average rate per hour
51,586	Machinists	64.7 cents
4,536	Blacksmiths	66.1 cents
10,271	Boilermakers	64.3 cents
7,364	Sheet metal workers	65.8 cents
6,296	Electrical workers No. 1	60.9 cents
3,247	Electrical workers No. 2	61.9 cents
23,198	Carmen	60.9 cents
10,870	Moulders	70.0 cents
38,138	Helpers	49.4 cents

The total study summarized above takes in the entire territory from New York to Washington, Philadelphia, Pa., to Chicago and St. Louis, Mo., and northward to the Great Lakes.

The statement added:

We also submit in Exhibit No. 9, the trend of the cost of living in certain cities along the lines of the Pennsylvania, showing conclusively that the trend of the cost of living along the Pennsylvania follows generally the line established by the Bureau of Labor Statistics for the United States.

Concluding the Pennsylvania statement said:

The information presented is the most recent we have been able to obtain and if taken at a later date would unquestionably show a greater reduction in the cost of living and further reductions in rates of pay in outside industries. The information considered from all angles proves conclusively to our mind that the rates of pay now in effect are not just and reasonable and that we would have been justified in asking for lower rates than those presented to our employees.

Western roads began the presentation of their cases on the second day of the hearings and among the first of these was the Chicago & North Western whose brief is representative of those given to the Board in behalf of these carriers. It said in part:

"It is deemed important to submit the cause as to common labor first for the following reasons:

"1. The season of the year has arrived when it is necessary that the railway company employ its full and complete quota of common laborers in its maintenance of way department.

"2. There are thousands of common laborers now out of employment in the territory traversed by this company's lines of railroad.

"3. There can be no doubt but that the present minimum scale for common labor is greatly in excess of that paid in other industries.

"4. The present minimum scale for common labor upon the railroad imposes a financial burden which the company cannot meet if it is to employ the number of men now necessary for the proper maintenance of its property."

In support of this plea to reduce the wages of unskilled labor exhibits were filed showing:

1. That common labor can be employed at the present time at rates varying from 25 to 45 cents per hour according

to the locality in which they are employed and that in a large part of the territory covered by the Chicago & North Western men can be obtained for 40 cents per hour.

2. That the rates being paid for unskilled labor in industries in the territory served by the North Western are substantially below the rates being paid under Decision No. 2.

"From an examination of these exhibits," the statement said, "it will be seen that there has been a marked decline in the wages of common labor for substantially all industries between the rates paid in April, 1920, and April, 1921."

Regarding the decline in the cost of living, references were made to the data prepared by the United States Bureau of Labor Statistics showing by means of weighted index numbers the decreases in the cost of commodities, both wholesale and retail, which have taken place since last summer when the peak was reached in commodity costs.

In presenting the case of the western carriers it was decided that six of the larger roads which cover that territory in general should carry the major part of the burden of proving that the decline in the cost of living and in the wages paid for comparable work in outside industries justify decreases in the wages of railway employees, the remaining carriers to file presentations covering peculiar local conditions.

It will be noted that there is no uniformity in the requests being made of the Board by the various roads. Some are asking for reductions in the wages of practically all of their employees, others for reductions in the wages paid unskilled labor, others for reductions in the wages of various classes of employees, the wage scales to vary according to the varying local conditions, while still others are asking for a return to the wage scales in effect prior to Decision No. 2. The manner in which the Board will act on these varying requests is unknown; its policy being to allow the carriers and employees to present their own cases in their own way.

St. Louis Southwestern Loses Case Before Board

A ruling in the controversy between the St. Louis Southwestern and its employees in pile driver, bridge and building, paint and house gangs and in tinner service was handed down by the Board on April 14 and announced on April 18. The decision upheld the employee's position throughout and criticized the carrier for the action it had taken in abolishing certain positions and thereafter contracting for the same work. The progress of the hearings in this case was described in the *Railway Age* of April 8, (page 903).

After reviewing the history of the controversy and the positions taken by both sides in the hearings held before the Board on April 1, the ruling said in part:

It is urged by the carrier that it has abolished positions, that they no longer exist, that the work formerly done by the incumbents of such positions is now being done by contract, and, that the persons performing said work are not employees but contractors.

It is not believed that any long legal disquisition is necessary to demonstrate the fallacy of this device to evade the obligations of Title III of the Transportation Act and of Decision No. 2 of the Labor Board. All employees of carriers are contractors. There is in every case a contract imposing an obligation of service on the one side and of compensation on the other. Nor are the persons performing the duties of the positions specified any the less employees of the carrier because bids may have been taken and the contract awarded to the lowest bidder. The question whether the persons performing the duties formerly attached to the specified positions are employees of the carriers or not employees, is to be determined by the character of their duties and not by the form of contract employed. It appears that the positions and occupations named, except cooks, have been long established in the railroad service, that the duties attached to them are duties which must be regularly performed year in and year out, and that such performance is necessary in order that the carrier may perform its duties to the public. These positions in general inhere in the service of a common carrier and are necessary to that service. This carrier con-

sidered them necessary, for after the abolition it re-established them by individual and special contracts.

It is found by the Labor Board accordingly that the persons performing the duties formerly allotted to the positions named, or substantially such duties, are in fact the employees of the carrier, that the pretended abolition of such positions was not in good faith, but was a device to evade the obligations of Decision No. 2 of this Board. Such a device cannot and will not be allowed to prevail. It can easily be seen that if a carrier may evade the decision of the Labor Board by abolishing a position and re-establishing it as in this case, there is an end to any obligation to obey a decision of the Labor Board as to wages, if the carrier is willing to employ this subterfuge.

As to track foremen and track laborers there seems to have been not even the "abolition" of the positions to mask the attempt at evasion. With regard to these positions, this carrier has very simply and directly violated Decision No. 2 and the plain provisions of the Transportation Act.

But it is urged that the compensation paid the carrier's "contractors" was arrived at by agreement and that such an agreement is within the authority set out in Decision No. 2 that changes might be made by agreement. This position is untenable.

For the reasons stated the Labor Board finds that the St. Louis Southwestern Railroad Company has violated Decision No. 2. It is the decision of the Labor Board that this carrier restore the said positions and the pay, duties and obligations of said positions to what they were on July 20, 1920, as established by this Board's Decision No. 2; and it is

further decided that the persons serving in said positions just prior to the effective date of the order of the carrier be reinstated therein if they so desire, and that each such person so reinstated receive pay equal to what he would have received, if occupying such position, at the rate provided by Decision No. 2 from the date removed or reduced in pay to the date of reinstatement, less what any such person may have earned by personal service in the meantime.

If the carrier shall make it appear to the Board that this decision requires the reinstatement of employees in excess of the requirements of the service, this decision will be modified accordingly.

The presentation of cases on behalf of individual carriers ended on April 20, and the Board adjourned until April 28 in spite of the pleas of the employees' representative for additional time before being required to reply to the carriers' arguments for wage reductions.

The sudden ending of the National Agreements case left the labor organizations with several voluminous exhibits regarding the "inadequacies and inefficiencies of management" which had not yet been presented to the Board. These exhibits, prepared by W. J. Lauck, consulting economist for the labor organizations, have however been injected as evidence in the wage case dispute. The character of these exhibits filed during the past week has been outlined in previous issues of the *Railway Age*.

Freight Claim Reduction on the Central of Georgia

Special Drive on Careless Freight Handling Results in 50 Per Cent Reduction of Claims

By G. L. Candler

Assistant General Manager, Central of Georgia

A RECENT ARTICLE in one of the New York newspapers declared that to mention freight losses and damage to the average railroad man was to strike him between the eyes. The truth of this statement lies not only in the enormous expense of freight claims to the carriers in 1919, but also in the materially increased amount which they paid out in 1920. To the writer it would seem that loss and damage are chargeable largely to one thing—improper handling of freight and, further, that this improper handling occurs either when the freight is being received from the shipper, when it is being loaded or when it is being billed. He cannot agree with the opinion held by many, that improper packing is an important factor in causing loss and damage to freight. The classification rules in the final analysis are based on sound principles. If they are adhered to they offer adequate protection to the carriers by providing receiving agents with the right to refuse any shipment not in condition to stand ordinary transportation. This power to refuse improperly packed shipments should be exercised regardless of any pressure caused by competitive conditions. When we consider the relatively small number of shipments that are refused it would seem that shippers after all are reasonably careful in packing and marking their shipments for transportation. What, then, are the factors contributing to these heavy increases in loss and damage claims during the past two years?

Careful Supervision Is Lacking

It does not appear reasonable to suppose that indifference and inefficiency in freight handling are a natural consequence of the world war. If this were the case, the same carelessness would be reflected in other branches of transportation. It is true, however, that those in charge of and responsible for

freight transportation have failed in many instances to give adequate service and direction in matters of claim prevention. It has been my experience and observation that the rank and file of the employees who handle freight are not only willing but anxious to co-operate with the management in any movement for better service. They must, of course, be informed of the conditions which they are asked to remedy and this work of education can be made to stimulate interest among all other employees. I would suggest that division officers hold frequent meetings for the sole purpose of discussing the causes of loss and damage of freight and for developing means of eliminating them. In the same way meetings for officers throughout the system should be held periodically, at which plans can be formulated for the entire organization. Claim prevention bulletins issued frequently to drive home some strong points, based upon a specific instance of loss or damage, are of great value in prevention work. Finally, much desirable information can be brought to the attention of the employees through a monthly or semi-monthly review of the claims paid, together with a summary of the facts in cases where the amount is very large or the facts surrounding the claim are unusual. I have recently had occasion to discover that the average employee at a freight agency welcomes this sort of information and desires suggestions that will improve his methods of handling freight.

"No Exception Week" Successful

The Central of Georgia has realized that without the closest co-operation of all officers and employees, any effort to reduce freight claims will fail utterly. To secure this very desirable combination of effort, and to make known the necessity for close supervision of freight handling, the com-

pany recently made a special drive for one week, known as "No Exception Week," which, incidentally, provided ample evidence of the results which this close co-operation can secure. The campaign was advertised among the personnel for a month before it was to commence. Numerous circulars and bulletins were issued, in addition to a great many personal letters sent out by officers of the transportation department to agents, conductors and yard men over the system. The purpose of this publicity was to drive home to our employees the serious situation which had developed from inefficient freight handling and to bring them to realize that better service was necessary immediately to stop this drain on the company's resources. A spirit of friendly rivalry was in evidence from the start, and a most remarkable and gratifying showing was made. The number of exceptions issued to cover over, short, and damaged freight during "No Exception Week" showed a decrease of approximately 95 per cent in comparison with the weeks immediately preceding the drive. More important than the campaign itself, however, has been the permanent interest which our organization has taken in claim prevention work. Statistics recently compiled indicate a reduction of 50 per cent in the number of exceptions filed since the campaign.

In my opinion considerable attention should be directed toward the duties of agents, since their functions are mainly concerned with freight handling. An especially careful study of conditions at each agency should be made in times of depression such as the present, so that any reduction in forces will not work to prevent adequate supervision by the agent and his assistants. We should not neglect to encourage the agent who displays evidence of interest in improving his methods, and we should be ready to co-operate with him by providing better facilities to aid him in securing more economical freight handling at his station.

Receiving Clerks Must Be Competent

I have referred to our classification requirements. There is one feature in this connection that should be considered carefully. Much more attention should be paid to the position of receiving clerk and, instead of being the lowest paid at an agency, it should be decidedly on the preferred list so that thoroughly competent employees can be made available. Our classification rules are both voluminous and complicated, yet very few receiving clerks are sufficiently familiar with them to be able to protect the interests of the company as they should be protected. Special inspectors have told me that they have found men acting as receiving clerks at important stations who had never heard of a classification or its rules. It is little wonder, then, that we find many instances where these rules are violated. Not only should the receiving clerks be competent, but they should be sufficiently numerous to insure a close inspection and check of every shipment offered for transportation at all times. Any number of packages, many of them valuable, cannot be identified and are disposed of at a great sacrifice because they were not properly checked at the point of origin. I am an advocate of inside marking and I favor instructing shippers to place some sort of an identification mark on each case as it is packed for shipment. Start all shipments right—that is, receive them properly, load them carefully and bill them correctly and they will have every chance of reaching their destination in first-class condition.

Many claims are caused by the loss of entire packages. Fifty per cent of the exceptions issued by the Central of Georgia, and I take it this condition obtains generally, are issued to cover over and short freight. To minimize this loss, particular care should be taken to bill freight strictly in accordance with the bill of lading that has been issued. Officers should insist that a check of waybills against bills of lading be made at the close of the day's business, notwithstanding the additional time required.

Capacity Car Loading Requires Care

The importance of increasing the average number of tons per car and the average tons per train is always before us. Economical and hence successful operation depends more on this than upon any other factor. Where sufficient tonnage of the proper class is available I hold that it is a distinct advantage to load the car to its capacity, provided, of course, it is destined to an agency or transfer point which has a force and facilities adequate to handle it. But when a car is loaded to capacity care must be taken to avoid piling heavy packages on light or fragile shipments, as this frequently causes considerable damage. When merchandise cars destined for long hauls are not loaded to their full capacity their freight should be bulkheaded. This can be done at a nominal cost and with proper care the bulkheading can be used a number of times.

An exception to this practice of capacity loading must be made in the case of merchandise cars which are to be worked locally by the train crews. These must be loaded light to avoid serious delays as well as to insure careful checking. To accomplish this end loading clerks and stevedores must be thoroughly familiar with the location of stations at which stops will be made so that the cars can be loaded with reference to the order in which they must be unloaded. We have found it advantageous to require loading clerks, agents and warehouse foremen to ride local freights periodically so that they can observe their own work and the methods of others as well. We encourage our conductors to criticize the methods followed at all times, letting them realize that proper loading of freight lessens their own work and responsibility. The average conductor has neither the time nor the inclination to make a full report on irregularities which come to his attention. To get around this we have provided them with a concise printed form which they can readily fill out and which is always at hand in the waybill pouch of each car. This idea has proved decidedly effective by bringing in reports which otherwise would not be made.

Conclusion

There is likely to be a certain amount of damage to freight no matter how carefully it may be loaded and braced. Emergency stops of long freight trains, the bursting of an air hose, or a careless stop at a water station are all likely to prove disastrous. When a train consists of more than 25 cars the locomotive should be detached before reaching a water crane at which a stop is to be made, unless the grade or some other physical conditions prevent. The same caution should be taken in inspecting air hose before a train leaves its terminal. It happens very frequently that the bursting of an air hose is accompanied by a shock so severe that not only is the freight damaged but the equipment suffers as well.

At the present time defective equipment, especially rolling stock with roofs, sides and doors in bad condition, is accounting for more damage to freight than at almost any time in the past. Until conditions are such that this equipment can be repaired, unusual care should be used in loading shipments that can be damaged by water or exposure.

Loss and damage to freight present a serious problem which must be solved quickly. No such drain on our revenues as this, which is wasting more than \$100,000,000 annually, can be justified. If every one of us can be brought to realize that efficient handling means better service to our patrons and that better service to them means more traffic and revenue for us, a long step forward will have been taken. For certainly every one of us knows that additional revenue must be obtained.

WHAT THE RAILROAD brotherhoods are really up against is a combination of General Atterbury, general apathy, and the general public.—Columbia (S. C.) Record.

E. H. Shaughnessy

E. H. SHAUGHNESSY, assistant director of the Division of Transportation of the American Petroleum Institute, has been appointed second assistant postmaster general. This appointment has a two-fold interest to railroad men. It is noteworthy, in the first place, because Colonel Shaughnessy is a railroad man, and consequently is fitted by training for the duties of his new office which, it will be recalled, has jurisdiction over the railway mail service. Equally significant is the fact that Colonel Shaughnessy's selection apparently indicates the intention of the new administration to bring to an end the controversy between the carriers and the post office department over payments for the service of mail transportation.

This controversy has been of long standing. As early as July 28, 1916, on the recommendation of Postmaster General Burleson, Congress passed a law, over the opposition of the carriers, fixing tentative rates for the transportation of the mails on a space basis. The Interstate Commerce Commission, however, was directed to investigate the matter fully and to prescribe the rates and permanent basis for the future. On November 1 of that year the postmaster general issued an order changing the system of payments from a weight to a space basis, which he claimed, would materially reduce the payments to the railroads. This order of the postmaster general made full use of the "consent and approval" of the Interstate Commerce Commission for a proposed trial period, providing a comparison of the space and weight bases on "certain selected groups" of mail routes. The "certain selected groups" as interpreted by the post office department, included practically all the railway mail routes in the country and the "trial period" provided for was continued indefinitely.

Again, in January of this year, the attention of Congress was directed to the fact that, although the Interstate Commerce Commission had announced an increase in the rates which the post office department must pay the carriers for the transportation of mails, effective on March 1, 1920, as well as a readjustment, retroactive to November 1, 1916, the post office department had not yet asked Congress for the necessary appropriation to cover this obligation. It was further pointed out that the amount withheld from the roads was by no means negligible since the increase for the future had been estimated at \$35,000,000 a year and the retroactive payments were expected to reach \$95,000,000. With these and other incidents fresh in memory, railroad men will regard the appointment of a transportation man as second assistant postmaster general as an indication that efforts will be made to handle the hauling of the mails as a transportation problem, which it is.

As to the new incumbent himself, Colonel Shaughnessy was born in Chicago, on October 26, 1882, and entered railway service in July, 1899, as a telegraph operator on the

Chicago & North Western. During the next 18 years he served continuously in various capacities on the North Western, both in Chicago and at other points on the line. On May 28, 1917, while serving as trainmaster, with headquarters at Chicago, he was granted leave of absence to enter military service. The War Department had just called on the railroads entering Chicago to raise a regiment of engineers, and Colonel Shaughnessy applied for service. He was asked to aid Colonel Langfitt in a civilian capacity in recruiting work, but was shortly commissioned first lieutenant and given command of a company in the regiment which became the well-known 13th Engineers.

He accompanied the regiment to France and remained with the organization during its first operations in the Verdun sector. In June, 1918, he was detached from the 13th Engineers and assigned to duty with the Transportation Corps, serving successively as general superintendent, assistant general manager, general manager and acting deputy general of transportation of the advance section. He was promoted to major in September, 1918, and to lieutenant colonel in February, 1919.

During the organization of the Transportation Corps, Colonel Shaughnessy collaborated with French military and civilian railway men in the preparation of a French-English book of rules for railway operation which was used by the American forces during the entire period of the war. He was awarded the Distinguished Service Medal by a general order of the War Department, was commended for conspicuous service at Chateau-Thierry, and was decorated with the Legion of Honor by the president of France. Colonel Shaughnessy returned to the United States in September, 1919, and was commissioned colonel in the Officers Reserve Corps, Engineers Section, in January, 1920. He was also included in the list of officers declared competent



E. H. Shaughnessy

for General Staff duty without further training.

Upon his return from overseas, Colonel Shaughnessy resumed his duties with the Chicago & North Western, but a short time later resigned from railway service to accept an appointment as assistant director, Division of Transportation, American Petroleum Institute, with headquarters at New York City.

SINCE THE PERIOD immediately preceding the war the number of freight cars on the Italian railways increased from 90,000 to 120,000, while the number of locomotives in the same period fell from 4,400 to 4,200. This diminution accompanied an increase in the length of line operated amounting to 900 miles. Locomotives have not yet recovered from the hard usage undergone in meeting war demands. Proper repairs and the building of new locomotives were slighted during hostilities, and since the cessation of hostilities various dislocations and labor conditions have interfered with construction work in this line.—*Commerce Reports.*

Pacific Type Locomotives for the Reid Newfoundland

THE REID NEWFOUNDLAND COMPANY operates a railway on the island of Newfoundland, extending from St. John's to Port-aux-Basques, a distance of 546 miles. The character of much of the country is extremely hilly and the motive power used in passenger and freight service is designed to operate on grades of two per cent and curves of 14 degrees. The track is laid with 50 lb. rails and the gage is 3 ft. 6 in. Much of the passenger traffic is handled by locomotives of the ten-wheel type, the most recent of which were built in 1917. The Baldwin Locomotive Works has recently constructed six Pacific type locomotives which are designed to meet the requirements of heavier traffic. A brief comparison between the Ten-wheelers and Pacifics is as follows:

	Ten-wheel type	Pacific type
Cylinders	17 in. by 22 in.	17 in. by 24 in.
Valves	Balanced slide	Piston—8 in. diameter
Boiler type	Straight top	Straight top Belpaire
Diameter	56 in.	56 in.
Working pressure	160 lb.	170 lb.
Firebox—Length	89½ in.	66¾ in.
Firebox—Width	29 in.	60½ in.
Tubes—Diameter	2 in.	5¾ in. and 2 in.
Number	184	18, 5¾ in.; 111, 2 in.
Length	12 ft. 0 in.	16 ft. 0 in.
Heating surface—Firebox	106 sq. ft.	93 sq. ft.
Tubes	1,148 sq. ft.	1,358 sq. ft.
Firebrick tubes		12 sq. ft.
Total	1,254 sq. ft.	1,463 sq. ft.
Superheater		343 sq. ft.
Grate area	18 sq. ft.	27.6 sq. ft.
Driving wheels—Diameter	50 in.	52 in.
Engine truck—Front, diameter	26 in.	30 in.
Back, diameter		30 in.
Wheel base—Driving	11 ft. 0 in.	10 ft. 0 in.
Total engine	20 ft. 5 in.	27 ft. 3 in.
Total engine and tender	47 ft. 9 in.	50 ft. 8 in.
Weight—On driving wheels	72,700 lb.	78,000 lb.
Total engine	92,100 lb.	115,000 lb.
Total engine and tender	148,000 lb.	199,000 lb.
Tender—Tank capacity	2,800 U. S. gal.	3,600 U. S. gal.
Fuel capacity	5 tons	9 tons
Tractive effort	17,300 lb.	19,250 lb.

The boilers of the Pacific type locomotives are of the straight top type with Belpaire fireboxes and are equipped

The tenders are of the eight-wheel type having a capacity of 3,600 U. S. gal. of water and 9 tons of coal. The frames are constructed of steel channels with steel plate bumpers. The trucks are of the arch-bar type with cast steel bumpers and chilled cast iron wheels.

Prices Still Higher Than Freight Rates

IN SPITE OF THE RECENT SHARP DROP, average prices are still on a higher basis than freight rates. This is shown in figures just compiled by the Bureau of Railway Economics. The following table is based on the wholesale price index number of the Bureau of Labor Statistics, and gives a relative freight-rate index number based on average receipts per ton-mile.

Year or month	Average railroad receipts per ton mile		Index number of wholesale prices
	Actual	Relative	
1913	.719	100	100
1914	.723	100	100
1915	.722	100	101
1916	.707	99	124
1917	.715	100	176
1918	.849	118	196
1919	.973	135	212
1920	1.052	146	243
Sept. 1920	1.131	160	242
Oct. 1920	1.226	171	225
Nov. 1920	1.263	177	207
Dec. 1920	1.209	168	189
Jan. 1920	1.192	166	177

Up to the close of 1920 rates lagged far behind prices. It is only since the drop in prices began that the margin between increase of prices and increase of rates has narrowed. For 1920, as a whole, prices exceeded rates by almost one hundred points, and even in January of this year prices were eleven points higher than rates.

Traffic in the last four months of 1920, with increased rates, was heavier in the United States than during the corresponding period of the three previous years. The depres-



Interesting Design of Passenger Engine for 3 ft. 6 in. Gage

with superheaters. The boilers are designed to carry a pressure of 200 lb., although the work-pressure used in service is 170 lb. The machinery is designed for a boiler pressure of 190 lb. should it be found desirable subsequently to raise the pressure. Brick arches are installed and are supported on tubes. The front of the firebox crown is supported on two rows of Baldwin expansion stays and the tubes are welded into the back tube sheet.

The cylinders are 17 in. in diameter with a 24 in. stroke and the steam distribution is controlled by 8 in. piston valves operated by Walschaert valve motion. The cylinders are fitted with cast-iron bushings. The frames have single front rails with extra heavy bumpers designed to resist snow bucking. Hodges trailing trucks are used. The equipment includes A.R.A. couplers, Westinghouse air-brakes, electric headlights, air sanders and steam heat. The extreme height of these locomotives is 12 ft. 6 in. and the width 9 ft. 3 in.

sion which set in, was therefore not an effect of increased rates; it came from causes which have produced business depression all over the world.

The ANDALUCES RAILWAY in Spain will probably purchase 35 or 40 American locomotives in the near future in spite of lower bids from other manufacturers because of the ability of American concerns to make early deliveries, according to reports from Consul Gaston Smith at Malaga. It is indicated also that purchases of cars are being negotiated.

THE SOUTHERN PACIFIC has just completed a first aid station or emergency hospital at Bay Shore, South San Francisco shops, which makes the thirteenth emergency hospital unit on the Company's Pacific system. The unit has an operating room, small ward, kitchen, waiting room and doctors' office, and the station is in charge of a trained nurse at all times.

I. C. C. Authorizes Lackawanna Stock Dividend

Issue of Additional Common Stock as a Dividend—Capitalization of Entire Surplus Not Authorized

WASHINGTON, D. C.

THE DELAWARE, LACKAWANNA & WESTERN was authorized by the Interstate Commerce Commission, in a decision dated April 18 and made public on April 20, to issue \$45,000,000 of additional common stock to be distributed as a dividend. The company had asked authority conditioned upon its disposal of its coal properties and acceptance of certain provisions of the Pennsylvania constitution to issue capital stock to the full amount of its corporate surplus, which amounts to about \$90,000,000, or such part thereof as the commission might approve. The present capital stock of the Lackawanna is \$42,220,550, and it has outstanding only \$102,600 of bonds. Its leased lines have \$44,811,710 of stock and \$53,697,657 of bonds.

The commission finds that the evidence establishes (1) that the Delaware, Lackawanna & Western railroad has a large uncapitalized surplus; (2) that the present capitalization is below the actual investment or fair value of the property; (3) that the increase in capitalization which would follow the grant of authority hereinafter suggested would still leave the total capitalization of the applicant below the fair value of the property; and (4) that the remaining uncapitalized surplus will be sufficient to serve the purposes for which a surplus should be accumulated.

It also finds that the proposed issue of stock as a dividend has been justified to the extent of \$45,000,000 and that to that extent it (a) is for a lawful object within its corporate purpose and compatible with the public interest, which is necessary and appropriate for, and consistent with the proper performance by it of service to the public as a common carrier, and which will not impair its ability to perform that service; and (b) is reasonably necessary and appropriate for such purpose; but that applicant has not justified an authorization of the issuance as dividends of the balance of its proposed capital stock in excess of \$45,000,000 and that authority therefore should be denied.

The authorization of the issuance of \$45,000,000 capital stock is conditioned in the order upon the issuance of evidences of indebtedness by the leased lines to applicant for the \$10,344,048.64, carried on its books as advances to leased lines, and the transfer by the Delaware, Lackawanna & Western of that sum to the proper subsidiary account under investment in leased lines:

An abstract of the majority report follows:

Applicant's situation, is in a sense equivalent to that of a road having outstanding \$42,220,550 of stock and \$98,611,967 of funded debt upon which it pays yearly interest of \$5,084,681, or about 5.15 per cent, with a total capitalization aggregating about \$150,000 per mile of road and \$52,100 per mile of track.

It is not shown what portion of the stock was paid for in cash, by service, or in property. Nor, as the effect of the many early consolidations does not appear, is it possible to state what portion may represent estimated value of merged properties. Stock dividends of \$10,890,013 are included in the "cash value of proceeds" column. It is therefore a fair conclusion from the record that the original subscribers actually paid for the outstanding stock, in cash or its equivalent, representing direct sacrifice on their part, not in excess of \$30,980,950.

Applicant distributed cash dividends of about 72 per cent upon its stock in 1909, of 22½ per cent in 1917, and of 20 per cent in every other year from 1905 to 1919, inclusive. The total dividends from 1853 to and including May 31, 1919, are given as \$210,159,430.64, of which nearly \$23,000,000 was in stock of applicant or of its subsidiaries and the remainder in cash. The average rate of dividends during this period was about 12.8 per cent.

Since 1853, according to one of its exhibits, applicant's net income from transportation has been \$208,004,765.04, that from sale

of coal \$66,009,776.02, that from other sources \$40,840,137.99, and its total net income \$314,854,679.05. From this the exhibit shows payment of \$210,159,430.64 in dividends and \$14,233,472.38 in interest, leaving a book surplus of \$90,461,776.03. The dividends exceeded the net income from transportation by \$2,154,665.60 but net income from that source and sources other than sales of coal exceeded dividends by \$38,685,472.39.

Applicant states that these surplus earnings are represented by the following items:

Investments in railroad property.....	\$32,030,645.47
Other investments:	
In mining properties.....	\$2,205,988.00
In other non-operating properties.....	2,344,179.31
In railroad, etc., stocks and bonds.....	24,824,046.25
In other stocks, bonds, etc.....	14,229,385.67
In advances to leased roads, etc.....	10,344,048.64
	53,947,848.07
Current assets (excess over current liabilities).....	3,136,714.80
Net accounts, U. S. R. R. Administration.....	1,326,567.69
	Total surplus.....\$90,461,776.03

This result is obtained by deducting from the book investment in road and equipment, less reserve for depreciation, the aggregate outstanding stock and funded debt, and assuming that the remainder and the other assets listed were paid for out of surplus earnings.

Applicant contends that its actual surplus is much larger, since its coal properties are carried in these figures at their remaining original cost rather than their value, and since expenditures for additions and betterments were frequently charged to operating expense prior to 1907.

Authority to issue stock can not be claimed as a right. It is within our discretion, subject to the limitation that we shall grant authority only if we are able to make the necessary finding. If applicant is lawfully entitled to earn a return upon the fair value of property acquired out of surplus this right will persist whether or not the stock issue is permitted.

Applicant contends that we should permit the capitalization of the full surplus of the company. It argues that refusal to grant the application would seriously discourage, if not entirely prevent, investment by the public in railway stocks. It alleges that a refusal to grant this application would be public notice of a lack of advantage in investing in stock. And it suggests that in the event of denial of the application there would be no inducement in the future to use surplus earning for additions and betterments, and that stockholders would insist each year upon the distribution of all available earnings.

Applicant points out that the lawful declaration of dividends at a rate high in comparison with that of other railroads in the same territory has led the public to the unwarranted conclusion that applicant has received and is receiving an excessive return on its investment in property devoted to public use, and that the proposed increase in stock would tend to remove this source of distrust and suspicion. It suggests also that in case of consolidations with other lines applicant could secure much better terms if its capital stock more nearly represented its value than as at present.

There is no proof that the surplus sought to be capitalized is the result of excessive transportation charges. Traffic has been carried by applicant at rates, controlled by state or interstate regulatory bodies, substantially the same as those applicable over competing lines. And there is no showing that the return from transportation charges upon the fair value of applicant's property owned or used for common carrier purposes has been excessive. Clearly the amount of the return from the coal property is immaterial except as it tends to explain what might otherwise appear to be excessive carrier return.

The question of the reasonableness of applicant's past return is not in fact before us at this time. Where the public has found it expedient to adopt a *laissez-faire* policy to encourage utility development, it cannot be said that profits have been illegally collected in the absence of regulation. The title to the surplus has vested without limitation or condition in the corporation and benefits the shareholder. The doctrine of implied trust, sometimes applied by courts and commissions to donated property, has no application to excessive return, for the payment of rates carried with it no requirement that the funds be left in the business or used for the public benefit. Its strained application to carriers who have made additions and betterments

from surplus would only penalize those who came nearest to benefiting the public. The surplus from income was unrestricted legal property of the company, and ceased to be funds of the public, before the decision to divert it to either dividends or additions and betterments was made.

Such reasoning, however, does not warrant authorization of the issuance of securities merely upon a showing of invested earnings.

To render the proposed issuance "compatible with the public interest" within the meaning of the statute, we are convinced that a substantial surplus should remain uncanceled as a support for applicant's credit, providing for emergency needs, offsetting obsolescence and necessary investments in non-revenue producing property and serving as a general financial balance-wheel.

We do not share applicant's apprehension as to the effects which will follow the required maintenance of such a surplus. Such a reserve is a direct benefit to the stockholder. It maintains the market value of his stock and protects not only his dividends but his *pro rata* share of the assets available on dissolution.

The terms of possible future consolidations and mergers are not now before us and can be dealt with when the occasion arises.

Applicant claims a total surplus available for capitalization of \$90,461,776.03. In view of the proposed sale of its mining property and distribution of the proceeds, the \$2,205,988 shown as surplus invested in such properties may be dismissed from further consideration.

Several items of the remaining \$88,255,788.03 of said surplus, do not fall within that class of assets which we deem it proper to permit applicant to capitalize.

Applicant, on May 31, 1920, held in its treasury stocks of railroad, terminal, transfer, and ferry companies to the amount of \$9,151,048.75, and bonds of such companies to the amount of \$15,672,997.50, making a total of \$24,824,046.25. Of this amount, \$56,450 was applicant's own stock. The balance consisted mainly of stocks and bonds of lines leased by applicant. The record discloses no intercorporate relations or other circumstances which bring these holdings within the sphere of securities which could properly be capitalized by a common carrier. It is not necessary for applicant to hold securities of its leased lines in order to operate its system if as it states its leases are in perpetuity. We are unable to form any sound opinion on the record before us as to lines controlled by stock ownership. Neither the actual value nor the earning power of the securities is shown. So far as the record shows all of these securities are in the same class with the recognized shifting assets. Applicant on that date also held in its treasury stocks of advertising, mining, timber and land companies to the amount of \$1,662,813.37 and United States government bonds and certificates of indebtedness, municipal bonds, and steel company bonds to the amount of \$12,566,772.30, making a total of \$14,229,585.67. These are flexible assets which we deem it improper to permit applicant to capitalize. If it should be thought desirable to distribute the portion of its surplus invested in such securities among the stockholders applicant would be able to apportion the securities themselves or distribute the proceeds thereof. They are neither property used or useful in rendering the public service, nor an assured part of any surplus.

Nor is any reason manifest why applicant should be permitted to issue capital stock against its net account of \$1,326,567.69 with the United States Railroad Administration which is merely an unadjusted balance.

The record contains no showing which would justify our authorizing applicant to capitalize its investments in non-operating properties. The reasons for acquiring and holding these properties are not stated, and no present or contemplated future use of them in connection with applicant's transportation service is shown.

Applicant's lines are stated to have been entirely rebuilt since 1900, the work, with the exception of the construction of the Lackawanna Railroad of New Jersey and the cut-off line in Pennsylvania being accomplished solely by the use of applicant's earnings. The testimony is that no charge was made to the capital account in connection with the excess cost of replacements prior to 1914 because no depreciation reserve was set up, and these expenditures were considered as off-setting depreciation. No comparison of these items is made of record, and the policy as to writing off abandoned property other than equipment is not shown.

Applicant is not seeking to capitalize any equity in its leases of railroad property, but only the amount of earnings said to have been invested by it in the properties of such roads. The evidence is that most of these roads are leased in perpetuity, but that some are leased for the corporate life of the subsidiary

line. Without the leases before us we are unable to determine the length or nature of applicant's tenure, and cannot on the present record authorize applicant to capitalize its total investment in such property.

Applicant has advanced from its earnings \$10,344,048.64 to leased and controlled lines. These advances are carried into the capital accounts of such roads and credited by them to applicant. They differ little from investments in leased lines, and when shown upon applicant's books as such investments may be capitalized by it.

Applicant seeks to capitalize \$3,136,714.80, the excess of its current assets over its current liabilities as working capital necessary in the operation of the road. The record indicates that there are included in its current assets mining materials and supplies valued at \$1,364,618.19 which doubtless would be turned over to the purchaser of its coal properties and therefore should not be considered in passing upon this application.

Commissioners Daniels and Potter wrote concurring opinions. Mr. Daniels concurred in the report so far as it goes, but refrained from giving entire adhesion to the basis which seems to underlie the report, saying he is not persuaded that the entire remainder of applicant's surplus not allowed to be capitalized is requisite for the necessary purposes of a surplus. Mr. Potter did not concur in the view that the amount to be issued should be limited to \$45,000,000, nor in all of the reasons or conclusions upon which the report is based. Commissioner Eastman filed a long dissenting opinion on the ground that the capitalization of surplus is contrary to the public interest and ought not to be permitted.

No opposition to the granting of the application was made by any state authority.

The Estimated Service Life of Western Tie Timber

By P. R. Hicks

Engineer in Forest Products, U. S. Forest Service,
Madison, Wis.

DECAY IS INFLUENCED by a great variety of factors, among the most important of which are the species and quality of wood used, climate, soil, drainage, etc. Since various combinations of these factors will occur in different cases, the durability of a given species cannot be expected to be always the same. In most species of timber the sapwood is very much less durable than the heartwood, and the amount of sapwood present, therefore, is an important factor in the durability of untreated wood. Timber cut from dense (heavy) close ground wood is usually considered more durable than that cut from more rapidly grown wood. Decayed heartwood, which is often found when the tree is felled, may be a big factor in the short life of many ties, although a small amount of heart rot in cedar ties may not have much influence. Timber used in soils that are always wet or always dry is more durable than that placed in soils alternately wet and dry, and it usually resists decay much longer in cold than in warm climates.

Fire-killed or dead timber that is sound and free from decay is as strong and as durable as green timber. Such timber should be very carefully inspected for decay, however, and the unsound ties should be rigidly excluded. Douglas fir usually remains sufficiently sound to make ties for five to six years after being killed. After this the sapwood becomes infested with insects and decay, but the heartwood remains sound for eight to 10 years with the exception of the outer two or three inches. The interior of trees over three feet in diameter may remain sound for still longer periods. Lodgepole pine also remains sound and will make good ties for several years after being killed, but dead western yellow pine should be very carefully inspected, as it contains much sapwood and may deteriorate rapidly.

Definite and reliable data on the durability of several western tie species are not available, so the opinions of railway officers on the durability of these ties were solicited. The replies for the untreated ties may be summarized as follows:

Douglas fir is estimated to have a life of six years east and north of the Missouri and in New Mexico, Arizona, and California. In Oregon, Washington, Montana, Idaho, Colorado and Wyoming a life of seven to eight years is estimated. In California locally grown Douglas fir is estimated to last four to six years. In Colorado, native Douglas fir, known locally as red spruce, or red fir, is variously estimated to last from nine to 14 years. Estimates on the life of western larch in Montana, northern Idaho and western Washington are from five to eight years. Western yellow pine is said to last two to eight years in California and four to five years in Colorado, Idaho and Montana. Incense cedar is said to have a life of 10 to 12 years in California and western red cedar eight to 10 years in Montana and Idaho. Western hemlock ties are estimated to have an average life of five years in Washington, redwood and Port Orford cedar 12 years in California and Oregon, and lodgepole pine four to six years in Wyoming.

Fewer estimates were made on the durability of treated western species. With a zinc-chloride treatment Douglas fir was variously estimated to have a durability of seven to 15 years, the lower figure being for ties treated with but about 1/4 lb. of zinc chloride per cubic foot in southern Idaho. Similar ties in Oregon, California, Arizona and New Mexico were estimated to last nine years. In Montana, with a treatment of 0.5 to 0.7 lb. per cu. ft., the estimate was 15 years. Western larch in Montana with a similar treatment was also estimated to last 15 years. Western yellow pine ties, treated with 0.5 lb. of zinc per cubic foot, are estimated to last 12 to 14 years in Colorado and 12 years in Wyoming, Kansas and Nebraska, but only seven to eight years in California if treated with but 0.25 lb. of zinc chloride per cubic foot. Lodgepole pine treated with 0.25 lb. of zinc chloride per cubic foot was estimated to last eight or nine years in southern Wyoming. The estimated life of creosoted Douglas fir and western larch ties in Washington, Montana and Idaho was 18 years, and western yellow and lodgepole pine 15 years.

These estimates are from various sources and represent the use of ties under many conditions of service. After a consideration of all the available data, the accompanying table was compiled, in which the durability of western ties

Much more accurate and definite data are desirable on the durability of ties, and this can be obtained only by service tests in which accurate records are kept. The best durability records at present available are those in the files of the Forest Products Laboratory* and these indicate that treated and untreated ties of Douglas fir, western yellow pine, lodgepole pine and western hemlock often last longer than estimated in the accompanying table.

Rail Production in 1920

THE PRODUCTION of rails in the United States in 1920, according to the statistics issued by the American Iron & Steel Institute, amounted to 2,604,116 gross tons. Compared with 1917, the year of greatest rail production since the beginning of the European war, this figure is low by 340,045 tons or 11.55 per cent, but it shows an increase over the production of 1919 or 400,273 tons or of 18.16 per cent.

The production of rail for 1920 and that for each preceding year back to 1906 are given in Table 1. In studying the table it is of interest to note the decline in the production of rail made of Bessemer steel from 3,791,459 tons, or 95.31 per cent of the total, in 1906 to 142,899 tons, or 5.49 per cent, in 1920. In the latter year open-hearth rail comprised 89.63 per cent of the total and miscellaneous steels 4.88 per cent.

TABLE 1—PRODUCTION OF RAILS BY PROCESSES, GROSS TONS

Years	Open-hearth	Bessemer	Rolled*	Electric	Iron	Total
1906	186,413	3,791,459			15	3,977,887
1907	252,704	3,380,025			925	3,633,654
1908	571,791	1,349,153			71	1,921,015
1909	1,256,674	1,767,171				3,023,845
1910	1,751,359	1,884,442				3,636,031
1911	1,576,923	1,053,420	91,751	462	234	2,822,790
1912	2,105,144	1,009,926	119,390	3,455		3,327,915
1913	2,527,710	817,591	153,043	2,436		3,502,780
1914	1,525,851	325,897	95,169	178		1,945,095
1915	1,775,168	326,952	102,083			2,204,203
1916	2,269,600	440,092	144,826			2,854,518
1917	2,292,197	533,325	118,639			2,944,161
1918	1,945,443	494,193	101,256			2,540,892
1919	1,893,250	214,121	96,422	50		2,203,843
1920	2,334,222	142,899	126,698	297		2,604,116

*Rolled from old steel rails. Included with Bessemer and open-hearth steel rails from 1906 to 1910 inclusive.

†Small tonnages rolled in 1909 and 1910, but included with Bessemer and open-hearth rails for these years.

There has been an appreciable revival in the production of alloy steels, principally titanium, which had been reduced almost to the vanishing point in 1918, as shown in Table 2.

TABLE 2—PRODUCTION OF ALLOY-TREATED STEEL RAILS, 1910-1920

Years	Production by alloys			Production by processes		Production by weight per yard			
	Total alloy in gross tons	Titanium	Aluminum	Open-hearth and electric	Bessemer	Under 45 lb.	45 and under 85 lb.	85 and under 100 lb.	100 lb. and over
1910	257,224	256,759		865	27,385	229,935		70,170	187,154
1911	153,899	152,990		909	33,539	115,450		27,097	126,892
1912	149,267	141,773		7,494	40,393	108,874	21	5,426	143,820
1913	59,519	47,655	11,864	33,567	25,952	*1	†9,414		50,014
1914	27,937	23,321	4,616	27,447	490	†1	†1,168	8,301	18,454
1915	24,970	21,191	3,779	24,367	603	†6	†1,977	6,553	16,432
1916	28,562	26,493	2,069	27,675	887		†1,761	10,506	16,295
1917	16,535	15,273	1,262	16,535			†335	6,671	9,529
1918	3,111	2,891	220	3,111			†747	2,640	424
1919	6,476	6,070	406	6,476				3,920	2,556
1920	12,909	11,652	1,257	12,911				7,514	5,069

*Includes rails under 50 pounds.

†Includes 50 pounds and less than 85 pounds.

The total production of rail, as given in Table 1, includes in addition to new rails rolled, the rails rolled from defective rails and from old rail. The total production in gross

*Detailed tie service test records can be obtained from the Forest Products Laboratory upon request. Applicants are requested to give the specific names of the timbers concerning which information is desired.

ESTIMATED AVERAGE DURABILITY OF WESTERN TIES*

	Un-treated, years	Treated with 0.5 lb. zinc chloride per cu. ft., years	Treated with 10 lb. creosote per cu. ft., years
Redwood	10-12	..	..
Port Orford cedar	10-12	..	..
Incense cedar	8-10	..	..
Western red cedar	7-9	..	..
Douglas fir	6-7	11	15
Western larch	6-7	11	15
Western hemlock	5-6	11	15
Lodgepole pine	4-5	11	15
Western yellow pine	4-5	11	15
Spruce	3-4	8	10
White fir (Abies concolor)	3-4	8	11
White fir (Abies grandis)	3-4	8	11
Red fir (Abies magnifica)	3-4	8	11
Engelmann spruce	3-4	8	11
Alpine fir	3-4	7	11

*Based on use of tie plates on all treated ties and the assumption that the ties are subject to heavy traffic.

†Used only in Montana, northern Idaho and western Washington. Douglas fir ties in this region have about same average life as western larch.

has been estimated. The table is based on the assumption that all treated ties are well tie-plated. Since the estimates are based on western conditions they may not apply to eastern conditions. Probably from 30 to 50 per cent variation from these estimates in the durability of these ties may be expected on account of differences in climatic conditions.

tons of renewed or rerolled rails so included is given in Table 3.

TABLE 3—PRODUCTION OF RENEWED AND REROLLED RAILS, 1913-1920

Years	Renewed from new seconds, new defective rails, etc.			Rolled from old rails	Total rerolled
	Open-hearth	Bessemer	Total		
1913	13,052	30,741	43,793	155,043	198,836
1914	13,538	13,234	26,772	95,169	121,941
1915	6,477	2,652	9,129	102,083	111,212
1916	1,711	2,149	3,860	144,826	148,686
1917	1,825	7,182	9,007	118,639	127,646
1918	13,296	19,462	32,758	101,256	134,014
1919	1,933	5,766	7,699	96,422	104,121
1920	19,493	1,979	21,472	126,698	148,170

In Table 4, which shows the production of rails by weight per yard for each of several years, it is of interest to note that tonnage of the rails weighing 100 lb. per yd. and over forms a larger proportion of the total (28.0 per cent) than in any year since this weight of rail has been recorded separately. During 1918 and 1919 the proportion fell off appreciably because the Railroad Administration bought no rail weighing over 100 lb.

TABLE 4—PRODUCTION OF RAILS BY WEIGHT PER YARD, 1905-1920

Years	Gross tons			
	Under 45 pounds	45 and less than 85	85 and less than 100	100 pounds and over
1905	228,252	1,601,624	1,546,053	3,375,929
1906	284,612	17,49,650	1,943,625	3,977,887
1907	295,838	1,569,985	1,767,831	3,633,654
1908	183,869	687,632	1,049,514	1,921,015
1909	255,726	1,024,856	1,743,263	3,023,845
1910	260,709	1,275,339	2,099,983	3,636,031
1911	218,758	1,067,696	1,536,336	2,822,790
1912	248,672	1,118,592	1,960,651	3,327,915
1913	*270,405	*967,313	2,265,062	3,502,780
1914	*238,412	*1,309,865	868,104	3,28,703
1915	*254,101	*1,518,291	742,816	688,995
1916	*295,535	*566,791	1,225,341	766,851
1917	*308,258	*882,673	989,704	763,526
1918	*395,124	*1,655,165	888,141	592,462
1919	*263,803	*495,377	2,063,571	478,892
1920	*489,043	*1433,333	952,622	729,118

*Includes rails under 50 pounds.
*Includes 50 pounds and less than 85 pounds.

the week was 693,719 cars, an increase as compared with the previous week of 27,077 cars, although it was 107,000 cars less than for the corresponding week of 1920 and 17,000 cars less than for the corresponding week of 1919. The loadings for the week of April 9 also represents an increase over the previous three weeks. During the first two weeks of March there was a gain but it was not maintained for the ensuing weeks.

There was a gain in the loading as compared with the previous week in all districts except the Central Western and the South Western, although the reports show a decrease as compared with 1920 in all districts. Increases as compared with the previous week were shown in the loading of grain and grain products, livestock, coal, forest products and merchandise and miscellaneous freight combined, and an increase as compared with 1920 was shown in the loading of grain and grain products. The coal loading was about 44,000 cars less than for the corresponding week of 1920. The loading of merchandise and miscellaneous freight, which reached a total of 449,493 cars, was greater than the loadings for any previous week this year, but was still about 34,000 cars less than the total loadings for the corresponding week of 1920.

The total car loading since January 1 this year has been 9,706,514 cars, as compared with 11,484,467 in 1920 and 9,869,739 in 1919.

The increase in loading was not reflected in the car surplus report, however. Previous records for the number of surplus freight cars on the railroads of the United States were again broken during the week ending April 8. The number of cars for which there was no freight averaged 507,427, or approximately 21 per cent of the total freight cars owned by the railroads of the United States.

This is an increase of over 11,000 cars as compared with the previous week and an increase of 210,000 cars since the first of the year. Of the total number of idle cars 261,294 were coal cars, an increase of about 6,000 cars in a week, while there were 176,916 surplus box cars, an increase in a week of 5,000.

At the time of the business depression in 1919, following the armistice, the number of surplus freight cars reached 451,739 for one week of March.

The summary follows:

Freight Car Loading

WASHINGTON, D. C.

THE NUMBER OF CARS loaded with revenue freight showed a considerable gain during the week ended April 9, according to reports compiled by the Car Service Division of the American Railway Association. The total for

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY—ALL DISTRICTS; COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO. FOR WEEK ENDED SATURDAY, APRIL 9, 1921

Districts	Year	Grain and grain products	Live stock	Coal	Cnks	Forest products	Ore	Merchandise L.C.L.	Miscellaneous	Total revenue freight loaded		Received from connections		
										This year	1920	This year	1920	1919
Eastern	1921	5,301	2,749	36,413	756	5,837	441	56,840	62,562	170,599	192,120	169,367	192,120	191,919
	1920	4,167	2,388	48,049	8,686	7,245	3,542	35,217	87,711	192,205	175,099	169,367	202,986	195,208
Allegheny	1921	2,261	2,582	39,115	2,267	2,237	83	40,770	48,543	139,156	182,343	150,411	88,944	117,212
	1920	1,982	2,854	52,693	7,024	3,454	4,236	39,576	70,524	139,156	182,343	150,411	88,944	117,212
Pocahontas	1921	121	91	15,447	50	1,290	37	2,594	5,840	25,470	32,902	29,629	13,323	16,965
	1920	137	127	20,383	637	1,826	239	146	9,407	25,470	32,902	29,629	13,323	16,965
Southern	1921	3,028	1,918	16,846	595	14,153	716	39,318	37,800	114,374	122,861	115,113	62,616	70,506
	1920	3,439	1,980	19,418	125	17,113	2,483	25,055	53,248	114,374	122,861	115,113	62,616	70,506
Northwestern	1921	8,201	6,232	3,571	542	14,631	695	27,487	28,939	90,298	105,175	98,584	40,496	50,601
	1920	8,949	7,517	7,980	1,203	19,336	1,932	20,572	37,686	90,298	105,175	98,584	40,496	50,601
Central Western	1921	4,663	9,868	13,123	117	3,899	1,496	28,895	31,779	98,540	104,444	92,069	43,769	53,410
	1920	7,198	8,886	16,711	470	5,466	2,601	22,596	40,512	104,444	104,444	92,069	43,769	53,410
Southwestern	1921	9,650	2,199	3,529	108	5,759	521	16,538	21,788	55,282	61,629	50,377	42,008	48,360
	1920	3,488	2,186	6,298	146	7,284	577	16,365	25,264	55,282	61,629	50,377	42,008	48,360
Total, all roads...	1921	33,415	25,339	128,044	4,835	47,806	4,787	212,142	237,351	693,719	801,559	711,282	460,523	560,040
	1920	29,360	25,938	171,532	13,509	61,724	15,610	159,533	324,353	801,559	801,559	711,282	460,523	560,040
Increase compared 1920	1921	38,073	28,143	147,380	11,676	52,405	15,866	52,609	106,998	192,160	192,160	192,160	99,566	103,996
Decrease compared 1920	1920	599	43,488	8,674	13,918	10,823	117	3,899	1,496	22,596	104,444	92,069	43,769	53,410
Increase compared 1919	1921	4,055	2,804	19,336	4,835	4,599	11,079	212,142	37,663	192,064	192,064	173,563	69,873	78,573
Decrease compared 1919	1919	4,658	2,804	19,336	4,835	4,599	11,079	212,142	37,663	192,064	192,064	173,563	69,873	78,573

L.C.L. merchandise loading figures for 1921 and 1920 are not comparable as some roads are not able to separate their L.C.L. freight and miscellaneous of 1920. Add merchandise and miscellaneous columns to get a fair comparison.

April 2	1921	33,354	23,584	109,284	4,862	46,911	5,068	211,244	231,895	666,642	858,287	688,567	459,161	669,872	518,098
March 26	1921	32,960	24,339	122,189	5,179	49,516	6,480	211,078	236,161	687,852	900,386	713,275	479,635	696,447	557,736
March 19	1921	36,038	26,423	126,081	6,122	50,066	6,048	208,816	232,114	691,707	855,060	699,720	490,938	652,300	515,212
March 12	1921	37,896	27,847	136,097	7,103	52,848	6,864	205,334	228,443	702,068	819,329	701,266	494,588	614,091	522,988

A Rapid Tilting Cradle Unloader for Box Cars

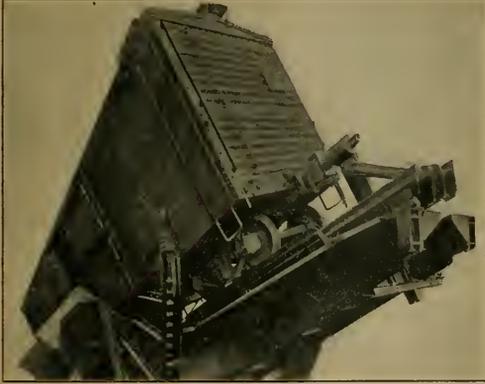
Box Cars Unloaded With New Device as Rapidly as Gondolas

—For Use Where Many Cars Are Handled

A TILTING CRADLE DEVICE which makes possible the mechanical handling of bulk material to or from box cars with a rapidity comparable with that which may be obtained where similar materials are handled in open top cars, has been developed by the Ottumwa Box Car Loader Company, Ottumwa, Iowa. The unloader is designed for use at large elevators, terminals and transfer points where the number of box cars loaded with bulk material to be handled daily requires an extensive equipment of

cially designed chains with pin-connected links, which are located around the circle of the rockers and attached to them at the ends with bolts, the nuts of which bear on coil springs to absorb the shocks of starting and stopping the tilting movement. The side tipping is accomplished by locating the track on a deck hinged at one side and lifted on the opposite side by pin racks and power driven sprockets.

The car is mechanically centered and held in position on the unloader by two grab arms on the cradle which disappear in small pits at either end of the foundation when not in use. After a car has been run on the unloader, these grab arms are raised out of the pits by motor driven sprockets and pin racks and are then moved simultaneously toward each other until they reach and center the car on the unloader. The heads of the grab arms are designed to bear against and hook over the top of the couplers to prevent the car from overbalancing when the cradle is tilted. Steel dogs engaging notched bars on the tilting deck prevent the grab arms from running back until the car is to be removed from



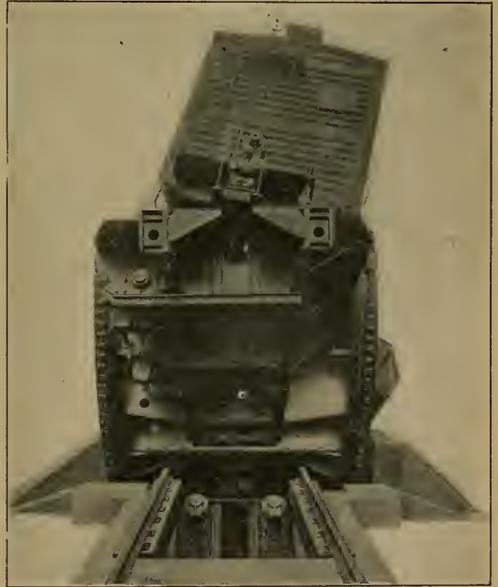
Unloading Side of the Cradle with Car in Unloading Position

unloading pits and the expenditure of a large amount of labor under the usual methods of handling.

This device is capable of completely discharging the load from a box car in from five to nine minutes without the expenditure of any labor aside from that of the single operator. This time includes that necessary to place the car on and remove it from the cradle and depends largely on the facilities provided for moving cars to and from the unloader. The rapid unloading is effected by tilting the car longitudinally to a maximum angle of 46 deg. from the horizontal, at the same time tipping it sideways from 15 to 24 deg.

The unloader consists essentially of a cradle built up of steel plates and angles with rockers at the sides which are carried on eight large steel rollers. The cradle is approximately 70 ft. long and 15 ft. wide and is placed in a pit approximately 19 ft. in depth from the top of the rail, 72 ft. long and 17 ft. between the side walls. The rockers, which are built up of reinforced steel plates, are circular in contour. Around the circles they are faced with heavy steel rails of standard railroad section. These rails bear directly on the steel rollers, which are mounted on double-beam girders which in turn rest on the foundation in the bottom of the pit. Heavy posts, hinged at the bottom and moved mechanically from the operator's station, are placed in the pit where they may be swung into position under the ends of the cradle when it is in its horizontal position. The cradle is thus securely supported against tipping when being loaded or unloaded, and heavy locomotives or cars may safely be moved across the unloader.

The cradle is tipped toward either end by means of spe-



End View of the Unloader with the Cradle Tilt and Side Tip in Unloading Position

cially designed chains with pin-connected links, which are located around the circle of the rockers and attached to them at the ends with bolts, the nuts of which bear on coil springs to absorb the shocks of starting and stopping the tilting movement. The side tipping is accomplished by locating the track on a deck hinged at one side and lifted on the opposite side by pin racks and power driven sprockets.

The car is mechanically centered and held in position on the unloader by two grab arms on the cradle which disappear in small pits at either end of the foundation when not in use. After a car has been run on the unloader, these grab arms are raised out of the pits by motor driven sprockets and pin racks and are then moved simultaneously toward each other until they reach and center the car on the unloader. The heads of the grab arms are designed to bear against and hook over the top of the couplers to prevent the car from overbalancing when the cradle is tilted. Steel dogs engaging notched bars on the tilting deck prevent the grab arms from running back until the car is to be removed from

the unloader. They are then mechanically raised by means of wedges, permitting the grab arms to be removed from the car and lowered into the pits.

A hopper bin is provided in a pit at one side of the unloader, to receive the material discharged from the car and deliver it to a suitable conveyor system. A chute connects the car door opening with this hopper. The lower end of this chute is stationary while the upper end is movable and is arranged to telescope with the lower end. The movable section is propelled against the side of the car at the door-

way by means of a small air cylinder, which holds the chute firmly in position just below the floor of the car during the unloading operation.

For unloading cars regularly fitted with grain doors or with boards nailed across the doorway inside of the car, a grain door opener has been developed for use with the unloader. This device consists of a large square plate studded with barbs which is moved against the grain door or boards by air pressure. This device engages the door while the car is horizontal. When the car is tipped to the side the grain door is held stationary while the car moves away from it. At the same time a wedge is dropped to the floor of the car and is forced under the bottom of the grain door, thus assisting in removing the bottom board and in holding the entire door out of the way, after it has been removed. When the car is empty the boards are dropped back inside.

The unloader is operated by three motors. A 75-hp. motor is used to tilt the cradle toward either end and a 50-hp. motor is provided to operate the side tipping mechanism. The grab arms are operated by a 20-hp. motor. Both the side and end tilting mechanisms are operated through gear reductions to worm gear drives which automatically lock the cradle and tilting deck in any position when the power is shut off. In addition to this, both of these motors are fitted with air brakes by means of which the momentum of the moving parts may quickly be absorbed after the power is shut off. When compressed air for this service is not available from an outside source the unloader is fitted with a small air compressor, driven by a 5-hp. motor and a small air reservoir.

The operator's station is located outside the foundation at the track level and on the side of the car from which the material is to be removed, so that he may observe at all times the progress of the operation. He is also provided with signals, usually electric, which indicate the various positions of the travel of both the end and side tips.

In operating the unloader, after the car has been secured by the grab arms it is first tipped to the side, the grain door or boards across the door opening being removed at the same time. This permits the material in the center of the car to flow out under the lower board. At the same time the operator starts the motor which tilts the cradle longitudinally. As the end tilting continues the material in the high end of the car flows out. As soon as one end is empty the cradle motor is reversed and the other end is unloaded. The small amount of material which runs past the door during this second operation is removed by once again reversing the tilt of the cradle.

One of these unloaders has been installed by the Commission of Public Docks of the city of Portland, Ore., at Pier No. 5 of the new No. 4 Terminal. By its use a compact and flexible arrangement has been obtained whereby material may be handled directly from the unloading pit of the unloader by conveyor to the hold of a ship, to storage bins on the pier or to open top cars. The device is also used as a loader for stowing bulk material in box cars as it is unloaded from shipboard, from open top cars or taken from the storage bins on the pier. At this installation the machine has unloaded phosphate rock from box cars in a total of nine minutes per car, including the entire time of getting the car to and from the cradle.

WHISKEY EASILY OBTAINABLE on Pullman cars was one of the items in the Pittsburgh (Pa.) Prohibition agent's notebook last month; and large numbers of empty bottles found on the ground along the line of the Pennsylvania Railroad constituted one of the bits of evidence supporting it; and on Sunday morning last, in Pittsburgh, a Pullman porter was arrested and 400 half-pint bottles of liquor, just brought to the station by a confederate, in five suit cases, were seized.

An Arrangement for the Safe Storage of Gasoline

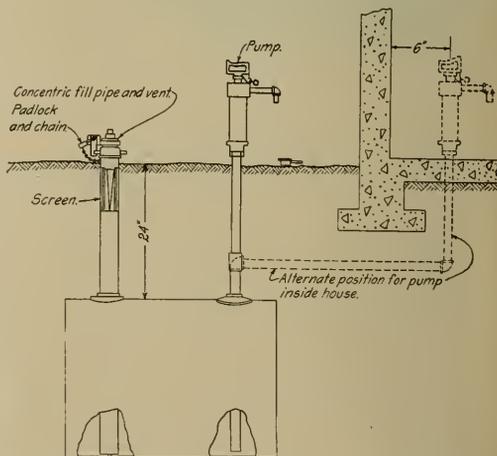
SUPPLIES OF GASOLINE and other fuel oils must be provided at so many points on a railroad that it is very difficult to control the housing of these highly inflammable materials in a way that will avoid excessive fire hazard.

For this reason, an account of a convenient storage outfit recently placed on the market is of interest. The elimination of drums and other shipping containers or receptacles means the elimination of fire hazard and loss in quality and quantity of oil through evaporation, leakage, spilling, etc. These storage outfits consist of an underground tank with a concentric filling pipe and vent and an outlet pipe equipped with the type of pump shown in the illustration. This pump consists of a seamless brass cylinder with a brass plunger and weatherproof housing over stuffing box. The handle is arranged to be secured by a padlock. A second padlock is provided to control the inlet pipe.

The storage tanks are made of 14-gage galvanized steel in sizes ranging from 70 to 290 gal. and are normally buried 24 in. below the ground level with the inlet pipe and pump placed directly above the tank. However, with additional piping it is possible to bury the tank outside and install the pump inside an adjacent build-



The Pump



The Storage Outfit Complete, Showing Alternate Locations for the Pump

ing, the entire equipment being complete with the exception of the horizontal pipe which will be of variable length depending upon the distance from the tank to the building.

This storage outfit has been developed by the St. Louis Pump and Equipment Company, St. Louis, Mo.

A PRACTICAL DEMONSTRATION of the type of beef that Alberta produces will be made next May or June when the department of agriculture of the province will ship to England 50 or 60 head of the best animals that can be obtained.

General News Department

The Western Railroad Association will on April 25 move its office from 122 South Michigan avenue, Chicago, to the Wrigley building, 400 North Michigan avenue.

The Long Island Railroad expects to electrify its division between Valley Stream and Babylon as soon as financial conditions will permit, according to a statement made by P. H. Woodward, general passenger agent, at a meeting of the Community Association of Bayshore on April 11. The distance from Valley Stream to Babylon is 21 miles.

The Boston & Albany announces that henceforth the following stations will be closed on Sundays: Longwood Brookline Hills, Beaconfield, Reservoir, Chestnut Hill, Eliot, Waban, Woodland, Faneuil, Wellesley Farms, Wellesley Hills, Ashland, North Grafton, Rochdale, East Brookfield, Brookfield, Warren and West Warren. Ten of these are on the main line.

"Commissioners of the Port Authority" to administer the laws and treaty under which the states of New York and New Jersey are to co-operate in the development of New York Harbor, have been appointed by the Governor of New York, as follows: Eugene H. Outerbridge, president of the New York State Chamber of Commerce; Alfred E. Smith, former governor of the state; and Lewis H. Pounds, former president of the Borough of Brooklyn.

Ninety miles in one hour and twenty minutes was the time made by a special train of two cars from Philadelphia to Jersey City last Monday afternoon over the Philadelphia & Reading and the Central of New Jersey, a speed equal to 67.5 miles an hour. This train was run for J. L. Stokes, a banker, to enable him to connect with a train for Montreal, the Pennsylvania being blocked by a derailment and the Reading having no regular train for two hours. Mr. Stokes paid for the train \$427.

The Chamber of Commerce of the United States has appointed a committee of five members and five alternates to co-operate with Secretary of Commerce Hoover in working out a plan for closer relationship between business and the Department of Commerce. Members of the committee are: A. C. Bedford, chairman of the board of directors of the Standard Oil Company of New Jersey, G. E. Smith, John L. Fahey, H. L. Ferguson and P. H. Gadsen. Alternates are: Howard Elliott, chairman of the board of directors of the Northern Pacific; A. L. Humphrey, president of the Westinghouse Air Brake Company; L. B. Stillwell, consulting engineer of New York; R. G. Rhett and H. M. Victor.

The legislature of the state of Tennessee recently enacted a statute providing for the elimination of grade crossings of state highways with railroads under the direction of the State Highway Commission, which is given the power to require the elimination of such grade crossings whenever it is considered necessary. Under this law the railroads are accorded the right of appeal to the Railroad and Public Utilities Commission of the state, which is authorized to make changes in the Highway Commission's order in the interests of the railroads. The law also definitely fixes the subdivision of expenses of such grade crossing elimination equally between the railroad and the public, the share borne by the public to be taken from highway funds, although this subdivision will be modified in the case of new highways or new railroads.

Senate Orders Railroad Investigation

The Senate on April 19 adopted without debate or discussion the resolution introduced by Senator Cummins providing for a general investigation of the railroad situation by the Senate

committee on interstate commerce. It is planned to begin hearings about May 2 and to hear the testimony of railroad executives first.

A Correction

In the tables of Revenues and Expenses of Railways, which appeared in the *Railway Age* of April 13, page 948, the operating revenues of the Chicago, Burlington & Quincy for the two months were incorrectly given. The figure of operating revenues for the two months should have been given as \$26,126,472 instead of \$36,126,472 as it was given and the operating ratio for the two months as 81.56 per cent instead of 58.98 per cent as was shown.

Pennsylvania Service Record for March

Of the passenger trains operated on the Pennsylvania system in the month of March, 94.1 per cent arrived at their destination on time and 96.9 per cent made schedule time, an improvement over March, 1920, of 16.7 per cent in the number of trains arriving on time and 9.1 per cent for trains making schedule time. Passenger train performance has improved for five consecutive months. On April 1 there were 92,738 idle freight cars stored in good order on the Pennsylvania System. At the same time 85.8 per cent of the locomotives owned were available for service, an increase of 7.5 per cent in available power over April 1, 1920.

The Two Essentials

The completion of a record of three-quarters of a century of the life of the Pennsylvania Railroad, which was organized on April 13, 1846, was noticed briefly in our last issue. The date was made the occasion by President Samuel Rea of a brief address to employees and the public, sketching the history and the present greatness of the corporation and "rededicating the property to the public service and to the maintenance of sound policies and practices."

The way out of the present crisis can be found, says Mr. Rea, by

"1. The realization of an understanding between railroad corporations and their employees as a result of which every officer and employee will have reasonable compensation depending on traffic and business and financial conditions, and will give to the public and to his company loyal service and the utmost effort of which he is capable; and

"2. The development of such relations between the railroads and the public that adequate revenues may be maintained with which to provide satisfactory transportation service, to supply adequate facilities in the future for the needs of a growing country, to pay fair wages, and to give the investors who furnished the money a fair return, with full confidence in those whom they employ to manage and operate the property they have provided for public use."

International Chamber of Commerce

The International Chamber of Commerce will hold its first annual meeting in London, England, from June 27 to July 2, 1921. The keynote of the meeting will be "The Restoration of the World's Commerce." There will be general sessions and group meetings for the discussion of economic problems in the fields of finance, ocean and land transportation, communications, production, distribution and the restoration of devastated areas. Subcommittees are to be appointed to consider topics of secondary importance under the main headings. The countries which will participate in the first meeting will be asked to name representatives for the various committees. The American Section of the International Chamber has asked the following men to serve on the American Land Transportation Committee: W. W. Atter-

bury, vice-president, Pennsylvania; Samuel O. Dunn, editor, *Railway Age*; S. M. Felton, president, Chicago Great Western; Carl R. Gray, president, Union Pacific; Colin M. Ingersoll, New York City; Col. J. A. McCrea, vice-president, Pennsylvania, Pittsburgh; Col. F. A. Molitor, consulting engineer, New York City; T. C. Powell, vice-president, Erie; John F. Stevens, Chase National Bank, New York City; John F. Wallace, consulting engineer, New York City, and Col. W. J. Wilgus, consulting engineer, New York City.

Executives Favor Senate Inquiry

A meeting of the steering committee of the Association of Railway Executives was held in New York on April 15. The purpose of the meeting was to consider the presentation of the railroad situation to be made before the Senate inquiry if the pending resolution by Senator Cummins is adopted.

"Although in some quarters it has been questioned whether such an inquiry is desirable or necessary," said Thomas DeWitt Cuyler, chairman of the Association, "the executives present expressed themselves unanimously as favoring the inquiry proposed by Senator Cummins. It was the unanimous opinion of the executives present that, in view of the very great importance of having the full support of an enlightened public opinion in meeting the present difficulties confronting the railroads, the fullest inquiry into the situation as proposed by Senator Cummins would be most helpful in the present situation."

Railroad Earnings for February

The Interstate Commerce Commission's monthly summary of railway revenues and expenses for February and for two months is as follows:

	February		Two months	
	1921	1920	1921	1920
1 Average number of miles operated....	235,562.78	234,514.93	235,558.83	234,533.67
Revenues:				
2 Freight	\$283,968,205	\$299,212,509	\$608,932,767	\$610,778,123
3 Mail	88,492,583	82,571,063	193,791,264	174,445,209
4 Mail	7,915,776	9,058,642	16,141,505	69,587,369
5 Express	4,459,069	11,671,553	11,902,170	25,570,730
6 All other transportation	11,698,162	10,741,832	25,165,015	21,688,336
7 Incidental	8,781,104	10,856,133	19,152,013	22,394,429
8 Joint facility—Cr.	608,272	668,552	1,314,345	1,382,521
9 Joint facility—Dr.	138,319	188,988	323,814	416,218
10 Railway operating revenues.	405,784,852	424,591,296	875,975,265	925,430,499
Expenses:				
11 Maintenance of way and structures	53,550,642	64,406,909	114,854,780	122,298,054
12 Maintenance of equipment	108,600,390	118,791,959	232,973,099	236,547,894
13 Traffic	7,041,698	5,014,511	14,410,534	9,959,452
14 Transportation	196,602,307	211,658,475	429,980,042	430,571,825
15 Miscellaneous operations	4,001,660	4,366,548	8,499,216	8,728,433
16 General	14,060,750	12,575,922	29,347,497	25,468,493
17 Transportation for investment—Cr.	377,840	355,956	954,377	692,501
18 Railway operating expenses.	385,479,607	416,458,368	829,109,791	832,881,650
19 Net revenue from railway operations	20,305,245	8,132,928	46,865,474	92,548,849
20 Railway tax accruals	21,983,797	20,709,114	44,810,687	41,094,512
21 Uncollectible railway revenues	80,607	101,064	163,222	218,690
22 Railway operating income	1,759,159	12,677,250	1,891,565	51,235,647
23 Equipment rents—Dr. balance.....	3,591,113	2,598,059	6,819,498	5,028,024
24 Joint facility rent—Dr. balance.....	2,028,035	1,576,492	3,286,609	3,397,474
25 Net of items 22, 23, and 24.....	7,378,307	16,851,801	8,214,542	42,810,149
26 Ratio of expenses to revenues—per cent	95.00	98.08	94.65	90.00

Railroad Administration to Ask

Additional Appropriation

The Railroad Administration is planning to ask Congress at an early date for an additional appropriation which will be needed to enable it to liquidate its affairs. Chairman Good of the House committee on appropriations stated in the House on April 19 that he had been advised by Director General Davis that the amount required would be approximately \$400,000,000, but it was stated at the Railroad Administration that the exact amount has not yet been determined. The Railroad Administration has already received in appropriations \$1,780,000,000, in-

cluding \$500,000,000 appropriated by the federal control law, a deficiency appropriation of \$750,000,000 in 1919, \$200,000,000 appropriated by the transportation act, and an additional amount by a later appropriation bill. At the time of the return of the railroads Director General Hines estimated the additional requirement at that time at \$436,000,000 in addition to the \$1,450,000,000 which had then been appropriated and a later appropriation was made to cover this amount subject to certain adjustments made by the transfer of Liberty bonds to the War Finance Corporation, etc. Mr. Hines made no estimate for payments to the railroads on account of undermaintenance, contending that the government would not have to pay any large sums on this account. Comparatively few of the claims of the railroads have yet been adjusted and although many of the railroads are making larger claims than were expected, it is not yet known what proportion of them will be allowed.

Why Should Employees' Families Ride Free?

The stockholders of the Boston & Maine, at the annual meeting of the company in Boston last week voted, *via voce*, unanimously, that free passes should not be issued except to employees traveling on the business of the road. As no announcement has come from the president concerning the matter it would appear that the action of the meeting has not as yet been confirmed by a stock vote. This vote evidently is a sequel to the report of the New Hampshire Public Service Commission, on February 16, in which the Boston & Maine was granted leave to close certain small stations in that state. In justification of its approval of that measure of economy the Commission issued a long report, rehearsing in forceful language the restrictive acts of the federal government which have necessitated the drastic curtailments of expenses that all railroads are now compelled to make; and then, in closing, declared that the "first economy" on the Boston & Maine ought to be the discontinuance of free service. Continuing, the report says:

"We refer to the pernicious practice, unjust and indefensible, of issuing free passes to officers and employees and their families; to surgeons, physicians and attorneys-at-law when not traveling on railroad business. Is it fair to furnish a private car, with servants, free of expense to officers of the railroad to take pleasure trips about the country? We are not saying that this privilege is often made use of, but the point is that the privilege should not exist. The words "free service" are outlawed in the vocabulary of railroad and public utility regulations. Justice requires that a railroad or public utility should serve all of the public alike. If part of the public does not pay for the service it receives, then the cost of that service must be taken care of by those who do pay. To the employee with a family of five, the free transportation privilege is worth a considerable sum, while to one with no family it is of no value; yet both may be doing the same kind of work and receive the same pay per day. A better arrangement would be to have the one traveling on railroad business pay his fare and be reimbursed by the railroad upon proper bill being presented. In its present situation the Boston & Maine cannot afford to turn its back on additional income, however slight."

A New Representative of "The Public"

Senator La Follette, in a statement to the press, announces the beginning of active work with the opening of the Sixty-Seventh Congress of "The People's Legislative Service," which was organized at a conference at Washington on December 17, 1920. The need for such an organization, he said, "arises out of the fact that while special interests of all kinds are represented in Washington and bring their influence to bear upon legislation, the interest of the general public is not represented." The People's Legislative Service is to "help meet this need by furnishing the facts on which intelligent legislation must be based." It is to be distinguished from lobbying organizations by the Senator's statement that "It is not a lobby. It is a fact service." With the statement is given a list of 77 members of the National Council of the People's Legislative Service, which includes, in addition to a number of so-called progressive congressmen and others, the heads of most of the railroad labor organizations affiliated with the American Federation of Labor and the Plumb Plan League; Edward Keating, business manager of the league;

Frederic C. Howe, the head of one of its bureaus, former congressman John M. Baer, cartoonist of the league's paper Labor; W. J. Lauck, Frank P. Walsh and Donald R. Richberg, one of Mr. Plumb's legal associates, and Col. S. W. Brookhart. The executive committee consists of Senator La Follette, William H. Johnston, W. G. Lee, Warren S. Stone, George Huddleston, congressman from Alabama, who has frequently appeared as spokesman for the Plumb plan in the House, and George P. Hampton. It is stated that the service "will direct its efforts to increasing the effectiveness of those senators and representatives who are battling for the public interest."

The People's Legislative Service gave a dinner at Washington on April 16 at which Senator La Follette spoke. He gave a list of 19 "great combinations of financial power which maintain active organizations in Washington" but in this he counted the railroads twice by including not only the Association of Railway Executives, which does have an office to keep in touch with legislation, but also the American Railway Association, which is represented in Washington only by the Car Service Division. He mentioned also the "Association of Railway Security Holders." The National Association of Owners of Railroad Securities has its headquarters in Baltimore. Senator La Follette also referred to the "adoption by Congress of a fixed percentage return" for the railroads, "which forced the Interstate Commerce Commission to increase the annual transportation bill of the nation by hundreds of millions of dollars . . . a striking example of the enormous power which can be marshalled by a single interest."

Senator La Follette also attacked the railroads at a meeting of the "People's Reconstructive League" on April 14. This is another organization in which the railroad labor leaders are active. A delegation from the meeting, which included the national legislative representatives of the four train service brotherhoods, called on congressional leaders to urge a "restoration of the railroads to unified government operation."

Railroad Bills in Congress

In the usual flood of bills which are introduced at the opening of a Congressional session, a large number pertaining to railroad matters this year are "old-timers," having been pending without action in previous sessions. The most important was the resolution providing for a general investigation of the railroad situation by a Senate committee. Most of the bills introduced were referred to committee. There is no change in the membership of the Senate committee of which Senator A. B. Cummins of Iowa is chairman. There have been several changes, however, in the House committee and Samuel E. Winslow of Massachusetts has been elected chairman to succeed John J. Esch, who was not returned to Congress but has been appointed a member of the Interstate Commerce Commission. The other members of the committee are as follows: James S. Parker, New York; Burton E. Sweet, Iowa; Walter R. Stiness, Rhode Island; John G. Cooper, Ohio; Edward E. Denison, Illinois; Everett Sanders, Indiana; Schuyler Merritt, Connecticut; J. Stanley Webster, Washington; Evan J. Jones, Pennsylvania; Carl E. Mapes, Michigan; William J. Graham, Illinois; Sherman E. Burroughs, New Hampshire; Walter H. Newton, Minnesota, and Homer Hoch, Kansas, republicans; and A. W. Barkley of Kentucky, S. Rayburn of Texas, G. Huddleston of Alabama, C. F. Lea of California, P. B. Johnson of Mississippi and H. B. Hawes of Missouri, democrats.

Among the bills relating to railroads introduced in the Senate are the following: By Senator Poindexter, to amend Section 4 of the interstate commerce act to provide a rigid long and short haul rule and to prohibit interference with commerce. This bill was passed by the Senate at the last session but received no further consideration. By Senator McKellar, a bill authorizing and directing the Interstate Commerce Commission to establish a system of mileage books to be issued to commercial travelers at reduced rates. By Senator Smoot, two bills to amend Section 10 of the Clayton act, similar to the Townsend bill reported by the Senate committee last session. By Senator Cummins, a bill to amend the safety appliance act and a bill to make it unlawful to give commissions, bribes or rewards to employees or to accept them. By Senator Harrison, a bill to establish

the standard of work and duty of common carriers of freight and to establish uniform rates.

Senator Pittman of Nevada presented to the Senate a resolution of the Nevada legislature petitioning Congress to amend the transportation act to protect and preserve the powers of the several states with relation to intrastate rates, services and facilities. Senator Ashurst of Arizona presented a similar resolution by the legislature of Arizona. Senator Trammell of Florida presented a resolution directing the interstate commerce committee to investigate the high freight rates being charged on citrus fruits, vegetables and other perishable farm products, with a view to bringing about early legislation that will result in a reduction in the existing freight rates on such perishable products. Senator Jones of Washington introduced a bill exempting vessels of the United States from paying tolls when passing through the Panama Canal. This was referred to the committee on interoceanic canals. Senator Frelinghuysen re-introduced his bill for seasonal coal rates.

Bills introduced in the House of Representatives include one by Representative Tinch of Kansas to abolish the Railroad Labor Board and transfer its functions to the Interstate Commerce Commission. Representative Logan introduced a bill to provide a penalty of \$50 for failure of a common carrier to adjust and pay in 40 days claims for freight overcharge or for loss or damage. Representative Madden re-introduced his bill to abolish the use of "Jim Crow" railroad cars for negroes by prohibiting discrimination on account of race, color or previous condition of servitude. Representative Anderson introduced a bill to require carriers to supply necessary warehouse facilities. Representative Black re-introduced his joint resolution directing the Railroad Labor Board to make further investigation of the wages of railroad employees and such modifications in its decisions as are justified in the public interest and directing the Interstate Commerce Commission at the same time to review its rate decision and make such reductions in rates as it may find to be just and reasonable. Representative Wright introduced a bill to prescribe rates, fares and charges of railroads for a period of one year. Representative Blanton introduced a bill to prohibit strikes on railroads.

Senator Lenroot has re-introduced in the Senate his measure of last session to provide for the creation and organization of the National Railway Corporation and for the acquisition, control and operation of railroads and water carriers by it under what is known as the Amster plan.

Senator Smoot has introduced a bill to amend Section 10 of the Clayton act, so that none of its provision shall apply to any railroad which is wholly owned by a person or corporation whose plant or factories such railroad is principally engaged in serving, nor to any director, agent or officer of any such road.

Senator McKellar: to authorize the Interstate Commerce Commission to establish mileage books for commercial travelers at 20 per cent less than regular passenger fares.

Senator Watson: to require railroads to issue interchangeable, non-transferable 5,000 mile tickets for 2½ cents a mile. The bill, however, provides for a modification of the rate from time to time by the Interstate Commerce Commission in accordance with changes in the average rate level.

Representative Mason: authorizing carriers to make special rates for school children and necessary attendants between any states in the United States and Washington, D. C., to enable them to visit the Capital for educational purposes.

Senator Cummins: to amend the valuation act by striking out the requirement that the commission report separately the original and present cost of condemnation and damages or of purchase of land.

Senator Fletcher: to amend Section 206 of the interstate commerce act so that freight claims based on alleged unreasonable rates during federal control may be filed with the commission within two years from the termination of federal control.

Representative Wright: forbidding railroads, for one year beginning 30 days after its passage, to charge rates higher than those in effect on February 27, 1920; and during the prescribed year the Interstate Commerce Commission "shall fix new rates under the terms of the transportation act, taking into consideration the business and financial conditions of the section or territory to be affected by the rates."

Traffic News

The New York State Barge Canal is to be opened on May 1. The Transmarine Corporation of Newark, N. J., expects to use 20 barges in freight service on the canal. The United States War Department, which has a fleet of 70 barges, has, as yet, taken no public action looking to the beginning of service.

A reduction in freight rates on Canadian roads approximating \$4.30 a thousand feet on lumber and shingles from British Columbia points to Toronto will become effective on April 21. The reduction is authorized by the Canadian Railway Commission to permit British Columbia lumbermen to compete with lumbermen of the Southern states.

Anthracite Shipments in March

The shipments of anthracite in March as reported to the Anthracite Bureau of Information, amounted to 5,737,771 gross tons as compared with 5,966,101 tons during the preceding month of February, and 6,077,821 tons in March, 1920. The decrease is attributed to the mild weather and to consumers' holding off on account of uncertainty as to April prices. The total shipments for the coal year ending March 31, amounted to 69,366,731 tons as compared with 69,815,034 for the year ended March 31, 1920, a decrease of 448,303 tons, which, considering the mild weather of the past winter, is remarkably small.

Shipments by originating carriers were:

	March, 1921	February, 1921
P. & R.	1,018,858	1,170,753
L. V.	1,022,714	1,063,508
C. of N. Y.	540,556	515,551
D. L. & W.	1,020,381	920,788
D. & H.	837,644	813,191
Penna.	333,687	426,350
Erie	561,013	633,705
N. Y. O. & W.	144,330	153,017
L. & N. E.	257,988	269,237
Total	5,737,771	5,966,101

Coal Production

The coal year came to an end on April 1 with production of soft coal still declining, according to the weekly bulletin of the Geological Survey. The output for the week ending April 2 was estimated at 5,797,000 net tons, a decrease of 7 per cent as compared with the week preceding. How much of the decline in output was due to the occurrence of the Mitchell Day holiday on April 1 and of Easter Monday, and how much to a further slackening in demand, is said to be uncertain. For the week as a whole, the two days seem to have accounted for about 1½ normal working days. The estimated production for the month of February, according to the bulletin, was 30,851,000 tons as compared with 40,270,000 tons in January and 52,123,000 in December. The total bituminous production for the coal year ended March 31 is estimated at 522,000,000 net tons as compared with 486,899,000 tons in 1919-1920, 552,041,000 in 1918-1919, 548,715,000 in 1917-1918, and 504,102,000 in 1916-1917.

The first week of the new coal year, that ending April 9, brought no relief from the depression which has affected the bituminous industry in recent months, says the weekly bulletin of the Geological Survey. The total output of soft coal is estimated at 6,089,000 net tons. Although this was an increase over the output of the holiday week preceding, the rate per working day declined slightly.

The National Coal Association has issued a review of the soft coal situation urging efforts to obtain an even distribution of coal output the year round. The statement points out that there should be an average weekly production of approximately 10,500,000 to 10,750,000 tons and that if production falls below this line of safety for any material period there will be danger of a pinch later. "It is all a matter of transportation," the statement says. "If the mines have the cars as they are needed, the public will have its coal. How to keep the bituminous coal moving so that the railroads do not become clogged . . . is a problem that confronts the industry no less than the railroads."

Commission and Court News

Interstate Commerce Commission

The Commission has further suspended until June 4 the operation of the proposed increased charges from \$2.50 to \$7.00 per car for switching cars between industries located on the St. Louis-San Francisco and interchange tracks of connecting lines, published in a St. Louis-San Francisco company's tariff, the operation of which was suspended until May 5.

The commission has suspended from April 20 until August 18 the operation of certain schedules published by the Missouri Pacific which propose to eliminate the existing transit privileges on grain and grain products at St. Louis, Kansas City, Mo., Atchison, Kan., and other points, when destined to Texas Gulf Ports for export on shipments originating at points on the Missouri Pacific in Missouri, Kansas, Nebraska and Colorado, Colorado.

The Commission has further suspended until May 17 certain class and commodity rates between points in defined territories in eastern and southern group to points in southwestern territory. The suspended schedules propose to apply an increase of 35 per cent over the rates in effect on August 25, 1920, to and from the basing points, used in the construction of through rates in lieu of these interterritorial percentage increase of 33 1/3 per cent established under approval of the Commission in Case No. 74, Ex Parte, the operation of which was suspended until April 17, 23 and 30, 1921, by orders previously issued.

The Commission, deciding the case instituted by the National Industrial Traffic League, holds that the commission is without jurisdiction to prescribe uniformity in the liability clauses of contracts for the construction, maintenance and use of private sidetracks. The liability clauses contained in the contracts made by most of the railroads were attacked by the league as unjust, unreasonable and unduly prejudicial, but after negotiations between the League and the railroads a set of liability clauses was jointly submitted to the commission with a request that it recommend their general adoption.

Personnel of Commissions

President Harding on April 14 sent to the Senate the nomination of John J. Esch for appointment as a member of the Interstate Commerce Commission. Mr. Esch has been serving under a recess appointment.

New Commissioners in New York

The new public service commissioners of the State of New York, provided for in the law revising the commissions, which was noticed in the *Railway Age* of April 15, page 928, were announced by the governor on April 16. The chairman is William A. Prendergast of New York City, former comptroller of the city. His term expires on February 1, 1931. The other commissioners are William K. Pooley of Buffalo, for a term expiring February 1, 1929; Charles Van Voorhis of Rochester, for a term expiring February 1, 1927; Oliver C. Semple of New York, to February 1, 1925, and Charles G. Blakeslee of Binghamton until February 1, 1923.

Mr. Prendergast took part in the negotiations between New York City and the railroads when the subway contracts of 1913 were made. He served twice as city comptroller. Mr. Van Voorhis is a leading Republican in Monroe County. Mr. Semple took part in an investigation of the New York City transit lines. He has counseled Governor Miller in public utility matters. Mr. Blakeslee is an engineer as well as a lawyer, and is corporation counsel of Binghamton. He went to France as a lieutenant and came back as a major. He is state commander of the American Legion.

For the "Transit Commission," to exercise authority over local transportation within New York City, the governor named as chairman George McAney, former president of the board of

aldermen; Leroy T. Harkness, who has had much experience as a legal officer of former New York City commissions, and Major-General John F. O'Ryan. General O'Ryan, a lawyer, commanded the 27th division of the American Expeditionary Forces in France, and is now the head of the New York National Guard.

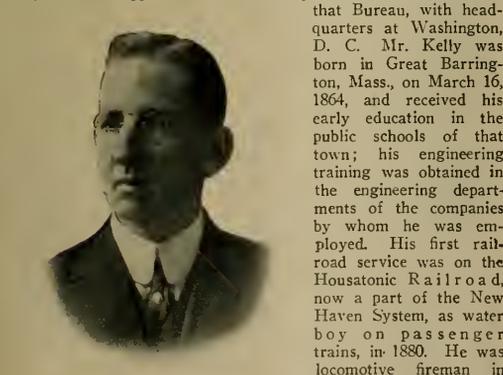
John J. Esch assumed his duties as a member of the Interstate Commerce Commission under a recess appointment pending his confirmation by the Senate.

Mr. Esch's appointment was confirmed by the Senate on April 18 by a vote of 52 to 3. Those who opposed him were Senators La Follette of Wisconsin, Trammell of Florida, and Watson of Georgia. Senator La Follette submitted a long minority report dissenting from the action of the committee on interstate commerce in recommending Mr. Esch's confirmation, in which he said that an examination of the records of Congress during the 17 years of Mr. Esch's services on the committee on interstate and foreign commerce "will show that he has been in substantial accord with the governmental policies in which the carriers of the country have been brought to their present plight and that his attitude revealed in his speeches and votes has been one of consistent friendliness to the railroads."

Mr. La Follette says that for many years Mr. Esch joined with his colleagues on the committee in ignoring recommendations of the commission; that he did not become an advocate of railroad valuation until the fight had been practically won; that he supported the federal control bill which, the Senator says, gave the railroads an exorbitant rental, that he voted for what Senator La Follette refers to as the 6-per-cent guaranty in the Transportation Act, and that he supported the bills extending the effective date of Section 10 of the Clayton law and to provide for the payment of the six months' guaranty. The Esch-Cummins law as it exists today was the work of Mr. Esch and the results of its application may be attributed largely to his authorship. The appointment of Mr. Esch to the Interstate Commerce Commission at this time, he said, will be an act of great significance to the people of the country who are crying for relief from conditions which have been aggravated by the operation of the Esch-Cummins law. It is recognized that Mr. Esch is more responsible than any other one man for the present Transportation Act.

John P. Kelly

John P. Kelly, for the past two years inspector of safety appliances in the Bureau of Safety, Interstate Commerce Commission, has been appointed senior railway mechanical engineer for that Bureau, with headquarters at Washington, D. C.



J. P. Kelly

born in Great Barrington, Mass., on March 16, 1864, and received his early education in the public schools of that town; his engineering training was obtained in the engineering departments of the companies by whom he was employed. His first railroad service was on the Housatonic Railroad, now a part of the New Haven System, as water boy on passenger trains, in 1880. He was locomotive fireman in 1884, and locomotive engineer in 1887. He served as locomotive engineer on the New Haven and later on the New York Central; and in 1898 was appointed air brake instructor on the Central. In 1899 he was road foreman of engines on the Chicago & Alton; in 1901 he went to the New York Air Brake Company, where later he was appointed assistant mechanical engineer. In 1905 he resigned and went to the Westinghouse Air Brake Company but in 1910 resigned and devoted his time to the business of consulting air brake engineer, and to writing for the technical press. In 1912 he entered the employ of the New York Central Lines as consulting air brake engineer. Later he went into government employ as above stated.

Foreign Railway News

Chinese Government to Order Locomotives

The Chinese Government is asking for bids on 41 locomotives to be supplied to the government railways, according to advices from Commercial Attache Julian Arnold at Peking. All bids received will be opened at Peking on June 15. The purchase of these locomotives will be financed by a group of Chinese bankers.

Retirement of England's Minister of Transport

LONDON.

Sir Eric Geddes, Minister of Transport, is to retire from this position in August next, when the State control of the railways ends. Sir Eric wished to resign from the Government in 1918, but was persuaded to remain for a period of two years in order to organize the whole system of transportation on a workable basis. Sir Eric Geddes stated that he will not renew his connection with any railway company.

Roumanian Committee to Study Railway Problems

LONDON.

It is announced that the Roumanian Ministry of Communications has appointed a special committee to study the problem of the railway organization and the possibility of electrification of part of the Roumanian railways. The committee consists of technical and financial experts and is to visit the United States, France and Italy, to study what facilities and credit institutions are offered in these countries for co-operating with Roumania for the electrification of the State railways.

Locomotive Building in France

LONDON.

The French output of locomotives at the end of the year 1922 will be 1,300 per annum. As its normal home consumption will not be more than 600, France will, states the Times (London) Commercial Supplement, become an important rival in South America and other foreign countries. At present, however, the workshops are busy refitting the home railways, not yet having executed the order placed just after the armistice of 1,100 locomotives.

Proposed Purchase of British Railroad in the Dominican Republic

It is reported that the Dominican government has been considering the purchase from the British owners of the Samana & Santiago, which connects the various towns in the interior with the port of Sanchez. The road is a 4-ft. gage, and has about 100 miles of track. It is understood that the price for which it was offered to the government was somewhat under \$2,500,000. Further information may be obtained from the Bureau of Foreign and Domestic Commerce or any of the district and co-operative offices upon reference to file No. 24151.

Inspection of the Orient in Mexico

Representatives of British and American interests which own the Kansas City, Mexico & Orient are making a trip of inspection of that property with the view of determining the advisability of constructing in the near future the unfinished gaps in the line in Texas and Mexico, as well as building the proposed branch line that is to run from San Angelo to Del Rio, according to reports from San Angelo, Tex. At Del Rio this line would connect with the transcontinental road of the Southern Pacific and with the branch line that the National Railways of Mexico is constructing from Allende, Mexico, to Villa Acuna, situated just across the Rio Grande from Del Rio. The inspection party consists of Frederick Hurdle and W. S. Poole of London, Eng., and Charles H. Jones of New York. Mr. Hurdle stated while in San Angelo that if a favorable report is made on the project all of the gaps will be built at the earliest possible time, and that the branch line between San Angelo and Del Rio would be the first work done.

American Specifications for France

The United States Department of Commerce is now translating into French, for publication in a French-English edition, 62 specifications of the American Society for Testing Materials particularly applicable to export trade. These specifications include those for rails and splice bars, structural and reinforcing steels, steel forgings and castings, steel wheels and tires, steel and iron tubes and pipe, boiler steels, wrought-iron products, pig iron, cast-iron pipe, malleable and gray-iron castings, copper wire, copper bars, spelter, bronze, cement, linseed oil and turpentine. These same specifications were translated into Spanish two years ago, and have since been distributed among consular offices and elsewhere in South America.

Exports of Car Wheels and Axles in February

The exports of car wheels and axles in February were valued at \$306,076. Shipments to the value of \$72,518 went to Cuba and \$56,523 to Chile. The detailed figures by countries, as compiled by the Bureau of Foreign and Domestic Commerce follow:

Countries	Dollars	Countries	Dollars
France	95	Brazil	5,256
Netherlands	1,107	Chile	56,523
Spain	12,950	Colombia	2,000
Switzerland	250	Ecuador	188
England	263	Paraguay	1,800
Canada	11,455	Peru	3,153
Costa Rica	1,835	Uruguay	8,500
Guatemala	750	China	92
Honduras	736	Kwangtung, leased territory	3,840
Mexico	85	British India	3,032
Panama	47,471	Dutch East Indies	41,156
Jamaica	360	Japan	11,688
Trinidad and Tobago	183	New Zealand	458
Cuba	72,518	Philippine Islands	6,580
Dutch West Indies	313	British South Africa	291
Dominican Republic	2,973	Portuguese Africa	1,470
Argentina	6,725	Total	306,076

January Exports of Car Wheels and Axles

January's totals of exports of car wheels and axles show a decided improvement over the figures for December. The total exports for the month were valued at \$802,351, and Brazil, with \$230,515 of this equipment, was the country which led all the others in the value of the shipments of this material. The detailed figures by countries, as compiled by the Bureau of Foreign and Domestic Commerce, are as follows:

Countries	Dollars
Belgium	21,421
France	80
Spain	9,600
Canada	70,817
Costa Rica	2,829
Guatemala	6,406
Honduras	4,012
Nicaragua	1,610
Panama	4,888
Mexico	56,126
Jamaica	3,554
Trinidad and Tobago	5,714
Cuba	30,436
French West Indies	290
Dominican Republic	1,375
Argentina	22,550
Brazil	230,515
Chile	53,300
Colombia	4,547
Ecuador	1,620
British Guiana	4,523
Paraguay	2,430
Peru	28,458
China	81,466
British India	6,672
Dutch East Indies	71,800
Japan	36,211
Australia	979
New Zealand	1,380
Philippine Islands	31,738
Morocco	4,200
Total	802,351

Roumanian Plan for Financing

Locomotive Purchases

LONDON.

A decree issued on January 26, 1921, authorizes the Roumanian Minister of Communications to make contracts along the lines indicated in a pro forma agreement. These agreements are to be made between national or local authorities and private firms who either pay for locomotives acquired by the Railroad Administration, or themselves purchase locomotives of types to be approved by the Railroad Administration. The agreements will give

to the firms advancing the necessary sums, or purchasing directly such locomotives, the right to run the locomotives for the purpose of transporting their own goods or goods purchased by them in the course of business. The necessary rolling stock is to be placed at the disposal of the firms supplying the locomotives and the trains will be run on a fast freight schedule, but contracting firms are to debit themselves with the ordinary transportation charges and are entitled to keep the locomotives at their own disposal until the sum of these ordinary transportation charges covers the cost of the purchase of the locomotives. Although the pro forma agreement does not clearly state it, it is understood that the firms advancing the necessary money or purchasing the locomotives will have the right to charge interest on the sums advanced.

Car Exports in February

The totals for the exports of passenger cars in February fell off sharply from the January figures and a measurable decline in freight car exports is also noted. The passenger cars shipped totaled 5, valued at \$20,725, and the freight cars 1,383, valued at \$2,314,499. Parts of cars exported during the month were valued at \$2,230,176, a marked increase over January. Cuba was the destination of 1,005 of the freight cars and Argentina of car parts to the value of \$1,100,922. The detailed figures by countries, as compiled by the Bureau of Foreign and Domestic Commerce, follow:

Countries	STEAM Passenger		Freight and other		Parts of cars. Dollars
	Number	Dollars	Number	Dollars	
Germany	622
Norway	65
Spain	1	9,950	5,811
England	13,660
Scotland	194
Bermuda	70,151
Canada	3	3,400	25	38,367	64
Costa Rica
Guatemala
Honduras	206
Nicaragua	2,326
Panama
Salvador	81,670
Mexico	185	233,887	106,821
Newfoundland and Labrador	1,506
Jamaica	5,915
Trinidad and Tobago	49,204
Cuba	1,005	1,644,414	423,347
Dominican Republic	3	2,250	6,402
Argentina	1,100,922
Bolivia	1	1,919	75,500
Brazil	30,168
Chile	27,472
Colombia	2	17,325	38	86,260	17,790
Peru	7	14,770	11,530
Uruguay	4,784
Venezuela	8,145
China	4	29,108	12,233
Kwangtung, leased territory	7,881
Chosen	16,361
British India	816
Other British East Indies	5,850
Dutch East Indies	110,301
Hongkong
Japan
Siam
Australia	6	20,100	6,487
New Zealand	192
Philippine Islands	30	95,490	35,576
British South Africa	77,582
Morocco
Portuguese Africa	20	56,314	120
Total	5	20,725	1,383	2,314,499	2,230,176

Railway Wages in England

LONDON.

The London Times reports that the National Union of Railwaymen has decided to impose an additional levy of 12 cents per week upon all its members. It is reported that this additional revenue will be used to increase the unemployment benefit and strengthen the resistance of out-of-work members to accepting wages below the present rates.

It is evident that the railway unions are endeavoring to strengthen their financial position in an attempt to meet any situation that may arise, either in regard to wages or the final solution of the railway problem which is soon to be discussed in Parliament. According to the present railway agreements, which the railwaymen have thus far shown no disposition to question, the wages of the railwaymen cannot be reduced below an average of about 125 per cent above their pre-war rates. It will be remembered that the English railwaymen have agreed to a sliding scale of wages depending upon the cost of living. The present figures in this respect indicate that there will be an average reduction of

about a dollar a week in wages on account of decreased cost of living, which the railwaymen have stated they are ready to accept in accordance with their agreement.

At the present time the annual wage bill of the railways has increased from \$235,000,000 in 1913 to \$865,000,000 (at par). The 8-hour day is responsible for a large amount of this increase. In some cases, as that of small stations open for, say, 10 hours, two men, whose hours overlap, are often required to perform one man's work. An instance was mentioned in Scotland where before the war 15 men were engaged for certain work at a total cost of \$3,410. At the present time 30 men are required for the same work at a cost of \$37,075.

The Railway Wages Board of Great Britain has, in accordance with the latest Board of Trade figures on the cost of living, and further in accordance with the wage agreement between the government and the unions, reduced the weekly wages of the railwaymen by four shillings (about \$1.00 at par) per week. Since the beginning of April, 1920, wages have been increased eight shillings a week (about \$2.00) in accordance with this scale, and the present reduction, which takes effect on April 1, is the first to have been made under the sliding scale. It is estimated that this reduction of four shillings a week will reduce the railways' wage bill by approximately \$29,000,000. The railway clerical staffs have also been affected by a fall in the cost of living. They will suffer a reduction of about \$100 a year in salaries.

Track Material Exports in February

The exports of track materials in February showed some decline over January's totals, but the falling off is not serious except in the case of track spikes, of which the February shipments were but 2,742,959 lb., valued at \$144,675. Rails weighing 59,300 tons, valued at \$3,603,938, and miscellaneous materials valued at \$1,148,612 are the other totals. The detailed figures as compiled by the Bureau of Foreign and Domestic Commerce follow:

Countries	Railroad spikes		Rails of steel		Switches, frogs, splice bars, etc.
	Pounds	Dollars	Tons	Dollars	
Belgium	.....	.....	470	\$31,178	\$9,233
Finland	7,700	\$62	24	1,626	.....
France	.....	.....	308	13,886	.....
Italy	.....	.....	40	2,400	.....
Netherlands	.....	.....	945	68,408	4,271
Norway	.....	.....	.....	.....	200
Portugal	27,000	1,401	48	4,494	9,096
Roumania	.....	.....	.....	.....	2
Spain	.....	.....	411	60,999	3,348
Sweden	.....	.....	1,842	134,004	6,422
England	.....	.....	3	180	1,917
Scotland	.....	.....	3,555	239,520	7,508
Ireland	.....	.....	.....	.....	687
Canada	104,445	4,761	316	15,253	28,855
Costa Rica	1,000	114	.....	.....	640
Guatemala	.....	.....	.....	.....	15,935
Honduras	194,944	6,020	2,352	145,840	16,029
Nicaragua	21,800	1,034	15	997	120
Panama	33,200	1,639	20	1,180	4,531
Salvador	1,000	70	.....	.....	161
Mexico	467,334	24,467	938	22,389	14,015
Trinidad and Tobago	15,800	861	588	40,533	6,687
Other Brit. West Indies	.....	.....	5	349	.....
Cuba	517,538	22,938	4,120	262,298	111,363
Virgin Islands of U. S.	.....	.....	.....	.....	1,275
French West Indies	.....	.....	23	2,000	575
Haiti	.....	.....	23	2,000	1,941
Dominican Republic	74,300	3,023	159	9,283	7,725
Argentina Republic	76,200	5,005	823	52,945	53,009
Bolivia	.....	.....	.....	.....	3,059
Brazil	315,329	15,577	2,062	128,305	79,562
Chile	.....	.....	81	5,107	14,771
Colombia	11,000	547	601	40,019	24,204
Ecuador	.....	.....	12	1,060	175
British Guiana	.....	.....	.....	.....	190
Peru	53,380	2,466	686	48,348	30,262
Uruguay	.....	.....	472	32,210	10,354
Venezuela	300	29	.....	.....	5,773
China	186,700	13,002	9,846	598,616	100,646
Kwantung, leased territory	270,000	11,401	.....	.....	5,891
Chosen	4,000	274	73	5,078	773
British India	96,116	3,823	1,581	107,656	13,171
Straits Settlements	.....	.....	138	10,821	571
Other Brit. East Indies	.....	.....	35	3,500	.....
Dutch East Indies	191,271	22,058	11,048	698,012	83,992
Siam	8,960	1,022	135	10,030	335,169
Australia	.....	.....	2,953	200,879	.....
New Zealand	.....	.....	1,291	97,797	9,126
Philippine Islands	607	74	399	27,375	3,124
British South Africa	59,525	2,599	2,329	147,656	42,654
British East Africa	.....	.....	487	34,958	4,845
French Africa	.....	.....	4,807	108,676	2,015
Portuguese Africa	4,810	308	2,592	165,200	72,725
Egypt	.....	.....	250	18,928	.....
Total	2,742,959	\$144,675	59,390	\$3,603,938	\$1,148,612

Equipment and Supplies

Locomotives

The LOUISVILLE & JEFFERSONVILLE BRIDGE & RAILROAD COMPANY is inquiring for some 0-6-0 type locomotives.

MITSUI & COMPANY, New York, are inquiring for 6 English type, 4 wheel, coupled, passenger locomotives, for the Shanghai-Hanchow Railway, China.

The JAPANESE GOVERNMENT has ordered from the Baldwin Locomotive Works for the Imperial Household 3 saddle tank locomotives with a total weight in working order of 16,000 lb.

Freight Cars

The BEACON OIL COMPANY, Boston, Mass., has ordered 20 tank cars, of 10,000 gal. capacity, from the General American Tank Car Corporation.

MITSUI & COMPANY, New York, are inquiring for 40 all-steel air dump cars, for the South Manchurian Railway, and also for 40 all-steel box cars of 40-ton capacity, for the Shanghai-Hanchow Railway, China.

MITSUI & Co., 65 Broadway, New York, representing a Chinese banking group and on behalf of the Chinese Ministry of Communications, are inquiring for 100 all-steel 40-ton gondola cars for the Pekin-Kalgan; also for 100 all-steel 40-ton box cars for the Tientsin-Pukow.

Passenger Cars

The TIENSIN-PUKOW is inquiring through the car builders for from 30 to 50 passenger cars.

BETANZOS FERROL RAILWAY.—Bids will be opened on April 25, at Madrid, Spain, for 34 passenger and 4 baggage cars.

THE SAO PAULO-RIO GRANDE (Brazil) is inquiring through the car builders for some passenger train equipment, to include sleeping cars.

MITSUI & Co., New York, are inquiring for 6 first-class and 6 second-class sleeping cars, 6 dining cars, 6 combination first and second-class, 10 third-class and 6 third-class with buffet passenger cars, for the Peking, Hankow Railway, China. This company also ordered from J. G. Brill & Company, 141 car sets of trucks, for the Osaki Municipal Railway.

Machinery and Tools

The DULUTH & IRON RANGE, Duluth, Minn., is inquiring for a 90-in. wheel lathe, 2 16-in. engine lathes, 1 14-in. engine lathe and a 48-in. by 48-in. by 12-ft. planer. All of these machines are to be motor driven.

R. S. STOKVIS & SONS, INC., 17 Battery Place, New York, has received specifications comprising about 250 tools for machine shop equipment for a railroad project in Africa. Complete specifications will be issued shortly and tenders submitted as soon as quotations have been received from manufacturers. The list includes a double centering machine axle lathe, vertical lathe, car wheel lathe, hydraulic shrinking press, extension gap lathes, turret lathes, shapers, high speed drills, planers, slotters, horizontal milling machines, double reaming machines, shearing machines, forging machines, bulldozers, steam power hammer, double frame steam power hammers, compressed air hammers, spring leaf shaping machines, leaf bending machine, hydraulic presses, universal shearing and punching machine, double shear and punch, plate straightening machine, rotary shearing machine, hydraulic press for boiler heads, double-end grinding machine, radial drills, double-head bolt threading machine, bolt pointing machine, nut threading machine, 14 in. lathe facing lathes, vertical drilling, reaming and grooving machine, milling machine, grinding machine, vertical grinding machine, tool grinder, twist drill grinder, disk polishing and grinding machines, universal radial.

Supply Trade News

The Roberts & Schaefer Company will remove its office on April 23 from the McCormick building to the Wrigley building, Chicago.

Homer C. Johnstone, formerly with the Midvale Steel Company, now represents the Gould Coupler Company, with headquarters at New York City.

The Consolidated Steel Corporation has removed its office from 165 Broadway to the Cunard building, 25 Broadway, New York City.

The Wonham, Bates & Goode Trading Corporation has removed its office from 17 Battery Place to 251 Fourth avenue, New York City.

D. T. Groff has been elected vice-president of the Jefferson Union Company, Lexington, Mass., and C. E. Cook, who was traveling representative, has been appointed sales manager.

The Hutchins Car Roofing Company, Detroit, Mich., will remove its New York City office on May 1 from 103 Park avenue to room 910 Canadian Pacific building, 342 Madison avenue.

The Southern Hardware & Supply Company, St. Louis, Mo., has appointed E. L. Ruby, Eastern sales agent, 1338 Real Estate Trust building, Philadelphia, Pa., for the sale of Saunders car stopper.

Victor T. Goggin, formerly New England sales manager of Fred T. Ley & Co., Springfield, Mass., has been appointed contracting engineer with Dwight T. Robinson & Co., Inc., with headquarters at New York City.

The Gold Car Heating & Lighting Company on May 1 will remove its offices from 17 Battery Place, New York City, and its warehouse to larger quarters at the Bush Terminal, 220 Thirty-sixth street, Brooklyn, N. Y.

H. G. Barbee, formerly in charge of eastern railroad sales of the Chicago Pneumatic Tool Company, has been appointed manager railroad sales, with headquarters in the Chicago Pneumatic building, 6 East Forty-fourth street, New York.

Dwight E. Robinson, until recently eastern railway representative of E. I. Du Pont de Nemours & Co., on May 1 will become manager of the railway sales department of Breinig Brothers, Inc., manufacturers of paints and varnishes, Hoboken, N. J.

The Keller Pneumatic Tool Company, Grand Haven, Mich., announces the removal on May 1, of its Chicago branch to larger and more up-to-date salesrooms and service station, on the main floor in the Transportation building, 624 South Dearborn street, Chicago.

The Merchants Shipbuilding Corporation, New York, announces that it will extend operations at its Chester, Pa., plant from the shipbuilding field into general steel construction. Power plant equipment, plate shop work and railroad equipment, to consist of the fabrication of steel for structures and for general structural work, will in future be manufactured at the plant.

Frank N. Grigg has been appointed southeastern sales manager of the Morton Manufacturing Company, with headquarters at 630 Louisiana avenue, Washington, D. C. Mr. Grigg will handle the sale of the entire "Acme Line" of railway appliances. C. H. Kadie, formerly master mechanic on the Southern Railway, is now in the sales department of this company and will assist Mr. Grigg.

John Hyland, formerly in the railway supply business at Chicago, is now located at Atlanta, Ga., representing the Edgewater Steel Company, Pittsburgh, Pa., the Joliet Rail-

way Supply Company, Burry Railway Supply Company, DeRemer-Blatchford Company, G. S. Wood Company and the Economy Torch Company, all of Chicago. His headquarters are at 1209 Fourth National Bank building, Atlanta, Ga.

The W. R. Hickman Lumber Company has been organized in Cleveland, Ohio, with W. R. Hickman, for the past five and a half years sales manager for the Nicola Stone & Myers Company, as president. The company will specialize in railroad and industrial lumber, handling yellow pine, West Coast stock, ties and hardwood car material. The general offices of the company are at 1264 Hanna building, Cleveland, Ohio, with representatives in Hattiesburg, Miss., and Seattle, Wash.

The Texas Company, Houston, Texas, announces the following appointments in its railway sales department. On February 1, W. H. Noble was appointed district manager at Chicago, vice John J. Flynn, deceased. On March 1 an office was established at St. Louis, Mo., 1689 Arcade building, with F. E. Sheehan, representative in charge, and an office in Los Angeles, Cal., 1206 Merchants National Bank building, with J. B. Flynn, representative in charge. Effective April 1, an office was established at Oklahoma City, Okla., with L. R. Dallam, representative in charge.

F. B. Jewett, chief engineer of the Western Electric Company, has been elected a vice-president and director of the company, continuing his present duties in charge of the technical forces of the company. Dr. Jewett, who was a lieutenant-colonel in the Signal Corps during the war and was decorated with the Distinguished Service Medal, was born at Pasadena, Cal., on September 5, 1879. He was graduated from the electrical engineering course of Throop Polytechnic Institute, of Pasadena, in 1898. From that time until June, 1902, he was a graduate student at the University of Chicago. During the next two years he was instructor in physics and electrical engineering at the Massachusetts Institute of Technology. Dr. Jewett's connection with the commercial telephone business dates from September, 1904, when he became transmission engineer for the American Telephone & Telegraph Company. While acting in this capacity, the loading of eight gage circuits was perfected; phantom tables and phantom loading for open wires and cables were developed; the New York to Denver circuit and line was engineered and also the Boston to Washington underground cable. In April, 1912, Dr. Jewett became assistant chief engineer of the Western Electric Company in charge of all development and research work. He has been chief engineer since 1916. Dr. Jewett was an advisory member of the Special Submarine Board of the Navy and contributed much towards the perfection of devices for detecting hostile submarines. The perfection of wireless telephoning is one of the undertakings which was completed under his direction.



F. B. Jewett

The Air Reduction Sales Company, Inc., manufacturers of Aircro oxygen, acetylene and welding and cutting apparatus, will move its executive offices on May 1, from 120 Broadway to 342 Madison avenue, New York City. The New York district office at 160 Fifth avenue, New York, after May 1 will be located at the Aircro factory, 191 Pacific avenue, Jersey City, N. J. The company has secured control of the National Carbide Corporation of Virginia, with a new plant at Ivanhoe, Va., and beginning May 1, 1921, will direct the policy and control the operation and sales of the Carbide Corporation.

Railway Financial News

BELT RAILWAY OF CHICAGO.—Annual Report.—The annual report for the year ended December 31, 1920, shows the following income account as compared with 1919:

	1920	1919
Operating Income—		
Operating revenues	\$3,940,302	3,788,790
Operating expenses	3,763,022	445,700
Net revenue from operations	\$177,280	Dr. \$45,700
Tax accruals	251,482	14,859
Railway operating income	Dr. \$74,201	Dr. \$60,558
Non-Operating Income—		
Joint facility rent income	\$1,433,951	1,616,359
Income from lease of road	278,101	
Total non-operating income	\$1,812,823	\$1,691,306
Gross income	\$1,741,621	\$1,630,748
Deductions from Gross Income—		
Rent for leased roads	\$1,530,597	\$1,457,662
Interest on funded debt	716	255
Total deductions from gross income	\$1,568,821	\$1,457,947
Net income	\$172,800	\$172,800

The Belt Railway did not accept the guaranty for the six months ended August 31, 1920.

The operating revenues and expenses in detail of the Belt Railway compare as follows:

	OPERATING REVENUES		Increase or Decrease
	1920	1919	
Transfer switching	\$3,698,588	\$2,864,762	\$833,826
Local switching	937,118	864,059	73,059
Total operating revenues	\$4,704,324	\$3,780,322	\$924,002
	OPERATING EXPENSES		
Maintenance of way and structures	\$669,034	\$357,145		$311,889
Maintenance of equipment	762,632	665,153	97,479
Traffic	10,156	4,285	5,871
Transportation	2,959,763	2,260,654	699,109
General	117,291	146,333	-23,042
Total operating expenses	\$4,518,877	\$3,427,570	\$1,091,307

The number of cars handled by the Belt Railway in 1920, both interchange and local, was 1,045,814. In addition, there was a total of 320,462 cars interchanged between owner roads at Clearing and other yards, handled by the Belt Railway through such yards in 1920.

President H. G. Hetzler in the report refers to maintenance as follows:

The expense for maintaining roadway and structures increased \$311,889.05, or 87.3 per cent, and was due to the following causes:

- (1) Higher wage rates in effect under Decision No. 2 of the United States Railroad Labor Board.
 - (2) Increased unit prices for materials.
 - (3) More extensive maintenance work performed.
- The necessity for increased maintenance work in 1920 was largely the result of deferred maintenance growing out of the fact that a considerable portion of the property was acquired new or rebuilt under track elevation within the period 1911 to 1916, the natural result of this circumstance being that for a number of years accruing depreciation was greater than could profitably be offset with equal replacements. Hence a portion of the increased maintenance work in 1920 was due to normally deferred maintenance, and a smaller part due to circumstances which dictated a program of renewals below normal during the year 1919.

The business handled during the years 1920 and 1919 was approximately the same, but the extremely adverse conditions from the standpoint of efficiency which prevailed in the transportation department during the first three months of the switchmen's strike, were productive of very expensive operation, whereas only a comparatively small amount of business was handled during that period.

BOSTON & MAINE.—New Directors.—At the annual meeting of the stockholders in Boston on April 13 the board of directors was enlarged to nineteen. The new members chosen were Woodward Hutson, vice-president and general counsel, and William J. Hobbs, a vice-president of the company.

CHICAGO, SAINT PAUL, MINNEAPOLIS & OMAHA.—Annual Report.—The corporate income account for the year ended December 31, 1920, compares as follows:

	1920	1919
Operating revenues	\$26,489,817	23,767,081
Operating expenses	23,767,081	
Net revenue from railway operation	2,722,736	
Tax accruals	1,461,938	
Uncollectible railway revenues	8,285	

Railway operating income	1,252,513	
Net rental income	37,717	
Net railway operating income	1,290,351	
Compensation for lease of road	815,603	\$4,934,790
Compensation guaranty period	2,740,197	
Total non-operating income	3,785,649	
Gross income	5,075,879	5,031,160
Interest on funded debt	2,405,763	2,282,180
Total deductions from gross income	2,488,209	2,654,443
Net income	2,587,670	2,376,718
Dividends:		
Preferred stock, 7 per cent	788,151	788,151
Common stock, 5 per cent	927,835	927,835
Balance income for year	871,684	660,732

The annual report of the Chicago, Saint Paul, Minncapolis & Omaha will be reviewed editorially in an early issue.

CENTRAL VERMONT.—Asks Authority to Issue Bonds.—This company has applied to the Interstate Commerce Commission for authority to issue \$100,000 of 5 per cent refunding gold bonds to cover additions and betterments made since January 1, 1920.

CHICAGO GREAT WESTERN.—Annual Report.—A review of this company's annual report for 1920 appears on another page of this issue.

CHICAGO & ALTON.—Authorized to Issue Stock.—The Interstate Commerce Commission has authorized this company to issue (1) 1,753 shares of its cumulative four per cent prior lien and participating stock; (2) 514 shares of its non-cumulative four per cent preferred stock; and (3) 45 shares of its common stock, in exchange for stocks of the old Chicago & Alton Railway Company and the Chicago & Alton Railway Company, which were consolidated March 8, 1906, into the present company.

CHICAGO & NORTH WESTERN.—Annual Report.—The annual report for the year ended December 31, 1920, shows the following comparative statement of income account:

	1920	1919	Increase or decrease
Operating revenues	\$140,755,628	\$140,755,628	
Operating expenses	130,252,212	382,314	129,869,899
Net revenue	10,503,416	Def. 382,314	10,885,729
Tax accruals	7,557,889	970,000	6,587,889
Uncollectible railway revenues	28,276		28,276
Railway operating income	2,917,251	Def. 1,352,314	4,269,565
Equipment and joint facility rents	2,217,599		2,217,599
Net railway operating income	699,652	Def. 1,352,314	2,051,966
Non-operating income:			
Compensation from U. S. Government	3,803,000	23,201,016	-19,398,016
Compensation for guaranty period	16,509,185		16,509,185
Gross income	23,811,563	24,140,709	-329,146
Interest on funded debt	10,440,294	9,273,859	1,166,435
Total deductions	11,265,706	10,052,605	1,213,101
Net income	12,545,857	14,088,105	-1,542,248
Sinking funds	86,603	105,522	-18,919
Dividends:			
Preferred stock (8 per cent in 1919; 7 per cent in 1920)	1,567,650	1,791,600	-223,950
Common stock (7 per cent in 1919; 5 per cent in 1920)	7,257,625	10,160,675	-2,903,050
Total appropriations	8,911,878	12,057,797	-3,145,919
Balance income for year	3,633,979	2,030,307	1,603,671

The annual report of the Chicago & North Western will be reviewed editorially in an early issue.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—Authorized to issue promissory notes.—This company has been authorized by the Interstate Commerce Commission to issue a promissory note for \$500,000 to the Guaranty Trust Company of New York and one for \$425,000 to the Central Union Trust Company.

DETROIT, TOLEDO & IRONTON.—Asks Authority to Issue Bonds.—This company has applied to the Interstate Commerce Commission for authority to issue \$182,000 of first mortgage 50-year, 5 per cent gold bonds due March 1, 1964, which are to be sold to Henry Ford and his associates.

INTERSTATE RAILROAD.—Authorized to issue stock.—This company has been authorized by the Interstate Commerce Commission to issue \$338,000 of capital stock to reimburse the treasury for

expenditures made out of income and to pay for certain additions and betterments.

NEW YORK, NEW HAVEN & HARTFORD.—Annual Report.—The corporate income account for the year ended December 31, 1920, compares with 1919 as follows:

	1920	Increase or decrease
Railway operating revenues:		
Freight	\$55,348,919	\$6,111,956
Passenger	\$2,270,794	7,496,576
Total railway operating revenues.....	\$57,619,713	\$16,967,190
Railway operating expenses:		
Maintenance of way and structures.....	\$20,654,480	\$6,374,426
Maintenance of equipment.....	30,443,016	9,060,734
Traffic	756,798	215,709
Transportation—rail line.....	67,233,026	16,575,517
Total railway operating expenses.....	\$126,346,384	\$33,516,682
Net revenue from railway operations.....	Def. \$2,634,673	—\$16,543,492
Railway tax accruals.....	4,500,175	426,635
Railway operating income.....	Def. 7,349,935	—16,957,998
Non-operating income:		
Dividend income.....	\$1,343,457	—\$908,780
Income from funded securities.....	1,095,047	—121,333
Income from unfunded securities.....	1,823,996	565,331
Rent from locomotives, passenger train cars and work equipment.....	1,456,876	376,014
Income from lease of road.....	1,198,262	—4,473
Total non-operating income.....	\$7,926,145	\$78,625
Gross income.....	576,210	17,036,623
Deductions from gross income:		
Rent for locomotives, passenger train cars, floating and work equipment and balance for hire of freight cars.....	2,969,484	1,836,037
Joint facility rents.....	3,897,528	263,780
Rent for leased roads.....	5,852,016	—2,704
Interest on funded debt.....	10,341,382	706,027
Interest on unfunded debt.....	3,184,001	—461,644
Total deductions from gross income.....	\$27,996,235	\$2,459,394
Net income, excluding government guarantees.....	Def. 27,420,025	19,496,017
Less government guarantees (see note).....	\$22,798,519	\$15,751,572
Net corporate income.....	Def. \$4,621,506	\$3,744,445
Ratio of operating expenses to total operating revenues.....	102.29	15.16
Ratio of operating expenses and taxes to total operating revenues.....	105.94	14.98

Note—Government guarantees include: Deficit in U. S. Railroad Administration operations for months of January and February; lap-overs audited from March 1 to December 31 applying to Federal control period; guaranteed standard return due from Director General for January and February; also amounts charged government under Transportation Act applicable to the guaranty period operations from March 1 to August 31, inclusive, as shown on books as of December 31.

The annual report of the New York, New Haven and Hartford will be reviewed editorially in an early issue.

Stockholders Vote for Merger at Annual Meeting.—The stockholders at their annual meeting in New Haven, Conn., on April 20, voted favorably on the proposal to merge into the company five subsidiaries, the Central New England, the Harlem & Port Chester Railroad, the New England Steamship Company, the Hartford & New York Transportation Company, and the New Bedford, Martha's Vineyard & Nantucket Steamboat Company. The vote was 913,371 shares in favor, none against. The vote was the same on acceptance of the annual statement of the road for the year ended December 31, 1920; on ratification of an agreement with the director general of railroads in regard to equipment and on refunding at maturity next year a loan placed in Europe in 1907. The board of directors was re-elected.

NORFOLK & WESTERN.—Board Chairmanship Ended.—At the stockholders' annual meeting at Roanoke, Va., on April 14, the company's by-laws were amended so as to abolish the office of the chairman of the board, which office has been vacant since the retirement of L. E. Johnson, since deceased, on January 1, 1921.

OREGON, CALIFORNIA & EASTERN.—Asks Authority to Issue Securities.—This company has applied to the Interstate Commerce Commission for authority to issue \$485,600 of bonds and 4,714 shares of stock.

PERE MARQUETTE.—Asks Authority to Pledge Bonds.—This company has applied to the Interstate Commerce Commission for general authority to pledge or sell \$3,231,000 of first mortgage, 5 per cent gold bonds now nominally issued and held in the treasury. The company does not propose to sell the bonds at this time, but desires to issue notes from time to time to provide funds for its corporate requirements and desires general authority to pledge the bonds as collateral.

TEXAS SHORT LINE.—Authority to Issue Bonds Denied.—The Interstate Commerce Commission has denied the application of this company for authority to issue \$175,000 of first mortgage bonds to retire maturing bonds, on the ground that the company's prospective earning power does not justify the fixed charges.

TOLEDO, ST. LOUIS & WESTERN.—Asks authority to issue receiver's notes.—The receiver has applied to the Interstate Commerce Commission for authority to issue \$692,000 of receiver's certificates of indebtedness to be used as collateral security for the payment of a loan from the United States.

VALDOSTA, MOULTRIE & WESTERN.—Sale Not Yet Approved.—C. L. Jones, president of this company, who purchased the road at a foreclosure sale on April 9, is awaiting confirmation of the sale by Judge Evans of the federal court.

WESTERN PACIFIC.—Authorized to Issue Bonds for Purchase of Sacramento Northern.—The Railroad Commission of California has authorized this company to issue and sell at 85 and accrued interest, \$4,180,000 of its first mortgage 5 per cent bonds. The bonds will be acquired by the Western Pacific Railroad Corporation and then distributed to bond holders of the Sacramento Northern, who have agreed to sell their bonds to the Western Pacific. The Western Pacific, as noted in the *Railway Age* of April 1 (page 866), has agreed to pay \$27.50 a share for the first preferred stock of the Sacramento Northern, \$15 a share for the second preferred and \$6 a share for the common stock. It has also offered to exchange for the bonds of the Sacramento Northern, first mortgage bonds of the Western Pacific on the basis of \$80 face value of the Western Pacific bonds for \$100 face value of the Sacramento Northern bonds.

WHEELING & LAKE ERIE.—Authority to Pledge Securities Denied.—The Interstate Commerce Commission has denied this company's application for authority to pledge from time to time any bonds, stocks or other securities which are now or may hereafter be held in its treasury as collateral security for any short term notes which it may issue within the limitations prescribed by Paragraph 9 of Section 20-a of the interstate commerce act. The commission says it is required to make investigation of securities before authorizing their issue and it cannot with propriety issue general authority of the nature contemplated in this application.

Guaranty Certificates Issued

The Interstate Commerce Commission has issued additional certificates for partial payments to railroads on account of their six months' guaranty as follows:

	Previously paid
Louisville & Nashville.....	\$4,750,000
Kingston Carolina.....	1,500
Georgia.....	300,000
Long Island.....	450,000
Rio Grande Southern.....	100,000
New York, Ontario & Western.....	600,000
Detroit, Toledo & Ironton.....	225,000
St. Joseph & Grand Island.....	155,000
Louisville & Wadley.....	6,500
New York, Philadelphia & Norfolk.....	300,000
	256,000
Total payments to April 19 made by the Treasury under the provisions of the Transportation Act have been as follows:	
(a) Under Section 204, for reimbursement of deficits during federal control.....	\$969,923.82
(b) Under Section 209:	
(1) To carriers to which final payment of the guaranty has been made under paragraph (g) including previous advances under paragraphs (h) and (i).....	1,311,700.63
(2) For advances under paragraphs (b) and (c) to carriers as to which a certificate for final payment has not been received by the Treasury from the Interstate Commerce Commission.....	263,235,874.00
(c) Under Section 212:	
(1) For partial payments in respect to the guaranty provided in Section 209.....	123,311,490.05
(2) For partial payments in respect to the reimbursement for deficits during the period of federal control provided in Section 204.....	418,000.00
(d) Under Section 210, for loans from the revolving fund of \$300,000,000 therein provided.....	193,685,137.00
Total.....	\$582,932,125.50

Dividends Declared

Central of New Jersey.—\$2.00, quarterly, payable May 2 to holders of record April 29.
 Pullman Company.—\$2.00, quarterly, payable April 30 to holders of record May 16.

Railway Officers

Executive

W. C. Morse, whose appointment as vice president of the Louisiana Railway & Navigation Co., with headquarters at Shreveport, La., was announced in the *Railway Age* of April 1 (page 915), was born in 1867 at Vineland, Mo. He was educated in the public schools and entered railway service in 1883 with the St. Louis, Iron Mountain & Southern (now the Missouri Pacific). He served the Iron Mountain as a telegraph operator and station agent until 1888 when he was promoted to train dispatcher at De Soto, Mo. Ten years thereafter he was promoted to chief dispatcher with the same headquarters. He resigned that position in 1902 to enter the service of the Atchison, Topeka & Santa Fe in a similar capacity at Chillicothe, Ill. In 1906 he returned to the service of the Iron Mountain as trainmaster at McGee, Ark. The same year he was promoted to superintendent of the Natchez division. Subsequently he served as superintendent of the Memphis, Central and Missouri divisions, until he resigned on April 1, to enter upon his new duties. Mr. Morse's name will be recalled as that of a contributor to these columns on interesting questions connected with operating problems.



W. C. Morse

H. C. Nutt, formerly president of the Central Equipment & Coal Commission, an organization having charge of all bituminous coal mining and distributing operations in Silesia, has been elected president of the Monongahela and the Pittsburgh, Chartiers & Youghiogeny, with headquarters at Pittsburgh, Pa. Mr. Nutt was born at Council Bluffs, Ia., November 12, 1863. He was graduated from the Sheffield Scientific School, Yale University, in 1883, and began his railroad career as a rodman for the Burlington & Missouri (now a part of the Chicago, Burlington & Quincy). He served in various capacities in the engineering department of that road and, in 1889, was appointed trainmaster at Alliance, Nebr. In 1892, he was promoted to assistant superintendent at Edgemont, S. D., and a year later was transferred to Sheridan, Wyo. In 1900 he became assistant superintendent of the Chicago, Burlington & Quincy with headquarters at Burlington, Ia. Three years later he was promoted to superintendent and the following year to general superintendent of the Iowa district. In 1905 he was transferred to the Missouri district and the following year became general superintendent for the



H. C. Nutt

Michigan Central, with headquarters at Detroit. In 1907 he went with the Northern Pacific as general manager of the western lines and, in 1909, was elected fourth vice-president. Mr. Nutt left the Northern Pacific in 1912 to become general manager of the Los Angeles & Salt Lake with headquarters at Los Angeles, Cal. During the war Mr. Nutt was commissioned a lieutenant colonel and served in France as deputy director general of the American military railways. Upon his return to this country he resumed his position as general manager of the Los Angeles & Salt Lake. He resigned this position early in 1920 to become president of the Central Equipment & Coal Commission in Silesia.

Operating

James M. Wachter, who has been appointed superintendent of terminals of the Mobile & Ohio and the Southern at Mobile, Ala., was born on March 7, 1863, at Bolivar, N. Y. He was educated in the public schools and entered railway service in 1880 as a switchman for the Louisville & Nashville at Birmingham, Ala. He later served the same road as a brakeman, conductor and general yardmaster until 1905, when he resigned to enter the service of the Mobile & Ohio as general yardmaster. From 1911 until 1914 Mr. Wachter was superintendent of terminals of the International & Great Northern at Houston, Tex. In 1914 he left the service of that company to become general yardmaster of the Mobile & Ohio. He was serving in this capacity at the time of his recent promotion.

E. W. Scheer, whose appointment as general manager, Eastern Lines, of the Baltimore & Ohio was announced in the *Railway Age* of April 15 (page 961), was born on April 28, 1875, at Zaleski, Ohio. He entered railway service February 10, 1890, as a messenger in the office of the superintendent of the Cincinnati, Washington & Baltimore (now a part of the Baltimore & Ohio). From May 1, 1890, to December 15, 1895, he was employed as a clerk and stenographer for the Baltimore & Ohio Southwestern. From the latter date until January, 1899, he was chief clerk to the division superintendent and then served as secretary to the vice-president and general manager until 1906. From then until 1912 he served consecutively as chief clerk to the general manager and assistant secretary and chief clerk to the general superintendent at Cincinnati. He then became assistant to the general superintendent of the same road at Cincinnati. The following year he became superintendent of the Illinois division with headquarters at Flora, Ill. In 1915 he was transferred in a similar capacity to the Indiana division at Seymour, Ind. In July of the following year he was promoted to general superintendent with headquarters at Cincinnati. In October of the same year he was transferred to the Northwest district of the Baltimore & Ohio and, in February, 1920, to the Maryland district, which position he held at the time of his recent promotion.



E. W. Scheer

Coincident with the abolishment of the Burlington division of the Chicago, Burlington & Quincy the lines from Albia to Des Moines, from Burlington to Tracy, and from Winfield to Washington have been consolidated with the Ottumwa division, while the lines from Fort Madison to Batavia and from Carthage Junction to Quincy have been consolidated with the Hannibal division. The following appointments have been made: N. H. Young, superintendent of the Burlington division, has been transferred to the Brookfield division, with headquarters at Brookfield, Mo., succeeding W. F. Giles, who has been

transferred to the Wymore division, with headquarters at Wymore, Neb., succeeding F. D. Gurley, who has been appointed assistant superintendent with the same headquarters. Mr. Gurley succeeds H. J. Hoglund, who has been appointed trainmaster with headquarters at Chicago. C. W. Orbin, chief dispatcher on the Burlington division, has been assigned to other duties and the position abolished. The changes were effective April 16.

Traffic

Harry C. Stauffer, whose appointment as general freight agent of the Philadelphia & Reading was announced in the *Railway Age* of April 15 (page 962), was educated in the common schools and in preparatory schools. Upon completion of his education he entered the service of the Philadelphia & Reading as agent at Kimberton, Pa. Later he served as agent at Byers, Pa., and then at Douglassville, Pa. From the latter position he was transferred to the position of chief clerk at the 31st street and Girard avenue station, Philadelphia. After serving at that point for some time he was appointed freight agent at Chester, Pa., and then freight agent at Reading, Pa. He remained on duty at this point for seven years and went to Philadelphia in 1910 as division freight agent in charge of the New York division and the Atlantic City Railroad. He continued in this position during the time the railroads were operated under federal control. When they were returned to private ownership on March 1, 1920, Mr. Stauffer was appointed general coal freight agent. He held this position until the time of the present appointment.



H. C. Stauffer

R. H. Morris, general western freight agent of the Southern, with headquarters at Chicago, has been promoted to freight traffic manager, with headquarters at Cincinnati, Ohio, effective April 15. Mr. Morris was born on February 25, 1866, at Xenia, Ill., and entered railroad service in 1884 as a telegraph operator on the Louisville, Evansville & St. Louis, at Fairfield, Ill. In 1886 he was appointed secretary to the general manager at Louisville, Ky., where he remained until 1887, when he was transferred to Evansville, Ind., as local agent. Two years later he accepted an appointment as commercial agent for the Louisville, Henderson & St. Louis, with headquarters at St. Louis, Mo., where he served until 1898, when he returned to the service of the Louisville, Evansville & St. Louis, as general agent, with headquarters at Evansville, Ind. When the Louisville, Evansville & St. Louis was taken over by the Southern, Mr. Morris continued to serve as general agent at Evansville. In 1905 he was appointed commercial agent, with headquarters at Cincinnati, and in 1909 he was transferred to Chicago. He was promoted to assistant general freight agent, with headquarters at Louisville, Ky., in February, 1917. In March, 1920, Mr. Morris was made northwestern freight agent, with headquarters at Chicago, Illinois.

Engineering, Maintenance of Way and Signaling

C. R. Mee has been appointed chief engineer of the Louisiana Railway & Navigation with headquarters at Shreveport, La., effective April 8.

W. A. Duff, assistant chief engineer of the Moncton Division of the Canadian National Railways, has been appointed engineer of standards with headquarters at Toronto, effective April 1.

Purchasing and Stores

J. F. Blasie has been appointed district storekeeper of the New York Central at Depew, N. Y., succeeding H. L. Grandy, transferred.

A. L. Prentice has been appointed district storekeeper of the New York Central, with headquarters at Elkhart, Ind., succeeding C. F. Heidenrich, who has been transferred to Collinwood, Ohio, in the stores department.

General

MISSOURI—ILLINOIS

The Missouri-Illinois which was organized to take over the operation of the Illinois Southern and which established its general headquarters at Bonne Terre, Mo., in February, has announced the appointment of the following officers:

F. J. Thomure.....	Vice-president and gen'l mgr.	Bonne Terre, Mo.
W. G. Patton.....	Assistant to vice-president.	Bonne Terre, Mo.
V. M. Johnson.....	Auditor	Bonne Terre, Mo.
M. Rittmaster.....	Assistant auditor	Bonne Terre, Mo.
E. L. Kimmel.....	Assistant general manager	Sparta, Ill.
C. M. Swan.....	Traffic manager	St. Louis, Mo.
F. P. Sackbauer.....	Ass't gen'l fr't and pass. agt.	St. Louis, Mo.
H. Schantl.....	Chief engineer	Bonne Terre, Mo.
C. E. Morrow.....	Assistant chief engineer	Sparta, Ill.
T. A. Roussin.....	Master mechanic	Sparta, Ill.

Obituary

M. M. Kirkman, former vice-president of the Chicago & North Western, died of apoplexy at the Henrotin Memorial Hospital, Chicago, on April 18. Mr. Kirkman was born in Morgan County, Ill., on July 10, 1842, and entered railway service in 1857 as a messenger for the Chicago & North Western. From 1857 to 1861 he served in the telegraph and traffic departments and as a train dispatcher. In 1861 he was made auditor of traffic accounts. He was promoted to assistant general accounting officer in 1865, and in 1867 was made general accounting officer. In June, 1870, he was given additional jurisdiction over the duties of local treasurer, and continued this work up to the time of his retirement from railroad service. He was promoted to controller in June, 1881, and was elected vice-president in November, 1889. Mr. Kirkman retired from active railroad service in April, 1910, after 53 years' continuous service with the North Western. He was the author of a number of treatises on transportation subjects, including "The Science of Railways," published in 1894.

Lester G. French, for thirteen years editor and assistant secretary of the American Society of Mechanical Engineers, and manager of the journal "Mechanical Engineering," died on April 18 at the French Hospital, New York. Mr. French was born at Keene, N. H., in April, 1869. He received his technical education at the Massachusetts Institute of Technology, from which he was graduated in 1891 with the degree of S. B. He served the year 1891-92 with the Cranston Printing Press Company as draftsman, and then became connected with the International Correspondence Schools, Scranton, Pa., as instructor in mechanical engineering. Leaving this institution in 1895, he went to Providence, R. I., where he entered the employment of the Builders Iron Foundry as assistant to the superintendent. In 1897 he became editor-in-chief of "Machinery," continuing in this position until 1906, when he resigned to take up the publication of technical books, among them being one of the earliest American treatises on the steam turbine, of which he was the author. In 1908 he was appointed editor of the publications of the American Society of Mechanical Engineers, which organization he served to the date of his death. Mr. French had been a member of the American Society of Mechanical Engineers since 1899.

THE SENATE has decreed another investigation of the railroads. Does the trouble with Congress in framing regulative railroad legislation lie in a want of the facts of the situation or does it lie in an incapacity of Congress to deal with the situation in the light of the known facts?—*New York World*.

EDITORIAL

Railway Age

EDITORIAL

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Many signs indicate that the turn has come in business, and that it may reasonably be hoped that from now on it will more or less steadily and substantially improve. The money market is easier, and the prices of securities somewhat higher than for some time. Of significance, unquestionably, are the changes which are occurring in the railroad freight situation. Recently, for the first time in months, the car surplus has shown a small decline. The number of cars of freight loaded, including even coal cars, has been showing increases, and in the week ended April 16 total car loadings of all kinds of freight were 738,906, the largest figure reported since the week ended January 15. Probably it is too early to begin to express much optimism, but certainly there are many indications that the worst of the depression has been experienced and passed.

Signs of Improving Conditions

It is now over ten years since the disastrous derailment on the Lehigh Valley at Manchester, N. Y., brought the transverse fissure before railway men as a new and particularly dangerous form of rail failure. Since that time thousands of similar failures have occurred in all parts of the country, in rails from different mills and under varying densities of traffic. Because of its particularly dangerous character the transverse fissure has received a great deal of attention from metallurgists and engineers, both individually and collectively. Their investigations have developed certain information of value, such as the fact that all rails of a heat commonly show the same characteristics in this respect. The reason for this tendency and the conditions which give rise to these fissures are, however, as yet unknown. Various theories have been projected from time to time but none has yet been proven. This form of failure is so dangerous and it is increasing so rapidly in frequency that no stone should be left unturned to arrive at the determination of its cause and the formulation of means for its elimination.

Are We Really Getting Anywhere?

While much of it is due to improper packing, the causes of the greater part of loss and damage, aside from theft, are improper handling and improper loading. This is well understood and on many of the more progressive roads, numerous plans and "drives" have been inaugurated to help remedy the situation. In general, such plans as have proved to be of value have been based on the principle of securing better supervision of loading. One road, as an experiment, assigned the loading of three cars daily to each of its agents at one of its terminals. These three cars were "charged" to each agent and he was required personally to oversee their loading. Notes were kept of the contents, the manner in which they were stowed, the name of the man in charge, etc. The car numbers were then sent to the agent at destination or, if bulk was to be broken en route, to the designated point. On arrival an inspection was made of each car. Where any irregularities were noted, a complete record was made of the condi-

tion of the load and the loading as observed on arrival and copies sent to the loss and damage department. Through this the agents were checked up and interested in securing better loading and causing less loss and damage claims since, with complete data at hand as to the loading at the point of origin and condition of shipments at destination, it was possible to get at some of the underlying causes.

One of the effects of the present acute necessity for retrenchment in expenses is the tendency to consolidate operating divisions with the consequent enlargement of territory under the supervision of a division staff. Within the past three or four weeks several roads, particularly in the west, have eliminated one or more division organizations. The most drastic change of this character which has been announced is that on the Chicago, Rock Island & Pacific where six divisions have been eliminated, as announced in our news columns this week. This tendency emphasizes the contrast in the practices of different railroads regarding the mileage which they assign to various divisions. Thus the average length of division on the Chicago, Burlington & Quincy, the Atchison, Topeka & Santa Fe and the Chicago, Rock Island & Pacific prior to the recent consolidations was about 425 miles, while the corresponding figure on the Union Pacific and the Southern Pacific was approximately 725 miles. While it is frequently stated with a great deal of truth that the railways as a whole suffer from deficient rather than excessive supervision, this contrast in operating organizations offers food for thought. The cost of a division organization is not confined to the salaries of the officers thereon but is incurred in large measure for the necessary office organization and increased correspondence resulting therefrom. It is possible that the stress for reductions in expenses now confronting the railways may cause other systems to study their organizations and perhaps find possibilities of consolidating divisions here and there. At the same time, with conditions such as they are now, the need for intensive supervision is so great that steps of this kind should not be taken except after most careful consideration.

The Consolidation of Operating Divisions

Almost every railroad which serves great industrial centers finds itself at some time or another in need of extending its facilities to take care of increasing traffic. Practically every road in such a position finds the high cost of additional lands an important limiting factor in any program for extensive improvements. The size and importance of the industrial concerns in the vicinity have increased land values and all available space close to the railroad is highly developed so that additional property can be obtained by the road only at almost prohibitive prices. The railways of the devastated regions of France and Belgium at the close of the war found themselves in a particularly favorable situation as regards this problem. Many important industrial cities were practically destroyed by the enemy. Because of this the railways were able to secure additional lands at comparatively low prices not only to meet their present requirements but to take

An Opportunity Recognized

care of their needs for a number of years to come. In addition, many improvements contemplated for years before the war have been embodied in the program for the reconstruction of the old railways. This phase of the railway reconstruction program, together with detailed examples of the extensive improvements provided for at several places, is discussed by Oliver F. Allen in an article appearing elsewhere in this issue. It would appear that this phase of the reconstruction program gives evidence of the same foresight and ability on the part of those in charge as did the solution of the many difficult problems of the early phases of reconstruction when the necessity for the greatest speed in opening the railways to traffic and the shortage of labor and many essential materials combined to challenge engineering skill of a high order.

Closely allied with the question of scheduling work in locomotive repair shops is the need for carefully placing machine

Placing Machines Scientifically

tools so that repair parts may be handled with the least possible lost motion. It is self-evident that the greatest economy lies in so arranging machines that a locomotive part will be moved from one to the other until all machine operations are completed without back travel. In this way there is big saving in time and the labor of trucking and long crane hauls are reduced to a minimum. Mechanical department officers as a rule fully appreciate the need for scientifically locating machine tools and many who have been unable to do so before will take the present opportunity to rearrange tools and shop equipment along the lines indicated. Considerable savings can be effected by localizing detailed repair work in sub-departments. This enables machines required for the repair of a given part, as for example a driving box, to be arranged in the order in which machine operations occur and all located in a comparatively small area. In this connection, it is worth while to emphasize the importance of properly locating lye vats for removing dirt and grease from locomotive parts. This is perhaps one of the most common causes of lost time and effort in railroad shops. Many shops try to centralize cleaning operations at one central lye-house and the result is that material repaired at sub-departments must be trucked back and forth a long distance. While large central vats are needed for certain heavy work, the answer to the problem seems to be in the installation of smaller individual tanks in the separate departments. Taken all together, the careful location of railway shop equipment to provide minimum trucking and no back movement offers possibilities of labor saving which are decidedly important.

“Inadequacies of Railway Management”

THE RAILWAYS have presented to the Railroad Labor Board a large amount of evidence showing that the cost of operation is being made excessive and burdensome to them and the public by a grossly inflated payroll. They have tried to prove that rules and working conditions inherited from government control cause inefficiency of labor and make it necessary to employ too many men. They have also tried to prove that the existing wage scales are too high in proportion to the present cost of living and the wages now being paid in other industries, and make necessary passenger and freight rates that are higher than the public ought to be required to pay.

The spokesmen of the labor organizations have made hardly any serious effort to defend the existing rules, working conditions and wages by evidence and arguments tending to show their reasonableness. Almost the sole answer they have made is that large amounts of money are being wasted

by the railway managements themselves through financial manipulation, and by failure to effect operating economies which, it is claimed, are perfectly feasible. They contend that no economies should be effected at the immediate cost of labor until every other form of alleged inefficiency and waste has been eliminated. They have introduced before the Labor Board several large printed documents in which they have set forth at length the “evidence” in support of their charges of bad management. The chief author of these exhibits is W. Jett Lauck, who styles himself “consulting economist” of the labor brotherhoods. The most pretentious of them is entitled “Inadequacies of Railway Management.”

Upon the theory of the labor leaders themselves, these documents are not pertinent to any question before the board. The labor leaders contend that the railways should be required to establish reasonable rules and working conditions, and reasonable wages, regardless of the financial ability of the companies to meet the resulting payroll. If the inability of the railways to meet the payroll should not be considered in fixing working conditions and wages, then the reason why the railways are unable to meet the payroll, whether it be mismanagement or rates that are too low, has no bearing on the question of working conditions or of wages.

Why, then, do the spokesmen of the labor unions persist in introducing documents designed to show that the railways are being mismanaged? They do it for two obvious purposes. They cry “Stop thief!” to divert attention from the evidence regarding the excessive payroll. They do it, also, as a part of their propaganda to destroy public confidence in private management and further their movement for the Plumb plan. Mr. Lauck and other spokesmen of the unions hypocritically denounce the comparatively small expenditures the railways are making to present the facts about the railroad situation to the public and at the same time spend many thousands of dollars in the dissemination of libels upon railway management which, if unanswered, would poison public opinion.

Mr. Lauck's document on “Inadequacies of Railway Management” is a classic example of the misrepresentations the labor unions are spending many thousands of dollars in compiling and disseminating. It consists almost entirely of quotations from editorials and articles in the *Railway Age* and the *Railway Mechanical Engineer*, and from addresses made by railway officers. How could he get from such sources evidence that the railways are grossly mismanaged? Very easily. The papers mentioned and railway officers have been engaged for many years in describing at length and in detail the great achievements of the managements in devising and carrying out improvements in plant and in operating methods which have made the railways of this country the leaders of the world in efficiency and economy. They have never claimed, however, that the management of our railways is 100 per cent efficient. They know that, like other human things, it is far from perfect, and they have recognized the fact that it is the function and duty of railway papers and railway officers constantly to point out the respects in which railway plant and operating methods are still imperfect, and to advocate the improvements needed still further to increase efficiency and economy. Among other things, railway papers and railway officers recently have emphasized the fact that the things most needed to increase efficiency and economy are measures which will correct the conditions which are causing the railroad payroll to be excessive.

Mr. Lauck, with commendable diligence, has searched through the files of the *Railway Age* and the *Railway Mechanical Engineer* for months for everything that these papers or railway officers have said regarding efficiency and economy. He has ignored everything he found tending to show that most railroads have been as progressive in making improvements in plant and methods as conditions would permit, and regarding the great gains in efficiency and economy that have been thus obtained. He has ignored all that has been

said about the extent to which the railways have been prevented from making other needed improvements by their inability, due to inadequate net earnings, to raise sufficient new capital. He has ignored all that has been said about the effects of the inefficiency of labor and the excessive wages.

On the other hand, he has pounced upon every article, editorial and statement which has been published pointing out shortcomings of plant and methods of operation. All articles, editorials and statements of this kind he has assembled and published in such a manner as to give the impression that they are the only things that have been said upon the subject of efficiency and economy. When articles, editorials and statements from which he has quoted have pointed out that improvements which they advocated could not be made unless the railways were enabled to earn larger net returns, he has found it convenient to suppress these parts of them.

Having ignored all evidence militating against his preconceived theory of railroad management, and seized upon every fact or statement which apparently tended to support it, Mr. Lauck of course concludes, as he intended from the start, that the railways are grossly mismanaged. He then places the annual cost of this mismanagement at the good round figure of \$1,000,000,000. In his exhibit he gives details for only \$578,500,000, but he issued a statement to the press placing the entire waste at \$1,000,000,000. As for any basis of actual fact his estimate had, he could just as well have made it \$1,500,000,000 or \$2,000,000,000 a year.

In the discussion of Mr. Lauck's views and estimates regarding railroad efficiency and economy the *Railway Age* does not have to set itself up as an authority, or to prove that it is frank and fair.

Mr. Lauck has tacitly admitted these things. For him to refuse now to accept our views as authoritative would be to destroy the force and effect he has tried to give to all the pages of quotations he has made from our columns. He has bound himself to admit that we are frank and fair in the discussion of problems of railroad efficiency and economy, for he has himself proved our fairness and frankness by quoting so much material from our columns in alleged support of his own views.

Premising our remarks, therefore, on his recognition of the fact that this paper is authoritative, frank and fair, we brand the documents regarding railroad efficiency and economy he has presented to the Railroad Labor Board as among the most wilfully dishonest and misleading productions ever submitted to a government body or to the American public. The man who will deliberately take perhaps one-fifth of the facts presented by any publication or man, upon a given subject, ignore the other four-fifths of the statements made and the facts presented by that publication or man upon the same subject, and then use the one-fifth to prove "mismanagement" which he must know the other four-fifths disprove, is not an "economist," however much he may advertise himself as such. He is merely the cheap, soap-box type of propagandist, who is reckless in what he says either because he does not know what he is talking about or because he does not expect to experience any of the effects of any harm he may do.

The managements of the railways are engaged in great efforts to restore efficiency and economy of operation. The far the leaders of the labor unions, who employ Mr. Lauck, have done all they could to defeat these efforts. The fact that they employ Mr. Lauck to spread propaganda, such as his thesis on "Inadequacies of Railway Management," indicates that in efforts to restore efficiency and economy the railway managements cannot hope for any more help from Mr. Lauck's employers than they have received in the past. Fortunately, hundreds of thousands of railway employees and a large part of the public cannot be misled by this low kind of propaganda.

Mr. Lauck's "Estimated Possible Savings"

W. JETT LAUCK, "consulting economist" of certain railway labor unions, has introduced before the Railroad Labor Board elaborate exhibits designed to show that mismanagement of the railways is causing wastes aggregating at least \$1,000,000,000 a year. He and other spokesmen of the labor unions contend that no changes in working conditions or wages which will reduce the compensation of labor should be made until all these alleged wastes due to mismanagement have been eliminated. Mr. Lauck also has denounced as unnecessary the course of the railways in laying off many thousands of employees within recent months. It follows, on his theory, that there should not have been any reduction of the payroll below what it was when a large business was being handled last year.

The payroll at that time was running at the rate of about \$4,000,000,000 a year. Total operating expenses were running at the rate of about \$6,300,000,000 a year. The difference of \$2,300,000,000 a year consisted almost entirely of expenditures for fuel, materials and supplies, and loss and damage.

It seems logically to follow, on Mr. Lauck's theory, that the railways should reduce these items an average of 45 per cent before curtailing the payroll in the slightest degree. The total cost of fuel, materials and supplies depends on their prices and the amount of them used. The railways cannot control the prices they must pay for them, and therefore to contend that but for "mismanagement" expenditures for these items would be so enormously reduced would be manifestly absurd. Whether Mr. Lauck really means to be understood as taking this position we are unable to tell from his documents, but this is what they imply.

The largest item in his estimated possible savings is one of \$272,500,000, which he claims could be made by "modernizing locomotives." He says there have been available for the last ten years devices which have demonstrated beyond question their ability to effect large savings. This is true, but it has no real relationship to his estimate of the amount that could be saved by the universal use of these devices. The figure of possible saving he gives is merely a wild guess based upon nothing tangible except his desire to show mismanagement.

Furthermore, the figures he himself gives disprove his imputation that the railway managements have not largely taken advantage of the availability of these devices. There are about 65,000 locomotives in the United States. Even the oldest of the devices to which he refers have been available in practical form for only about ten years, and others for shorter periods. In this comparatively brief time 35,000 locomotives have been equipped with superheaters, 43,000 with brick arches, 37,000 with automatic fire doors and 15,000 with power reverse gears. Many other improvements have been made which might be mentioned. Never before in the history of the railroads of this or any other country were steam locomotives and the service rendered by them improved as much as they have been in the United States within the last ten years. And yet, because more improvements have not been made Mr. Lauck roundly denounces the railways for alleged "mismanagement!"

Besides condemning the railways for not having raised all their locomotives to the highest possible point of efficiency, Mr. Lauck condemns them as being wasteful because they have not standardized all their freight and passenger cars, brought all their engine terminals up to present needs, installed all the machine tools needed in their shops, perfected the power plants of their shops and standardized all the materials used in maintenance of way. His assumption that general standardization is desirable is simply an evidence of his ignorance, since the extent to which standardization

should be carried in any branch of railroading is still recognized by experts as a debatable question.

As to improvements in locomotives and in engine terminals, the installation of needed machine tools in shops, the improvement of power plants, and many other things mentioned by Mr. Lauck, they can be made only by the investment of large amounts of new capital. New capital can be raised only if net operating income is earned to pay a return upon it. With the exception of the years 1916 and 1917, the railways have never had a net return which approached adequacy since 1910. The only way their net return can be made adequate now is by reduction of the present operating expenses. Adequate reductions cannot possibly be made in the near future in present operating expenses without reducing the payroll. But Mr. Lauck opposes all reductions in the payroll. Therefore, at one and the same time he denounces the railroads for alleged wastes due to mismanagement and opposes the only means by which they can be enabled to eliminate the larger part of the wastes which he charges exist, and many of which unquestionably do exist.

The kind of intelligence and fairness Mr. Lauck manifests throughout his discussion is strikingly illustrated by what he says under the heading, "Train Operation." "High powered locomotives have been developed with zeal," he remarks, "but the corresponding efficiency of train loading has been overlooked. It is a case of being all dressed up and no place to go." Now, the fact is, that the average train load increased from 475 tons in 1915 to 728 tons in 1920, or over 53 per cent in five years—which, of course, Mr. Lauck does not mention. Meantime, Mr. Lauck's clients, the labor unions, did all they could to defeat this increase in efficiency by trying to secure the passage of legislation requiring the employment of extra men in train crews, or legislation reducing and absolutely limiting the length of freight trains and thereby reducing or limiting their loads. As an example of hypocrisy, the criticism of the labor unions' own "economist" that the railway managements have not sufficiently increased the average train load is a "pipkin." In no other respect has the efficiency of management been more strikingly demonstrated than by these increases in train loading in spite of constant labor union opposition.

Among the largest items in Mr. Lauck's list of estimated savings is one for loss and damage. Being a defender of government control, he makes no reference to the fact that the increase in freight claim payments from \$35,000,000 in 1917, to \$106,804,000 in 1919, or 205 per cent, which he mentions, occurred under government control. He quotes the *Railway Age* as authority for the statement that a 50 per cent reduction can be made in loss and damage. He makes no mention whatever, however, of the many columns of information published in this paper and elsewhere showing that immediately after the return of the railways to private operation the American Railway Association organized, and has since been conducting, a special bureau for the express purpose of carrying on a campaign to reduce by 50 per cent the enormous item of loss and damage which developed under government control.

Far be it for the *Railway Age* to contend that under good management economies as large as Mr. Lauck has estimated can not be made. But even though all the needed capital were available, it would take years to make the improvements in the physical plants which would be required to effect the large economies he claims are possible. If, therefore, no reduction in the payroll were to be made, as Mr. Lauck contends should be the case, until all these other economies had been effected, the present payroll would have to be maintained without diminution for years to come, regardless of its intrinsic reasonableness or unreasonableness.

But the maintenance of the existing payroll and the effecting of the various economies Mr. Lauck himself advocates

would be incompatible. In the first place if the present payroll should be maintained this would render it impossible for the railways to earn the net return necessary to enable them to make the improvements Mr. Lauck says should be made. On the other hand, if these improvements should be made and the economies they would render practicable should be effected, these economies would result chiefly from reductions in the amount of labor that the railways would have to employ, and from consequent reduction of the payroll. Mr. Lauck mixes up economies in the purchase and use of fuel and supplies, and in the use of labor, without apparently knowing at any given time which kind of economy he is talking about.

The more the documents he has presented to the Railroad Labor Board are studied by persons who know anything about the railroad business, the more admiration they will have for the colossal gall he has shown by the way he has dealt with the problem of railroad efficiency and economy, and the more they will be impressed with the unscrupulous lengths to which labor union leaders are willing to go in their propaganda against private management and in favor of the Plumb plan.

Boston & Maine

THE ANNUAL REPORT of the Boston & Maine for 1920 shows that this carrier is far from being in a particularly happy position, despite the progress that has been made during the administration of President Hustis both in the way of improvements to the physical property and in the financial structure. The fact that the railroad is confronted with serious difficulties of various kinds is not a new one. It has been given no small amount of attention of late in the hearings before the Interstate Commerce Commission in the New England divisions case and in the more recent hearings before the New England governors' committee.

The Boston & Maine in 1920 did the largest freight and passenger business in its history. The handicaps which have characterized the aftermath of federal control on the railroads of the country in general, combined with the special conditions which have had to be met by the New England roads, were such, however, that the operations for the year resulted in a deficit of imposing proportions. The amount of the deficit may be stated in various ways, but in whatever way it may be stated, it looks equally serious. Suffice it to say that if there had been no federal compensation or guaranty, the deficit after the payment of taxes, interest, etc., would have been no less than \$17,132,482. Taking into consideration the standard return for January and February and the guaranty for the six months of the guaranty period, the corporate income account shows a deficit amounting to \$1,364,693 after the payment of \$1,227,948 of dividends on preferred stock.

Even at the risk of repeating what has already been given considerable attention in the *Railway Age*, it may be worth while to touch briefly upon the special conditions which confront the New England roads and the steps that are being taken in the attempt to compensate for them. The special conditions are principally the high costs of fuel, the increased rates which have to be paid on such fuel as is delivered by rail and the fact that the New England lines are short haul terminal lines; as such, they are subjected to large debit balances for the hire of freight cars, and it is well known that terminal labor costs have risen out of proportion to labor costs in general. The debit balance for the hire of freight cars on the Boston & Maine in 1920 was no less than \$3,866,947; the size of this figure is perhaps best shown by the fact that the interest on funded debt was \$5,272,223.

The steps that have been taken by the New England lines

to compensate for these difficulties have been varied and inconsistent but thus far without measurable success. They include an attempt to secure larger divisions on through rates, which matter is now pending before the Interstate Commerce Commission. An attempt has been made to secure a payment from the Central freight association and trunk lines amounting to \$15,000,000 annually pro-rated among the connecting carriers and covering the period from March 1, 1920, to March 1, 1922. This matter also is pending and does not seem to be making noticeable progress. The latest step is a proposal to increase freight rates and passenger fares within New England by an amount equal to 10 per cent, with exceptions on certain kinds of traffic; this is the question which is now being investigated by the committee of 30 appointed by the governors of the New England states and known as the governors' committee.

An increase of rates would be most inopportune at this time, and naturally it is being met with great opposition on the part of the New England shippers. The fact that the carriers have taken the step of asking for it shows, as nothing else could, how desperate is their situation. It is evident, nevertheless, that no matter what one may think about the efficiency or the methods of the New England carriers, they must have relief of some kind if they are to continue to function. The importance of the facts stated is brought out even more pointedly when it is realized that in the first two months of the present year, the Boston & Maine had a deficit after rentals of no less than \$3,027,756.

The year 1920 was a rather busy one for the Boston & Maine from the standpoint of financing. Between June 1 and October 1 there matured bonds and notes to the amount of \$26,449,000, of which \$17,606,000 was represented in Boston & Maine 5 per cent series A mortgage bonds due July 1 and \$8,843,000 in bonds and notes of subsidiary companies. The latter maturities were met by a loan from the revolving fund for \$5,000,000 and an agreement whereby the holders of the maturing obligations agreed to accept 50 per cent of their holdings in cash and 50 per cent in new 10-year general mortgage bonds, payable June 1, 1930, bearing interest at 6 per cent, which agreement was accepted in spite of the prevailing conditions in the money market.

The \$17,606,000 Boston & Maine bonds were refunded by Boston & Maine 6 per cent mortgage bonds to the amount of \$17,606,000 at 98½ taken by the United States government, in compliance with the agreement with the director general in connection with the reorganization plan. Bonds were also issued to the director general for \$8,000,000 on account of expenditures for additions and betterments during federal control. Other financing included a loan from the revolving fund amounting to \$1,212,500 for new locomotives and one for \$5,443,979 for improvements to way and structures and equipment. The Boston & Maine was allocated by the Railroad Administration 500 box cars, 1,500 gondola cars and 20 Santa Fe type locomotives. The equipment trust notes covering this equipment amounted to \$5,329,500.

The changes which have been made in the financial structure of the Boston & Maine in recent years are well known. They are embodied in the fact that prior to the receivership in 1916 and the subsequent reorganization, the great burden of the road was its rentals for leased lines, amounting in 1916 to no less than \$5,626,029. When the road was reorganized, effective as of January 1, 1919, the finances had been changed so that there was exchanged for the stock of the leased lines preferred stock of the Boston & Maine. The rent for leased roads in 1920 was but \$927,845, a reduction of nearly \$5,000,000 from 1916. When the leased roads were acquired, the Boston & Maine, of course, took over their bonded indebtedness, amounting to \$39,330,000. Including the indebtedness incurred during federal control, the total long term debt on December 31, 1920, was \$123,775,084. At the

end of 1916 it was \$43,338,000. The interest on funded debt in 1916 was \$1,754,980 and on unfunded debt \$970,497. In 1919 the interest on funded debt was \$5,272,223 and on unfunded debt \$18,857, an increase as between the two years of about \$2,500,000.

Even with the changes in indebtedness following federal control and the increase in interest charges caused by the 1920 refunding, the decrease in fixed charges has been over \$2,000,000. In 1920 the dividends paid on preferred stock amounted to \$1,227,948, of which about \$1,000,000 was paid on the preferred issued to the former holders of stock in the leased lines. These dividends were all declared in the first part of the year; the dividends for the latter part were passed because of the conditions at that time. It will be seen that the holders of this preferred stock have thus made a sacrifice that it would seem is more than railroad security owners should, in all fairness, be asked to make. The fact that they have suffered in this wise is only another indication of the seriousness of the situation on the Boston & Maine.

It has been aptly said that under present conditions the problems of operation represent only about 2 per cent of the problems of the Boston & Maine, and finances, etc., the other 98 per cent. Even with this in mind, however, it is worth while making a note of one of the important improvements in operation which have recently been made. This is the introduction of Santa Fe locomotives on the Berkshire division between Mechanicville, N. Y., and East Deerfield, Mass. The Berkshire division is the Boston & Maine's connection with the west, and it is practically the main stem of the Boston & Maine system. To put these Santa Fes in service required the strengthening or rebuilding of no less than 44 bridges between East Deerfield and Rotterdam, N. Y. A larger turntable was put in at Rotterdam and improvements in the engine terminal at East Deerfield included the addition of 11 stalls. The Santa Fes have not been in operation a sufficient length of time to show what they may be able to do. They are hauling trains that were formerly handled by two Consolidations and, inasmuch as the Berkshire division has no heavy grades, the improvement in train loading should be a marked one. The road has also made improvements on other parts of its line, but these on the Berkshire division are the most interesting. The Boston & Maine has been handicapped in the past by lack of motive power of the most modern type. The operation of these Santa Fes will therefore be watched with interest.

It has been noted above that the Boston & Maine in 1920 did the biggest freight and passenger business in its history. The revenue ton-miles amounted to 3,705,528,286—an increase of 12.52 per cent over 1919 and an increase of 2.57 per cent over 1918, the best previous year. The total number of tons of revenue freight carried in 1920 were 27,186,674, the average haul was 136 miles and the average revenue per ton-mile was 1.439 cents. The average revenue train load was low, being but 479 tons, but this was an increase over the average of 472 tons in 1919. In view of the conditions governing on the Boston & Maine, with its large mileage of branch lines and the fact that it is a terminal road, it is to be expected that we should see figures of but 23.2 tons per loaded car; 17.5 miles per car per day and ton-miles daily per car amounting to but 294.

The Boston & Maine, although to a lesser extent than the New Haven, is distinguished by its proportionately large passenger business. The total number of passengers carried in 1920 was 54,933,009. The revenue passenger miles totaled 1,014,734,717—an increase of 3.96 per cent over 1919, the best previous year. The average distance carried per passenger was 18.47 miles, the average number of passengers carried per train mile was 97.81 and per car mile 25.66. The report gives the interesting detail that there were carried in and out of Boston in 1920 no less than 33,913,598

passengers, which is presumably the record for any passenger station used by one road, although it is possibly exceeded by the New Haven's business handled in and out of South Station in Boston, that station being used by two roads.

The principal figures for operation in 1920 as compared with those for 1919 are as follows:

	1920	1919
Mileage operated	2,256	2,258
Freight revenue	\$53,306,738	\$43,302,141
Passenger revenue	24,680,435	22,116,094
Total operating revenue	86,652,745	72,935,146
Maintenance of way expenses	15,093,264	9,612,460
Maintenance of equipment	20,168,923	15,287,526
Traffic expenses	704,051	498,722
Transportation expenses	51,348,806	38,437,592
Total operating expenses	90,989,433	67,144,063
Net from railway operations	Def. 4,336,687	5,791,083
Taxes	3,001,087	3,043,388
Operating income	Def. 7,385,901	2,746,694

The corporate income account is as follows:

Gross income	\$11,223,095	\$8,453,456
Interest on funded debt	5,272,223	3,419,337
Interest on unfunded debt	18,857	1,008,570
Total deductions from gross income	10,609,265	5,795,933
Net income	614,730	2,657,523
Dividends	1,227,948	2,035,716
Net balance	Det. 1,364,693	523,248

New Books

Handbook of Building Construction, by George A. Hool and Nathan C. Johnson. In two volumes totaling 1,474 pages, illustrated. 6 in. by 9 in. Bound in flexible leather. Published by the McGraw-Hill Book Company, 239 West Thirty-ninth street, New York City.

Physically this work consists of two separate volumes, but in the arrangement and treatment it is essentially a single treatise since the page numbering is continuous from one volume to the next and the table of contents in Volume I and the index in Volume II refer to both books. The title "Handbook of Building Construction" quite properly describes the contents of the two volumes and the brief preface in Volume I declares that the book is designed as a reference work for the architect, engineer and builder. It would seem, however, that the needs of the engineer or truly engineering requirements are given the most generous consideration. It is true that under the head of "General Design Data" at the end of the first volume, architectural design is given some space including charts of the "orders" and typical floor layouts of structures for various purposes; there are also details of mail chutes, plunge baths, window frames, doors, etc., but in the main the first volume is concerned with the structural design of buildings composed of steel, concrete or wood, rather than with architectural design while a large part of the second volume is devoted to the design and layout of the heating, plumbing, ventilating, lighting, telephone, elevators, sanitation, etc. While the first 79 pages are devoted to the elements of structural design, this is of value primarily as a general review or handy reference rather than with the idea that it would enable the novice to acquire a thorough working knowledge of the subject.

The first 86 pages of the second volume are devoted to all manner of construction equipment used in building construction, including the excavating machinery used for taking out the foundations. The next 140 pages are devoted to general information on various building materials, including tables of standard sizes and styles and physical properties. This is followed by a number of chapters on estimating contract specifications, etc., while the remaining portion of the book is devoted to the special trade or auxiliary features of buildings referred to above. The subject matter as a whole bears the mark of authoritative accuracy, references to marine borers which cover only the effect along the North Atlantic seaboard without any reference to the more serious attacks to the Gulf and Pacific coasts being an oversight of a nature that may be expected in any work covering so broad a field as this handbook.

Letters to the Editor

Some Suggestions as to the Sixteen Points of Decision No. 119

NEW YORK.

To the Editor:

The decision of the United States Railroad Labor Board, No. 119, is offensively objectionable in that it forces the recognition by the railroads of union labor and imposes the conditions of a closed shop. This is the more offensive in view of recent history—such a recognition of the unions was refuted by the United States War Labor Conference Board. Mr. Gompers withdrew from and broke up the President's First Industrial Conference because of its refusal to give such recognition and the President's Second Industrial Conference avoided the difficulty by making no mention of it.

It was frequently said of the Director-General's administration that he was apparently far more concerned with organizing the railroad employees than he was with their efficient operation.

The decision is further objectionable in its lack of firm definiteness and its 16 points are open to the objections made by Secretary Lansing, of President Wilson's famous 14 points. Said Lansing, "When the President talks of self-determination, what unit has he in mind? Does he mean race, a territorial one or a community? Without a definite unit, which is practical, application of the principle is dangerous to peace and stability. . . . The phrase is loaded with dynamite—it will raise hopes that will never be realized."

Secondarily, what does the United States Railroad Labor Board mean by saying that, "There shall be a proper classification of employees and a reasonable definition of the work to be done . . . but shall not *unduly impose unnecessary conditions* upon the carriers," or again, "The principle of seniority . . . should be so applied as not to cause *undue impairment of the service*."

What about dynamite, hopes and disappointments?

I should like to make the following suggestions regarding handling of negotiations with maintenance and other employees (except train service) in the preparation of agreements covering working conditions.

Decision No. 119 handed down by the United States Railroad Labor Board on April 14, 1921, terminates the national agreements and all rules and working conditions thereunder enforced by authority of the Director-General or extended by that of the Labor Board. This in effect makes necessary the consideration of rules affecting all classes of labor embraced in said decision.

In the negotiation of agreements with employees in the maintenance of way and maintenance of equipment departments, and others, each road is required to negotiate its individual agreements, but in order that all may give consideration to the same important principles, roads should immediately call together the officers who will conduct the negotiations. It is suggested that general consideration be given to the following, believing that in agreements of this character there should be as few rules as possible and these confined to the basic principles of the schedules:

The present national agreements with the Federated Shop Crafts alone comprise 186 rules, and those with the other crafts are relatively as bad.

Generally, these agreements are objectionable as violative of economic and efficient production in the following particulars:

First. They fix compensation upon an hourly basis, eliminating piece-work, bonuses and other methods of incentive

to individual effort, which should be restored by such roads as desire to avail themselves of them, and should not be contracted away by any road.

Second. The business of transportation is conducted 24 hours each day for 365 days in the year. The business of production, except farming, is practically limited to periods of from eight to ten hours daily, customarily for about 300 days each year. It is further subject to substantial fluctuations in the volume of traffic moving over a series of years and much of the traffic is seasonal in each year. Wide latitude must, therefore, be exercised by management in the disposition of the railroad forces in order to adjust the one situation to the other.

Third. In the last 20 years, in no year of depression has the ton-mileage declined more than 10 per cent, and in but one year—1916—has the ton-mileage increased more than 20 per cent (when it amounted to 23.9 per cent), the largest other increases being in 1910, 16.6 per cent, and in 1906, 15.7 per cent. It would, therefore, seem very desirable as a means of stabilizing labor conditions that the standard work-day range between eight hours and ten hours, no reduction in forces being made in times of depression until they have been placed upon an eight-hour basis, and no increases in forces being made in times of business activity until the hours of labor have been increased to ten. Payment of overtime is a very questionable device, and in any event should not be allowed until the time is increased beyond 55 hours per week or for unusual service.

Fourth. No restrictions of lap-shifts should be permitted and the many methods for securing payment of overtime on Sundays, holidays, emergency work, travelling, etc., under which the overtime, which is never less than 1½ times the regular rate, may be increased to as much as five times the regular hourly rate, should be eliminated; so also the unreasonable travel expense allowances. Where employees are called and cannot then be employed upon the work for which they were called and there is an arbitrary allowance, provision should be made for their use in other occupations during the time paid for.

Fifth. While reasonable recognition should be given to seniority, it should be entirely and definitely subordinated to the judgment of management, as to the capacity, capability and productive efficiency, reliability and loyalty of the employee, and this whether the forces are to be reduced or enlarged, and the demoralizing effects of "bumping" and other practices to which it has given rise, should be avoided.

Sixth. All rules which interfere with discipline or weaken control of management, should be eliminated. No employee should be permitted to lay off without first securing permission.

Seventh. No payment should be made for punching time clocks, time consumed in receiving payment of wages, time consumed for lunches and other meals, or other time not worked known as "bonus time."

Eighth. The employment of men must not be restricted by labor union conditions as to apprenticeship and other qualifications, long experience having fully demonstrated the ability to prepare men for much of the maintenance work in a comparatively short period. Equally, management must not be hampered by labor union restrictions as to the "right to a job." All the work, if within the capacity of one individual, should be performed by him and to the extent possible full freedom should be given for the employment of handymen and apprentices under the direction of or associated with skilled labor.

Ninth. There should be a definite separation of all the forces of management down to and including gang leaders. These men should not be permitted to become parties to any agreement between the company and its employees. They should be definitely excluded from association with or obligation to the employees, their sole interest being that of

management and their sole duty being to the employing company; nor should there be any restriction upon their engaging in and doing the work of an employee where their services can be in that manner utilized.

Tenth. Rules which limit the initiative of management in prescribing conditions under which new men are employed, have no place in agreements with employees. All employees shall be required to furnish full statements as to their employment over a period of five years, and shall pass physical and mental tests, including those of eyesight and hearing, it being in the interest of safety of life and property and of management to have full information as to the health, habits and association of persons entering its employment, as well as their qualifications and fitness for the particular places they are to fill; and this not only to prevent fraudulent claims in cases of personal injury and the undue loading of pension lists, but to protect others from communicable diseases which might endanger their health and even their lives.

Eleventh. That the agreements run for one calendar year, but that all wages be subject to revision on 30 days' notice to keep pace with changes in the cost of living until more normal conditions are restored.

EXECUTIVE.

Bettering Train Movements

By Telephone

CHICAGO.

TO THE EDITOR:

In an editorial entitled, "Bettering Train Movements by Telephone," in the *Railway Age* of February 25, attention is called to the serious delays which often occur to freight trains after being made up, because of poor facilities for delivering running orders preliminary to their departure. It is stated that, to overcome this condition, one road has installed telephones, connected to the dispatcher's circuit, at outgoing ends of certain busy yards, so that when a train is made up and ready to leave, the conductor can communicate directly with the dispatcher who gives him his running orders, the conductor copying these orders and, after completing them, depositing one copy in a box provided for the purpose.

While it is true that at some points freight trains are delayed in this manner, which in turn results in delays to other trains on the line, and the suggestion that these delays be eliminated or reduced is a good one, it can not be done (without limiting conductor's hours of service) in the manner in which it is stated that one road has undertaken.

To require the conductor to copy train orders, receiving them over the telephone, as a regular thing and not in emergency, and as it is said this road will do, would restrict his hours of service to those prescribed by the hours of service act for operators, train dispatchers and others handling train orders. (See Interstate Commerce Commission's Conference Ruling 342, February 12, 1912.) The matter is of such importance I feel I should call your attention to it.

W. N. N.

THE GREATEST NUMBER of immigrants into Canada during 1920 came from Ireland. The total immigration from 64 countries in 1920 was 147,502, of which 98,636 entered via ocean ports, and 48,865 from the United States. Of this number, 49,248 came from England, 19,496 from Scotland and 61,112 from Ireland.

AN ACTIVE CAMPAIGN for the extension of Canadian trade will be undertaken by Canadian trade commissioners in Europe this summer. Plans have already been made to cover Norway, Denmark, Sweden, northern Africa, Spain and Portugal, while an intensive campaign will be carried out by the Canadian trade commissioner in London among British buyers.



Fig. 1—Panoramic View of Estaires, a Town in the Coal Regions of Northern France, Showing the Cleaning Up Process Well Under Way and Reconstruction Started

War's Devastation Aids Railway Reconstruction

Depreciated Land Values in Ruined Sections of France and Belgium Permit Increased Facilities

By Oliver F. Allen

Formerly Major of Engineers, American Expeditionary Forces

PREVIOUS ARTICLES of this series have dealt with the rebuilding of bridges and tunnels in the devastated regions of France and Belgium (*Railway Age* of April 8 and April 22). This was described as one of the first steps taken in the reconstruction program of the railways after the lines

and fixes factory centers. Space is rarely saved for future railway extensions, and betterments are usually a compromise between traffic requirements, interference with existing industrial plants, destruction of valuable buildings, utilization of important sites and the funds available for the improvements.

A unique result of the terrible destruction in the north of France has been the opportunity to take property at a low

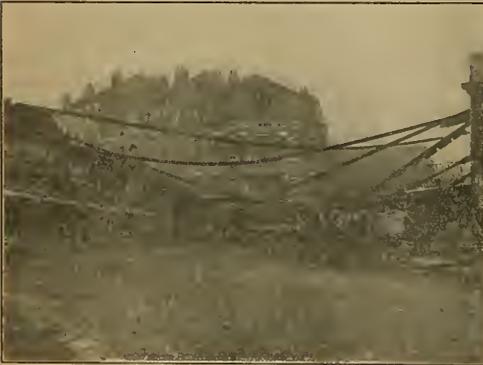


Fig. 2—A Destroyed Steel Railway Bridge at Lille

had been opened to traffic with only those structures and facilities which were absolutely necessary for operation. The problem of rebuilding the yards and terminals had next to be solved and it is now proposed to give some attention to this phase of the reconstruction work.

Railway engineers always face a difficult problem when trying to provide increased facilities in thickly populated districts. The industrial growth which creates the demand for increased facilities at the same time raises property values



Fig. 3.—Further Destruction of Steel Bridges at Lille

The debris of the destroyed abutments has been cleared away to allow military truck trains to use the street.

valuation without interference with industry. The destruction of many communities has been so complete that neither industrial plants, residences, nor even streets have survived. This is illustrated by Fig. 1, showing the destruction at



Continuation of Photograph Shown on Opposite Page—Temporary Buildings Being Used as Homes, Stores and Offices—Destruction of This Sort Made the Relocation of Railway Tracks and Terminals Possible

Estaires after the cleaning up process was partially completed. Inasmuch as both factories and railroad terminals have to be rebuilt, it is possible not only to enlarge facilities comparable with the increase in traffic, but to rearrange things so as to facilitate greatly the rapid and easy movement of both freight and passengers. In many cases where the destruction of a town or city was only partial, it was worst near the railway. This depreciation in value of property adjacent to both freight and passenger stations has enabled the French railways in the devastated regions to purchase additional land not only for present requirements but for further anticipated growth during the next 20 to 30 years. The government has assisted in this work and it was started so early that several thousand projects outlining anticipated requirements for the next generation have been studied with sufficient detail to justify already the purchase of the required property.

out regard to the time of day or Sundays and holidays. While the eight-hour day is sometimes used principally as a means for getting higher pay while still working ten or eleven hours, the tendency is, of course, toward the shorter day. The railroads are contemplating conforming to eight-hour laws in such a way as to move the maximum tonnage with one or two shifts with the minimum amount of Sunday and



Fig. 4—Reconstructed Bridge at Lille

Same as that shown in Fig. 2. The arches are very flat and the concrete very thin at the centre. The iron balustrades have been salvaged and used.

Not only are bigger transfer yards, passing tracks and sidings required because of the growth in industry, the use of the bigger trains, etc., but they are demanded by changed labor conditions. For instance, under pre-war conditions at the transfer points adjacent to the coal mines trains could be made up and dispatched as cars came in from the mines with-



Fig. 5—New Reinforced Concrete Bridges at Lille

These structures replace those shown in Fig. 3.

overtime labor. They are, therefore, in such places as Lens taking advantage of the destruction to increase greatly the capacity of the transfer yards so that incoming local coal trains can be made up into through trains and stored for 36 hours if necessary. The train crews can go on duty at regular hours and the storage capacity will be sufficient to avoid sending out many coal trains on Sundays. Trains will be sent out in rapid succession at such hours as will result in the minimum labor cost for their crews between the coal fields and Paris or other large centers or junction points.

A typical case of taking advantage of the war's havoc where the destruction of the city was only partial is at Lille. The map, Fig. 6, shows the pre-war railroad arrangement. Four double track lines fanned out toward the south. The one at the western extremity led via Bethune to the center of the coal fields and metallurgical industry of the north. The

one to Paris made the most direct connection to the capital. The one to Valenciennes traversed the areas largely given up to textiles and vitreous products, including Mons and other large towns in that direction. The fourth swung off to the east toward Tournay and so to the central parts of Belgium. Another line led to the northwest, in the direction of Dunkirk

fortifications between St. Sauveur and Port Vauban will be retained. The loop around the western and northern sides of the city is located substantially as projected before the war, but arranged to handle traffic quicker and easier. A loop has been added to the cut-off between the Bethune line below Santes and Armentieres by way of Beauchamps where

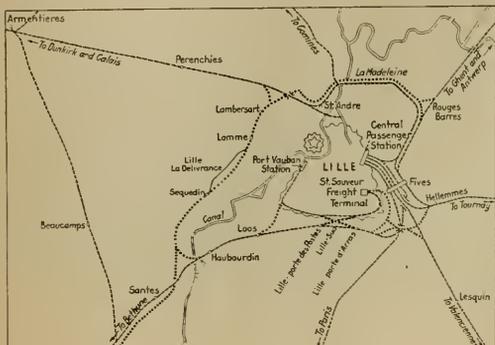


Fig. 6—Lille Before the War

Existing railways indicated by broken line and projected extensions by dotted line.

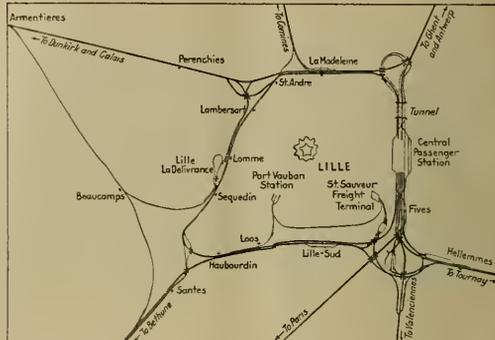


Fig. 7—Lille After the War

Showing Improvements Completed by the Northern Railway in February, 1920. A comparison with Fig. 6 will indicate the improvements.

and Calais, and the sixth, northeast in the direction of Ghent and Antwerp, in Belgium.

The central passenger station was a stub end terminal. The principal freight station at St. Sauveur was also a terminus and the facilities for getting from some of the lines to this yard were very inadequate. There was another freight terminal, the Port Vauban station, which was equally difficult of access.

Before the war, improvements as outlined by the dotted lines on Fig. 6 were contemplated. These included shops and transfer yards at Lille-la-Delivrance and large transfer yard at Rouges Barres. This pre-war program contemplated only the partial elimination of grade crossings of intersecting lines, and the abandonment of the stub end passenger station would have been so expensive that it was not even considered. The lines came into the city above the street grade before the war and their destruction was very complete as shown by Figs. 4 and 5. These old steel bridges were rebuilt with reinforced concrete as described in the preceding article in this series (*Railway Age*, April 22, page 973) and the completed structures are shown in Figs. 4 and 5.

Taking advantage of the destruction the management decided to build a comprehensive belt line around the city, to abandon the old central passenger station site and to build nearby a new station with through tracks. The relocation of lines decided upon includes an arrangement of the through tracks so that trains from and to all six lines mentioned above, as well as on the less important suburban and branch lines, and through trains over any combination of these lines, can come into town, pass through the station and go out again without passing over any grade crossings at intersecting lines or streets, and without changing direction.

The two main freight terminals are retained but are so connected as to improve and expedite the handling of both incoming and outgoing freight. The map, Fig. 7, shows the new arrangement. The southern part of the city not economically served by the Port Vauban and St. Sauveur freight stations will be taken care of by new freight and passenger stations at Lille-Sud midway between the existing stations of Lille-Porte-des-Postes and Lille-Porte-d'Arras, shown in Fig. 6, which will be abandoned. The connection inside the

it is brought over to the new transfer yards at Lille-la-Delivrance.

The connections on the east side of the city have been greatly modified on account of providing for through traffic, both freight and passenger.

Classification yards, storage tracks and repair shops are provided southeast of the city at Hellemmes, not far from the new passenger station and the St. Sauveur freight terminal.

The next article of the series which will continue the discussion of the rebuilding of yards and terminals in the devastated regions will appear in an early issue of the *Railway Age*.

PRESIDENT OREGON signed an order on January 26 transferring the administration of the National Railways of Mexico from the Department of Communication and Public Works to the Treasury Department.



Photo from "International"

Armed Postal Employees Guarding Mail

Needed Improvements in Locomotive Design*

Operating Conditions Demand Large Units Which Introduce Difficult Problems in Design and Maintenance

By H. W. Snyder

Mechanical Engineer, Lima Locomotive Works

NO ONE, IT IS BELIEVED, will dispute the fact that present day operation of high-power locomotives is one of the most vital questions with which our railroads are concerned. The demands of constantly increasing passenger and freight traffic have brought about a constant increase in size and power of our locomotives.

In view of the rapid strides that have taken place in increasing the size and power of locomotives within the last few years, it seems rather out of place to predict that the maximum has been reached. It is also true that the use of improved devices has made possible the satisfactory operation of the large locomotives of today. Everything seems to indicate that we have not reached the maximum capacity of the locomotive even within the present limits of clearance and rail load, and we may expect to see these same engines made far more powerful and economical by the application of devices which are now available or which are already being given serious attention.

In view of the foregoing, the most vital matter which confronts locomotive designers and operating officials is that of increasing the capacity as well as the efficiency of the locomotives which we have today. In many ways these problems have already been attacked and great improvements are continually being made.

In the following paragraphs an attempt will be made to bring to attention some of the problems which our present day locomotives bring forth and upon the proper solution of which depends their success.

Combustion and Steam Generation

In order that large engines may operate properly, it is of course necessary that a sufficient supply of steam be furnished to cylinders so that they can be made to produce their maximum horsepower. It is not enough to provide a given number of square feet of heating surface in the firebox and the tubes so that we may be reasonably certain that sufficient water will be evaporated to supply the cylinders. It is, however, necessary that we take into account proper construction of the boiler, necessary firebox volume to produce the best possible combustion of fuel, and the design of grates so that fuel will be economically burned to such an extent only as required by the maximum evaporation of the boiler.

In producing heavy motive power it has been necessary on account of prohibitive axle loads to apply a sufficient number of axles under the engine to reduce the individual axle load to within reasonable limitations. This has lengthened out the engine to such an extent that boiler design and maintenance has become a serious problem. In the first place, it is necessary to design a boiler that will properly function with the other vital parts of a locomotive. At the same time the length has become such that the use of combustion chambers is a necessity to avoid a prohibitive length of tube. Large engines have been constructed with a tube length of 25 ft. and it seems that no definite rule has been established as to what the limit of length of tube of a given size should be. Experiments have been made on this subject and it has been said that the maximum length in inches of a

tube of a given size should be approximately 100 times its diameter in inches. It would seem that this is as nearly correct as any general rule which has been devised and one which can be readily followed.

The author does not feel that any definite rule should be made in regard to length of tubes, for this might bring about a condition whereby other vital features of the engine would be involved in order to abide strictly to the length as noted above. Tubes 2 or 2¼ in. in diameter in excess of 20 ft. in length are questionable, and this feature should be looked into carefully before a decision is reached.

The advent of long combustion chambers has brought along with it the necessity for increased attention to boilers. The application of a long combustion chamber requires a large number of additional staybolts and it would naturally be expected that a boiler of this kind would require more staybolt attention. For this reason, if for nothing else, there is no doubt that a proper installation of flexible stays in the firebox and combustion chamber will prevent a great deal of the staybolt trouble which has been experienced in the past. Although long combustion chambers require more attention in maintenance this will be offset by the increased firebox volume and the resulting better combustion.

On account of height limitations, the height of the dome as well as the steam space in the boiler has been reduced to such an extent that difficulties are being encountered with the proper life and maintenance of superheater equipment, because too much water is drawn over through the throttle into the superheater. This is a question requiring experiment to determine as nearly as possible the minimum steam space which should be provided for boilers working on various grades.

Increased Capacity Needed Without Increase in Size

As noted above, it seems that we have about reached the limit of size of cylinders and size of boiler due to road clearances. To undertake to provide additional road clearance on practically all of the main lines today would mean a total expenditure of money, entirely out of proportion to the benefits that would accrue.

On account of the apparent limitations of piston thrust and road clearances the greatest problem with large locomotives today, is to increase their capacity without exceeding greatly present sizes. Anything to increase the hauling capacity of the locomotive without increasing the height and width limitations under which the locomotive must work might be called an essential capacity-increasing device. A few of these with which we are most familiar and which have proved beyond doubt their desirability are the superheater, the brick arch and the mechanical stoker. There are possibilities of still increasing the efficiency of the superheater without increasing the size of the boiler in which it must operate. There are also possibilities and constant improvements in the design of brick arches which lend to higher evaporation and better combustion of fuel.

It has been stated that when a locomotive requires as much as 6000 lb. of coal per hour it has gone beyond the limits of the ordinary fireman. Automatic stokers have been in use so long that their dependability for heavy power is no longer

*Abstract of a paper to be presented at the spring meeting, Chicago, May 23-26, 1921, of the American Society of Mechanical Engineers.

in question. Many men are studying this particular feature of locomotive design and operation and we may confidently expect in the future a gradual increase in the efficiency of these mechanisms. As they stand today they are an unqualified success, and time and study will bring about the necessary refinements so that better combustion and less coal per horsepower will be used.

We have not as yet gone very extensively into the use of feed-water heaters. It has been proved without a doubt in foreign countries that the feedwater heater is an essential capacity-increasing device as well as an economical addition to the locomotive. In this respect, then, it would seem that we are somewhat behind the Europeans, and there is no doubt that in the near future when the economies that can be effected by the use of feedwater heater are realized it will become almost as general as the superheater today.

Another small item which has received only passing attention in this country is the variable exhaust. As is well known, a variable exhaust that can be properly operated and which will not require much maintenance attention will have a great tendency to relieve high back pressure at high speeds, and its operation will also provide the necessary draft at slow speeds. It is one of the small things that deserves consideration and study and something which it is felt will be worked out satisfactorily for the future.

The Engine Proper

There have been no radical changes in the general design of cylinders. The use of outside steam pipes has resulted in advantages both from a casting and maintenance standpoint. It would seem well worth while to consider a design of cylinder by means of which the weight could be reduced to a great extent, permitting of additional weight of other parts, and thereby increasing the capacity of the locomotive.

The design of valve gears has received a great amount of attention and many accepted types are now available. In all of these every effort has been to better the steam distribution. In maintenance we are far ahead of engines used twenty years ago. There is yet, however, much to be desired in steam-distribution and this subject will bear as careful study in the future as it has in the past.

Power Transmission

When we consider that as much as 150,000 lb. piston thrust is being transferred through a single main rod and from this into the driving wheels of a locomotive, it is not difficult to understand why troubles are experienced with main crankpins and particularly side rod bearings at the main pin. In order to provide the proper strength to take care of this tremendous piston thrust it has been necessary to design extremely heavy main and side rods. The piston thrust is not the only consideration in this connection. The inertia forces, particularly in drifting, at times reach figures that are even greater than the piston thrust. Practically all of this must be taken care of through the main crankpin and the necessary connections to the side rods at this point.

All are familiar with the large number of experiments which have been carried on to produce a steel that would give a higher elastic limit than the ordinary high-carbon open-hearth steel which was successfully used until engines reached their present proportions. The use of such steel for side rods, main rods and piston rods has been principally confined to heat-treated and quenched forgings, which permitted the use of sections which were considerably lighter than what could be used with the ordinary open-hearth annealed forgings. Steel has also been produced which gives a high elastic limit and which can be successfully used with ordinary annealing, permitting very considerable reductions in weight compared to the ordinary open-hearth steel formerly employed. The use of such a steel does away with quenched

forgings and permits of rods being heated for closing-in straps and similar work without destroying the quality of the material as is the case with quenched forgings.

Main and side rods have been produced and have been in successful operation for the past few years in which the piston thrust is carried directly from the main rods to the side rods back of the main wheel. Such a design does not increase the total weight of the rods to an extent likely to cause any appreciable increased difficulties from a counterbalance standpoint.

The design of main and side rods as well as main crankpins will always be a vital question in the construction of locomotives. It has been necessary, and always will be in designing the rods for locomotives, to assume certain arbitrary limits of fiber stress based principally upon past experience. It is impossible to take into account all the stresses produced in rods when a locomotive is in operation, and for this reason the allowable fiber stresses in tension, compression and bending must be taken comparatively small in comparison to the elastic limit ordinarily obtained in such forgings.

There has already been a great deal written and a number of experiments conducted regarding the proper design of rods to successfully stand up under severe usage and at the same time reduce to a minimum the ordinary difficulties presented from the standpoint of counterbalance. Hollow-bored piston rods, light designs of crosshead and piston, the use of high-tension steel for side and main rods as well as the use of hollow-bored crank pins are familiar to all. More careful attention should be paid to the quality and upkeep of rod bearings and every endeavor should be made to provide bearings of such quality and design that renewals will be reduced to a minimum.

A main pin designed properly for heavy piston thrust must be so proportioned that the length will bear a certain relation to the diameter within very close limits. On account of the necessity for keeping cylinder centers as close together as possible because of rod clearances, if a proper length of main pin is obtained, its proper size presents a difficult proposition. This is one of the great difficulties which the author is confident will be overcome in the near future by the proper application of a design previously mentioned, wherein a large part of the piston thrust is transmitted directly from the main rod into the side rod.

Counterbalance

It is a very difficult matter to separate the question of counterbalance from the design of connecting rods and reciprocating parts. There is a great diversity of opinion in regard to the proper amount of counterbalance which should be applied to locomotives. The author believes that with our present heavy engines with long wheelbase it is not necessary to balance as much as 50 or 55 per cent of the reciprocating weight. In fact, it is quite possible that we may be able to counterbalance a smaller percentage of reciprocating weight than has heretofore been attempted, especially for long, heavy engines, provided the revolving weights at the main pin can be properly taken care of. Every effort, however, should be made to balance all of the revolving weights on the main pin.

The author is of the opinion that no definite set rule can be established in this regard, but that each particular design is a study in itself, and wherever revolving weights at the main pin are encountered such that they cannot be properly counterbalanced, steps should be taken to provide the best means possible of reducing revolving weights at this point as well as providing reciprocating parts as light as possible consistent with strength. This of course has been accomplished in the past by hollow-boring the main pins and piston rods and by using a light design of piston head, which in-

dicates that a steel having a high elastic limit with the proper elongation and reduction of area should be employed. The use of such steel has already proved that it can be depended upon. One of the principal fundamentals in counterbalance is to keep the reciprocating weight light.

The Running Gear

On account of the large increase in the size of cylinders of present-day heavy locomotives over those used several years ago, the cylinder centers have been spread until they have reached practically the clearance limitations of the railroads, and the necessity for larger journals to carry properly the increased axle loads has caused the frame centers to be brought nearer together.

This condition increases very materially the distance from the center of the cylinder to the center of the frame, which of itself produces greater strain in the frame and at the same time increased pressure on the driving-box bearings as well as shoes and wedges. In addition to the above, piston thrusts have increased from approximately 65,000 lb. to approximately 150,000 lb., and means must be provided to properly take care of the increased piston thrust along with the increased overhang.

While discussing the subject of frames it is hardly possible to ignore the vital question of frame cross-bracing. Substantial and sufficient cross-braces should be applied between the frames and rigidly bolted thereto to form a rugged structure which will not rattle to pieces.

It seems as though the design of driving boxes and driving-box brasses has not successfully kept pace with the rapid increase in piston thrust. We have in almost general use the same type of driving-box brass which has been standard on locomotives for years. The design is such that the brass extends about half-way down over the journal. Inasmuch as this brass must take up the piston thrust, it is very evident that we shall have trouble in taking care of driving-box brasses until a suitable design is produced—one in which the brass will cover much more of the front and back projected area of the journal than is now the case.

Guiding and Trailing Trucks in

Connection With Long Wheelbase

With our present heavy Mikado and Santa Fe type locomotives the length of rigid wheelbase is almost if not quite double the rigid wheelbase in ordinary service 20 years ago. It is unnecessary to comment upon the fact that it is a difficult matter to operate such engines around curves of even comparatively small degree and at the same time prevent the rapid wear of hub liners and driving-box faces, thus increasing quickly the lateral play to a prohibitive point and necessitating work in the shop to overcome it.

Santa Fe type engines with 22-ft. rigid wheelbase are not uncommon. Engines of this type and of this size will weigh in the neighborhood of 400,000 to 420,000 lb. When we stop to think that to move this tremendous mass of material around a 16- or 18-deg. curve a force of many thousand pounds is required, is it any wonder that we obtain rapid flange wear and the necessity for returning tires before the proper amount of mileage has been obtained? In the majority of cases, it is believed, the force necessary to properly curve an engine of this kind has been applied at the front truck and the first driver. In most cases types of leading trucks have been used which produce a very small resistance on curves of small degree. In order to prevent rapid flange wear as well as to overcome the development of lateral play unnecessarily, designs have been produced which will give a high initial resistance of the front truck and provide a lateral motion for the front driver with adequate resistance so that some of the guiding force is transferred back to the second pair of drivers.

Since locomotives operate the greater part of the time on tangent tracks, it is necessary to have a high initial guiding resistance which will not be increased when curving. In other words, a flexible wheelbase is produced which has all the requisites of the ordinary rigid wheelbase, but at the same time will overcome many of the difficulties now encountered in an attempt to operate engines of this size and length. Many designs of trailing trucks have been produced with the idea in mind of helping to remedy the conditions which have been noted above. These of course have met in a way the conditions which it was necessary to overcome. There is much yet to be done in producing a trailing truck which will have the proper facilities for equalization of spring rigging and at the same time produce an initial guiding force which can be kept nearly constant, thus avoiding the high final lateral resistance which is found in a good many of the trailing trucks now in use.

In addition to the foregoing some work has been done in the way of producing a design by means of which the lateral play in locomotive driving wheels can be taken up without removing the wheels from under the engine or taking the boxes off from the axles. No doubt in the near future a practical device of this kind will be produced. This is another one of the many problems which can be worked out which will enable the railroads to keep their locomotives in service.

The advent some years ago of the power reverse gear overcame one of the great objections that engineers had to large locomotives. It is a fact that it is almost impossible for one man to reverse one of our large locomotives equipped with the ordinary hand reverse lever. Power reverse has come to be an essential part of engine equipment and has been found to be economical even though it may be used on a locomotive which could be comparatively easily reversed by hand.

Probably no one thing contributes more to the failure of side rods than the improper adjustment of shoes and wedges. If these are allowed to run loose, stresses in the side rods will amount to a very high figure and it is impossible to determine to what extent they may go. A satisfactory automatic wedge if properly applied and maintained will, no doubt, go a long way toward preventing side rod failures.

Means for Increasing Nominal Tractive Effort

All railroads have points on certain divisions where there is a critical grade or the necessity of starting a heavy load under adverse conditions. At such places increased tractive effort is required which is not needed elsewhere. We are therefore confronted with the problem of producing a device which can be set to work to increase the tractive effort of a locomotive to such an extent that the critical grade or the necessity for increased tractive effort to start a train under adverse conditions will be overcome, thus enabling the engine to take its full tonnage over the entire division. This device should be so made that it can be applied when necessary and thrown out when the additional tractive effort is not required. Designs have already been produced wherein an additional tractive effort of 8,000 or 10,000 lb. has been applied to the trailing trucks of large locomotives. There is also a possibility of applying such a device to the tender truck, thus availing ourselves of the adhesive weight of the tender to help boost the engine over the critical points in a division. There is always present a possible potential boiler capacity which can be brought out by the use of a variable exhaust or other device sufficient to obtain rapid combustion at slow speeds.

What has already been done along this line may be taken as a start in the right direction. A certain amount of development work must be done in order that these necessary improvements may be made to operate satisfactorily. These problems require the co-operation of the railroads to provide

the necessary means for trying out such devices which, after having been carefully considered, show that they have possibilities for the future use.

The question of ash pans is also one needing serious consideration. With the large increase in size of locomotives in many cases we have evidently lost sight of the importance of this necessity.

Lubrication

Lubrication is a subject which has received much attention and a great number of combinations and experiments have been made to determine the most satisfactory method. With our present high superheat the proper introduction of oil into the cylinders and valves of a locomotive is worth serious consideration.

It is common practice in European countries to provide a force-feed lubricator located very close to the cylinder. The ordinary method which they use in connecting up this lubricator is to provide a pipe to each end of the piston-valve steam chest. This oil supply opens directly over each end of the valve when it is in central position. In addition an oil pipe is supplied to the cylinder at its center. It is reported that by this method there is less carbonization of the oil than when it is fed into the steam pipes or into the center of the piston valve steam chest. Whether or not this is so the author has no means of proving, but it seems logical.

In order to increase the tonnage which a locomotive can haul it is just as vital to decrease the resistance as to increase the power. It is not an impossibility to provide roller bearings for passenger cars and there seems to be no reason why they cannot be used on freight cars. Of course, this would mean very radical changes in design and a gradual displacement of present equipment, but the reduction of rolling resistance and the better facilities for lubrication which would be provided would be sufficient in time to overcome the necessary expense. All this may seem rather far-fetched, but is at least worthy of consideration.

Conclusion

In summing up the situation, it may be said that the use of the superheater alone has increased the capacity of locomotives when compared with saturated engines of the same design to such an extent that no one would think of building a large locomotive for up-to-date railroad service without the application of superheat. This is one of the greatest strides that has been made in the construction of locomotives in the past few years. We must not content ourselves, however, with what has been done with this one device. The large locomotive of today has become a necessity and is here to stay. What we need to do now is to avail ourselves of the opportunities offered in the application of many of the labor-saving and capacity-increasing devices which have already been worked out and are giving satisfactory service and at the same time look forward to the possibilities of applying other devices which are yet in their infancy, but which have proven beyond doubt that they are well worth our consideration and are of sufficient importance to warrant their adoption. There are many improvements yet to be made in locomotives and it behooves the operating officials of railroads as well as the leading minds in locomotive operation and design to get together and to continue to produce locomotives which in the next 20 years will be as far ahead of our present engines as our present locomotives are ahead of the locomotives that were built 20 years ago. Without the capacity-increasing devices which have been mentioned the large locomotive of today would be impossible—it could not be operated satisfactorily. Our large engines are an absolute justification of these improvements. Further developments are ready at hand and in their use lie the possibilities of still more powerful and economical transportation units built to operate within our present limitations of clearance and permissible rail loads.

A Welfare Campaign Among Mexican Laborers in the Southwest

By F. M. Richardson

Railroad Secretary, Young Men's Christian Asso., Chicago

THE RAILROAD DEPARTMENT of the Young Men's Christian Association is now conducting a welfare campaign among track laborers on the Rio Grande and the Albuquerque divisions of the Atchison, Topeka & Santa Fe in New Mexico that possesses much of interest to railway officers. As Mexican labor predominates in this territory, it was essential that the man selected to conduct this work have a speaking knowledge of Spanish. Other qualifications considered essential were a sympathy with the aspirations of the Mexican laborer, a teachable and inquiring mind and a willingness to accept the hospitality of a lodging in the labor camps to be visited. S. L. Hernandez, a secretary experienced in mining camp work was selected.

Colloquial instruction in English, educational talks in Spanish and the distribution of carefully selected literature printed in Spanish are the three principal channels through which educational contacts have been made. This work has been done at visits to sections and construction camps.

A typical program for an evening spent at a section, with practically every man, woman and child assembled either in the section house or in the station waiting-room, is generally as follows: (1) A 20-min. musical program, using the phonograph; (2) an educational talk upon some subject of interest; (3) English instruction; (4) distribution of literature.

The musical records most in demand are band numbers. Mexican national airs and Mexican folk songs are largely used in these programs. The talk following the musical program gives opportunity for general instruction in Americanization, for a discussion of relations of fidelity to one's employer and many other topics related to the circumstances of their life and employment. Especially does the talk present an opportunity to promote a better international feeling by pointing out America's traditional policy in relation to neighbors as exemplified by Cuba and the Philippines.

Mr. Hernandez has been able to counsel the family on the problems confronting them in relation to the education of the children, upon thrift and why they should deposit their savings in banks. Unfortunately, the Mexican attaches the same suspicion to our American banks that he holds regarding the fidelity of those in old Mexico. Every problem in the range of personal and family problems seems to have been brought to him, each complicated by ignorance and yet each reflecting a desire for adjustment to the conditions that obtain on this side of the border. Articles in the better Spanish literature, published in Mexico and in the United States, are brought to their attention to substantiate this traditional attitude of America as opposed to statements in the incendiary literature that has reached them. When it is remembered that the unmarried men of these groups return by the hundreds to old Mexico as often as every six months for a short visit, this work cannot be without real significance in promoting a better international feeling among the people.

On cars in transit with labor parties to distant points, sometimes requiring a trip of several days' duration, a program similar to those for the section men's evenings is conducted at intervals when the car is at layover points or on sidings. The phonograph contributes much to the contentment of such a party. The literature is in demand on the part of the few who can read, while the talks are listened to attentively by all. These labor parties are made up mostly of immigrants from old Mexico. Instruction regarding how to live in America is eagerly received. Popular subjects are: How to Keep Healthy, Things to Eat, and How to Count.

Joseph H. Young

JOSEPH H. YOUNG, who becomes president of the Denver & Rio Grande on its reorganization and release from receivership, is one of that large majority of railway executives who have risen from the ranks. He entered railway service as an office boy when he was 18 years old, and had a varied experience in the traffic, operating and other departments of railroads in different parts of the country before he attained to executive responsibilities. Nine years ago he became president of the Spokane, Portland & Seattle and other Hill lines in the northwest. In 1914 he became president of the Norfolk Southern. Under government control he was first federal manager of the Virginian and the Norfolk Southern and later senior assistant director of the division of operation of the Railroad Administration.

Mr. Young is thoroughly acquainted with the Denver & Rio Grande and the people in the territory it serves. He was born and grew up in Salt Lake City and at different times held traffic and operating positions on different railroads in the territory of the Rio Grande, including the Rio Grande Western. The Denver & Rio Grande is, financially speaking, what is commonly called a "poor" railway. Mr. Young has had experience as an operating officer in both rich railroads and poor railroads. Besides being an experienced and able operating executive he has always shown unusual diplomacy and skill in dealing with questions arising between the railroads and their employees, on the one hand, and the public on the other. All things considered, he is probably as well equipped as any man that could have been selected to deal with the problems that will confront the management of the Denver & Rio Grande for some years to come.

Mr. Young was born January 17, 1864, at Salt Lake City, Utah, and was educated at the University of Utah. He entered railway service in 1882, as office boy and warehouseman on the Utah Central, at Sandy Station, Utah. He was later agent and operator at various stations and then bill clerk, at Salt Lake station, the same road. He was with the Union Pacific as ticket clerk and train agent at Ogden, Utah, from 1883 to 1886. From 1886 to 1889 he was traveling passenger agent of the Chicago & North Western and in 1889-91 was general agent of the Salt Lake & Eastern at Salt Lake City, and general superintendent of the Utah Central. From 1891 to August 1, 1902, he was superintendent of the Utah division of the Oregon Short Line. Mr. Young was general superintendent of the Rio Grande Western, now part of the Denver & Rio Grande, at Salt Lake City from August 1, 1902, to December 1, 1904. On the latter date he became general superintendent of the Colorado & Southern. On December 11, 1905, he was promoted to general manager of the same road. From May 1 to October 1, 1907, he was general superintendent of

the St. Louis & San Francisco, and then served in a similar capacity with the Southern Pacific at San Francisco until May 1, 1910. In the latter year he was elected president of the Alaska Steamship Company, the Northwestern Steamship Company, Ltd., the Northwestern Commercial Company, the Northwestern Fisheries Company, and the North Coast Lighterage Company; and vice president of the Copper River & Northwestern. From May 15, 1912, to January, 1914, he was president of the Spokane, Portland & Seattle, the Oregon Trunk Railway, the Oregon Electric Railway, the United Railroads, the Spokane & Inland Empire, the Pacific & Eastern and the Dalles, Portland & Astoria Navigation Company with office at Portland, Ore. He was elected president of the Norfolk Southern, with headquarters at Norfolk, Va., in May, 1914. He was appointed federal manager of the Virginian in May, 1918, and in addition federal manager of the Norfolk Southern in the following month. He became senior assistant director of operation of the Railroad Administration in January, 1919, and returned to the presidency of the Norfolk Southern on March 1, 1920.



J. H. Young

Car Loading

WASHINGTON, D. C.

ANOTHER GAIN in the number of cars loaded with revenue freight indicating an improvement in general business conditions is shown in the weekly report of the Car Service Division of the American Railway Association for the week of April 16. The total was 703,896, a gain of 10,000 in a week and of 37,000 in two weeks. This is the largest total for a week, with one exception, since January 15, although still below the figure for the corresponding week of 1919, when the total was 706,012. It was greater than for the corresponding week of 1920, when the loading was reduced to 601,695 by the switchmen's strike. For the week of March 5 the loading was 712,822. There was an

increase as compared with the previous week in all districts except the Southern, where there was a drop of 1,457 cars. The increase is mainly in coal, which showed a gain of over 7,000 cars for the week, and merchandise and miscellaneous freight which showed a gain of 1,633 cars. Merchandise and miscellaneous has been gaining steadily since the first of the year, while coal has been falling off about an equal amount, but for two weeks in April the coal movement has been increasing. There were small gains as compared with the previous week also in livestock, forest products and ore.

An improvement in the demand for cars is shown by reports received by the Car Service Division for the week ended April 15. The average number of surplus or idle freight cars for the week was 499,479, or a decrease of 7,948 as compared with the previous week when a new high record in the number of idle cars was shown. This reflects the increase in loading shown in the week's report of April 9.

This reduction in surplus was due entirely to an increase

in the demand for coal cars, the number of surplus coal cars being 252,010, or a decrease of 9,284 compared with the previous week. The number of idle box cars remained virtually unchanged, there being 176,805 on April 15 as compared with 176,916 on April 8.

Compared by districts, decreases in the number of surplus

theory of this Act has not worked out during the last seven months.

The value of the New England roads is included in trunk line territory; therefore, the New England railroads are certainly entitled to earn as much on their value as the trunk lines as a whole, and if they fail substantially in that, the deficit should be made good in some way.

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY—ALL DISTRICTS; COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO FOR WEEK ENDED SATURDAY, APRIL 16, 1921

Districts:	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Merchandise L.C.L.	Miscellaneous	Total revenue freight loaded			Received from connections		
										This year	1920	1919	This year	1920	1919
Eastern	1921	5,041	2,888	37,114	782	5,730	850	56,375	63,962	172,742	.....	.....	177,385	.....	.....
	1920	2,148	874	30,826	1,522	5,593	982	26,018	43,078	.....	.....	111,041	169,935	.....	87,232
	1919	2,370	3,159	41,710	2,447	2,264	948	42,631	46,786	142,315	.....	.....	.....	94,988	.....
Allegheny	1921	1,070	1,819	38,786	3,044	2,053	2,594	25,752	34,964	.....	.....	110,082	145,491	.....	54,967
	1920	137	76	17,202	57	1,398	23	2,645	6,221	27,759	.....	.....	.....	13,334	.....
	1919	108	59	18,756	597	1,635	286	178	8,589	.....	.....	30,208	33,046	.....	13,790
Pocahontas	1921	2,922	1,951	17,341	460	14,049	708	38,037	37,349	112,817	.....	.....	.....	62,413	.....
	1920	2,790	2,365	21,158	240	16,063	2,806	24,977	51,964	.....	.....	122,363	112,286	.....	65,866
	1919	7,869	6,609	3,751	406	14,326	1,011	27,668	29,695	91,335	.....	.....	.....	39,063	.....
Southern	1921	7,449	4,732	8,040	951	20,452	2,807	19,766	34,675	.....	.....	99,163	101,659	.....	36,648
	1920	10,050	9,890	14,362	113	4,083	903	30,090	30,141	99,936	.....	.....	.....	42,820	.....
	1919	5,902	6,094	14,378	312	4,081	2,316	18,800	31,188	.....	.....	83,151	92,643	.....	28,890
Northwestern	1921	4,978	1,957	4,178	98	6,057	498	16,636	22,890	57,292	.....	.....	.....	42,104	.....
	1920	2,509	1,001	3,942	115	5,809	370	15,609	18,333	.....	.....	45,687	50,952	.....	30,540
	1919	33,367	26,530	135,658	4,365	47,909	4,941	214,082	237,044	703,896	.....	.....	.....	472,107	.....
Central Western	1921	22,276	16,944	135,885	6,781	55,680	12,154	129,173	222,795	.....	.....	601,695	.....	.....	317,933
	1920	37,066	28,154	144,563	.....	52,935	20,583	.....	422,711	.....	.....	.....	706,012	.....	525,277
	1919	11,091	9,586	.....	.....	.....	.....	84,909	14,249	102,201	.....	.....	.....	154,174	.....
Southwestern	1921	.....	.....	.....	228	4,416	7,777	.....	7,213	.....	.....	.....	.....	.....	.....
	1920	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	1919	.....	.....	.....	4,365	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total all roads	1921	3,699	1,624	8,905	.....	5,026	15,642	.....	185,667	2,116	.....	.....	.....	.....	53,170
	1920	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	1919	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

L.C.L. merchandise loading figures for 1921 and 1920 are not comparable as some roads are not able to separate their L.C.L. freight and miscellaneous of 1920. Add merchandise and miscellaneous columns to get a fair comparison.

April 9	1921	33,415	25,339	128,044	4,835	47,806	4,787	212,142	237,351	693,719	801,559	711,282	460,523	560,040	530,396
April 2	1921	33,354	23,584	109,284	4,862	46,911	5,508	211,244	231,895	666,642	858,827	688,567	459,161	696,872	518,098
March 26	1921	32,960	24,339	122,189	5,179	49,516	6,480	211,028	236,161	687,852	900,386	713,275	479,635	699,427	557,376
March 19	1921	36,038	26,423	126,081	6,122	50,065	6,048	208,816	232,114	691,707	855,060	699,720	490,938	652,300	515,212

cars were shown in the Allegheny, Pocahontas, Southern, Central Western and Southwestern regions, while increases were reported in the Eastern and Northwestern.

Suggests Solution for New England Railroad Problem

F. J. LISMAN, head of the investment house of F. J. Lisman & Co., New York, and recognized as a leading authority in matters of railway economics, has suggested to the Interstate Commerce Commission a plan for solving the pending argument as to the divisions or allowances to be given the New England roads, which solution he believes would probably have a better chance for adoption than some of the other plans which have thus far been suggested. Briefly, Mr. Lisman suggests that the New England roads and the lines doing business with them should keep an account of the earnings derived from business interchanged with New England and that a sum sufficient to equalize the net earnings of the New England roads with those of the trunk line carriers should be paid the New England lines monthly, the sum to be pro rated among the carriers in proportion to each line's New England business. He further suggests that the plan should be made effective for a period of, say, twelve or fifteen months and that the present New England divisions case be suspended until the information to be derived from the procedure in the suggestion will be available.

He has outlined the details of his plan in the following statement:

Suggested Solution to Keep New England Lines Out of Bankruptcy

The intent of the Transportation Act was to enable the railroads to earn 3 1/2 per cent on the fair value of their property devoted to public service. Owing to unforeseeable conditions the

The adjustment or rates and divisions is a very lengthy process and urgent help is needed. It is, therefore, suggested that all the railroads in trunk line territory should keep an accounting of all earnings derived from business interchanged with the New England railroads and should pro rata and in proportion to their earnings from this traffic (not exceeding, however, 12 1/2 per cent of such gross earnings) pay over to the New England lines, a sum which will equalize the net earnings of the New England railroads. That is to say, if in any one month all the railroads in trunk line territory have had net earnings as a whole at the rate of 3 1/2 per cent per annum of their value and if the deficiency of the New England roads below 3 1/2 per cent during that month, should have been \$1,000,000, then the lines in trunk line territory, out of their earnings, are to make good this difference pro rata. For instance, if the earnings of the Pennsylvania Railroad on business interchanged with the New England lines during that month should have been \$1,000,000, which may have been 20 per cent of the total gross earnings on this interchange business earned by the lines West of the Hudson River, then the Pennsylvania Railroad should be required to pay this pro rata, that is up to \$125,000, to the New England roads, or as much less as may be required.

As the three systems in what was formerly known as "Pocahontas Region" have been large beneficiaries from the rate increase granted to the trunk line group, which includes the valuation of the New England roads, they should also contribute their proportion of the deficiency of the New England railroads on business carried by them and destined for New England points. This tonnage which moves out by water from Hampton Roads aggregates between 7,000,000 and 10,000,000 tons annually.

The connecting lines now claim the New England roads are not administered as economically as they might be, nor their local rates sufficiently high. It is, of course, easy to see the mote in your brother's eye and ignore the beam in your own eye. These points will be brought out by the investigation proposed by Senator Cummins and need not be considered at this time.

If the above suggested division of earnings should be ordered for twelve to fifteen months, it would give time to investigate the matter of fair divisions because it would not be proper to make this plan a permanent one in view of the fact that such a division is somewhat communistic in its nature and does not offer sufficient incentive to the New England roads to get the most out of their property.

Bankruptcy of the New England roads would not in the least serve or increase the facilities to the New England public; it would further disturb confidence in railroad securities and in view of the large advances of the government to these railroads, it would undoubtedly bring forth much adverse comment in

Congress and elsewhere, on part of men not familiar with the past and present needs of the situation.

It is in his letter to the Interstate Commerce Commission that Mr. Lisman suggests the suspension of the New England divisions case. In that letter he urges the need of prompt action and further details the plan of keeping separate accounts on the business interchanged with the New England lines. Concerning the latter feature of the plan he says in his communication:

"(3) That the commission suggests or recommends to the carriers that they shall keep separate accounts not only of the earnings accruing from the business interchanged with New England lines, but also as near as possible of the expenses here incurred in connection with said traffic; that the carriers west of the Hudson River file with the New England carriers, and the New England carriers vice versa file with their western connections, etc., not more than 90 days after the close of each month a detailed report of the earnings and expenses incurred in connection with this interchange tonnage. If any carriers should feel that these accounts are not properly kept they shall endeavor to arrive with each other upon an understanding as to the proper method of keeping such accounts, and if they fail to come to an agreement within forty-five days after the question of improper accounting has been raised they should appeal

to the commission with a request for a decision on the subject."

"The object of these suggestions is," the letter to the Commission says, "that the necessary material for a final decision on New England divisions will thus be gathered together in course of the next 12 months, and that in the meanwhile most of the details on which a final decision must necessarily be based will largely be threshed out between the carriers themselves. I am using in the first line of Suggestion 3 the words 'suggests or recommends' in preference to the word 'order' for the following reasons: Many of the carriers, especially those in C. F. A. territory, participate to a small extent only in the New England tonnage and therefore will not want to bother to keep cost accounts in connection with this business. I am referring to such roads for example as the Ann Arbor, the Detroit & Mackinac, etc., and possibly some of the more important companies who get only a short haul from this traffic."

"The costs of operation of the New England railroads," Mr. Lisman continues, "have risen much more owing to the high wages than those of all other railroads. This is due to the fact that wages constitute nearly the entire cost of the expensive terminal and switching service. With decreasing wages the costs on the New England railroads should contract correspondingly more rapidly than on the other lines."

Do Mill Defects Cause Transverse Fissures?

Study of These Rail Failures Points to Influence of Chance
Mishaps in Particular Heats

By C. W. Baldridge

Assistant Engineer, Atchison, Topeka & Santa Fe, Chicago

DURING THE YEAR of 1920 there occurred on some of the American railways a seeming epidemic of broken rails due to transverse fissures. On January 1, 1920, the number of identified failures on one railway amounted to 39 rails and on March 12, 1921, the identified failures due to fissures on this road amounted to 199 with a dozen or more failed rails which are suspected of being transverse fissure failures on their way to the test department for positive identification. Most of these suspects are broken rails that became so rusted before inspection as to make their positive identification impossible without running them through the drop machine and testing them for further fissures. The remainder are rails showing cracks in the gage side of the head of the rail, indicating a transverse fissure, but not yet broken for inspection.

A study of these broken rails develops some interesting facts, the first one being that out of more than two hundred rails involved, only one, a rail rolled by the Colorado Fuel & Iron Company in August, 1904, is charged with being of Bessemer process steel, this being assumed because it does not bear the process mark, "OH" to indicate that it is of open-hearth process steel. Serious doubt is cast upon its being of Bessemer steel by the fact that the Colorado Fuel & Iron Company, which made the rail, commenced making open-hearth steel in 1903. But owing to the fact that both open-hearth and Bessemer furnaces were in operation, and ingots from all furnaces were worked in the same rolls, no process marks were added to the brand on the rails until the use of Bessemer steel for rail making was abandoned, in the latter part of 1908.

Other mills followed much the same practice. The dates of commencing the use of open-hearth steel for rails, and

the times of adopting of a process mark are indicated in brief as follows:

The Carnegie Steel Company began the operation of its open-hearth plant at Bessemer in 1913, but had rolled some rails from open-hearth steel shipped from its Edgar Thompson plant since 1910. It does not use the process mark "OH" as part of the brand except on request, but uses a stamp "OH" along with the heat number.

The Cambria Steel Company began the manufacture of iron rails July 27, 1854, of Bessemer steel rails in 1867, from steel obtained from outside sources. It began the manufacture of Bessemer steel July 10, 1871, and the rolling of rails therefrom on July 12, 1871. It began manufacture of acid open-hearth steel rails in 1878 and of basic open-hearth steel rails in 1906. The distinguishing process mark "OH" was adopted at that time. The first rolling of Bessemer steel rails in the United States is reported to have occurred at North Chicago Rolling Mill, in 1865.

The Colorado Fuel & Iron Company first rolled "OH" steel rails in latter part of 1903, gradually increasing the "OH" tonnage until June, 1908, when the use of Bessemer steel for rail making was discontinued. There is no information as to process marks prior to latter part of 1908, but discontinuing of the use of Bessemer steel, the mark "OH" was added to brand. Previous to this the process mark could not be added to the brand, as both kinds of steel were passed through the same rolls.

The Lackawanna Steel Company began the manufacture of open-hearth steel rails on February 2, 1907. The open-hearth process mark was stamped on the rails until 1920, when "OH" was added to the brand.

The Tennessee Coal, Iron & Railroad Company com-

menced the manufacture of rail from open-hearth process steel in 1903, and adopted the process mark in 1906.

The Illinois Steel Company started rolling open-hearth steel at Gary Works, February 17, 1909, and "OH" was added to the brand at that time.

On one railway with which the writer is familiar, over ten thousand miles of Bessemer steel rails have been used, more than half of it having served the first cycle of its usefulness in main line track, with only one transverse fissure failure being charged against it, and that one case being seriously open to doubt.

About 400 miles of 85-lb. A.S.C.E. section rail of Bessemer process steel, or perhaps mixed processes are still in main line running track, and carrying the same axle loads, the same locomotives and same trains that are being carried by the 90-lb. open-hearth rails adjoining. Not a transverse fissure failure has been found in this Bessemer steel, while a considerable number of such failures have been found in the open-hearth steel adjoining.

Very few failures due to transverse fissure have been reported in Bessemer steel rails by other companies, and in view of the mixture of rails made from the two kinds of steel, before process marks were adopted, it is advisable that the heat number of every transverse fissure failed rail which is now charged to Bessemer steel be traced to prove if possible to which process the rail really belonged. If the tracing of the heats of the fissure failed rails now charged to the Bessemer process should prove them to be of open-hearth steel, it would practically prove that transverse fissures are due to some difference in the two processes, and even if these rails are of Bessemer steel, the very few of such failures in that process steel indicates that the failures are due to something which almost never happens in the Bessemer process and only occasionally happens in the open-hearth process.

Returning to a study of the fissure failures as quoted above, 23 identified transverse fissure failures have been found in one heat of steel, 6 of the 23 rails being "B" rails and 8 of them "G" rails. Another heat has developed 6 identified failures, all 6 of them occurring in "G" rails. Another heat has developed 13 identified fissure failures and 8 suspects; another heat recently inspected has a record of 6 identified fissure failures, 4 suspects, 2 mashed heads and 1 split head failures.

Another heat recently inspected showed 13 identified fissures and rail failure reports indicate 3 suspects not yet inspected; 4 of these identified being "C" rails, 3 "D" rails and 2 "B" rails. Another heat shows 5 identified fissures, 3 of them occurring in "C" rails.

The total identified fissure failures are divided among rails of letters as follows: A—19, B—32, C—46, D—24, E—26, F—22, G—25, H—1, and unknown 2.

The large number of failures occurring in an individual heat, and the number of failed rails of the same letter in the heat, indicates that transverse fissures are due to some defect which affects the heat as a unit. In this case transverse fissure failures have been found in only about one-half of one per cent of all the heats of open-hearth steel in use to date and in only one or in none of the Bessemer heats. It is, therefore, possible to trace back for the cause. The rails of heats which have not produced failures are carrying the same loads as are those which have produced failures. They are laid in the same manner, supported in the same manner, and were handled in the same manner from the mills to their present position in the track.

At the mills the rails of different heats were loaded alike, were gagged in the same gagging presses and in the same manner, were handled over the hot beds in the same way, and were rolled through the same rolls, in as near the same way as it is possible to roll them. Should any of these features be the cause of transverse fissure, the failures would naturally

scatter indiscriminately through the entire output and not bunch up in a few heats.

In tracing back, the soaking pit is the first point where a difference of any consequence could occur, but here again the scarcity of fissure failures in Bessemer steel brings a verdict of acquittal. Therefore, the cause for the failures must lie still further back. The real point of difference between the two processes of steel making, as well as the difference between different heats made by the same process, must originate between the charging of the furnace and the teeming of the ingots, for the charging of the furnace is the beginning and the teeming of the ingots is the ending of the heat's existence as a unit.

A study and comparison of the two processes of steel making show several points of difference, a slight derangement of any one of which may be the cause of transverse fissure failures. In the open-hearth process, a larger amount of cold carbonizing reagent is added to the molten metal in the ladle, and usually with less agitation of the metal to insure thorough mixing, than occurs in the Bessemer process. Some heats in the open-hearth process require more "coking up," that is, the casting of bags of powdered coke and shoveling of lump coal, etc., into the ladle while the steel is running from the furnace, than do others.

It is possible that in one-half of one per cent of the heats, this is improperly done, or possibly over done, and brings about a defective state of the steel. Another possible source of trouble might be the addition of too much lime to the bath in the open-hearth furnace too shortly before the tapping of the furnace. However, the most probable cause is the frozen tap hole, which occurs occasionally in the open-hearth furnace and cannot occur in the Bessemer furnace.

The frozen tap hole delays for a time the removal of the heat of metal from the furnace, after it has reached the proper condition for removal, the length of time depending upon the means at hand for cutting the hole open. This delay results in burning out the carbon from the melt to a greater extent than was intended and usually results in heavier recarbonizing, or addition of spiegel, powdered coke, etc., in the ladle than would have been necessary had the tapping been accomplished without delay. It is true that a delay in pouring the heat of metal from a Bessemer converter might occur, due to some derangement of the plant, but such a delay occurs much less frequently than does the frozen tap hole in the open-hearth furnace.

It may be that none of the conditions mentioned is the cause of transverse fissures, but since only about one heat in two hundred is affected, there can be little doubt that the trouble can be easily remedied, or avoided, when it is known what to do, or what not to do, in the making of the steel. The indications are that the cause of transverse fissures in rails is connected with the furnace practice, therefore, the surest way of determining just what is the cause would probably be to have a careful log kept of every detail of the furnace practice of each heat, and when transverse fissure heats are located (which will usually be from 3 to 10 years after the manufacture of the rails), make a careful study and comparison of the details of the furnace practice of the good and bad heats.

Mrs. M. E. WILBER, a typist in the general office of the Southern Pacific at San Francisco, wrote during the year 1920 a total of 38,756 letters, spending in this work 2,165 hours. Mrs. Wilber's portrait is printed in the April number of the Southern Pacific Bulletin, and she is called the Mistress of the Keyboard. The year's record averages 143 letters per day of eight hours, and the total number of hours given seems to indicate that she worked about five and a half days a week for fifty weeks. It is estimated that the average number of lines in each letter written was seventeen.

Great Northern-Northern Pacific Bonds Approved

I. C. C. Authorizes New Joint Bonds and Also Additional Bonds for Collateral and Conversion

WASHINGTON, D. C.

THE PLAN proposed by the Great Northern and Northern Pacific railroads for refinancing their purchase of the stock of the Chicago, Burlington & Quincy by the issue of \$230,000,000 of joint 15-year 6½ per cent convertible gold bonds secured by the Burlington stock and some additional collateral in the form of individual bonds of the two companies was approved by the Interstate Commerce Commission in a decision dated April 21 which was made public on April 25. The new joint bonds, which under the commission's order are to be sold at not less than 91½ per cent of par, are to refund the \$215,000,000 of joint 4 per cent bonds issued 20 years ago to finance the Burlington purchase, which mature on July 1. Commissioners McChord and Eastman filed dissenting opinions opposing the plan as being unduly expensive. Commissioner Potter filed a concurring opinion answering their arguments and pointing out that the commission had prevented the carrying out of the plan proposed by the roads under which \$80,000,000 of Burlington bonds would have been issued against improvements made out of income and used to retire a part of the joint bonds.

The application has attracted unusual interest because of the size of the financial transaction involved, as it represents the largest railroad bond issue ever made at one time.

The various steps in the refunding transaction as authorized were as follows:

Various Issues Authorized

The commission's order approves the proposed joint trust indenture of the Northern Pacific and the Great Northern, in the form submitted.

The Northern Pacific and the Great Northern are authorized (1) to issue \$230,000,000 of their joint 15-year 6½ per cent convertible gold bonds under a proposed trust indenture to be executed and delivered under date of July 1, 1921, by them to the First National Bank of the City of New York as trustee.

The Northern Pacific is authorized (1) to issue nominally \$33,000,000 of its 6 per cent refunding and improvement mortgage bonds, series B, under its mortgage dated July 1, 1914, to the Guaranty Trust Company of New York; and (2) to pledge the bonds as collateral under the proposed

indenture; the bonds to be dated January 1, 1921, and to mature July 1, 2047.

The Great Northern is also authorized (1) to issue nominally \$33,000,000 of its 7 per cent general mortgage gold bonds, Series A, under its proposed general gold bond mortgage, dated January 1, 1921, to the First National Bank of the City of New York; and (2) to pledge the bonds as collateral under the proposed indenture; the bonds to be dated July 1, 1921, and to mature July 1, 1936.

The Northern Pacific is authorized to issue at par and accrued interest, and from time to time upon payment or conversion of the joint bonds in accordance with the provisions of the indenture, its refunding and improvement mortgage bonds, series B, to an amount not exceeding \$107,000,000 under its mortgage; the bonds to be similar to the \$33,000,000 of bonds described to be used for purposes specified.

The Great Northern is also authorized to issue at par and accrued interest, and from time to time upon payment or conversion of the joint bonds in accordance with the provisions of said indenture, its general mortgage gold bonds, series A, to an amount not exceeding \$107,000,000 under its proposed general gold bond mortgage; the bonds to be similar to the \$33,000,000 of bonds above described and to be used solely for the purposes specified.

The proposed general gold bond mortgage of the Great Northern, in the form submitted, is approved.

The Great Northern is also authorized to pledge as collateral under its proposed general gold bond mortgage \$12,132,000 of its first and refunding mortgage gold bonds, bearing interest at 4¼ per cent, dated May 1, 1911, maturing May 1, 1961, issued under its first and refunding gold bond mortgage, dated May 1, 1911, to the Bankers Trust Company, and now held unencumbered in its treasury.

The Great Northern is authorized to pledge as collateral under its proposed general gold bond mortgage, an additional \$24,200,000 of its first and refunding mortgage gold bonds, subject to the existing pledge thereof with the Secretary of the Treasury as security for a loan under section 210 of the transportation act; said bonds being similar to the \$12,132,000 of such bonds above described.

Following is an abstract of the report:

Report of the Commission

A hearing upon the application was had on April 11, 1921. At the hearing there were no appearances except in behalf of the applicants. No objection to the granting of the application has been offered by any authority of any State in which either applicant operates.

The application grows out of the necessity of paying or refunding \$215,227,000 of 4 per cent joint and several bonds, in the hands of more than 18,500 holders, issued under date of July 1, 1901, in payment for 1,076,135 shares of the capital stock of the Chicago, Burlington & Quincy of the par value of \$100 per share. They are secured solely by the pledge of 1,658,674 shares of that stock owned by the applicants. The applicants, lacking available funds with which to pay them, must issue and sell some form of securities sufficient in amount to raise substantially all of the required \$215,227,000. For this purpose they have decided to issue the joint 6½s; and the uncontradicted evidence is that the issuance thereof is the best means now available for obtaining the necessary funds.

Conversion Privilege

The joint 6½s will be callable for redemption, as a whole or in amounts of not less than

\$5,000,000, on 75 days' notice at 103½ per cent of par and accrued interest. Each holder of joint 6½s, whether or not they be called for redemption, will be entitled to convert them at any time before maturity into a like amount of the Northern Pacific refunding and improvement mortgage bonds, and/or of the Great Northern general mortgage gold bonds. But this right of conversion into the mortgage bonds of either applicant will cease when \$115,000,000 of its bonds, less an amount equal to one-half of the principal amount of joint 6½s redeemed, shall have been issued upon such conversion. Upon such conversion, except when made upon an interest date, accrued interest will be adjusted in cash. The evidence shows that the calling of joint 6½s for redemption would probably result in the conversion of the greater part of the bonds so called.

Many of the joint 4s are held by insurance companies, savings banks, trust companies, trustees and other similar investors. In several of the chief investment states bonds secured by stock collateral alone cannot now be lawfully purchased and held by such investors. It is believed, however, that the provision for conversion will not only enable the applicants to

reach this market but will also insure the early substitution of mortgage bonds for a considerable portion of the joint 6½s without any calling of the latter for redemption.

Between July 1, 1914, and December 31, 1920, the Northern Pacific expended for additions and betterments properly chargeable to capital account \$45,208,084, none of which has been capitalized. It now proposes to reimburse its treasury in part for these expenditures by drawing down on account thereof, under its refunding and improvement mortgage, \$33,000,000 of series B bonds, and to pledge the same under the indenture. These bonds will be callable for redemption after July 1, 1936, on any interest date on three months' notice at 110 per cent of par and accrued interest.

The Northern Pacific mortgage reserves \$22,400,000 of the bonds issuable thereunder for issuance from time to time for the purpose of purchasing, paying or retiring joint 4s before, at or after their maturity. Section 4 of the third article thereof provides that \$1,000 of the bonds so reserved may be issued for each \$500 of the pledged stock upon its release from pledge and deposit with the trustee thereunder. That company seeks authority to issue from time to time,

pursuant to this provision, its mortgage bonds to an aggregate amount of not more than \$107,300,000.

The maximum interest rate permissible under the Great Northern first and refunding gold bond mortgage is 5 per cent. That company can not procure the issuance of bonds thereunder against deposits of the stock, unless it deposits a majority of the issued and outstanding shares. It does not own a majority of the shares. It therefore determined to execute and deliver under date of January 1, 1921, to the First National Bank of the City of New York its proposed general gold bond mortgage. Section 5 of the third article thereof provides for the issuance of \$140,000,000 of series A bonds to be dated July 1, 1921, mature July 1, 1936, and bear interest at the rate of 7 per cent. These bonds will not be redeemable before maturity.

The Great Northern proposes to draw down under that section and to pledge under said indenture \$33,000,000 of series A bonds. The remainder, \$107,000,000 thereof, are reserved by that section for issue from time to time for the purpose of exchanging, redeeming, or retiring upon surrender for conversion, in accordance with the terms of the indenture, a like principal amount of the joint 6½% bonds. Authority is sought to issue, from time to time, pursuant to this provision, series A bonds to an aggregate amount of not more than \$107,000,000.

The proposed indenture provides that, upon any redemption of joint 6½%, the trustee shall release to each applicant in respect of each \$1,000 of bonds so redeemed \$100 of its pledged mortgage bonds at \$85 per value, of the pledged stock. It also provides that, upon any surrender of joint 6½% for conversion into the mortgage bonds of either applicant, the trustee shall release to that applicant, for each \$100 of bonds so surrendered and against delivery to the trustee of \$100 of such applicant's mortgage bonds, \$77, par value, of the pledged stock and \$20 of its pledged mortgage bonds. Each redemption or conversion of joint 6½% will, therefore, result in a partial severance of the applicants' joint ownership of the stock.

There have been issued and are actually outstanding \$35,668,000 of the Great Northern first and refunding mortgage gold bonds due May 1, 1921. There have been pledged with the Secretary of the Treasury \$24,200,000 of similar bonds. It is desirable that this company's proposed general gold bond mortgage be a first lien on a majority of the bonds issued and outstanding under its first and refunding gold bond mortgage. Therefore, it proposes to close its first and refunding gold bond mortgage with \$72,000,000 of bonds issued and outstanding thereunder, of which \$35,668,000 will remain in the hands of the public. The balance, \$36,332,000, will be pledged under the proposed general gold bond mortgage, which will provide for the pledge thereunder of \$24,200,000 of such bonds, subject to the existing pledge thereof with the Secretary of the Treasury, and of an additional \$12,132,000 thereof now held by the company unencumbered in its treasury.

Proposed Terms of Sale

The applicants propose to issue and sell the joint 6½% at some convenient time on or before July 1, 1921, through a contract to be made with a syndicate of bankers, who will agree to provide on or before that date the moneys needed to pay the joint 4s. No contract or commitment of this kind has as yet been made and will be made without our approval. The applicants propose to sell the joint 6½% at the best prices obtainable at the time when their issue is authorized. They represent that it is not possible to obtain definite prices in advance of such authorization; but that the joint 6½% probably could not be sold to the public for more than 96½ per cent of par and accrued interest, and that the cost to the applicants of marketing the same, including a reasonable compensation to the syndicate and to the distributors, will be about 5 per cent. If the transaction should be consummated on this basis, the joint 6½% would be purchased by the syndicate at 91½ per cent of par and accrued interest and the discount thereon would cover the cost to the applicants of marketing the same. The amount 6½% to be sold to the syndicate at that price the effective rate of interest which the applicants would have to pay would be about 7.45 per cent. While this rate is very high the uncontradicted evidence is that the terms mentioned are the best which can be obtained at the present time.

If the proposed issue of bonds should net the

applicants but 91½ per cent of par, it will be necessary for them to provide \$4,777,000 in addition to the proceeds thereof in order to pay the joint 4s. This evidence shows they will be able to do.

The proposed issue of joint 6½% will increase the fixed annual interest charges of each of the applicants by \$3,170,460, provided that none of the bonds are converted. Assuming a conversion of half the issue into the 7 per cent bonds of the Great Northern and half into the 6 per cent bonds of the Northern Pacific the fixed annual interest charges would then be further increased by \$75,000 in the case of the Great Northern and be correspondingly decreased by \$75,000 in the case of the Northern Pacific. These figures do not reflect the additional cost to either applicant resulting from the sale of the joint 6½% at a discount.

We approve the applicants' proposed joint trust indenture and the proposed general mortgage of the Great Northern in the respective forms in which they have been submitted.

The applicants have had their joint 4s outstanding for nearly 20 years. During that time they have made good earnings but have not reduced the principal amount of this obligation. The interest thereon has been more than met currently by their dividends from the Burlington stock, to purchase which the joint 4s were issued. The near approach of maturity presents the alternative of default, or of such refinancing as now appears to be practicable. And the testimony is that an extension or refunding of the present loan for a short term would be of no material benefit to applicants. The situation presents an emergency and we must deal with that situation as it is.

Commissioner Potter Calls Plan Sound Financing

Commissioner Potter in his concurring opinion said in part:

It appears to me that there is reason to apprehend that the dissenting opinions of Commissioners McChord and Eastman may leave erroneous impressions regarding the views of the commissioners who concur in the majority report.

Undoubtedly the carrying out of the plan will be expensive. It should be pointed out, however, that the element of expense is due in substantial part to the fact that we declined to approve of the plan submitted to us on the application of the Burlington, and forced the utilization of the more expensive plan now submitted.

There is a suggestion of criticism because of the fact that the Great Northern and the Northern Pacific acquired the Burlington stock. I fail to see wherein we have license to criticize that transaction. Its merit is not involved in this case. There has been no inquiry regarding the propriety of it, and there is no record upon which fairly it could be criticised. It has stood unquestioned for 20 years, and for the purpose of this proceeding must be presumed by us to have been sound. Beyond this, the phenomenal record made by these three properties during the last 20 years, in fairness should be regarded as justifying the relation which existed between them. That relation seems to harmonize with the consolidation provisions of the Transportation Act and to indicate that those who were responsible for it were leaders about 20 years ahead of the leaders of the present day.

It is suggested that some sinking fund scheme should have been followed heretofore. A sufficient answer is that no such plan was adopted, and we must deal with conditions as we find them. It has not been pointed out how any sinking fund scheme would have been helpful. The carriers have not, during the last 20 years, disbursed any undue or disproportionate amounts in dividends. They have spent vast sums for additions and betterments which were needed in the public interest. Any sinking fund scheme which would have withdrawn earnings with which to retire the Burlington joint 4's would have served no purpose except to force the issuance of other securities with which to replace them. Under the plan which we have already prevailed a large part of capital invested in railroads has been represented by bonds. This has been in the public interest, and this method of financing undoubtedly will continue. The plan represents sound financing and has been forced by necessity as the best method. It would not have been and could not have been used if it were not supported by sound economic reasons.

It is likely that when the Burlington joint 4's were put out the 20-year maturity was decided upon because it was believed that they could be refunded on a basis better than 4 per cent—which probably could have been done except for the World war.

The suggestion that an extension of two or three years should have been obtained has been answered by testimony that it is impossible to obtain such an extension. The intimation that a forced refunding on a 6 per cent basis should have been resorted to, suggests a policy of repudiation which should not be encouraged by us. In this country the investor has the right to choose the investments which he will make. When, as in this case, he is entitled under the contract which he holds to receive a definite amount at a certain time, he has the right to demand that amount in the medium which his contract provides. To force an investor to receive in payment of his debt another security worth only 80 or 90 cents on a dollar would represent a policy of dishonesty, which we, on behalf of the American public, have no right to enforce and approve.

The situation before us is relatively simple. The joint 4's must be met on July 1, 1921, if the credit of the applicants and railroads generally is to be preserved. The results of a denial of this application would be disastrous to the railroads and to the public. It probably would be impossible to put through any other plan by July 1. This application and the prior application by the Burlington to the investors, and our assistance for more than six months. The uncontradicted evidence is that the method proposed, despite its cost, is the best available and the only one the success of which is virtually assured.

Commissioners McChord and Eastman Dissent

Commissioner McChord, in a dissenting opinion, said in part:

The plan submitted is, in my judgment, so expensive and so at variance with the spirit and purpose of the amended act, and so foreign to the interests of the public and the carriers, that I am constrained to withhold my assent. Twenty years ago the northern lines jointly acquired approximately 97 per cent of the capital stock of the Burlington, and to obtain the funds issued their joint and several 4 per cent bonds collaterally secured by deposits of the capital stock so purchased. During that period the Burlington dividends have paid the interest upon the bonds. The northern lines have distributed dividends upon their own capital stock, and have expended various sums in maintenance, betterments and extensions; but nothing has been set aside as a sinking fund to retire any part of their bond issue, and at the end of the 20-year period they have failed to cancel a single dollar of the indebtedness incurred for the sole purpose of obtaining control of another trunk line. To postpone the day of reckoning they now propose a joint refunding issue of \$230,000,000, initially increasing their outstanding obligation by approximately \$15,000,000, to be floated in accordance with a plan which will net them about \$210,000,000, after deducting the discount and underwriting costs. Thus, at the threshold, not only are they faced with an expenditure of approximately \$20,000,000 to accomplish merely the flotation of the issue, but the net proceeds will fall almost \$5,000,000 short of the principal sum necessary to meet and retire the outstanding joint 4's, and, as frankly admitted, this deficit must be "dug up" from other sources. This is not all; they are to assume a 15-year undertaking to pay an interest rate increased by more than 50 per cent annum, which for that period will aggregate over \$86,000,000 additional fixed charges, based upon a principal enlarged by nearly \$15,000,000, and callable at 3½ per cent above par, equal to 12 per cent of par in excess of the initially available net. So, also, in the event the privilege of the conversion into the Northern Pacific 6's is exercised, within the prescribed limits, the bonds, although enjoying a lower interest rate, are callable after 15 years at a premium of 10 per cent of par.

The foregoing discloses the prodigality of the transaction, the cost of which must sooner or later be met by travelers and shippers or else impair by so much the resources of the applicants. Having been unable to abate a single dollar's worth of their outstanding joint 4's there is scant hope that the northern lines will

be able to reduce the new and more burdensome undertaking or even recoup the initial sacrifice with which it is to be launched, and the approval by the majority includes no such requirement for the future. Certainly, the present progression is in the direction of disaster. This is not a matter of negotiating a loan with which to continue those lines as going concerns, but solely to enable them to retain control of the Burlington; and it can not be successfully contended that the present scheme is necessary to maintain this triple alliance as a transcontinental system, in view of our power to prescribe through routes and joint rates, and to provide for joint use of terminals upon appropriate terms.

I think we should limit our authorization to an issue of refunding bonds of the northern lines in an amount sufficient to retire the maturing issue, bearing interest at 6 per cent and secured by the joint mortgage and by the collateral now having a materially increased value, to be exchanged par for par by negotiation with the present bondholders. An admissible alternative would be an appropriate extension or renewal of the present obligations for a further period of something like 2 or 3 years, even at 7 per cent, the present indications being that the interest rate has passed the peak and will then have declined to a reasonable figure; and before the expiration of that time steps could be taken to place refunding bonds in the hands of investors on less costly terms.

Commissioner Eastman said in part:

Applicants and their financial advisers, while no attempt has been made to communicate with any considerable number of the holders of the joint bonds, state that they have interviewed a few of the larger holders and find no disposition

to accept 6 per cent bonds, however secured, in substitution for the maturing 4 per cent bonds. On the contrary, they doubt whether many of the holders will accept in exchange even the proposed new bonds on a 6 1/2 per cent basis, and they believe that it will be necessary to pay cash in settlement in more than three-fourths of the cases. Their plans, therefore, contemplate the sale of most of the new bonds to new purchasers for cash, and it is testified that the cost to applicants of this marketing will be about \$11,500,000.

Notwithstanding these statements, I cling to the belief that with our help and without employing brokers at the huge cost proposed, applicants could carry through this refunding operation upon much better terms. In this belief I rely, not upon altruism, but upon the enlightened self-interest of the holders of the joint 4's. Railroads generally are passing through a very trying period, and their welfare is vital to the welfare of the country. Friendly co-operation, such as I have in mind, on the part of the holders of maturing securities would not be an act of charity, but in the long run an act of selfish wisdom. If given the opportunity, I believe they would be quick to grasp the essentials of the situation and act accordingly. And such co-operation on their part would most assuredly react favorably both upon labor and upon the general public.

But we have the public interest to consider, and not merely the attitude or desires of the bondholders. The maturing joint 4's were originally issued to purchase the Burlington stock. The issue added nothing to the railroad property of the country, but had for its purpose only a shifting of control. To retain this control, applicants now propose to mortgage their own

properties, invade the investment market with a new issue of \$230,000,000 of bonds, and pay brokers \$11,500,000 for selling these bonds to the public on a 6 1/2 per cent basis. It seems to me that we should not, under existing critical conditions, permit railroad credit to be drawn upon in such a way and for such a purpose. It is admitted that many of the large holders of the maturing bonds, if paid in cash, will not now reinvest in railroad securities. The new bonds will, therefore, tap and be a heavy drain upon the present inadequate market for such securities, without adding in the slightest degree to railroad facilities. The same would have been true of the original plan for refunding with the help of Burlington bonds.

Reduced to simple terms the facts are that applicants did not pay cash for the Burlington stock in 1901, but gave for it their 20 year notes, secured by the stock as collateral. These notes are due next July, and it is claimed that the holders are unwilling to extend, even if offered a very large increase in interest rate. Applicants therefore desire to meet their obligations in cash, and they can undoubtedly do so if permitted to pay the price; but the transaction will place a heavy burden upon the country and will impair the market for railroad securities which are needed for much more vital purposes.

I therefore concur in the conclusions which Commissioner McChord has reached.

I feel confident, in view of prevailing railroad conditions, that these conclusions, if adopted by the commission, would meet with widespread approval, and that this approval would even be shared by the holders of the maturing bonds if the situation were made clear to them.

Southern Road Develops High Power Weed Burner

A NEW TYPE of weed burning apparatus was recently developed in the shops of the Texas & Pacific which is capable of destroying vegetation for a distance of 10 ft. each side the center of the track while operated at a speed of five miles per hour. In addition to the weed burner

The new weed burner was constructed on the principle of a direct application of heat at a temperature of 1,400 to 1,500 deg. F., and experience has developed that this may be done with safety. The heat is blown upon the vegetation beneath a hood 38 ft. long suspended over the track, giving a length of contact sufficient to destroy vegetation while the burner is moving five miles per hour.

The heat is developed by the efficient combustion of fuel oil, combined with the correct quantity of air applied by



The Weed Burning Outfit Complete with Burner in the Foreground, Followed by Tank Cars, Locomotive, etc.

car itself, the full complement of equipment required for this work includes a locomotive, an oil tank car, a water car, a camp car for employees and a caboose. The total cost of destroying vegetation with this equipment is said to be less than \$5 per mile, including the consumption of 60 gal. of fuel oil per mile by the locomotive and the weed burner.

forced draft, the combustion taking place in a furnace lined with refractory materials. The temperature of the furnace gases is reduced to safe limits for application to the track by the further admixture of air in suitable quantities. A particularly complete arrangement has been worked out for the mechanical handling of dampers, wings, hoods, etc., so that

the process is thoroughly under the control of the operator. The apparatus is mounted on a steel underframe flat car lengthened to 60 ft. The machine is carefully designed to assure continuous operation at a low maintenance cost. Standard commercial equipment is used for parts subject to wear or breakage, thus minimizing expense and delay for repairs. The apparatus has proved successful in operation.

Farmers' Organizations

Demand Rate Reduction

WASHINGTON, D. C.

THE DELEGATION of representatives of the National Farmers' Union and other agricultural organizations which have been in conference at Washington and which called on members of the Interstate Commerce Commission on April 20 to urge an immediate reduction of freight rates, took their appeal to President Harding on April 21. A memorial was presented pointing out the serious conditions faced by the agricultural industry and urging that immediate relief be given, but in the memorial no effort was made to place the entire blame for the situation upon freight rates and the President was urged to consider the agricultural and transportation problem as a part of the broad national question of economic readjustment. The memorial said in part:

"With frozen credits, with almost prohibitive freight rates and with costs of distribution so enormous, it is impossible for the farmer to market his products without incurring a loss. The consequence is that while millions of tons of food rot in the field or are held in the barns or in other places of storage, scores of thousands of our children in the cities are unable to obtain food sufficient to nourish their little bodies. The farmers are overwhelmed with debt. They are unable to buy necessary fertilizer. They cannot obtain needed credit and there are in hundreds of thousands of cases no markets open to them. The freight rates constitute a crushing burden on the farmer. We maintain that the rise in freight rates to heights hitherto undreamed of a time when their products were being marketed at figures far below the ten-year average price is crushing the life out of the industry and if continued will retard the development of that co-operative spirit among the great industries of the nation which must be fostered in order to bring about in an orderly manner the reconstruction of our disordered national life.

"It is true the railway executives complain that they are making no money and some of them fear that a reduction would mean ruin for the mammoth enterprises they are directing. There is no element in American industrial life would more regret the ruin of the great carrying industry than would the farmers. Therefore it is in no spirit of petty criticism that we approach this immense subject. Transportation is second only in importance to production. The one is dependent upon the other. The one gives life to the other.

"So it is in a spirit of friendliness to the railways that we make our appeal to you. The railways cannot continue to be wholesome without the assistance of agriculture. When farms are abandoned or production restricted railway securities must suffer impairment in value. We are here to offer to yourself and the railways the hearty, intelligent and enlightened co-operation of the tillers of the soil. Agrarian America cannot survive unless it is in constant contact with urban America and this contact is secured by the railways and other carrying agencies.

"But, Mr. President, to settle this problem and to settle it right, agriculture needs the co-operation of all basic industry. It is ready to take its place by the side of steel, oil, finance, coal, lumber, labor, the railway executives and other great agencies. But we want you to lead all."

The President was asked to call a conference of the heads of finance, the coal industry, the oil industry, the railway industry and labor, and especially the railway labor board, in order that they, in harmony with agriculture and under the leadership of the President, may work out a solution of the problem.

A committee report presented by S. W. Brookhart and adopted by the meeting was less conservative than the memorial. In attributing a large part of the losses of the farmer to the "unreasonable rise in railroad rates" the report declared that the rise in freight rates was caused by a "cost

plus guaranty law," that the valuation used by the commission was too high and covered over five billion dollars of water, that the men who controlled the railroads controlled the price of steel and coal and it referred to the wage advance of last year as if it were the only one that had to be met by the increase in rates.

"A unified government regulation under the management of honest and competent men would reduce costs of transportation in vast amounts," the report said. "The railroads now have about 10 billions of capital at an average rate of 4½ per cent. Upon all of this they have a guarantee of 6 per cent. This means a bonus of 150 millions. Add to this the guarantee on capital above market value and there would be a saving of 450 millions on capital charge alone. Seven hundred millions could be saved on coal, steel, and other expenses when the power of the trusts is broken. The waste of competition could be reduced by over 400 millions. The capitalization of unearned increment at the rate of over 300 million dollars per year would be saved. These items make a grand total of nearly 2 billion dollars, most of which could be used in the reduction of rates with proper readjustment of wages. The farmers pay 56 per cent of the freight rates and have a just demand for this reduction."

The executive committee of the American Farm Bureau Federation, which has been holding a two-weeks' meeting in Washington, has formulated a legislative program calling for a repeal of the "guaranty section" of the Transportation Act and a reduction of freight rates.

Rates to Intermountain Territory

Found Not Unreasonable

WASHINGTON, D. C.

THE INTERSTATE COMMERCE COMMISSION has issued a decision dismissing the complaint of the Intermediate

Rate Association, a voluntary organization of shippers' organizations and state commissions in the intermountain territory, which had asked for graded rates to the intermountain territory lower than those to the Pacific Coast. The commission finds that the rates from points of origin east of the Rocky Mountains to the so-called intermountain territory are not unreasonable, unduly prejudicial or otherwise unlawful. The opinion by Chairman Clark points out that this case differs from previous cases in which rates from and to these territories were considered in that now the rates to the intermountain territory are not higher than to the coast and there is no contention that they should be higher. The question is as to whether the rates to intermountain territory should be lower than to the coast and, if so, to what extent. After outlining the history of the long-drawn-out controversy over transcontinental rates, the report points out that on March 15, 1918, all departures from the long and short haul rule in westbound transcontinental rates were removed under the commission's decisions, in which it was found that, due to conditions brought about by the war, water competition between the Atlantic and Pacific ports was no longer a compelling force, and it was held that the maintenance of lower commodity rates to the coast than to intermediate points unduly preferred the coast. The commission also expressed the view that rates in certain instances, at least, might be graded. These decisions required no change in the class rates as they were already lower to the intermediate points than to the coast.

In the spring of 1918, shortly after the revised rates referred to were established, intermountain shipping interests took up with the Railroad Administration the question of graded rates for all commodities; that is, lower rates to intermountain territory than to the coast. After hearing before the Chicago western district freight traffic committee in July, 1918, the matter was referred to a joint committee, composed

of the members of the San Francisco district freight traffic committee and the Portland district freight traffic committee, with directions to work out in detail and submit for consideration a complete system of graded rates. A plan of readjustment was prepared and agreed to by the members of the coast committee, and referred to the Chicago committee for consideration and transmission with recommendations to the director general's director of traffic. In the meantime, the director general and his director of traffic visited Spokane and indicated to its citizens that graded rates would be accorded intermountain territory. However, the Chicago committee failed to act on the coast committee plan and the director of traffic eventually took the matter out of its hands and referred it to the Interstate Commerce Commission under section 8 of the federal control act, with a request that it give him its recommendations. Apparently because of the prospects of an early return of the roads to their owners, the request was withdrawn, but finally, at the suggestion of the director of traffic, the matter was drawn to the commission's attention by the filing of the complaint in this case.

In terms, violations of sections 1, 2 and 3 of the act to regulate commerce were alleged; but the principal complaint was brought under section 3, namely that the Pacific coast is given unreasonable preference, and intermountain territory is subjected to undue prejudice and disadvantage, because the commodity rates are not graded so as to afford intermountain territory the full benefit of its location nearer the east. The class rates were satisfactory to complainant. They are graded and, except for recent general increases, have been in effect for a number of years.

At a hearing on the complaint in 1919 the coast committee plan had the almost unqualified support of the intermountain interests, and, the report says, if adopted, it would practically satisfy the complaint. The director general and the carrier corporations vigorously opposed its adoption and later appointed a committee of railroad traffic officials to propose a readjustment which they would be willing to make in case the commission should find undue prejudice against intermountain territory. Such a proposal was prepared and submitted to the commission late in December, 1919, and it was understood that this proposal, although submitted during federal control, was primarily on behalf of the carrier corporations and looked forward to the then prospective period of private control. The carriers contended that the present rates are not unduly prejudicial and their plan was presented for adoption only in the event that the present rates (which referred to the rates in effect prior to the 33 $\frac{1}{3}$ per cent advance made last August) were found unlawful. It contemplated a complete readjustment of the class and commodity rates giving effect to the grading principle, but entailed the disruption of important commodity rate relationships as between eastern points of origin and the cancellation of many commodity rates which latter matters were beyond the scope of the proceeding.

The complainant asked an adjustment which entirely disregards water competition and based solely on distance and other transportation conditions. The coast committee plan also assumed the non-existence of rail and water competition for transcontinental traffic and the rates proposed were based on distance and other transportation conditions. The eastern groups were retained, but the intermountain blanket was broken up and all rates were based on a first-class rate of \$4.00 from the Atlantic seaboard to the Pacific coast. Plans based on this with some modifications were also presented by the Utah and by the Idaho interests. The various plans and the positions taken by various groups of shippers are discussed in the report, after which the conclusions are stated in part as follows:

Complainant's allegations with respect to the propriety of the present commodity rates have not been sustained. Speaking of these rates, as a whole, no undue prejudice to intermountain ter-

ritory appears, and we can not say that the rates should be graded. Conditions warrant the carriers, in their discretion, in continuing the present blanket adjustment on many and perhaps most of the commodities that move in considerable volume. The ships that now ply between the Atlantic and Pacific ports are not nearly so numerous and the tonnage now moving is not nearly so heavy as during the period that followed the opening of the canal and preceded our entry into the war, but it is, nevertheless, certain that there is now sufficient transportation by water and ample indication that it will further develop and increase, to warrant the belief that within a comparatively short time it will reach a point where it will be felt in a serious loss of tonnage by the rail lines unless they have available appropriate measures to meet the situation. There is not that strife and rivalry that formerly characterized the coexistence of these two modes of transportation to and from the Pacific coast, but as between these separate sets of carriers there is that natural and well-grounded fear of each other's ascendancy and power, sufficient, especially in view of the existing movement by water, to warrant a finding that there is actual competition at the present time. Energetic business competitors in their struggle for success always look beyond the present and are justified in keeping themselves fortified against each other's activities, even before the situation becomes serious. It is mainly for these reasons that the commodity rates have been held to their present level and largely for these reasons that the carriers are now opposing a disturbance of the present adjustment. Moreover, it was for these reasons, and in the interest of rate stability, that the suggestions as to grading made in our report in *Transcontinental Rates, supra*, were not couched in more positive and forceful language. There is less reason now than then for grading. We are not now prepared to say that the rail carriers can well be put in a position to lose or to risk losing a considerable portion of their present and prospective traffic to and from the coast by having their rates increased in order that there may be a differential in favor of intermountain territory. An increase to the coast would be necessary unless we found the present rates to be not less than reasonable maxima. On this record we can not say that this is so. Moreover, rates for long hauls, particularly on low-grade traffic, are often blanketed over extensive territories, and even if the rates to the coast were found to be reasonable maximum rates it would not necessarily follow that all of them should be graded. In view of the special conditions under which these commodity rates were established and have been maintained, we can not fairly, unless we find them to be reasonable maximum rates, spread their effects farther into the interior. It is understood, of course, that these findings apply to the general rate structure. A somewhat different conclusion might be reached with respect to a specific commodity rate constituting an exception to the general adjustment. The fact that rates from certain interior eastern points of origin to the Pacific coast are lower than from the Atlantic seaboard is discussed in the record although not definitely brought in issue by the pleadings. This grouping of eastern points of origin applies to the intermountain territory as well as to the Pacific coast terminals. The grouping is not a source of injury to complainant. It reflects an adjustment of long standing.

Methods of rate making based upon theories that are no longer tenable or upon conditions that no longer exist should be discarded. When distances are relatively great, and when transfer at rate-breaking points is not attended by unusual costs, the combination basis, using local rates, ordinarily is abnormal and unscientific and often discriminatory. The railroads should be regarded more and more as one national system, and the time may not be far distant when we should proceed to the establishment of joint through class and commodity rates, lower than the combinations of locals, between practically all points in the country. We have generally recognized that through rates should be less than the combinations, but prompted chiefly by considerations of paramount public interest, growing out of the revenue conditions of certain carriers, we have refrained from and even declined absolute condemnation of combinations. We are now vested with specific authority to initiate rates that will protect revenues, and where carriers will suffer depletion of revenue by reason of the establishment of new joint rates, appropriate measures can be taken for their protection. We are not, however, prepared to now require the joint through rates here prayed for.

Since the record in this case was made up many and far-reaching changes in economic and transportation conditions have occurred. Conditions are unsettled. The future of transportation by rail and by water is uncertain. The suggested comprehensive plans for readjusting all of the rates over this large territory and the evidence submitted for and against each plan tread far outside the limits of the complaint. We deemed it advisable to hear what the parties desired to submit regarding a possible readjustment that would do justice to all. We have discussed some of those matters rather fully in this report. The record and

the discussion should be helpful in paving the way for a final settlement of this vexed situation. The extent of the territory that would be affected by a readjustment of all of these rates is indicated by the interests for which appearances are shown. Their interests are diverse and their contentions are often diametrically opposed. These questions can not be settled justly by accepting the views of those on either extreme.

Labor Board Rules A. B. & A. Wage Cut Illegal

THE ACTION of the receiver of the Atlanta, Birmingham & Atlantic in reducing the wages of its employees, in compliance with a ruling by Federal Judge S. H. Sibley recently, is in direct violation of the Transportation Act, according to a decision of the Railroad Labor Board announced on April 21. The Board, however, declared that "there is nothing to be gained at the moment by requesting the court to recall its wage reduction order and to direct a reinstatement of the former employees" and suggested that the employees, most of whom are on strike, hold conferences with the receiver and if an agreement is not reached, bring the case again before the Board. The decision also criticised the employees for striking instead of referring the wage dispute to the Board.

This case, the progress of which has been described in the *Railway Age* of February 4 (page 319), February 11 (page 367), February 18 (page 412), February 25 (page 454), March 4 (page 520), March 11 (page 548), and March 18 (page 724), has attracted a great deal of interest as the first case which has brought forth a clash between the Labor Board and a federal court and as the first legal tangle which the Board has been called upon to unravel.

After outlining the history of the controversy and the positions taken by the contending sides in the hearings held before the Board, the decision analyzed the stand taken by the carrier in opposition to the charge of violation. The receiver, in defending his position contended that: (1) he was not a party to Decision No. 2 and therefore not bound thereby; (2) he acted only under the orders of a federal court; (3) the Labor Board had decided that it was without jurisdiction in the case; (4) the Board's refusal to consider the carrier's financial ability to pay was not consistent with the Constitution in that it would deprive a carrier of its property without due process of law; (5) the Atlanta, Birmingham & Atlantic was not a party to Decision No. 2; and (6) the Labor Board being without jurisdiction the federal court had a right to fix just and reasonable wages.

Referring to the first two of these contentions, the decision termed them "insufficient" saying:

Assuming that the Atlanta, Birmingham & Atlantic was a party to Decision No. 2, it is believed to be clear that this receiver is also bound. The appointment of a receiver does not alter the status of a property. It effects remedies and does not change the rights or obligations of the carriers. Among the obligations resting on a carrier is to carry goods and passengers at the rates approved by the Interstate Commerce Commission; to pay the engine and train service employees according to the basis of pay set by the Adamson Act; and to conduct transportation pursuant to the Hours of Service Act and numerous other Federal Acts enacted by Congress for the regulation of carriers. The appointment of a receiver by a federal court does not and cannot warrant the operation of the property by him free of these obligations.

But it is urged that the act of the receiver in reducing wages was authorized by the District Judge. In the opinion of the Labor Board and with all respect to the learned judge who approved the order, the said order was beyond the jurisdiction of the District Court. Under Title III of the Transportation Act, 1920, Sections 301 and 307, the duty of determining just and reasonable wages upon a dispute duly referred, is imposed upon the Labor Board.

Referring to the third contention of the receiver, the Board denied that it had ruled it was without jurisdiction in the case saying:

The Labor Board found that Section 301 had not been complied with, and it required the parties to comply therewith as was its duty under the law.

The fourth contention of the receiver was called "unsound" in the decision which said in this connection:

It is difficult to see how a requirement that the conference should be on the justness and reasonableness of the then wages should amount to a taking of the carrier's property without due process. It was contemplated that the parties might agree at least in part, if they so conferred. It appeared that all prior conferences concerned themselves only with the ability of the carrier to pay, which is certainly not the only factor to be considered. If the conference had decided nothing, the dispute could have been referred to this Board for decision pursuant to law, and if the receiver had paid the wages according to Decision No. 2 for the brief period necessary for this Board to consider and decide the matter, it is very probable that the property would have been less reduced than by the course adopted. Furthermore, by this procedure the law would have been complied with.

The fifth contention was categorically denied, the Board stating that the carrier was a party to conferences held at Washington, March 10 to April 1, 1920, at which the just and reasonable wages were discussed.

In closing its finding the Board said in part:

It is believed to be important to state again that in the opinion of this Board Title III required that in conferences on wage disputes the question should be what shall constitute just and reasonable wages. Throughout the conferences in this case the sole question discussed was the inability of the carrier to pay.

Not until February 14 did the representatives of the carrier claim that the wages were not just and reasonable. Then for the first time did the carrier maintain that a decline had taken place in the cost of living. This claim laid the foundation for the valid dispute, over which the Board could take jurisdiction provided an attempt had first been made to settle the differences in conference. Such a conference the Labor Board in Decision 89 directed the parties to hold. The employees endeavored to comply with the direction; the receiver refused immediately putting into effect the wage reduction. This action on the part of the receiver the Labor Board regards as a violation of Decision No. 2.

The Labor Board finds also that the receiver in reducing wages by authority of the Court instead of referring the dispute to the Board, has proceeded contrary to the letter and spirit of the Transportation Act.

The Board believes that the exigencies of the case, and a misunderstanding of Decision No. 89, led the court into an error in assuming jurisdiction and authorizing the receiver to reduce wages instead of directing the receiver to comply with Decision No. 89. The action of the Court is regrettable since it has resulted in a strike, injurious alike to the Atlanta, Birmingham & Atlantic, its employees, and the region served by it, in which situation the Labor Board is powerless to act effectively so long as the Court differs from the Labor Board in its interpretation of the Transportation Act, 1920.

Assuming the correctness of the Labor Board's conclusion that the receiver was subject to the Board's jurisdiction and that he violated the Transportation Act in reducing wages there remains the question whether the petitioners also violated the Act.

While the Labor Board appreciates the provocation to which the employees were subjected by reason of the receiver's action, nevertheless, the Board cannot condone what in itself was a wrongful act on the part of the employees. It was their duty, on learning that the receiver would not join in referring the dispute to the Labor Board, but insisted in putting the wage order into effect, to themselves refer the wage dispute to this Board.

The complication resulting from the strike and the replacement of former employees by others now working at a reduced rate, are such that the Labor Board believes there is nothing to be gained at the moment by requesting the Court to recall its order of February 28, and to direct a re-instatement of the former employees. It does, however, request that the Court direct the receiver to confer with the petitioners upon the question as to what constitutes a just and reasonable wage for the employees on the railroad, taking into consideration all factors set forth in Section 307 of the Transportation Act, 1920, and upon other questions involved, and in case of disagreement, to submit the dispute to this Board for decision.

The Labor Board also requests the petitioners to attempt again to confer with the receiver regarding the justness and reasonableness of the wages and in case of failure to agree to submit the dispute to this Board for decision.

However, as the United States District Court of the Northern District of Georgia, Northern Division, is exercising jurisdiction in regard to the matter of wages for the employees, it is decided by the Labor Board that in order to prevent a conflict in jurisdiction, it will take no further action in the matter until the Court shall approve or deny this Board's requests herein.

Rational Electrification of Steam Railroads

Method for Determining What Values of Profile and Traffic Density Make Electric Operation Desirable

By George R. Henderson

THE FINANCIAL CONDITION of the railroads in this country makes every economical suggestion of more than usual interest, and especially is this true of electrification, although the expense of installation at this time is, in many cases, prohibitive. A few years ago mechanical engineers received the unlimited claims of the electricians with considerable skepticism, but since a number of roads have electrified sections of their line and more rational claims are now in order, the subject has become one of importance to all the large roads.

A few weeks ago, at the Franklin Institute in Philadelphia, A. H. Armstrong of the General Electric Company gave a most interesting lecture on this subject, presenting facts and figures which had been obtained largely from the Chicago, Milwaukee & St. Paul line in Montana, of which 440 miles have recently been electrified. As this represents main line operation in a mountainous country, the results are of more general interest than those of local applications, such as the New York Central and the Pennsylvania in the vicinity of large cities.

Mr. Armstrong's claims were moderate and entirely free from the "cure-all" type which did more harm than good a few years ago. The important matters of repairs, inspec-

tion, turn-arounds, hosting, etc., were presented so forcibly that the writer considered it would be of interest to compare the costs of steam and electric operation over a hypothetical mountain division and to discover what importance the cost of coal assumes in the discussion. As present figures for material and labor are considered abnormal, pre-war prices were assumed, such as those prevalent a dozen years back. A division of 300 miles in length, with 50 miles each of 1/2 per cent, 1 per cent and 2 per cent up and down grades was used as a basis of calculations, and is shown in profile by the sketch. Roundhouses for steam locomotives are located at each end of the profile and at points 100 miles from each end. Locomotives may be considered as the Railroad Administration standard Mikado (2-8-2) type with the following characteristics:

Sec.	Locomotive	Total train weight	Total resistance	Ratio to trac. force, per cent	Speed upgrade
A	1	3,400 T.	51,000 lb.	85	15 m. p. h.
B	2	3,650 T.	91,000 lb.	76	17 m. p. h.
C	3	3,900 T.	175,000 lb.	97	10 m. p. h.

Down hill a speed of 20 m.p.h. may be attained, and perhaps 30 m.p.h. permitted on Sec. F. These speeds, with two hours allowance for changing engines, water stops, etc., would indicate a total of 20 hours over the 300 miles. Transportation delays, of course, would often increase this time.

The amount of coal has been estimated at 3 1/2 lb. per horsepower-hour, which corresponds with 100 lb. per square foot of grate per hour for sections A and B, and 4 lb. per horsepower-hour for Sec. C. Downhill 1/4-ton of coal per hour has been assumed. This gives coal used as

Sec. A	12 tons burned in 3 hrs. 20 min.
Sec. B	20 tons burned in 3 hrs. 0 min.
Sec. C	45 tons burned in 5 hrs. 0 min.

Down hill movement would use about 4 tons. The cost of coal varies greatly, especially at this writing, but some years ago \$2 would represent a fair price per ton. The cost of pumping and treating water is likewise variable, but 25 cents per 1,000 gal. may be assumed, and as roughly one pound of coal will evaporate one gallon of water, we may charge water costs at 50 cents per ton of coal.

Repairs constitute another variable, but 20 cents per engine mile would probably represent pre-war figures for a locomotive of this size.

The pay of enginemen (engineer and fireman) will be covered at the rate of 8 cents per mile, that is, \$5 for engineer and \$3 for fireman per 100 miles.

The cost of handling at terminals, including hosting, turning, wiping, inspecting, etc., will be taken at \$1.50 per engine, and these various figures will be compared with estimated costs of electric operation. The coal consumed at terminals is not included, but would be considerable—on the other hand, the power plant for generating the electric current must be kept constantly in operation, and a loss of some fuel must here be apparent.

The comparative costs for electric operation will consist largely in fuel and operating methods. For the locomotives we may consider a total of 12 pairs of drivers with 60,000 lb. on each, and four truck wheels with 45,000 lb. on each, a total of 900,000 lb. or 450 tons, and with train of 3,150 tons we have a total of 3,600 tons. Whether satisfactory results could be obtained by using this tractive force of 180,000 lb. at the head of the train would depend upon the construction of the cars placed in this service, and it might be necessary to have one unit at the head and another at the rear of the train to prevent destruction to draft rigging and center sills. If the latter course were necessary two engine crews would be needed, whereas one crew (of two men) could operate both units at the head of train by multiple control.

The question of fuel will also depend upon the possibility



Theoretical Profile Used as Basis of Calculation

tion, turn-arounds, hosting, etc., were presented so forcibly that the writer considered it would be of interest to compare the costs of steam and electric operation over a hypothetical mountain division and to discover what importance the cost of coal assumes in the discussion. As present figures for material and labor are considered abnormal, pre-war prices were assumed, such as those prevalent a dozen years back. A division of 300 miles in length, with 50 miles each of 1/2 per cent, 1 per cent and 2 per cent up and down grades was used as a basis of calculations, and is shown in profile by the sketch. Roundhouses for steam locomotives are located at each end of the profile and at points 100 miles from each end. Locomotives may be considered as the Railroad Administration standard Mikado (2-8-2) type with the following characteristics:

Tractive force	60,000 lb.
Adhesive weight	240,000 lb.
Weight engine and tender	500,000 lb.
Heating surface (water)	4,285 sq. ft.
Superheater surface	990 sq. ft.
Grate area	70 sq. ft.

A train of 63 cars of 50 tons total weight each, or 3,150 tons for the load back of the tender, will require one engine for Sec. A, two for Sec. B, three for Sec. C and one for D, E and F down hill, the train being considered as operating in the direction of the arrow. The helper engines would start from the intermediate roundhouses, and in order to operate return trains would make 200 miles and 100 miles, respectively, for 300 miles of through train, one engine being used as a pusher over sections B and C. We may consider the

of using regeneration, which means that there must be an ascending train at the same time that one is descending the grade, and this may not always be possible of arrangement. If the power house is steam operated, a kilowatt hour could readily be produced at the switchboard by the combustion of 2½ lb. of coal, and if 25 per cent loss be allowed from switchboard to rims of drivers, we will have a total coal consumption of 2½ lb. per horsepower-hour.

The train need not be broken (except for the possible shifting to the rear unit in passing over the heavy grades), as the electric locomotives can run 300 miles without difficulty, whereas we have considered that the steam locomotives would have to lay over each 100 miles of upgrade. This will reduce the terminal expenses, as repairs are generally found to be less than for steam locomotives; they are taken at one-half the amount, or 10 cents per mile for each of the two units. If the road was constructed as an electric line the intermediate roundhouses, with the coal, ash and water arrangements, shops, etc., could be eliminated, thereby saving considerable initial expense.

Electric locomotives operate satisfactorily on inspections made every 3,000 miles, and while they are much more expensive to build than steam locomotives, the fact that a greater car mileage can be gotten from them under ordinary conditions puts the initial cost of locomotives at about the same figure. The alternating current locomotive runs at a nearly constant speed, regardless of the load, so that we may assume 15 miles per hour throughout, or 20 hours to pass over 300 miles.

In the subjoined table two columns are provided for the electric operation, the first considering that regeneration is not possible and that one unit of power must push over the 2 per cent grade; the second utilizes the force of gravity of the descending train to assist those ascending, and virtually to put coal back into the bunkers; also considers that one engine crew only is needed by putting all the power at the head of the train. By calculating the horsepower needed to operate the 3,600-ton train, we find the fuel required as follows:

Sec.	Horse power required	Fuel required
A	2,160	9.5 tons
B	3,600	16.0 tons
C	6,500	28.0 tons
D	-5,000	-20.0 tons
E	-2,160	-8.5 tons

The minus signs are the credits to be allowed where regeneration is possible, and would reduce the coal requirements from 53.5 tons to 25 tons. These various values may now be tabulated for comparison, remembering that the second electric column includes regeneration and multiple unit control.

	Steam	Electric 1	Electric 2
Cost of coal per trip, at \$2.....	\$162.00	\$107.00	\$50.00
Cost of water per trip, at \$0.50.....	40.00		
Cost of repairs per trip.....	120.00	60.00	60.00
Cost of handling.....	9.00	1.00	1.00
Pay of engine men.....	48.00	32.00	24.00
Total per trip.....	379.00	200.00	135.00
Cost per train mile.....	1.26	0.67	0.45
Saving per train mile.....		0.59	0.81

Items such as train crew, car repairs, etc., which would be the same in both cases, have been omitted. It is evident from this table that the economies of electric operation should be considerable and must depend largely upon the original cost and fixed charges, as well as the traffic conditions of the section.

From the statements of Mr. Armstrong, the pre-war costs would have been something like \$30,000 per mile of road for electrification, and in order to save 10 per cent of this there would have to be earned \$3,000 a year over steam operation. By the first column of electric operation there would be a saving of 59 cents per train mile, which would require over 5,000 trains a year, or seven trains a day in each direction of 63 cars each, a total of 882 cars to pass

over the division in each 24 hours; if the traffic did not approach this figure, electrification could hardly be considered.

Then a variation in the cost of fuel might change the conditions enormously so that the saving would be greater or less than expected. If water power were available the cost of electric operation would be much more stable, but, in any event, each case would be a problem of its own and a careful study of all the conditions involved would be necessary to estimate the probable economic advantages which might be obtained. The above is a hypothetical case to show some of the possibilities of rational electrification.

Safety First on the Chicago & North Western

THE SAFETY RECORD of the Chicago & North Western for the 10½ years ending with 1920, just issued, by R. C. Richards, chairman of the central safety committee, in Bulletin No. 53, again shows the remarkable results accomplished on that road. For the years 1912 to 1920, inclusive, the members of the Safety Committees made 50,029 recommendations for the elimination of dangerous conditions and practices; and all but four per cent of them were adopted and put into effect. Comparing these years (10 years 6 months), with 10½ years ending June 30, 1910, before the safety committees were organized, the bulletin shows the following large reductions (although the number of employees, the business and the mileage of the company have largely increased):

- 417 fewer employees killed, a decrease of 37 per cent.
- 22,600 fewer employees injured, a decrease of 24.7 per cent.
- 4 fewer passengers killed, a decrease of 3.5 per cent.
- 2,003 fewer passengers injured, a decrease of 20.4 per cent.
- 629 fewer outsiders killed, a decrease of 25.3 per cent.
- 330 fewer outsiders injured, a decrease of 5.1 per cent.

Colored diagrams are given which show what very large percentages of casualties to employees are due to dangerous practices on the part of the employees themselves.

In closing, the Bulletin says:

"This company will appreciate, carefully consider and adopt, if practicable, any suggestion or recommendation from its employees, patrons or neighbors which will make its operation safer, more regular and more satisfactory to the public.

"And the end is that the workman shall live to enjoy the fruits of his labor; that his mother shall have the comfort of his arm in her age; that his wife shall not be untimely a widow; that his children shall have a father, and that cripples and helpless wrecks who were once strong men shall not long be a by-product of industry."



On the South Eastern & Chatham, England, Twenty-Five Years Ago

U. S. Chamber of Commerce Discusses Railroads

Report of Committee on Railroads Presented to Group Session at Atlantic City Annual Meeting

IN THE ANNUAL report of the Committee on Railroads of the Chamber of Commerce of the United States, which was presented to the Chamber at its convention at Atlantic City, N. J., on April 27, emphasis was laid on the necessity for reductions in railroad operating costs, particularly with reference to wages. After reviewing briefly the important railroad history for the past year, the report, in calling attention to the necessity for greater economy, pointed out that the increased gross revenues which will come to the railroads with reviving business conditions will not in all probability be sufficient to offset the present operating expenses. Increased co-operation of the carriers with each other in the performance of their services, particularly in the organization and management of terminals, was also advanced as one method of securing more efficient operation. Considerable importance was attached to the present state of railway credit and to the various plans for railway consolidations.

This report was read at a meeting of the railroad group of the convention on Wednesday, and the reading was followed by a discussion. The subject of the discussion was "What can be done to reduce cost and increase efficiency of railroad transportation?" The principal speakers were E. J. McVann, secretary of the Smokeless Coal Operators of West Virginia, representing the shippers, and F. A. Molitor of the Institute of Consulting Engineers, New York, representing the engineering profession. It had been planned to have a speaker representing the railroad executives and one representing the banking interests, but this part of the program could not be carried out.

The Committee's Report

The meeting of the railroad group was presided over by George A. Post, chairman of the Railroad Committee and president of the Hudson River Bridge Corporation, New York. The report was read by Richard Waterman, secretary of the Railroad Committee. Other members of the committee are: W. S. Dickey, Kansas City, Mo.; F. C. Dillard, Sherman, Tex.; E. J. Frost, Boston, Mass.; E. R. Johnson, Philadelphia; Charles E. Lee, New York; W. L. Salmon, Rochester, N. Y.; G. W. Simmons, St. Louis, Mo.; A. W. Smith, Atlanta, Ga., and Harry A. Wheeler, Chicago. An abstract of the report follows in part:

The railroads together with the other industries of the country are passing through a period of readjustment. The effect of the business depression which began about October last will appear from the following facts of record:

That the March traffic (in cars loaded) was about 13 per cent lower than in the corresponding month of 1920, and 18 per cent below the rather high average of March, 1918. Normally there is, of course, an annual traffic decrease from the fall peak to mid-winter. But in February, 1921, the earnings were 36 per cent below the previous October peak (the high record) as compared with a drop of 30 per cent between the 1918 peak (August) and February, 1919. The total car loading January to April, 1921, was about 15 per cent less than in 1920. The railroad business is subject to two controlling factors—economic conditions and government regulation. Public policy can determine the relations of the government to the railroads, but the economic forces to which the railroads are subject can be modified only by changes in prevailing economic conditions. There is no legislative panacea that will completely solve the railroad problem or any other economic difficulty.

The Transportation Act

In adopting the Transportation Act of 1920 Congress recognized the fact that the war had brought about large changes in the conditions under which production and transportation must in the future be carried on in the United States. In leg-

islating for the railroads in 1920, the primary purpose of Congress was not to correct railway abuses, but to facilitate the re-establishment of railroad credit, thereby making possible the improvement and extension of railroad facilities. It was a constructive and not a punitive measure.

The provisions of the Transportation Act of 1920 as regards the adjustment of disputes concerning wages and working conditions are among the most important. The law provides that employers and employees shall negotiate with each other and by negotiation settle as many controversies as possible. When disputes as to working conditions cannot be settled by negotiation, they may be considered by boards of adjustment established by agreements of employers and employees. These boards of adjustment may be either local, district or national. They are composed of representatives only of the carriers and their employees. There are to be no public members of the adjustment boards. Disputes as to wages that cannot be settled by direct negotiation by the parties in interest are to be referred to the Railroad Labor Board of nine men, three representing the carriers, three the employers and three the public. No boards of adjustment, local, district or national, have thus far been established. This deadlock remained unbroken. The President promptly appointed the Railroad Labor Board in the spring of 1920, and a few months after it had been established, it decided a dispute as to wages that had been pending for more than a year. About \$700,000,000 was added to the wages of railroad employees by this decision. In January, 1921, the Railroad Labor Board began hearings on the question of the continuance or abolition of the national agreements as to working conditions that had been entered into by the United States Railroad Administration with the railroad unions other than the four brotherhoods having to do with train operation. Three months later the Board decided that the national agreements should be terminated July 1 of this year. Prior to that date, the carriers and their employees are to work out new agreements to be submitted to the Labor Board for its approval.

Present Railroad Problems

It may be helpful to analyze some of the major questions with a view to stating some of the factors that must be considered in bringing about satisfactory conditions as regards railroad transportation.

The question that reaches to the heart of the matter is, "How can the railroads increase net operating income?" To find an answer to this question, the railroads must somehow reduce operating expenses. This they are striving to do by efforts to increase operating efficiency and to reduce the costs of materials and labor required for the performance of the services rendered. It is recognized by the railroads that rates and fares cannot be increased. Gross revenues will undoubtedly rise with the gradual revival of business as economic conditions return to normal. It is, however, believed that the increased net operating income that will come with the gradual expansion of business will not be sufficient to re-establish the financial stability and the credit of the railroads, unless the cost per unit of service can be greatly reduced.

The first step towards the accomplishment of greater economies in the operation of railroads is the larger co-operation of the carriers with each other in the performance of their services. In terminal organization and management the co-operation of the carriers is especially urgent, and in this field undoubtedly many economies can be brought about.

The Committee feels that an earnest effort on the part of the carriers to reduce operating expenses wherever possible, and to increase the efficiency with which they conduct their business will be appreciated by the public. Whatever economies may be effected by changes in operating methods, there must inevitably be a reduction in the percentage which salaries and wages comprise of the total operating revenue. The pay roll of the railroads in 1917 amounted to \$1,700,000,000, or about 45 per cent of the operating revenue. In 1920 the pay roll had more than doubled, having risen to \$3,750,000,000, which was about 60 per cent of operating revenue. Readjustment of salaries and wages is in progress in all industries, and it is to be assumed that railroad wages will in the future, as they have in the past, bear an equitable relationship to wages paid in other activities. The Railroad Committee assumes that every effort will be made by the carriers to maintain equitable scales of wages for different classes

of employment. While wages must be reduced, no class of labor should bear an inequitable share of the burdens of the rehabilitation period and all should render a full eight hours' service for eight hours' pay.

Capital Requirements

For several years comparatively little new capital has been invested in railroads. Had there been no European war, and had business conditions been prosperous, from \$3,000,000,000 to \$5,000,000,000 would have been invested in American railroads during the past six or seven years. In order that the business of the country may revive and go ahead at a desirable pace, a large amount of capital must be put into the facilities for railroad transportation.

This capital must be obtained by railroads owned and operated by private corporations, and the capital must be supplied by the investing public. It is obvious that the public will not invest in the railroads unless a return of at least five and one-half or six per cent per annum is reasonably certain. In planning for the future of the railroads, provision must be made for a net operating income that will enable the railroad companies to pay a reasonable return upon capital investment.

Consolidation and Federal Incorporation

The Interstate Commerce Commission is working upon a plan for the grouping or consolidation of American railroads into a limited number of permanent competitive systems of approximately equal strength and stability. The plan of voluntary consolidation is to be tried out. At the present time it is uncertain how far railroad companies will be disposed to go or how far they will be able under probable financial conditions to proceed in accomplishing the grouping or consolidation of our many railroad lines into the contemplated limited number of large permanent systems. The grouping or consolidation of railroads must ultimately be accomplished. In order to maintain rate structures that are fair to the public as a whole and adequately profitable to the railroads, it is necessary to have railroad systems of approximately equal financial stability and strength. In order to enable those sections of the country now served by weak and struggling railroads to obtain the transportation facilities required in the public interest, it is necessary to do away with the "weak sisters" as separate entities.

The Committee does not recommend additional legislation on the railroad question at the present time. It will be desirable to have further experience under the Transportation Act of 1920 before considering amendments or additions to that law. As has been pointed out in this report, the railroads are sharing with other enterprises the misfortunes of the hour. Before another year is over, it is possible that business conditions and railroad traffic and earnings will be more favorable. Another year will give Congress a better perspective of the railroad situation. In the meantime, a Committee of the Senate will have inquired into the present difficulties of the railroads and into the workings of the Act of 1920. That investigation will enable Congress to act with a fuller knowledge than it possesses at the present time.

The Shippers' Viewpoint

E. J. McVann, secretary of the Smokeless Coal Operators' Association of West Virginia, led the discussion from the point of view of the shipper. Mr. McVann emphasized the point that whatever suggestions he had to offer were tendered in the spirit of helpful co-operation rather than in that of destructive criticism. He sketched the growth of the mileage of the railroads of the country from 30,000 in 1860 to 260,000 in 1920 and remarked that any country which could show such a record of accomplishment need not be greatly alarmed by the present railroad situation, perplexing though it is. One of the difficulties of the railroads in the past, according to Mr. McVann, was that regulation showed to some degree a lack of knowledge of the subject. Now, he said, the same difficulty was being experienced again in the demands which are being made on Congress for amendments to the Transportation Act before it has been given a fair trial.

Mr. McVann quoted figures to show the present high operating rates of most of the roads and emphasized the necessity of reducing expenses. He declined to express an opinion regarding the contention which is being made in some quarters to the effect that the present high freight rates are "higher than the traffic will bear" and that they are delaying the return of normal prosperity. "A little ray of light" could

be made out in the present dark outlook, Mr. McVann said, in the reports of a slightly declining car surplus.

As a possible solution of one phase of the railroad problem Mr. McVann suggested a campaign for greater car mileage per car per day. He gave as an example of the possibility of improvement in this direction the case of the Virginian, which road, he said, when faced with an acute car shortage a year ago was enabled to increase its mileage per car per day from less than 25 to more than 60. He remarked that in the days of congested traffic last year miles per car per day of all the roads reached the highest figure in history only to decline when traffic fell off. Mr. McVann considered that such economies as this offered the opportunity for increasing service without additional capital.

Another point which was particularly stressed in Mr. McVann's address was the waste of the present lack of co-ordination of terminal facilities. He said also that waterways should be used to a greater extent to relieve railway congestion. Waterways, he said, should not be considered as competitors to the railroads but should be co-ordinated with them. As an example of this he cited the railroads which make a special business of moving coal up to the lake ports for the lake boats and which carry ore to the coal regions as a return load. He closed with a plea for better water terminals for the railroads.

The Opinion of an Engineer

F. A. Molitor, who discussed the railroad problem from the point of view of an engineer, devoted his address almost entirely to the labor phase of the problem. He first gave some index numbers on the cost of living and railroad wages, with 1915 as a base at 0. The index numbers he gave for 1916 were 8.7 for cost of living and 7.3 for railroad wages; for 1917, 31.3 as living cost and 29.9 as wages; for 1918, 71.0 as living cost and 52.2 as wages; for 1919, 72.2 as living cost and 71.0 as wages, and for 1920, 104.0 as living cost and 117.6 as wages. He called attention to the following: that in 1920 the wage index greatly exceeded the index for the cost of living; that the wage index of 117.6 was the average for the whole year of 1920; that with the July, 1920, wage award wages are now at the index of 130.0 while prices have receded from 1920 to 81.2 in January, 1921.

Mr. Molitor estimated that the railroads would fail to secure their legal return this year by about one billion dollars. He believed the abrogation of the National Agreements, which he was not so sure would be brought about, would result in a saving of not more than \$250,000,000. This would leave \$750,000,000 yet to be taken care of. This, he said, could be done either by an increase of about 1¼ mills per ton per mile in freight charges or by reducing wages. If wages should be reduced to the level previous to the July, 1920 award a saving of \$700,000,000 would be effected, according to his estimate. This would still leave \$50,000,000 to be taken care of, and Mr. Molitor would do this by a further reduction of one cent per hour in every wage rate.

Mr. Molitor asked that no favoritism be shown in dealing with labor. He urged also that the managements of the roads should take the public into their confidence more than they have and that the open shop, with piece work, should be restored. Discipline, he said, should be improved and employees should be made to realize the quasi-public nature of their position in which strikes should not be permitted; they should learn that they are not a privileged class. He advocated the incorporation of the unions, the access of the public to their records and the provision for a secret ballot on strikes. He expressed the opinion that the final valuation of the carriers would be in the neighborhood of 25 billion dollars and suggested that freight rates to pay 5½ per cent on that sum would be rather high. He closed his address with an appeal to the bond holders to assist in solving the problem.

President Finds Railroad Problem Difficult

Cabinet Still Seeking Solution—Complaints from Many Quarters That Present Rates Check Business Revival

WASHINGTON, D. C.

PRESIDENT HARDING and members of his cabinet are finding the railroad problem one of great difficulty and many complications. Efforts to regard it as a Gordian Knot to be severed by a single sword-stroke have thus far proved fruitless, and something like the "watchful waiting" policy of the last administration seems to have been adopted, but apparently the administration is still hoping with some impatience for an Alexander who will make it unnecessary for the Interstate Commerce Commission and the Railroad Labor Board to continue their slow progress of trying to untie the knot. The problem, from the viewpoint of Washington officials, is how to reduce rates in view of the position taken by the railroads and the Interstate Commerce Commission that there can be no general reduction in rates until the foundation has been laid for a reduction in operating costs, and that material reductions even in rates on particular commodities can hardly be made until it is shown, somewhat more conclusively than by a mere assertion, that the reductions will so increase the movement as to result in better net revenues.

Recent cabinet meetings have been very largely devoted to the economic situation, with particular reference to agriculture, industry and transportation, and the President and his advisers appear to have been persuaded that the railroad question is the key to the whole problem, but they have as yet found no "plan" or "solution." As yet there is great reluctance on the part of the administration to go over the heads of the bodies constituted by law to decide on wages and rates but it is understood that some impatience is being felt at the length of time required by those bodies to function under the provisions of the laws from which they derive their authority and the President is still giving some consideration to the plan of calling a general conference of representatives of various interests to see if something cannot be done by agreement. It is understood that the question has also been raised at cabinet meetings as to whether the existing machinery for the regulation of rates and wages, which makes it impossible for the Interstate Commerce Commission to act with a free hand but requires it to await the action of another body, is not too cumbersome to keep pace with economic conditions and as to whether the forthcoming investigation by Senator Cummins' committee may not develop the need of some change in the law.

The theory also persists in some quarters that the rate-making rule of the Transportation Act, which requires the Interstate Commerce Commission to take into consideration operating expenses and to try to make rates produce "as nearly as may be" a 6 per cent return in the cause of the high rates and that its repeal would in some way reduce rates which in January and February did not even pay expenses for more than half the roads. This theory entirely ignores the fact that if the Interstate Commerce Commission should be convinced that lower rates would produce more net revenue it would be complying with the law if it reduced the rates, and it is advanced rather by the habitual critics of the railroads, but many Senators and others who are receiving floods of complaints from their constituents who believe they could make more money if rates were lowered, find it easy to believe that they are not proposing to injure the railroads in any way because the belief is so commonly held that the railroads would make plenty of money if they would only reduce rates enough to increase their traffic.

As the rates, rather than the expenses which have caused

the advances in rates, represent the point of contact between the railroads and commerce, the President and his cabinet are looking at the problem largely from the standpoint of the effect of the rates as it has been stated to them by numerous complainants. They have apparently been convinced that the level of the rates, particularly those on basic commodities, is largely responsible for the halting condition of business generally, and somewhat disturbed that prompt action cannot be taken to bring about a reduction at least on some of the commodities as to which the freight rate represents an important factor in the cost.

Cabinet Looks at Problem from Standpoint of Rates

The President showed in his address to Congress a recognition of the fact that the present high cost of transportation is an inheritance from the period of federal control and he is showing no disposition to urge a general reduction of rates without regard to the cost, because he has no desire to return to the plan of making up deficits from the federal treasury as was done for 28 months, but he is convinced that certain rates are too high and that their reduction would have a beneficial effect. For example, it has been represented to the President that the citrus fruit growers of the Pacific coast are unable to market their products in the East at a price that will give them any return after paying freight and the middlemen's charges, that grain prices have fallen so low that the farmer has little left after paying the freight and that the principal reason for the no-market condition in the coal industry is that consumers are holding off their orders waiting for lower prices to such an extent that the country is heading into a coal shortage situation similar to that which existed last year. It is assumed by those who complain about the rates that a reduction in coal rates, for example, would reduce the price sufficiently to attract buyers. Administration leaders also are convinced that the application of a uniform percentage advance was a mistake and it is apparent that any move to bring about a readjustment which would speed up the movement of certain basic commodities will have their support, but there is no one who has any authority to give orders to the Interstate Commerce Commission to reduce rates without awaiting action by the Labor Board to reduce expenses nor to the Labor Board to speed up a wage decision.

The coal situation is being pointed to by those who insist that the application of a uniform percentage advance last August was a mistake, although at the time the rates were made the purchasers of coal were bidding against each other to get it almost regardless of price.

Complaints Made to I. C. C. Concerning Rates

The Interstate Commerce Commission has before it many formal complaints asking for rate reductions, and presumably these represent the rates which the shippers feel it is most important should be reduced, but the commission is following the usual procedure in handling these cases and is not inclined to pay much attention to such requests as were made of it last week by a delegation of Congressmen and delegates to the convention of the National Farmers' Union that it order a summary reduction in rates. The complaints regarding rates which reach Washington are of several kinds. There is the argument that the railroads are a public servant and that as low rates are desirable the railroads ought to reduce their rates regardless. If prices can-

not be regulated rates can. There is the complaint of the grain grower, the price of whose product is fixed by the market and has fallen so low that it leaves the producer very little after transportation costs have been deducted. There is also the complaint of the fruit and vegetable growers, whose products still cost the consumer about as much as ever but who are told by the middlemen that the freight rate leaves practically nothing for the producer. There are also many articles on which the price has been reduced, in spite of the rate increase, but apparently not enough to break the "buyers' strike" and it seems easy for many to believe that a reduction in the freight rate would move the business. There are also heard in Washington occasionally the voices of those who have not yet discovered that the "transportation crisis" of which they read in the newspapers is not the same kind of a crisis that was experienced last year and they are advocating waterway improvements to "take the load off the over-burdened railroads."

Considered at Cabinet Meeting Tuesday

At the cabinet meeting on Tuesday the discussion regarding the program for a "return to normalcy" apparently turned aside a little from the freight rate question to a consideration of what can be done in other directions to improve business conditions, for it was stated at the White House that there were no new developments in the railroad situation but that the Federal Reserve Board was going to relax a little the harshness of its efforts to promote deflation and that it would encourage a more liberal credit policy in the agricultural sections and in some industrial sections which have been complaining of "frozen credits" as well as of freight rates.

Another Letter from Chairman Clark

Chairman Clark of the Interstate Commerce Commission is becoming a voluminous letter writer in his replies to Congressmen and others who write to him urging a reduction in rates as a means of restoring business. The letters are not made public by the commission but some of them have been given out by the recipients. A few have already been published in the *Railway Age*.

In a letter to Senator Willis of Ohio, Mr. Clark said:

The commission is as anxious as the shipper and the carrier to find a solution of the transportation problem. We are well aware and I think fully advised of the unfortunate conditions that exist at the present time. We cannot, however, look at the situation from one side alone. It is not a question to-day whether or not the rates shall produce 5½ or 6 per cent upon the value of the carriers' properties. The unfavorable conditions in commerce and industry generally and the unfortunate plight of individuals and individual industries can not be worse than the present plight of the railroads. It is obvious that the present condition can not long continue without general and widespread bankruptcy of the railroads.

We have participated in some instances in arranging and encouraging readjustments of rates where it has been made clear that such readjustments would move a substantial volume of traffic at rates that would yield some profit, which traffic would not otherwise move at all, but, in view of the facts above stated, it is difficult to see how the commission could urge any reductions in rates that would result in reductions in the revenues of the carriers which, as stated, are insufficient now to pay the interest on their bonds, to say nothing of any return to the stockholders.

This whole subject is receiving the most careful study and consideration. It is obvious that until a wider margin can be established between the dollar earned and the cost of earning it conditions cannot substantially improve. This result must be brought about through appropriate readjustment of operating expenses, the adoption of every possible and reasonable economy and general revival in business. We are not hopeless nor pessimistic as to the future.

Conference on California Fruit Traffic

The Interstate Commerce Commission on April 23 took cognizance of the numerous complaints regarding the rates on fruits and vegetables by announcing that Henry J. Ford,

special assistant to the commission, and formerly a commissioner, will conduct conferences relative to rates on fruits and vegetables in Los Angeles, Cal., on May 3; in San Francisco, Cal., on May 6; and in Denver, Colo., on May 10. These conferences were called at the request of the California and Colorado legislatures, which passed resolutions requesting the Interstate Commerce Commission to investigate the alleged serious situation of producers of fruits and vegetables in those states.

The conferences are to be held between shippers and carriers, and while they relate primarily to the rates to and from California and Colorado points, carriers' and shippers' organizations from other fruit and vegetable producing districts will be granted an opportunity of making statements at these conferences relative to the general situation if they so desire. The commission's Bureau of Traffic has been investigating the fruit and vegetable situation for some time.

The Washington newspaper correspondents on April 26 received a statement "from producers and shippers of perishable and high tonnage commodities on the Pacific Coast," declaring that California's entire cantaloupe crop is endangered by the excessive freight rates to the East, according to telegrams received by Senator Shortridge of California from growers and bankers of Southern California. The Senator was quoted as saying that the crop is valued at about \$11,000,000, of which a great portion will be lost to the growers if freight rates are not reduced and he urged the establishment of emergency rates.

"Loss of Entire Package"

THIS IS THE TITLE of one class of the freight claim agent's problems, distinguishing such cases from pilferage, wreck damage and other kinds of trouble. "Loss of entire package" necessitates oftentimes a persistent pursuit of many blind leads. This was the subject of a recent address by E. F. Ford, freight service inspector of the Chicago, Burlington & Quincy, at Kansas City, from which the outstanding lesson is that even the most puzzling and complicated loss and damage cases are due in most cases to disregard of the simplest fundamental rules. Mr. Ford cited four illustrative cases, all of which would have been prevented by these four rules: (1) Look at marks. (2) If boxes are numbered, put numbers on way-bill and compare the numbers in checking. (3) File receipts with care. (4) Freight for which there is no way-bill should be delivered only on satisfactory evidence of ownership. Following is an abstract of the descriptions of the four cases as given in Mr. Ford's address:

Case 1.—Claim for \$369 for shortage of a case of dry goods No. 4707 consigned to B. M.; unloading tally showed it checked out OK but when consignee called no trace of it could be found. After checking B. M.'s receiving records and finding no trace it occurred to me that this firm's freight was floored next to McCord's and that it might have got into a trap car made up for that firm. I accordingly called on and checked the receiving record at McCord's and, sure enough, found it duly recorded, even to the same case number. Months had elapsed since the transaction; and while McCord's receiving record was clear the stock record was not; and it required several visits to the manager before he was convinced that the goods moved through his stock.

Case 2.—Claim for \$1,200 filed by an Eastern shipper for alleged loss in transit of a centrifugal pump consigned to S. T. C., Kansas City. Our unloading record showed a clear tally, but we could not show delivery; and the consignee's receipt was missing from files. A special visit to the S. T. Company was rewarded by finding the pump set up and in operation; and it was identified by the shop number on the pump.

Case 3.—Several large consignments of drugs in boxes shipped from Philadelphia to J. W. & B., Kansas City; claim for shortages to the value of \$750. This transaction involved a total of several hundred boxes, and when they left the factory each box was stenciled clearly and was numbered, bills of lading carrying the same numbers. Originating Eastern line did not put those case numbers on way-bills. Successive consignments overtook one another and got mixed at our junction with the Eastern line. The checkers applied the proper number of cases against each billing and forwarded to Kansas City; and delivery was made of enough cases to fill out each way-bill, as long as the cases lasted. Now, one of these cases would contain high class drugs valued at, say, \$65; another would be valued at perhaps \$2. By disregarding case numbers, and not enough cases eventually showing up to balance the transaction, it was left to the honesty of the consignee to base his claim upon the higher or lower priced goods, just as he chose. Our delivery record being faulty as to case numbers, and the teamster's records being no better, we were at the mercy of J. W. & B., but that firm was found to be managed by a man who proved to be the very soul of honesty and square dealing.

Case 4.—Seven bundles of rugs which checked over in a certain car on billing of other rugs for W. V. These seven bundles were delivered as an overage to W. V. on that billing and without lifting bill of lading or certified copy of invoice. On account of faulty and incomplete records at W. V.'s we have never been able to convince them that they received seven bundles of rugs which did not belong to them. V. also has a house at Denver and one at Dallas; and what happened, as a matter of fact, was that the shipper billed the seven bundles to V. at Denver or Dallas and marked them to V. at Kansas City in error.

In case 1 the trucker went wrong by flooring a B. M. case in McCord's section; and the check clerk who later made up the trap car for McCord compounded the trucker's error by not securing a careful check. In case 2 we seem to have handled the pump all right, but we could not produce the receipt. In case 3 the Eastern line went wrong by not billing the case numbers; but we would have been safe, never-

4. If cases carry numbers which are not on the receipts enter such numbers.

5. If a consignee advises you that a certain overage is due on a preceding bill, find out what was delivered instead of it. If receipt is clear and if that article, according to your record was astray, or over, keep after him for proof of ownership until you get it.

6. When certain overages are still on hand despite reasonable notice to consignee, open such packages and give him a complete invoice, including stock or invoice numbers found within.

7. Notices sent out on arrival of astray and over freight should carry the fullest possible description. If notice is furnished at the start, nine times out of ten you will find consignee is able and quite eager to surrender documentary proof or advise you what billing it is short on, perhaps over some other road.

8. If you are still unable to get a reply after fair notice, arrange for a representative to make a call. Exhaust every effort to secure disposition before you finally report that you cannot; because, when you do thus report, such articles are forwarded to the over freight station and are sold for little or nothing.

Tests of Franklin Precision Power Reverse Gear

UNUSUAL AND INTERESTING tests of the new Franklin Precision power reverse gear, manufactured by the Franklin Railway Supply Company, Inc., New York, were made recently at Franklin, Pa. The object was to put the gear through tests that would duplicate locomotive service as nearly as possible and to subject it to conditions more severe than would occur on the locomotive itself. The specific purposes of the tests were to determine whether the piston would absorb valve motion shocks without moving, whether the gear would remain when set without creeping, whether the cut-off could be readily adjusted under load, whether the cut-off indicator and gear would work in synchronism, whether

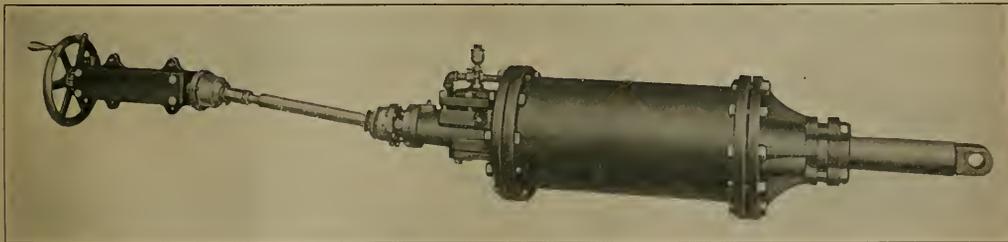


Fig. 1—Gear Assembled as Applied to the Locomotive

theless, had we taken those individual case numbers and had made an accurate check upon delivery. In case 4 we simply gave W. V. seven bundles of rugs without proof of ownership.

Important Freight House Rules

1. Be on the lookout that your freight is plainly marked to start with; if it carries two or three marks and you are very busy don't load it but set it aside until the marking can be made right.

2. Look out for foxy teamsters slipping in bills of lading for receipt on freight that they take to some fence and dispose of.

3. Mr. Trucker: When you are not sure of your section or your car, drop your truck right there, and ask your stowman or check clerk to set you right.

shocks and stresses would be eliminated from the control going to the cab and whether the gear would automatically and instantly resist movement if an unbalanced load was suddenly applied.

To determine these points special testing apparatus, shown in Fig. 2, was constructed. The gear was secured to the frame in the same way in which it is applied to a locomotive. Application of the cab control wheel and operating rod was made in the same relative position as actual service requires and the cut-off indicator set at its proper relation to the gear. Compressed air at a pressure of 105 lb. per square inch was applied to the cylinder. A set of gages was attached to the cylinder compartment for pressure reading, bleed cocks being installed at each gage.

To subject the reverse gear to stresses similar to those re-

ceived from the valve gear when a locomotive is running an extended rod was attached to the gear piston rod. This rod passed through an adjustable friction clutch by means of which varying and very heavy resistances could be applied. To the friction clutch was attached a connecting rod, which was operated by an eccentric with one inch travel, driven by an electric motor. The eccentric served to reciprocate the clutch on the extended piston rod, subjecting the gear to shock and reversal of stresses equaling those occurring in actual service.

Frictional resistance between the adjustable clutch and extended piston rod was obtained by tightening the clutch. These frictional resistances were calibrated by hanging known weights on a cable which passed over a pulley and was hooked on the extended piston rod. When the friction of the clutch stopped the weight from moving, the frictional resistance equalled the load on the cable. This weight arrangement was used to establish a known frictional resistance.

Two conditions were considered, the first where the force acting on the gear piston was the same in both directions, the second an unbalanced force acting in one direction only. In the first case the desired frictional resistance between the clutch and rod was obtained as outlined above, and the cable and weights were disconnected from the rod. The motor was then started and the clutch forced to travel back and forth on

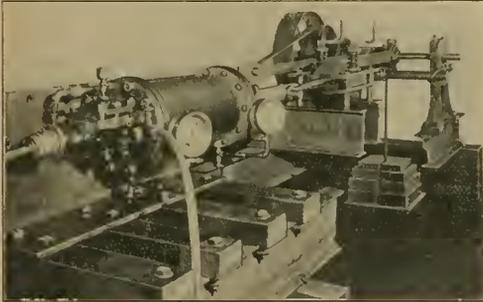


Fig. 2.—Gear with Rod and Clutch Attached for Test

the piston rod 320 times per minute. Observations were taken on ten separate tests, each test being run without a stop for 30 minutes.

To duplicate the condition of an unbalanced force acting on the gear in one direction only the frictional resistance of the clutch was first set to equal the weight hung on the rod and the weight not disconnected.

In starting these tests observations were taken with no load on the gear in order to establish the position of the cab indicator relative to the actual point of cut-off. Moving the indicator from corner to corner and setting to any desired cut-off the relative positions of the indicator and piston checked in every case within $1/32$ in.

Seven separate running tests were made with the clutch operating against the gear in each direction. The first test was run with 500 lb. frictional resistance between clutch and piston rod and the resistance was increased 500 lb. for each test until a load of 3,500 lb. was reached. With the motor reciprocating the clutch 320 times per minute there was absolutely no movement of the piston. The gear was moved from corner to corner slowly or as rapidly as desired and the cut-off always checked with the position shown by the cab indicator. While under load the force required to adjust the cut-off was so small that the operating rod could be rotated by hand without using the cab control wheel. The gear absorbed all shocks, no vibration or stresses being transmitted to the cab control wheel or indicator.

To demonstrate the operation in case of leaks the pressure in the cylinder was bled down approximately 15 per cent. Under these conditions the piston moved .005 in. each way under load. When the leakage cock was closed the pressure automatically rose and stopped entirely all movement of the piston.

To determine the effect of an unbalanced load in one direction only the clutch was set for 2,000 lb. and weights left attached, the clutch and weight equaling 4,000 lb. one way and zero the other. Under these conditions the gear immediately set up the differential pressure in the cylinder required to absorb the shocks. There was no movement of the piston and bleeding of each cylinder compartment by hand had no effect.

To further unbalance the load the clutch pressure was increased to 2,500 lb., making a load of 5,000 lb. acting on the gear in one direction only. No movement of the gear was perceptible, the cut-off being held as rigidly as before.

Description of Gear

This power reverse gear, as its name implies, is designed for precise adjustment of cut-off. It consists of a 10 in. by 18 in. cylinder with all parts enclosed. It has ample strength for the heaviest work. The operating valve is attached to the rear end of the cylinder and is controlled by a hand wheel in the cab. This wheel is provided with an indicator showing the point of cut-off and is connected to the gear by an operating rod. This wheel and rod are relieved of all stresses or shocks in the functioning of the gear.

No crosshead or guide is used with this gear, the thrust being taken through the piston. Levers and rods have been eliminated and there are no pins or bushings to wear and affect the accuracy of cut-off. No adjustments are provided as none are required. Wearing parts have been reduced to the minimum. Steam can be used as a medium for operating the gear in emergencies.

The results of the tests described above show that the gear provides extremely accurate adjustment of cut-off and freedom from creeping. Pressure is automatically set up to resist sudden unbalanced forces and maintain stability of adjustment. All shocks from the valve gear are absorbed by the air in the gear cylinder. The design gives a low air consumption and provides adjustment of cut-off with minimum physical effort. When air is cut off the gear remains positioned corresponding to the last adjustment and cannot be changed until air or steam is again used.

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Photo by Keystone

Idle Shipping at Hoboken, N. J.

General News Department

A. H. Rudd, chief signal engineer of the Pennsylvania system, presented a paper on "Modern Signaling" before the Railway Club of Pittsburgh, Pa., on April 28.

President Harding has been asked by the Washington representatives of the four brotherhoods of train service employees, and by local representatives, to urge a Congressional investigation of the situation on the Missouri & North Arkansas, where the train employees have been on strike. It is charged that the management had violated the orders of the Railroad Labor Board.

Senate Railroad Investigation to Begin May 10

Senator Cummins, chairman of the Senate committee on interstate commerce, has announced that the committee's hearings in the general inquiry into railroad conditions will begin on May 10, with railway executives as the first witnesses.

Progress in Automatic Train-Control

The Bureau of Safety of the Interstate Commerce Commission and the American Railway Association will at once place inspectors on the Chicago & Eastern Illinois and Chicago, Rock Island & Pacific to watch the operation of the automatic train stops which are in use on those roads and to report on the effect of automatic train control on railroad operation. The two inspectors representing the government are P. W. Jones and R. B. Johnson, the recently appointed examiners. Those for the American Railway Association are O. C. Underwood, formerly signal supervisor, Southern Railway Lines, East, and L. C. Heilman, formerly office engineer, signal department, Chicago, Rock Island & Pacific. Messrs Johnson and Underwood are assigned to the Chicago & Eastern Illinois and Messrs. Heilman and Jones to the Rock Island.

A. W. Newton, chief engineer of the Chicago, Burlington & Quincy has been appointed an engineering member of the joint committee on automatic train control, in place of H. R. Safford, who resigned recently.

Senator Capper Would Repeal 6

Per Cent Rule of Rate-Making

Senator Capper of Kansas on April 25 introduced a bill to repeal the 6 per cent rule of rate-making in Section 15-a of the act to regulate commerce as amended by the transportation act, and the Senator issued a statement to the press which indicated a belief on his part that the repeal of this section would tend to reduce freight rates. The Senator's bill would also repeal the provision of the law under which the Interstate Commerce Commission has taken jurisdiction to order increases in intrastate rates on the ground of discrimination against interstate commerce. The bill would amend the first paragraph of Section 3 of the act to regulate commerce as amended by Section 405 of the transportation act, the first paragraph of Section 15 as amended by Section 418 of the transportation act, repeal paragraphs 3 and 4 of Section 13 as amended by Section 416 of the transportation act, and repeal Section 15-a as amended by Section 422 of the transportation act. The Senator's statement took the position that a reduction of freight rates would save the railroads from receivership and bankruptcy.

A New Proposal for the Canadian Railway Crisis

Lord Shaughnessy, chairman of the Canadian Pacific (speaking, however, as an individual citizen and not officially), has written to the Prime Minister, proposing that all of the government-owned railways of Canada be put into the hands of the Canadian Pacific, to be operated by that company, along with its own lines, as a single system. He says that even at this late date, it would be wise for the government to drop the Grand

Trunk; that the Canadian Pacific could manage the National lines under a perpetual contract; that the National Transcontinental scheme was a deplorable blunder in conception and execution, and that wages and working conditions are on a fictitious basis, and must be amended. Savings would result from consolidation by elimination of unnecessary train service, duplicate terminal work, and common use of cars and locomotives.

Lord Shaughnessy submits an elaborate tentative plan for solution of the difficulties that confront the government. He would relieve the Grand Trunk of some of the burdens it is now carrying. He would provide for certain guarantees to the stock and bond holders of all companies concerned, improving as the situation improved; and he would look hopefully to the wiping out of the deficit by immigration and development of the country.

International Chamber of Commerce

The International Chamber of Commerce, in which the United States Chamber of Commerce is interested, is to hold a meeting in London June 27-July 2, as noticed in the *Railway Age* of April 22, page 1000. It will discuss various important aspects of the general topic, "Restoration of the World's Commerce." The United States has been assigned leadership in one of the five divisions of the Congress, namely, "Transportation and Communications." Walker D. Hines, who is now engaged in the arbitration of questions pertaining to European River Shipping, is in charge of this subject. Other divisions of the London Congress, such as finance, production and distribution are organized under the auspices of Britain, France and Italy. The Transportation Group, under Mr. Hines' general direction, has been organized in four branches as follows: Communications, John J. Carty, chairman; J. Rowland Bibbins, secretary. Port Facilities, L. E. Stilwell, chairman; N. Sumner Myrick, secretary. Ocean Transportation, H. H. Raymond, chairman; N. Sumner Myrick, secretary. Land Transportation, Chairman to be assigned; Richard Waterman, secretary. These committees are already at work on the programme.

Freight Claim Division A. R. A.

Meeting Chicago, May 17 to 19

The Freight Claim Division of the American Railway Association will hold its 30th annual session at the Hotel Sherman, Chicago, on May 17, 18 and 19. Coronado Beach, Cal., had originally been selected as the place of meeting, and Denver, Colo., had been substituted later. The present railroad situation made necessary a further consideration, however, and Chicago was selected. Wednesday, May 18, has been set aside for a special order of business, at which the report of the Committee on Cause and Prevention, followed by a discussion of claim prevention matters, will occupy the attention of the members throughout the day.

Hoover Resigns from American Engineering Council

Herbert Hoover has resigned as president of American Engineering Council of the Federated American Engineering Societies. Mr. Hoover's resignation was submitted and accepted as the closing action of the sessions of the council held April 16 at the Engineers Club of Philadelphia, Pa. Mr. Hoover gave as his reasons the fact that American Engineering Council by its constitution was necessarily engaged in furthering national activities which involve legislation; and that he as a member of the executive branch of the government could not consistently direct such activity as an officer of American Engineering Council. The council, in a resolution of regret at Mr. Hoover's retirement, voted its appreciation of Mr. Hoover's leadership during the organization period of the council and his initiation of policies and effort.

One of the most important matters before the council was the

Operating Statistics of Large Steam Roads—Selected Items for the Month of January, 1921,

Region, road and year	FREIGHT SERVICE													
	Average miles of road operated		Locomotive-Miles			Car-miles			Ton-miles (thousands)		Locomotives on line daily			
		Trains	Principal and helper	Light	Loaded (thous.)	Empty (thous.)	Per cent loaded	Gross. Excluding locomotive and tender	Net. Revenue and non-revenue	Service-able	Unservice-able	Per cent service-able		
New England region:														
Boston & Albany.....	1921	393	283,241	304,355	37,136	4,332	2,840	60.4	251,783	103,349	130	27	17.2	...
Boston & Maine.....	1921	393	294,721	313,826	33,896	5,143	1,578	76.5	247,660	109,543	126	35	21.7	...
Boston & Maine.....	1920	2,481	2,677,686	2,874,738	146,328	9,272	6,879	73.6	2,389,409	849,349	846	115	29.9	38
N. Y., N. H. & H.....	1921	1,959	436,893	473,641	38,280	8,403	5,228	61.6	484,137	206,517	298	76	20.3	25
N. Y., N. H. & H.....	1920	1,938	530,547	564,607	38,528	11,292	2,915	79.5	539,666	269,653	318	96	23.2	2
Great Lakes region:														
Delaware & Hudson.....	1921	880	408,358	576,872	38,846	9,137	6,921	56.9	659,894	325,459	267	45	14.4	42
Delaware & Hudson.....	1920	858	390,164	520,320	39,033	8,327	4,760	63.6	565,808	291,180	259	35	11.9	39
Del., Lack. & Western.....	1921	989	502,621	616,140	123,124	13,130	7,386	64.0	778,318	361,381	354	71	16.7	17
Del., Lack. & Western.....	1920	989	514,351	635,478	146,328	16,291	6,726	70.6	949,915	699,720	347	27	20.7	8
Erie (inc. Chi. & Erie).....	1921	2,289	1,000,432	1,110,663	39,879	26,295	18,586	58.6	1,781,364	842,354	577	125	17.8	62
Erie (inc. Chi. & Erie).....	1920	2,239	1,154,783	1,313,741	42,589	30,773	13,216	70.0	1,833,157	904,482	570	193	25.2	17
Lehigh Valley.....	1921	1,431	556,761	618,246	54,427	13,154	7,738	60.1	859,737	409,123	381	199	34.3	86
Lehigh Valley.....	1920	1,429	621,305	694,878	71,849	16,291	6,726	70.6	949,915	699,720	347	27	20.7	8
Michigan Central.....	1921	1,829	1,000,432	1,110,663	39,879	26,295	18,586	58.6	1,781,364	842,354	577	125	17.8	62
Michigan Central.....	1920	2,239	1,154,783	1,313,741	42,589	30,773	13,216	70.0	1,833,157	904,482	570	193	25.2	17
New York Central.....	1921	1,431	556,761	618,246	54,427	13,154	7,738	60.1	859,737	409,123	381	199	34.3	86
New York Central.....	1920	1,429	621,305	694,878	71,849	16,291	6,726	70.6	949,915	699,720	347	27	20.7	8
New York Central.....	1920	1,829	1,000,432	1,110,663	39,879	26,295	18,586	58.6	1,781,364	842,354	577	125	17.8	62
New York Central.....	1920	1,826	564,114	593,007	16,930	17,041	5,117	76.9	851,934	398,308	260	94	26.6	6
New York Central.....	1921	5,646	2,061,483	2,313,436	178,334	55,295	51,425	51.8	3,752,700	1,570,840	1,056	434	29.1	68
New York Central.....	1920	5,646	2,227,233	2,503,896	197,420	65,681	26,327	71.4	3,610,223	1,776,223	1,172	53	34.1	10
N. Y., Chic. & St. L.....	1921	572	391,135	445,626	2,241	11,104	2,614	80.9	552,006	266,599	113	65	36.5	4
N. Y., Chic. & St. L.....	1920	572	391,135	445,626	2,241	11,104	2,614	80.9	552,006	266,599	113	65	36.5	4
Pere Marquette.....	1921	2,207	285,093	292,914	4,534	5,798	4,087	58.0	321,412	166,599	171	35	17.0	25
Pere Marquette.....	1920	2,200	325,026	340,340	7,959	7,090	5,900	73.7	364,674	179,322	171	35	17.0	25
Pitts. & Lake Erie.....	1921	2,25	147,471	168,246	6,815	3,633	2,390	59.0	217,641	155,777	100	10	13.2	0
Pitts. & Lake Erie.....	1920	2,25	147,471	168,246	6,815	3,633	2,390	59.0	217,641	155,777	100	10	13.2	0
Wabash.....	1921	2,418	610,807	630,239	6,263	13,873	7,599	64.6	805,561	357,405	275	61	18.2	15
Wabash.....	1920	2,418	615,260	642,026	10,550	15,821	3,812	80.6	802,561	395,915	271	63	18.9	...
Ohio-Indiana-Allegheny region:														
Baltimore & Ohio.....	1921	5,185	1,903,582	2,415,493	137,434	39,913	35,631	52.8	2,888,905	1,342,938	1,065	265	19.9	108
Baltimore & Ohio.....	1920	5,154	2,001,923	2,513,199	152,454	48,926	24,287	66.8	3,104,149	1,582,297	1,040	264	20.2	12
Central of N. J.....	1921	678	290,690	314,531	29,616	5,376	4,189	56.2	384,136	190,800	200	60	24.2	7
Central of N. J.....	1920	678	290,690	314,531	29,616	5,376	4,189	56.2	384,136	190,800	200	60	24.2	7
Chicago & Eastern Ill.....	1921	1,151	281,154	283,905	3,771	5,824	4,612	55.8	397,861	195,993	115	62	30.5	2
Chicago & Eastern Ill.....	1920	1,131	305,809	317,447	5,432	7,259	2,521	67.3	441,637	231,842	100	74	42.5	1
C., C. & St. L.....	1921	2,396	719,549	747,951	896	16,438	10,899	52.1	1,169,620	513,335	308	113	26.8	15
C., C. & St. L.....	1920	2,396	719,549	747,951	896	16,438	10,899	52.1	1,169,620	513,335	308	113	26.8	15
Elgin, Joliet & Eastern.....	1921	837	149,636	165,919	11,978	3,963	2,224	64.1	316,847	175,171	95	9	8.6	4
Elgin, Joliet & Eastern.....	1920	837	149,636	165,919	11,978	3,963	2,224	64.1	316,847	175,171	95	9	8.6	4
Long Island.....	1921	395	40,533	47,727	7,806	481	459	25.0	64,721	9,874	35	7	16.0	6
Long Island.....	1920	395	40,533	47,727	7,806	481	459	25.0	64,721	9,874	35	7	16.0	6
Pennsylvania System.....	1921	10,850	4,748,383	5,247,461	417,350	100,262	78,001	56.2	7,419,843	3,692,239	2,202	893	28.9	136
Pennsylvania System.....	1920	10,927	4,808,311	5,349,584	408,953	111,653	53,197	67.7	7,068,525	3,698,872	2,107	985	31.9	8
Phila. & Reading.....	1921	694	614,672	706,907	94,776	13,366	10,566	56.3	985,403	513,012	314	84	21.1	39
Phila. & Reading.....	1920	690	678,041	779,745	99,510	15,591	7,483	67.6	1,037,634	591,775	299	74	19.8	19
Pocahontas region:														
Chesapeake & Ohio.....	1921	2,530	767,697	843,475	22,408	18,843	17,562	51.8	1,542,522	800,310	400	147	26.8	36
Chesapeake & Ohio.....	1920	2,517	846,738	951,097	32,444	22,973	14,227	61.8	1,681,850	936,122	407	132	24.5	5
Norfolk & Western.....	1921	2,055	814,383	994,789	37,927	19,752	16,191	55.0	1,651,564	892,492	507	127	25.3	101
Norfolk & Western.....	1920	2,038	813,104	1,039,551	42,813	22,701	12,199	65.0	1,659,162	973,873	417	256	38.0	11
Southern region:														
Atlantic Coast Line.....	1921	4,898	672,415	677,921	11,936	13,038	9,169	57.1	744,930	378,831	284	122	30.0	...
Atlantic Coast Line.....	1920	4,894	757,800	760,620	13,226	16,983	6,760	71.8	841,651	348,417	280	133	33.2	...
Central of Georgia.....	1921	1,908	231,415	233,547	3,895	5,003	1,247	80.0	246,935	123,260	102	25	19.7	...
Central of Georgia.....	1920	1,913	231,415	233,547	3,895	5,003	1,247	80.0	246,935	123,260	102	25	19.7	...
I. C., (inc. M. & V.).....	1921	6,151	1,950,244	1,963,356	40,254	41,769	31,853	56.7	2,950,133	1,450,198	710	109	13.3	4
I. C., (inc. M. & V.).....	1920	6,152	1,986,674	1,997,487	42,826	49,052	20,809	70.2	2,953,958	1,450,886	722	116	13.8	14
Lehigh Valley.....	1921	5,026	1,539,210	1,669,891	13,970	25,611	17,443	62.2	2,511,885	1,189,133	633	134	21.6	3
Lehigh Valley.....	1920	5,024	1,577,346	1,721,928	55,397	27,275	12,830	68.0	1,631,381	813,726	505	112	18.2	...
Seaboard Air Line.....	1921	3,537	437,707	446,356	9,086	8,613	5,345	61.7	485,233	188,034	171	91	34.7	...
Seaboard Air Line.....	1920	3,537	457,534	476,384	12,423	10,936	4,028	73.1	561,525	242,171	181	94	33.3	...
Southern Railway.....	1921	6,944	1,213,899	1,340,833	26,620	22,712	17,649	62.3	1,166,947	586,292	232	20	20.0	...
Southern Railway.....	1920	6,955	1,421,758	1,481,010	53,308	33,574	10,800	76.2	1,659,953	768,349	957	182	16.0	5
Northwestern region:														
C. & N. W.....	1921	8,320	1,714,444	1,761,132	22,369	28,349	23,252	54.9	1,807,164	767,033	661	293	30.7	...
C. & N. W.....	1920	8,652	1,747,114	1,785,817	25,110	35,114	14,770	70.4	1,919,914	861,681	698	238	24.9	...
C., M. & St. P.....	1921	10,623	1,799,411	1,864,031	80,932	42,282	21,912	57.7	1,727,797	741,414	677	364	27.7	58
C., M. & St. P.....	1920	10,623	1,799,411	1,864,031	80,932	42,282	21,912	57.7	1,727,797	741,414	677	364	27.7	58
C., St. F., M. & O.....	1921	1,726	313,251	329,804	13,027	4,914	2,954	62.5	288,634	118,802	142	59		

Compared with January, 1920, for Roads with Annual Operating Revenues above \$25,000,000

FREIGHT SERVICE

Region, road and year	Cars on daily line					Gross tons per train					Net tons per train					Passenger service				
	Home	Foreign	Total	Per cent un-serv-iceable	Stored	exclud- ing locomotive and tender	Net tons per train	Net tons per car	Net tons per car-day	Net tons per mile of car-day	Car-miles per mile of road	Pounds of coal per 1,000 tons gross	Train miles	Passenger train car-miles						
															Trains	Passenger train car-miles				
New England region:																				
Boston & Albany.....	1921	2,646	5,342	7,988	6.8	960	838	365	21.4	49.1	29.0	8,476	238	317,570	2,016,895					
1920	513	8,569	9,082	4.5	1,541	840	372	21.3	38.9	23.9	8,984	247	318,801	2,011,651						
Boston & Maine.....	1921	10,377	17,534	31,411	13.7	1,541	1,038	446	25.4	26.0	16.1	3,289	181	855,996	4,494,166					
1920	7,475	13,877	21,352	5.9	407	1,007	402	24.6	15.1	15.1	10,770	182	655,922	4,484,293						
N. Y., N. H. & H.....	1921	19,832	19,729	39,561	13.3	3,024	1,108	473	24.6	16.8	11.1	3,401	216	1,082,636	6,570,190					
1920	7,800	36,912	44,712	5.6	.....	1,017	471	22.1	18.0	10.2	4,155	221	1,093,365	6,680,940					
Great Lakes region:																				
Delaware & Hudson.....	1921	7,852	9,596	17,448	8.0	.....	1,616	797	35.6	60.2	29.7	11,925	217	185,493	963,898				
1920	1,133	15,521	17,654	6.0	.....	1,450	746	35.0	53.2	23.9	10,942	244	190,289	927,104					
Del., Lack. & West.....	1921	14,407	8,880	23,287	7.4	2,481	1,549	719	27.5	50.1	28.4	11,790	217	491,293	3,500,317					
1920	3,699	19,407	23,106	6.4	.....	1,560	772	27.5	55.4	28.2	12,957	(1)	468,336	3,352,474					
Erie (inc. Chi. & Erie).....	1921	24,624	27,276	51,900	9.5	8,199	1,767	842	32.0	54.2	27.9	12,030	182	655,922	4,484,293					
1920	7,202	47,243	54,445	7.5	.....	1,587	783	29.4	53.6	26.0	12,918	193	698,522	4,971,766					
Lehigh Valley.....	1921	23,830	13,810	37,640	10.3	3,034	1,544	735	31.1	35.1	18.8	9,225	205	378,000	2,776,408					
1920	7,780	26,588	34,368	6.9	.....	1,528	756	28.8	44.1	21.6	10,611	226	380,546	2,676,657					
Michigan Central.....	1921	15,156	14,486	29,642	8.3	4,327	1,564	625	25.1	33.1	23.7	5,101	156	899,464	4,932,745					
1920	3,444	37,468	40,912	6.2	.....	1,510	706	23.4	31.4	17.5	7,038	(1)	336,145	5,453,087					
New York Central.....	1921	62,622	79,342	141,964	8.4	14,373	1,820	762	28.4	35.7	24.2	8,974	163	2,453,122	18,689,902					
1920	17,077	132,898	149,975	7.0	.....	1,621	776	26.2	37.2	19.8	9,869	(1)	2,533,963	18,112,137					
N. Y., Chic. & St. L.....	1921	8,315	6,299	14,614	9.5	445	1,399	545	22.7	66.1	50.4	12,264	137	88,142	507,653					
1920	1,324	10,715	12,039	5.8	(1)	.....	1,418	680	24.0	71.4	41.2	10,270	(1)	68,749	434,733				
Pere Marquette.....	1921	4,838	8,665	17,503	7.3	1,500	1,127	525	25.8	27.6	18.2	2,186	201	287,689	1,403,217					
1920	3,945	20,217	24,162	6.7	.....	1,122	542	24.9	23.5	12.8	2,583	215	292,808	1,408,837					
Fitts & Lake Erie.....	1921	8,797	12,093	20,890	14.5	2,018	2,064	1,160	42.9	24.1	9.5	22,384	92	113,705	586,536					
1920	3,761	20,180	23,941	10.9	.....	2,121	1,203	485	26.5	10.4	26.0	10,230	(1)	102,800	525,110				
Wabash.....	1921	10,860	13,633	24,493	10.8	.....	1,319	585	25.8	47.1	28.3	4,768	210	552,806	2,782,020				
1920	5,135	19,258	24,393	9.3	.....	1,304	643	25.0	52.4	26.0	5,282	212	553,581	2,698,481					
Ohio-Indiana-Allegheny region:																				
Baltimore & Ohio.....	1921	55,241	51,376	106,617	6.8	4,196	1,518	705	33.6	40.6	22.9	8,356	225	1,382,179	8,590,573					
1920	17,160	81,941	99,101	5.8	.....	1,551	790	32.3	51.5	23.8	9,904	(1)	1,341,275	8,199,485					
Central of N. J.....	1921	12,741	13,533	26,274	15.2	1,840	1,322	656	35.5	23.4	11.7	9,072	224	315,910	1,380,005					
1920	4,065	20,800	24,865	7.8	374	.....	1,190	600	33.2	27.7	13.3	10,133	(1)	312,939	1,320,065				
Chicago & Eastern Ill.....	1921	15,335	8,483	23,818	10.9	.....	1,354	663	24.0	42.3	24.3	7,235	209	946,009	4,829,293				
1920	9,232	10,883	20,115	9.6	.....	1,444	758	32.0	37.2	17.3	6,612	(1)	236,582	1,516,250					
C., C. & St. L.....	1921	12,800	21,626	34,426	11.2	6,861	1,625	716	31.4	48.3	29.5	6,937	174	770,414	4,543,237					
1920	3,364	31,620	34,984	6.2	.....	1,538	769	29.3	56.6	27.5	8,037	(1)	758,688	4,596,067					
Elgin, Joliet & Eastern.....	1921	9,271	7,129	16,400	8.3	438	2,121	1,171	44.7	24.0	13.2	6,696	150	.....	(?)				
1920	2,044	4,838	6,882	6.3	.....	1,956	1,050	40.1	33.9	13.2	6,696	150	.....	(?)					
Long Island.....	1921	1,283	3,385	4,668	4.6	247	1,100	244	21.5	6.8	4.9	8,07	424	189,621	1,037,611					
1920	566	5,240	5,806	3.6	.....	595	237	19.7	5.3	4.0	784	(1)	183,816	935,880					
Pennsylvania System.....	1921	167,306	167,306	334,612	9.9	49,770	1,567	707	36.6	43.4	24.0	10,739	249	1,406,009	8,279,623					
1920	86,746	202,274	289,020	7.9	47,871	.....	1,470	769	33.1	43.3	14.0	10,920	(1)	5,333,329	34,471,852				
Phila. & Reading.....	1921	18,508	18,530	37,038	8.9	.....	1,603	838	38.5	44.9	20.7	23,32	225	521,189	2,358,648				
1920	5,950	31,591	37,541	6.1	.....	1,530	873	38.0	50.9	19.8	27,664	(1)	497,327	2,300,452					
Pocahontas region:																				
Chesapeake & Ohio.....	1921	26,977	22,048	49,025	6.9	11,500	2,009	1,043	42.5	52.7	24.0	10,206	163	446,963	2,501,203					
1920	5,755	32,549	38,304	8.3	.....	1,986	1,106	40.7	78.8	31.3	11,998	(1)	413,382	2,262,948					
Norfolk & Western.....	1921	27,751	14,479	42,230	6.3	4,715	2,028	1,096	45.2	68.2	27.5	14,011	187	404,277	2,609,470					
1920	7,993	27,690	35,683	6.3	.....	2,040	1,146	41.1	84.3	31.6	14,750	(1)	404,897	2,577,208					
Southern region:																				
Atlantic Coast Line.....	1921	20,124	14,087	34,211	10.2	.....	1,108	415	21.4	26.3	21.5	1,840	157	885,316	6,303,050				
1920	3,347	29,016	35,363	8.7	.....	1,111	460	20.5	31.8	21.6	2,299	186	874,752	5,969,355					
Central of Georgia.....	1921	6,426	3,882	7,308	14.8	750	1,055	502	27.8	50.9	28.0	1,949	181	327,055	1,715,034					
1920	4,438	9,931	14,369	9.3	.....	1,063	579	26.3	40.6	20.9	2,079	187	346,000	1,877,623					
I. C., (inc. Y. & M. V.).....	1921	33,354	28,406	61,760	5.6	3,660	1,513	692	32.3	70.5	38.5	7,080	162	1,437,486	8,328,697					
1920	12,216	44,922	58,138	5.9	.....	1,487	730	29.6	80.5	38.8	7,607	(1)	1,398,444	8,275,137					
Louisville & Nashville.....	1921	29,930	23,817	53,747	16.7	112	1,024	488	32.1	45.5	24.2	4,870	212	960,785	5,564,636					
1920	15,335	26,331	41,666	8.0	112	.....	1,121	515	28.8	48.4	24.3	5,235	209	946,009	4,829,293				
Seaboard Air Line.....	1921	9,190	10,944	20,134	12.3	.....	1,109	430	21.8	30.1	22.4	1,715	204	622,652	3,690,522				
1920	2,956	19,726	22,682	6.8	.....	1,227	529	22.1	34.4	21.3	2,208	204	602,998	3,619,946					
Southern Railway.....	1921	23,453	28,283	51,736	4.2	12,431	1,084	464	24.8	35.1	22.7	2,616	232	1,478,840	9,184,751					
1920	11,916	56,905	68,821	2.2	.....	1,168	540	22.9	36.0	20.6	3,565	(1)	1,493,532	9,137,918					
Northwestern region:																				
C. & N. W.....	1921	44,379	28,848	73,227	8.2	4,000	1,054	447	27.1	33.8	22.7	2,974	222	1,704,861	10,177,895					
1920	22,774	62,440	84,814	6.1	.....	1,102	479	23.7	31.7	19.0	3,337	(1)	1,669,518	10,026,406					
C., M. & St. F.....	1921	36,655	28,655	65,010	8.1	6,600	1,242	529	25.2	41.5	22.5	3,236	(1)	1,095,919	8,627,588					
1920	19,388	64,473	82,261	5.9	.....	1,242	592	25.2	41.5	22.5	3,236	(1)	1,095,919	8,627,588					
C., St. P., M. & O.....	1921	3,084	9,568	12,652	12.3	1,223	921	379	24.3	30.3	20.1	2,220	221	319,713	1,808,052					
1920	41,551	16,273	15,816	7.9	.....	887	405	24.3	30.6	17.6	2,801	(1)	323,852	1,924,535					
Great Northern.....	1921	18,853	31,828	50,681	7.1	.....	1,267	623	25.3	21.7	11.5	1,551	214	1,001,927	5,974,081				
1920	16,988	9,313	26,301	9.1	1,856	.....	1,114	514	26.3	30.5	18.1	1,898	151	434,474	2,326,697				
Norfolk Pacific.....	1921	6,260	14,560	20,828	6.1	.....	950	485	23.4										

report of the Committee on Elimination of Waste in Industry, of which J. Parke Channing is chairman and L. W. Wallace, executive secretary of the council, vice-chairman. The committee has been conducting an assay of waste in principal industries for more than three months and now reports that the results of the assay will be ready in June.

E. E. Hunt, who has been on Mr. Hoover's staff, and who has been identified with the Elimination of Waste in Industry committee since its formation, has been retained to direct the work of that committee until its completion. In submitting the report of the Patents Committee the executive secretary noted the favorable attitude of members of Congress toward pending patent legislation sponsored by the council. Every effort will be made to bring about necessary Patent Office reforms at the present session of Congress.

Other matters discussed by the secretary were petitions of the council for the appointment of an engineer as Assistant Secretary of War, in which favorable action was not obtained, and for the appointment of an engineer to the Interstate Commerce Commission, which is still under consideration. The executive secretary of the council has been appointed on the advisory board to the Board of Surveys and Maps to succeed A. D. Flinn, who represented old Engineering Council.

The next meeting of the council will be held in St. Louis, Mo., on June 3. This meeting will probably be the most important yet held by the society as it will synchronize with the report on the waste assay.

Comparison of Steam and Electric Locomotives

At a meeting of the Franklin Institute held at Philadelphia on April 14 two papers were read on steam and electric motive power. The characteristics of the electric locomotives were discussed by N. W. Storer, general engineer of the Westinghouse Electric & Manufacturing Company, while the characteristics of the steam locomotive were treated by A. W. Gibbs, chief mechanical engineer of the Pennsylvania System.

Mr. Storer stated that he considered it probable that there would gradually be a radical evolution of operating methods in order to utilize the electric locomotive most effectively and discussed some of the factors to be considered in this connection. An important advantage would result from making the speed of passenger and freight trains more nearly uniform as could be done advantageously with electric motive power. On account of its greater reliability the electric locomotive would not impose the same limitations on the length of operating division as the steam locomotive and greater mileage could be obtained from the individual units. Under certain conditions the use of aerial right over track was of great importance. Electrification opens up possibilities in the use of multiple level stations to increase station capacity and improves the operation of stub-end stations by decreasing the number of switching movements. In concluding, Mr. Storer discussed at some length the relative advantages of various types of motors and compared the speed-pull curves with those of typical steam locomotives.

Mr. Gibbs confirmed his remarks to the mechanical problem of transmitting power from the motors to the wheels and the behavior of locomotives as vehicles. He stated that while the transmission of power in electric locomotives seems simple, it really is very difficult and while the electrical features of the motive power were often satisfactory, the mechanical features were troublesome. After discussing briefly the various types of transmission, Mr. Gibbs outlined some of the difficulties encountered in designing locomotives for high speed. In developing the design of Pennsylvania electric passenger locomotives, tests were conducted to determine the riding qualities of electric engines with various wheel arrangements. A section of track was prepared especially for measuring the stresses, a record being obtained by the impression of a steel ball on a steel plate inserted in special ties. The tests showed that a high center of gravity was advantageous and that symmetrical driving wheel arrangements were unstable. Some of the electric engines proved very destructive to the track and as a result of these tests, a design of locomotive with wheel arrangements corresponding to two eight-wheel engines facing in opposite directions and with motors above the wheels was adopted. In conclusion, Mr. Gibbs stated that there was still much to learn with regard to the behavior of electric locomotive as vehicles and further tests should be made to determine the most satisfactory types.

Traffic News

The Department of Domestic Distribution of the Chamber of Commerce of the United States, which has been making a survey of business conditions, reports that by far the largest number of answers to its question as to how the department might help in lowering the cost of merchandising said: "Do something to lower freight rates." Answers were received from some two thousand business men, retailers, wholesalers and manufacturers.

The Postmaster General has filed with the Interstate Commerce Commission an answer to the petition filed by the New England railroads asking for a reexamination of the facts and circumstances surrounding transportation of mail in New England and for an order readjusting the rates since September 1, 1920. The Postmaster General asks that this petition be denied on the ground that such a retroactive order would be in contravention of the rights of the government.

At the annual meeting of the Transportation Club of San Francisco, Cal., the following officers were elected: President, W. B. Hinchman, assistant traffic manager, Tonopah & Tidewater; first vice-president, P. G. Williams, auditor, Associated Oil Company; second vice-president, Harry C. Ewing, commercial agent, Pere Marquette; secretary, E. A. Senneff, general agent, St. Louis-Southwestern; directors, J. J. Shea, bar pilot; J. T. Bate, Pacific coast agent, Missouri, Kansas & Texas; D. M. Swobe, vice-president, McCloud River Railroad; F. C. Lathrop, assistant general passenger agent, Southern Pacific; and M. F. Cropley, assistant general manager, Pacific Steamship Company.

Coal Production

Production of soft coal in the week ended April 16 was marked by a slight but distinct recovery, says the weekly bulletin of the Geological survey. The output is estimated at 6,325,000 net tons, an increase of 416,000 tons over the week preceding and the largest since the second week of March.

Seasonal Coal Rates Proposed

A plan proposed for promoting the "off-season" movement of coal in the early part of the year, in order to avoid shortage and congestion in the fall and winter and to promote a uniform rate of production, is embodied in a bill introduced in Congress by Senator Frelinghuysen providing for seasonal coal rates. The bill was strongly endorsed by the Interstate Commerce Commission and was introduced in the Senate last year; and it was favorably reported by the Senate committee; but it was not acted upon by the Senate. Chairman Clark has appeared before the committee and favored the bill. It provides for a reduction of from 5 to 25 cents a ton from the normal or basic freight rate, from March to July, with corresponding increases in the rates from August to February. The bill was opposed last year by the railroads on the ground that there was a demand for more coal than the railroads could haul anyway and it was opposed by various boards of trade and coal dealers' associations on the ground that it would penalize those industries or communities that necessarily must obtain most of their coal late in the year. This year both the railroads and the coal operators are trying to induce the early purchase of coal. The Interstate Commerce Commission takes the position that it could not authorize seasonal differentials without specific authority of law.

Members of the Senate committee appeared reluctant to have Congress itself legislate so directly on rates as to fix the seasonal differentials itself, but it was informally decided to report a bill authorizing the Interstate Commerce Commission to make an investigation and if it deems it desirable to initiate seasonal rates.

Some negotiations between the Eastern railroads and the shippers of lake cargo coal have been going on for some time, looking to an immediate reduction in coal rates, and it is understood that a number of the railroads are willing to make some reduction. A reduction of 28 cents per ton has been discussed.

Commission and Court News

Interstate Commerce Commission

Port Terminal Charges to Be Investigated

The commission is to investigate the reasonableness of the charges for wharfage, storage, etc., at south Atlantic and Gulf ports at and south of Hampton Roads, Va., and also the propriety of including in the rates of the carriers to and from the ports, the cost of these services. The commission will investigate in a broad and comprehensive way the charges, the nature of the services rendered, the cost thereof and the facilities employed. Comparison will be made with similar charges, costs and services of water terminals not owned or operated by the carriers.

The commission will also inquire into the propriety of absorptions of terminal charges at the ports by the carriers; whether the proper growth and development of any ports are unduly restricted; and whether the free flow of commerce at the ports is unduly impeded.

The proceedings will be set for hearing at places and dates to be determined later.

Personnel of Commissions

The Senate on April 25 confirmed the appointments of B. W. Hooper, Samuel Higgins and W. L. McMenimen as members of the Railroad Labor Board. The committee on interstate commerce had approved the appointments on April 23 though representatives of the maintenance of way employees' organizations had protested the appointment of Mr. McMenimen, who is the second representative of the train service brotherhoods on the board. The Senate has also confirmed the appointment of Col. E. H. Shaughnessy as second assistant postmaster general.

Robert B. Johnson, heretofore in the Bureau of Valuation of the Interstate Commerce Commission, has been appointed signal engineer examiner in the Bureau of Safety of the Commission. Mr. Johnson was born at Leesburg, Va., and was educated at Virginia Polytechnic Institute. His railroad service has been in the signal department on the Southern Railway; as general foreman for the General Railway Signal Company and also as assistant signal engineer for the General Railway Signal Company of Canada. During the world war he served as major of field artillery and while in France was in the 79th division.

Percy W. Jones, heretofore with the Chicago & North Western, has been appointed signal engineer examiner, Interstate Commerce Commission, Washington, for service in the Bureau of Safety. Mr. Jones was born at Reading, Pa., and was graduated from Pennsylvania State College in 1910 in electrical engineering. His railroad service has been on the Pennsylvania lines west of Pittsburgh, the Chicago, Rock Island & Pacific and Chicago & North Western, doing various kinds of work in the signal department. In 1917, 1918 and 1919 he served in the construction division of the United States Army with rank of Lieutenant, being in charge of the electrical and building repair sections at Fort Oglethorpe, Ga. Since the war he has been in the valuation department of the signal engineer's office of the North Western.

President Harding on April 27 sent to the Senate nominations for appointment as members of the Interstate Commerce Commission for E. I. Lewis, chairman of the Public Service Commission of Indiana, and J. B. Campbell of Spokane, Wash., who has for many years represented the intermountain interests in rate litigation as attorney for the Spokane Chamber of Commerce and later as attorney for the Intermediate Rate Association, whose complaint asking a reduction in the rates from the east to the intermountain territory was dismissed by the Interstate Commerce Commission in a decision made public on April 27. Mr. Lewis was appointed for a term expiring December 31, 1925, to succeed J. S. Harlan and Mr. Campbell for one of the new positions on the commission for a term expiring December 31, 1924.

Foreign Railway News

Italian Locomotives for Bulgaria

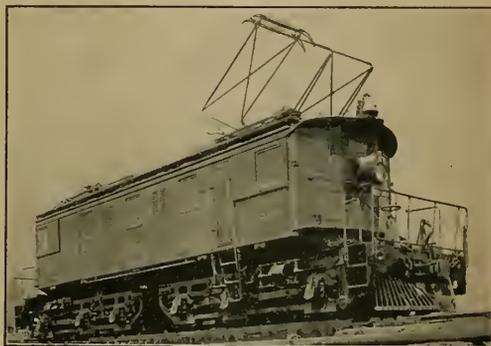
LONDON.

It is reported that the Ansaldo Company, Rome, has made a contract with the Bulgarian government for the construction of 40 locomotives for freight and passenger service.

Electric Locomotives for South America

The first Baldwin-Westinghouse freight locomotive for the Paulista Railway Company, Brazil, S. A., has been completed and tested. The passenger locomotives are nearing completion. Announcement of the proposed electrification of the Paulista Railway was made in the April 23, 1920, issue of the *Railway Age*.

The locomotives are to be used in freight service on the principal broad gage trunk lines of the railroad which runs through



Freight Locomotive for the Paulista Railway

the most prosperous and productive part of the state of Sao Paulo. The freight locomotives each weigh 116 tons and have six driving axles, each equipped with one 280 hp. direct-current motor, arranged for operation with two motors in series on the 3,000-volt line. They are designed to handle trailing loads up to 770 tons over a line having a maximum grade of about 2 per cent. The locomotives are equipped with M. C. B. couplers for testing purposes, but will later be equipped with continental draft gear and arranged for vacuum train brakes.

Railway Situation of India

The annual report of the railway department of the government of India for the year ending March 31, 1920, shows an addition to the total railway mileage of the country of 119, bringing the total up to 36,735. None of the railways are of standard gage. Of 5 ft. 6 in. gage there are 17,990 miles; of 3 ft. 3½ in., 15,181 miles; of 2 ft. 6 in., 2,926 miles; and of 2 ft. gage 638 miles.

The net earnings of all the railways totaled \$124,729,308 (rupees to dollars at par), or \$3,396 per mile. The total capitalization was \$1,835,063,748 and the net income represents an earning of 6.8 per cent on the capital outlay. The total passenger train miles during the year was 52,092,000, the total freight train miles was 70,061,000 and the mixed train miles 34,169,000. The average freight haul was 232 miles and the average freight charge per ton mile was 7 mills.

The orders for equipment during the fiscal year included 364 locomotives, 14,157 freight cars and 699 passenger train cars. The railway department is experimenting with central automatic couplers with the view of adopting them as standard if it is found advisable. It is reported that Simplex couplers are being tried on the Great Indian Peninsula Railway. With the use of these couplers and strengthened underframes it has been

found that trains of about twice the ordinary weight can be handled.

The year was marked with strikes and various labor troubles. In many cases wages were advanced as much as 50 per cent over the pre-war rates. The railways gave employment during the year to 711,690 persons. Of these 693,884 were natives, 10,865 were Anglo-Indians and 6,941 were Europeans.

March Exports of Locomotives

Exports of steam locomotives in March totaled 105, valued at \$5,317,029. This figure represents a slight increase in number and an enormous increase in value over the February totals. Fifty of these locomotives, valued at \$3,570,100, were destined for France. The detailed figures by countries, as compiled by the Bureau of Foreign and Domestic Commerce, follow:

Countries	No.	
France	50	\$3,570,100
Canada	3	33,865
Honduras	1	9,522
Mexico	6	83,000
Jamaica	1	5,525
Cuba	6	231,629
Brazil	1	22,000
Venezuela	1	13,425
China	7	344,628
Japan	6	72,000
Philippine Islands	6	289,800
British East Africa	2	14,098
Egypt	15	627,437
Total	105	\$5,317,029

March Exports of Car Wheels and Axles

The exports of car wheels and axles in March were valued at \$295,336, slightly less than the total for February. The complete figures by countries, as compiled by the Bureau of Foreign and Domestic Commerce follow:

Countries		
Greece		\$40,975
Canada		12,473
Guatemala		99
Nicaragua		123
Panama		2,403
Mexico		9,954
Cuba		1,900
Dominican Republic		1,300
Argentina		28,350
Brazil		64,325
Chile		78,321
Ecuador		892
Peru		7,537
Uruguay		509
China		18,988
British India		900
Japan		12,990
Philippine Islands		11,503
British South Africa		984
Total		\$295,336

Locomotive Exports in February

The exports of steam locomotives in February suffered a violent slump. The total is 97, valued at \$2,355,295, while similar figures for January show 149, valued at \$4,248,147. Mexico was the destination of 31 of these engines, valued at \$831,980. Most of the slump can be laid to the falling off of Cuban shipments from 66 in January to 13 in February. The detailed figures by countries as compiled by the Bureau of Foreign and Domestic Commerce follow:

Countries	Number	Dollars
Costa Rica	4	54,909
Honduras	2	33,600
Mexico	31	831,980
Newfoundland and Labrador	6	221,700
Cuba	13	325,180
Virgin Islands of U. S.	1	574
Dominican Republic	3	97,386
Dutch Guiana	1	6,046
China	7	205,060
Dutch East Indies	1	2,200
Hongkong	1	14,112
Japan	8	60,230
New Zealand	4	21,261
Philippine Islands	7	301,400
British West Africa	1	18,771
British South Africa	3	87,726
Total	97	2,355,295

Amalgamation of Two Great English Companies

A provisional agreement has been made by which the London & North Western Railway will absorb the Lancashire & Yorkshire; and it seems to be understood that there will be no doubt of the approval of the stockholders of the two companies. For

several months past, one man, Arthur Watson, has been general manager of both these companies, and they have for many years worked in friendly co-operation. For 12 years past there has been a pool by these two companies and the Midland of certain competitive freight traffic. An amalgamation was proposed fifty years ago, but Parliament then refused its approval.

The main lines of the London & North Western extend from London to Liverpool, Holyhead, Carlisle, Manchester and Leeds. The principal lines of the Lancashire & Yorkshire lie east and west, Liverpool and Southport being prominent western termini and Goole the principal eastern terminus. The aggregate mileage of the London & North Western is 2,066 and of the Lancashire & Yorkshire 601. The smaller road has the densest traffic of any road in Great Britain, its receipts per mile in 1917 being \$53,081. Those of the larger road were \$38,418. For the year 1920 the following statistics have been published:

	L. & N. W.	L. & Y.
Gross receipts	\$195,905,871	\$84,787,108
Net income	33,355,633	12,911,591
Dividends on preferred stock	8,969,660	5,174,811
Dividends on common stock	15,640,739	4,120,527

Note—Pounds shown as dollars at par value.

For the four weeks ending January 2, 1921, the government has published the following items:

	L. & N. W.	L. & Y.
Freight ton miles	163,788,686	44,141,901
Average haul, miles	41.34	24.91
Average freight train load, tons	139.07	122.77
Ton miles per mile of road	80,407	74,188
Passengers carried	8,089,634	6,454,477

The Lancashire & Yorkshire has been one of the most enterprising of English companies, Sir John A. F. Aspinall, its general manager for about twenty years, up to about 1908, being one of the distinguished railroad engineers of the country. The company owns a large fleet of steamers plying between Goole and the Continent.

French Railway Deficits

The railways in France, in common with those of almost every other country, are suffering heavy deficits. According to the latest statistics, which have been supplied by the Bureau of Railway Economics, revenues fell short of expenditures at the end of 1919 by \$260,878,100 (francs to dollars at par). In fact, for each successive year since 1913, the French railways have been writing their net returns in red ink. The deficits remained within relatively moderate limits during the first years of the war, increased quickly from the beginning of 1917, then made a formidable leap in 1919. The deficits of the French railways from 1913 to 1919 are shown below:

Year	Deficits All Roads
1913	\$15,188,900
1914	54,095,300
1915	58,617,600
1916	53,094,300
1917	77,026,300
1918	101,595,200
1919	260,878,100

Freight rates have been increased approximately 140 per cent since the war, with a corresponding increase in passenger rates of 55, 50 and 45 per cent. The railways cannot hope to look for a great measure of further relief by asking for an additional increase in rates. Although traffic is growing, the French roads have by no means begun to resume their normal peace time standards. Only July 1, 1920, the number of loaded cars was 35,273, although in March, April and May it was over 36,000, the normal peace time standard being from 57,000 to 67,000 cars daily.

The French Minister of Public Works hopes to bring about some relief by reducing costs of operation. As in the United States the wage item appears to absorb the greatest percentage of operating revenues, with the cost of fuel running second. If the abnormal price of coal decreases, this itself may be sufficient to convert the aggregate deficit into a surplus, otherwise relief will have to be sought which may necessitate either a reduction in wages or a transference of the deficit to the tax payer. On January 1, 1913, employees on the French railways numbered 356,789; by January 1, 1920, this number had increased to 460,947, or 29 per cent. Their compensation, which in 1913 amounted to \$148,525,880, has increased today to \$637,706,160, or an increase of 329 per cent. The annual compensation per man before the war of \$52 has reached \$1,744, or an increase of 216 per cent. The introduction of the eight-hour day alone was responsible for an increased expenditure of over \$150,000,000 annually.

Equipment and Supplies

Locomotives

THE UNION PACIFIC is inquiring for 65 locomotives.

MITSUI & Co., New York, are inquiring for prices on material for the construction of 3 Pacific type locomotives, for the South Manchurian Railway.

THE CHILIAN STATE RAILWAYS will open bids on July 6, in Santiago, Chili, for 20 Mikado type locomotives of 1.676 meter gage, also for 10 Mikado type locomotives of one meter gage. Other information can be obtained at the New York City office of the company, 141 Broadway.

NATIONAL RAILWAYS OF MEXICO.—Francisco Perez, director general of the National Railways of Mexico, on a recent visit to the United States, bought 91 locomotives from the Illinois Central, for the National Railways. These lines are not in the market for any additional locomotives at the present time.

Freight Cars

THE CHILIAN STATE RAILWAYS will open bids July 6, in Santiago, Chili, for 100 Hart convertible cars of 45 tons capacity, 200 box cars of 30 tons capacity, 300 flat cars of 30 tons capacity and 20 refrigerator cars of 30 tons capacity, all to be of 1.676 meter gage.

Passenger Cars

THE CHILIAN STATE RAILWAYS will open bids on July 6, in Santiago, Chili, for 80 coaches of 1.676 meter gage, also for 2 sleeping coaches, 2 dining cars, 2 first-class coaches, 2 third-class coaches and 2 mail cars, all of one meter gage.

Iron and Steel

THE KANAWHA & MICHIGAN has ordered 1,500 tons of rails from the United States Steel Corporation.

THE MISSOURI, KANSAS & TEXAS has ordered four through riveted truss spans, requiring a total of 680 tons of steel, from the Lackawanna Bridge Company, Buffalo, N. Y.

MITSUI & Co., New York, are inquiring for 5,000 tons of 75 lb. rail and the necessary splice bars for the Japanese Government Railways, also for 1,560 tons of steel for bridges, for use in Japan.

Miscellaneous

THE CHICAGO & NORTH WESTERN is inquiring for 400 tons of iron bars for delivery May 3.

THE NEW YORK CENTRAL is asking for bids until 12 o'clock noon May 5, for a minimum of 200,000 gal. and a maximum of 800,000 gal. of asphaltum base fuel oil, with gravity of 14-16

Signaling

THE UNION PACIFIC has ordered from the General Railway Signal Company, to be installed by the railroad company at a tunnel between Altamont, Wyo., and Aspen, two electric interlocking machines with illuminated track diagrams: one machine to have 20 working levers and the other 21.

"SUMMER TOURS" is the title of an attractive booklet now being distributed by the Chicago & North Western and the Union Pacific, describing 33 personally escorted tours to Yellowstone and Rocky Mountain National Parks to be made this summer. Each tour covers two weeks and provides over 500 miles of auto-mobiling.

Supply Trade News

C. B. Cole, formerly manager of the Chicago territory of the Union Twist Drill Company, has joined the sales staff of the Tool Sales & Engineering Company at Chicago.

The Simmons-Boardman Publishing Company, publishers of the *Railway Age* and other publications, will, effective May 1, move their Cleveland, Ohio, office to 4300 Euclid avenue.

The Railway Materials Company announces that on May 1 its general offices will be removed from the Railway Exchange to suite 1900 Wrigley building, 400 North Michigan avenue, Chicago.

The offices of the Official Guide, published by the National Railway Publication Company, have been removed from 75 Church street to larger quarters at 424 West Thirty-third street, New York City.

A. H. Weston, formerly sales engineer, Lackawanna Steel Company, is now associated with the American Chain Company, Reading specialties division, with headquarters at 1054 Grand Central Terminal, New York City.

The W. T. Dunn Co., 10 High street, Boston, Mass., has been appointed New England sales agent for B. M. Jones & Co., Inc., 192 Chambers street, New York, importer of Mushet and Titanic tool steels, and Taylor's best Yorkshire iron.

J. J. Connors, until recently superintendent of motive power of the Denver & Salt Lake, has formed a connection with the Lowe Brothers Company, Dayton, Ohio, as railway representative, with office at 1243 Monadnock building, Chicago, Ill.

Russell B. Reid, for several years assistant sales manager of the Edward R. Ladew Company, has been made manager of sales for the Sharon Pressed Steel Company, Sharon, Pa. Mr. Reid will have his headquarters at 66 Broadway, New York City.

The offices of the Pocket List of Railroad Officials and the official Railway Equipment Register, published by the Railway Equipment and Publication Company, have been removed from 75 Church street to larger quarters at 424 West Thirty-third street, New York.

F. W. McIntyre has been appointed general sales manager of the Reed-Prentice Company and the Whitcomb-Blaisdell Machine Tool Company, Worcester, Mass., also the Becker Milling Machine Company, Hyde Park, Boston, succeeding J. P. Hsley, who has resigned to go with the Taylor Steel Construction Company, New York.

Fred H. Dorer, Wells building, Milwaukee, Wis., has been appointed sales representative for the American Spiral Spring & Manufacturing Company in Wisconsin and the northern peninsula of Michigan. McCreery & Taussig, Railway Exchange building, St. Louis, Mo., have been appointed sales representatives for the company in Missouri and southern Illinois.

H. M. Davison, who was from 1903 to 1919 with the Hayward Company, New York, and for two years just past was general sales manager for the Ohio Locomotive Crane Company, Bucyrus, Ohio, has again become associated with the Hayward Company and will hereafter be connected with the management of that company. Among other duties he will have the general management of sales.

Sidney G. Johnson, formerly vice-president and general sales manager, of the General Railway Signal Company, has been appointed eastern sales representative for the Hazard Manufacturing Company, Wilkesbarre, Pa., to look after its

interests in rubber insulated railroad signal wire and kindred products, with the railroads in eastern territory Mr. Johnson's office is at room 626, 30 Church street, New York City.

The Multiple Storage Battery Company, of New York City, has reorganized with Herbert G. Clopper, formerly of the New Jersey Zinc Company, elected president and treasurer; Norman D. Sturges remains as vice-president and general manager, and Jasper Bayne retains the position of secretary. The board of directors has been increased to include Howard Bayne, vice-president of the Columbia Trust Company, New York City, and L. M. De Vausney, vice-president of the Seaboard National Bank, New York City.

Crane Company

The Crane Company showed net income of \$8,969,311 for the year 1920, after writing down its inventory \$5,617,000. This compares with net income for the previous year of \$11,363,051. Only \$1,917,000 of the inventory written off was charged to 1920 earnings, the balance being charged against reserve. In 1920, \$27,061,000 of accumulated surplus was distributed as a stock dividend.

The statement follows:

Income Account	1920	1919
Net after dependencies, taxes, etc.	\$8,649,624	\$11,248,242
Income from investments	685,263	328,829
Total net earnings	9,334,887	11,777,071
Interest and premium on bonds	365,576	414,019
Net income	\$8,969,311	\$11,363,051

Obituary

Willard L. Candee, formerly for about 20 years previous to 1915, president of the Okonite Company, Passaic, N. J., died on April 24 of heart failure in New York City, while on an automobile trip from Long Island. He was born 70 years ago at Yonkers, N. Y., and was one of the pioneer men in the telephone field, also in the electrical lighting field. He was associated with Charles A. Cheever in organizing the first telephone company in New York City, in the early eighties. In 1884, with Mr. Cheever, he organized the Okonite Company for manufacturing insulated wires and cables for electrical purposes, and about ten years later he became president of that company. Mr. Candee remained as president until he retired from active business five or six years ago.



W. L. Candee

Trade Publications

TRACK WORK.—The Ramapo Iron Works, Hillburn, N. Y., has recently issued a complete new catalogue of its products comprising about 500 pages. The book is bound in loose leaf form and is devoted to sectional, diagrammatic and half-tone views of switch-stands, switches, frogs, crossings, guard rails and accessories in heavy and light equipment.

HORIZONTAL RETURN TUBULAR BOILERS.—The Bigelow Company, New Haven, Conn., has reprinted in a separate book matter relating to their return tubular boilers appearing in the company's regular catalogue. This includes a general description of this type of boiler, detailed instruction for setting, illustrations of boilers and furnaces and comprehensive tables of data.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company has awarded the contract for a craneway building at Topeka, Kan., to Jerome Moss, Chicago, instead of to Joseph E. Nelson & Son, Chicago, as was announced in the *Railway Age* of April 15 (page 958).

ATCHISON, TOPEKA & SANTA FE.—This company, which was noted in the *Railway Age* of April 15 (page 958), as co-operating with the railroad Y. M. C. A. at Topeka, Kan., in planning additions and improvements to the Y. M. C. A. building at Topeka, at a cost of approximately \$25,000, is now accepting bids for this work.

ATCHISON, TOPEKA & SANTA FE.—This road, which was noted in the *Railway Age* of March 11 (page 574), as contemplating the construction of a blacksmith shop at San Bernardino, Cal., with dimensions 80 ft. by 307 ft., has awarded the contract for this work to Joseph E. Nelson & Sons, Chicago. The estimated cost is \$150,000 and construction will commence at once.

BALTIMORE & OHIO.—This company will replace its present double-deck, single track bridge across the Allegheny River at Foxburg, Pa. The new structure will consist of three double-deck, riveted, single track trusses, each 173 ft. 6 in. long. The contract for the fabrication and erection of this structure has been awarded to the Bethlehem Steel Bridge Corporation.

CHICAGO & NORTH WESTERN.—This company has awarded contracts for the construction of concrete bridges throughout the system to the Widell Company, Mankato, Minn.; S. G. Cool, Manitowoc, Wis.; Peppard & Burrill, Minneapolis, Minn., and White & Duffy, Milwaukee, Wis. The total cost of the work will be approximately \$200,000.

CHICAGO UNION STATION COMPANY.—This company will shortly accept bids for a viaduct on Van Buren street between Canal street and the Chicago River.

ILLINOIS CENTRAL.—This company, which is accepting bids for the construction of a viaduct over McLemore avenue, Memphis, Tenn., will award the contract for this work about May 5.

MAINE CENTRAL.—This company will build an 8-span steel bridge with concrete piers over the Kennebec river at Norridgewock, Me. T. Stuart and Sons, Newton, Mass., have been awarded the contract for the foundations and the Bethlehem Steel Bridge Company for the steel. The cost of the work is estimated at approximately \$125,000.

TEXAS MIDLAND.—The Interstate Commerce Commission has issued a certificate authorizing the construction of an extension from Commerce to Greenville, Texas.



A Seven-foot Gage Locomotive on the Great Western, England, in 1880.

Railway Financial News

ALASKA ANTHRACITE RAILROAD.—Asks authority to issue bonds.—This company has applied to the Interstate Commerce Commission for authority to issue \$1,500,000 of 6 per cent, 20-year bonds to be sold at 90, the proceeds to be used in completing the extensions of its property in Alaska.

ATCHISON, TOPEKA & SANTA FE.—Annual Report.—The income statement for the year ended December 31, 1920 compares with the preceding year as follows:

	1920	1919
Operating income, four months ending December 31, 1920	\$12,983,725	
Compensation under federal control		\$44,615,087
Compensation, January and February	7,699,832	
Guaranty, six months ending August 31, 1920	22,553,225	
Other income	9,842,116	15,100,116
Gross income	\$53,078,597	\$59,715,203
War tax accruals	2,608,497	3,373,271
Interest on bonds, including accrued interest on adjustment bonds	\$49,650,372	\$54,752,917
	12,015,621	11,654,259
Dividends:		
Preferred (5 per cent)	\$6,208,685	\$6,208,685
Common (6 per cent)	13,441,110	13,351,695
Surplus carried to profit and loss	\$17,881,460	\$23,438,819

The annual report of the Atchison, Topeka & Santa Fe will be reviewed editorially in an early issue.

BOSTON & MAINE.—Annual Report.—A review of this company's annual report for 1920 appears on another page of this issue.

CHESAPEAKE & OHIO.—Authorized to pledge bonds.—This company has been authorized by the Interstate Commerce Commission to pledge and repledge from time to time until otherwise ordered all or part of \$487,000 of general mortgage 4½ per cent gold bonds of 1892 held in the applicant's treasury as collateral security for short term notes.

CHICAGO, BURLINGTON & QUINCY.—Bond offering.—Announcement was made by J. P. Morgan Co. on Monday, following the receipt of news that the issue had been approved by the Interstate Commerce Commission, to the effect that a national syndicate of banking institutions and investment houses in New York, Boston, Philadelphia, Pittsburgh, Chicago, Cincinnati, Detroit, Cleveland, Minneapolis, St. Paul and St. Louis would offer the following day \$230,000,000 Northern Pacific-Great Northern joint 15-year 6½ per cent convertible bonds to the public at 96½ and interest, to yield about 6½ per cent.

Details of the issue are summarized as follows from the letter to the bankers prepared by Howard Elliott, chairman of the Northern Pacific, and Louis W. Hill, chairman of the Great Northern:

The joint fifteen-year 6½ per cent convertible bonds are to be the direct and joint obligations of the Northern Pacific and of the Great Northern Railway companies, and are to be secured by a pledge of 1,658,674 shares (approximately 97 per cent of the outstanding stock) of the Chicago, Burlington & Quincy Railroad Company (which percentage of stock has heretofore constituted the sole collateral security for the maturing Burlington joint 4s), and in addition by \$66,000,000 in mortgage bonds of the two obligor companies, the deposited collateral being valued at an amount in excess of 120 per cent of the principal amount of joint 6½ per cent bonds to be issued.

The joint 6½ per cent bonds may be converted, par for par, without charge, at the option of the holder, at any time (upon presentation not later than fifteen days before maturity or earlier redemption) into 6 per cent refunding and improvement mortgage bonds (Series B) of the Northern Pacific Railway Company, due 2047 (callable after fifteen years, at the company's option, at 110 per cent and accrued interest), or into 7 per cent fifteen-year general mortgage bonds (Series A) of the Great Northern Railway Company, due 1936 (with no option of prior redemption), or into bonds of both issues in any ratio between the two which the holder of the joint 6½ per cent bonds may desire, but not more than \$115,000,000 of either of such mortgage bonds will be issuable upon such conversion.

Such Northern Pacific bonds are, in the opinion of counsel, a legal investment for savings banks and trust funds in New York, Massachusetts, Connecticut and Vermont. Both such Northern Pacific bonds and such Great Northern bonds are, in the opinion of counsel, a legal investment for life insurance companies in the State of New York.

Special features of the financing are that discount will be allowed at 6½ per cent a year on the principal sum of the bonds from the date of payment to July 1, from when interest on the bonds will accrue, and that the Burlington joint 4s, which mature on July 1, 1921, with final coupon attached, will be accepted in payment at 100 and accrued interest to date of payment on allotments, scheduled for on or about May 16.

The decision of the Interstate Commerce Commission approving the issue will be found in the article entitled "Great Northern-Northern Pacific Bonds Approved" which appears on another page.

CHICAGO, MILWAUKEE & ST. PAUL.—Annual Report.—The corporate income account for 1920 compares with 1919 as follows:

	1920	1919
Railway operating income March 1 to December 31, inclusive:		
Railway operating revenues	\$141,643,202	
Amortizing operating expenses	134,087,552	
Net railway operating revenue	7,555,650	
Railway tax accruals	6,179,992	
Railway operating income March 1 to December 31, inclusive	1,372,519	
Rents—received	912,536	\$183,313
Interest on other securities and accounts	1,502,736	1,756,393
Amount accrued under guaranty provision	22,250,811	
Compensation, January and February	4,640,721	
Compensation accrued		27,945,820
Total other income	29,755,776	3,787,714
Gross income	31,128,295	31,733,534
Interest on funded debt	17,593,581	16,690,835
Interest on unfunded debt	2,240,811	
Hire of equipment	3,874,141	
Rents—paid	1,171,334	92,609
Total deductions	26,762,224	24,090,489
Net income	4,366,071	7,643,045

The annual report of the Chicago, Milwaukee & St. Paul will be reviewed editorially in an early issue.

DENVER & RIO GRANDE WESTERN.—Directors Elected.—At the first meeting of stockholders at Denver, Col., on April 22 of this company which was organized to take over the properties of the Denver & Rio Grande sold at foreclosure on November 20, 1920, Alvin W. Krech, of New York, was elected chairman of the board. Mr. Krech is also chairman of the board of the Western Pacific Railroad Company and president of the Equitable Trust Company of New York, which holds a \$30,000,000 mortgage on the property.

The directors elected, all of them from New York, were: F. W. M. Catchen, I. de Bryn, John B. Dennis, Frederick H. Ecker, A. M. Hunt, Alvin W. Krech, John B. Marsh, Robert W. Martin, George Welwood Murray, Lyman Rhoades, John Y. Robbins and R. B. Young.

After the regular meeting a special meeting of the stockholders amended the articles of incorporation of the new company to make the \$1,000,000 issue of common stock of no par value. The original incorporation filed with the Secretary of State had fixed a par value of \$50 a share. The change was made to conform with a law passed by the last Colorado Legislature.

The comment on the election of J. H. Young as president of the Denver & Rio Grande Western appears on another page of this issue.

FERNWOOD, COLUMBIA & GULF.—Authorized to issue bonds.—This company has been authorized by the Interstate Commerce Commission to issue and sell \$200,000 of refunding mortgage bonds.

FREDERICKSBURG & NORTHERN.—Authorized to Issue Promissory Note.—This company has been authorized by the Interstate Commerce Commission to issue, under date of January 1, 1921, its promissory note for \$36,936, bearing interest at 6 per cent per annum, payable to the order of J. L. Browne to cover certain advances made to the applicant.

KINDER & NORTH WESTERN.—Asks Permission to Abandon Line.—This company has applied to the Interstate Commerce Commission for a certificate authorizing the abandonment of 6 miles of its line from Bullard to Vizard, La., and the abandonment of operation as a common carrier of 8 miles from Vizard to Ennad, proposed to be sold for use as a logging road.

LOS ANGELES & SALT LAKE.—Asks authority to issue notes.—This company has applied to the Interstate Commerce Commission for authority to issue \$2,500 of one year, 7 per cent promissory notes.

NEW YORK, ONTARIO & WESTERN.—*Annual Report.*—The annual report for the calendar year 1920 shows the following corporate income account as compared with 1919:

	1920	1919
Compensation from U. S. Govt. ....	.....	\$2,103,589
Interest on deferred payments of above.....	.....	56,513
Compensation, January and February.....	\$350,598	.....
Net railway operating income, March 1 to December 31	355,952	.....
Estimated partial payment on account of guaranty deficit in net railway operating income, period March 1 to September 1.....	795,950	.....
Miscellaneous rent income.....	6,673	4,815
Income from securities and accounts.....	843,163	316,760
Income from sinking and other reserve funds.....	3,217	960
Equipment rents—net	23,262	.....
Gross income	\$2,378,815	\$2,482,642
Rent for leased roads.....	200,752	197,708
Interest on funded debt.....	1,176,430	1,185,115
Total deductions from gross income, inc. other.....	1,523,477	1,548,668
Net income	\$855,339	\$933,974
Balance for year.....	\$805,890	\$900,680

The operating revenues and expenses in detail and the principal traffic statistics for 1920 compare with 1919 as follows:

	OPERATING REVENUES	
	1920	1919
Merchandise freight	\$3,115,005	\$2,493,348
Coal freight	4,885,788	3,909,251
Milk	1,167,585	1,093,873
Passenger	3,098,508	2,697,357
Total operating revenues.....	\$13,154,689	\$10,190,027
OPERATING EXPENSES		
Maintenance of way and structures.....	\$2,249,095	\$1,742,907
Maintenance of equipment.....	3,449,277	2,637,554
Traffic	145,718	108,569
Transportation	6,279,307	4,811,278
General expenses	355,750	320,783
Total operating expenses.....	\$12,684,317	\$9,841,748
Net revenue from railway operations.....	\$470,372	\$1,068,279
Railway tax accruals.....	457,040	401,809
Railway operating income.....	\$10,714	\$666,445

PASSENGER TRAFFIC		
Number of revenue passengers.....	1,925,897	1,761,870
Number of passengers carried one mile.....	98,911,515	91,369,678
Average distance carried (miles).....	51.36	51.86
Average receipts per passenger mile (cents).....	3.133	2.952

MILK TRAFFIC		
Number of tons carried of milk earning revenue.....	152,835	151,662
Number of tons carried one mile.....	27,131,032	26,476,451
Average distance haul of one ton.....	177.52	174.58
Average receipts per ton per mile.....	4.303	4.131

FREIGHT TRAFFIC		
Number of tons carried of freight earning revenue	5,279,972	5,165,934
Number of tons carried one mile.....	691,073,698	602,704,487
Average distance haul of one ton	130.89	116.67
Average receipts per ton per mile.....	1.158	1.062

The report, signed by President John B. Kerr, says: The financial results of operation since September first on all roads have been disappointing for causes that are well known, but the results on our line compare favorably with those of the great majority of the carriers.

PENNSYLVANIA.—*Dividend Reduced.*—This company on April 27 reduced its quarterly dividend from 1½ to 1 per cent. The decrease is a quarterly reduction of one half of 1 per cent. This is the first time in twenty-two years the Pennsylvania has reduced the annual dividend basis below 6 per cent. Since 1899 it has paid 6 per cent annually, with the exception of 1906 when it paid 6½ per cent, and in 1907 when it paid 7 per cent. For seven years prior to 1899, the dividends were 5 per cent.

RENSSELAER & SARATOGA.—*Authorized to Issue Bonds.*—This company has been authorized by the Interstate Commerce Commission to issue \$2,000,000 of first mortgage 6 per cent, 20 year, gold bonds and to deliver them to the Delaware & Hudson Company in accordance with a certain lease. The Delaware & Hudson was authorized to guarantee the bonds and to sell them at par to pay off a like amount of bonds of the Rensselaer & Saratoga which mature on May 1.

TEXAS MIDLAND.—*Authorized to issue bonds.*—This company has been authorized by the Interstate Commerce Commission to issue \$500,000 of first mortgage 4 per cent, 30-year refunding bonds and to sell them at not less than par.

TOLEDO, ST. LOUIS & WESTERN.—*Referees Report on Just Compensation.*—The board of referees appointed by the Interstate Commerce Commission has issued a report finding that the gov-

ernment should pay \$1,113,486 as just compensation for the use of the company's property during the period of Federal control for each year and pro rata for the fraction of the year comprised in that period. This represents \$1,022,468 as the average annual operating income for the three year test period, and three additional items to which the referees say the company is entitled in addition to the standard return. The company had claimed \$1,500,000 a year.

WABASH.—*Annual Report.*—The corporate income account for 1920 compares with 1919 as follows:

	1920	1919	Increase or Decrease
Operating revenues:			
Freight	\$43,324,700	\$35,255,548	\$8,069,152
Passenger	11,218,051	10,143,356	1,074,695
Total operating revenues.....	59,982,282	48,847,086	11,135,197
Operating expenses:			
Maintenance of way and structures	10,541,360	8,086,880	2,454,480
Maintenance of equipment.....	14,735,801	9,358,676	5,377,125
Traffic	1,169,383	1,157,109	12,274
Transportation	30,023,953	24,610,615	5,413,338
General	1,999,814	1,997,569	402,245
Total operating expenses.....	58,859,395	44,587,030	14,272,366
Net operating revenue.....	1,122,887	4,260,056	—3,137,169
Tax accruals.....	1,574,473	1,445,726	128,747
Total operating income.....	Def. 454,940	2,805,154	—3,260,094
Total non-operating income.....	863,291	728,708	134,584
Gross income.....	408,351	3,533,861	—3,125,510
Total deductions from gross income	7,778,178	6,082,812	1,695,366
Net income.....	Def. 7,369,827	Def. 2,548,951	—4,820,876
Compensation accrued under federal control.....	971,135	.....	.....
Guaranty	8,063,778	.....	.....
Total	9,034,910	.....	.....
Credit income balance transferred to profit and loss.....	1,983,943	.....	.....

The annual report of the Wabash will be reviewed editorially in an early issue.

Guaranty Certificates

The Interstate Commerce Commission has issued the following certificates for partial payments on account of the six months' guaranty for last year:

Toledo, Peoria & Western.....	\$175,000
Buffalo & Susquehanna.....	100,000
Michigan Central.....	650,000
Tennessee Central.....	80,000
Delaware & Hudson.....	500,000
Georgia Southern & Florida.....	130,000
Chicago, Indianapolis & Louisville.....	125,000

Dividends Declared

Keokuk & Des Moines—Preferred, 3 per cent, payable May 5 to holders of record April 26.
Reading Company—First preferred, 50 cents, quarterly, payable June 9 to holders of record May 24.
Pennsylvania.—1 per cent quarterly, payable May 31 to holders of record May 2.



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Deportation of Undesirables in San Francisco

Railway Officers

Executive

Edward S. Jouett, assistant general counsel of the Louisville & Nashville, has been elected vice-president and general counsel, with headquarters at Louisville, Ky., effective April 21, succeeding Henry L. Stone, resigned.

B. B. Greer, vice-president of the Chicago, Milwaukee & St. Paul, has been elected president of the Des Moines Union Railroad in addition to his other duties, succeeding F. C. Hubbell, of Des Moines, who has resigned.

Financial, Legal and Accounting

J. M. Gayle has been appointed auditor of the Beaver, Meade & Englewood, with headquarters at Oklahoma City, Okla.

Operating

Roger T. Taylor, assistant general superintendent of the Northern Pacific, with headquarters at Livingston, Mont., has been appointed trainmaster, with the same headquarters, effective April 15.

Walter D. Pearce, trainmaster of the Northern Pacific, with headquarters at Forsyth, Mont., has been appointed supervisor of bridges and buildings, with headquarters at Glendive, Mont., effective April 15.

A. L. Soule has been appointed assistant to the general manager of the Atchison, Topeka & Santa Fe with headquarters at Topeka, Kan., effective April 25, succeeding F. J. Mackie, assigned to other duties.

F. J. MacKie, assistant to the general manager of the Atchison, Topeka & Santa Fe, with headquarters at Topeka, Kan., has been appointed superintendent of the Plains division, with headquarters at Amarillo, Tex., effective April 20. Mr. MacKie succeeds O. J. Ogg, who has been transferred to the western division, with headquarters at Dodge City, Kan., succeeding D. S. Farley, who has been promoted to assistant general manager.

ROCK ISLAND CONSOLIDATES DIVISIONS

The Chicago, Rock Island & Pacific has consolidated divisions, effective May 1, as follows: That part of the Minnesota division between Cedar Rapids and St. Paul-Minneapolis, and between Vinton, Iowa, and Iowa Falls, has been consolidated with the Cedar Rapids division, the consolidated division to be known as the Cedar Rapids-Minnesota division. That part of the Minnesota division between Manly, Iowa, and Short Line Junction has been consolidated with the Des Moines Valley division. The Colorado division has been consolidated with the Nebraska division, and is to be known as the Nebraska-Colorado division. The St. Louis division has been consolidated with the Kansas City terminal division, and is to be known as the St. Louis-Kansas City division. The Louisiana division has been consolidated with the Arkansas division, and is to be known as the Arkansas-Louisiana division. The Indian Territory division has been consolidated with the Panhandle division, and is to be known as the Panhandle-Indian Territory division. The Amarillo division has been consolidated with the El Paso-Mexico division, the new division to be called the El Paso-Amarillo division.

Coincident with these consolidations, appointments and transfers have been made as follows: H. R. Saunders, superintendent, with headquarters at El Reno, Okla., has been transferred to the Chicago Terminal division, with headquarters at Chicago. Mr. Saunders succeeds C. T. Ames, who has been appointed trainmaster, with headquarters at Des Moines, Iowa. Mr. Ames succeeds W. E. Warren, who has been trans-

ferred to Cedar Rapids, Iowa. A. L. Haldeman, superintendent, with headquarters at Manly, Iowa, has been transferred to Cedar Rapids, succeeding E. D. Hungerford, who has been appointed assistant superintendent, with headquarters at Minneapolis, Minn. Mr. Hungerford succeeds F. M. Patt, who has been appointed trainmaster of the Colorado division, with headquarters at Colorado Springs, Colo. Mr. Patt succeeds O. F. Young, who has been assigned to other duties. H. E. Allen, superintendent, with headquarters at Fairbury, Neb., has been transferred to Estherville, Iowa, succeeding C. E. Green, who has been appointed trainmaster, with headquarters at Cedar Rapids. Mr. Green succeeds W. L. Pauley, retired. F. N. Tinsman, superintendent, with headquarters at Colorado Springs, Colo., has been transferred to Fairbury, Neb., succeeding Mr. Allen. J. A. McDougal, superintendent, with headquarters at El Reno, Okla., has been appointed superintendent of the Oklahoma division, with the same headquarters, succeeding H. R. Saunders. D. Van Hecke, superintendent, with headquarters at Haileyville, Okla., has been transferred to El Reno, succeeding Mr. McDougal. H. P. Greenough, superintendent of the El Paso-Mexico division, with headquarters at Dalhart, Tex., has been appointed superintendent of the El Paso-Amarillo division, with the same headquarters. C. H. Hubbell, superintendent, with headquarters at Amarillo, Tex., has been appointed trainmaster, with the same headquarters. G. W. Rourke, superintendent of the Kansas City Terminal division, with headquarters at Kansas City, Mo., has been appointed superintendent of the Kansas City division, with the same headquarters. Mr. Rourke succeeds H. E. Correll, who has been appointed trainmaster, with headquarters at Eldon, Mo. J. S. Jones has been appointed trainmaster, with headquarters at Kansas City, Mo. A. E. Walker, superintendent of the Arkansas division, with headquarters at Little Rock, Ark., has been transferred to the Arkansas-Louisiana division, with the same headquarters. Mr. Walker succeeds J. G. Bloom, who has been appointed division engineer, with headquarters at Fairbury, Neb.

Traffic

D. H. Hoops, division freight and passenger agent of the Chicago & North Western, with headquarters at Chicago, has been promoted to general freight agent, effective May 1. Mr.

Hoops was born in Chicago and entered railroad service in 1885 as a junior clerk in the accounting department of the Chicago & North Western. His entire railroad career has been spent in the service of that company. He was transferred to the traffic department in 1888 and has served continuously since then in that department. He was made chief clerk to the general freight agent in 1895, and in 1898, was promoted to general agent, with headquarters at Des Moines, Iowa. He was shortly transferred to Chicago as acting

general agent in the freight department, and in 1900 was promoted to general agent in the passenger department, with the same headquarters. In 1906, he was transferred to Denver as general agent in the freight and passenger departments. In 1911, he was transferred as general agent, freight department, at Denver. Mr. Hoops was promoted to division freight and passenger agent, with headquarters in Chicago, as stated above, in 1917.

John P. Williams, general agent, freight department, of the Chicago & North Western, with headquarters at Chicago, has been promoted to division freight and passenger agent,



D. H. Hoops

with the same headquarters. **H. S. Bischoff**, general agent, with headquarters at Salt Lake City, Utah, has been transferred to Chicago, succeeding **Mr. Williams**. **N. O. Browne** succeeds **Mr. Bischoff**.

U. G. Soule has been appointed commercial agent of the Southern, with headquarters at Chicago, effective March 15.

A. W. Gill has been appointed assistant to the freight traffic manager of the Southern, with headquarters at Cincinnati, Ohio, effective April 15, succeeding **E. M. Lane**, deceased.

R. T. Powers has been appointed commercial agent of the Winston-Salem Southbound Railway, with headquarters at Cincinnati, Ohio. **J. H. Swaim** has been appointed commercial agent, with headquarters at Winston-Salem, N. C.

Samuel F. Miller, general freight agent of the Chicago & North Western, with headquarters at Chicago, has been promoted to assistant freight traffic manager, effective May 1, succeeding the late **E. D. Brigham**. **Mr. Miller** was born at Wepona, Ill., on January 17, 1867, and entered railway service on July 21, 1881, as a telegraph operator for the Chicago & North Western. His entire railway career has been spent in the service of this company. In 1884, while serving as cashier, he was made station agent and was employed in that capacity at various points on the line in Wisconsin until 1890, when he was promoted to traveling agent. In 1896 he was made general agent, and after five years' service in this capacity he was promoted to assistant general freight agent, with headquarters at Chicago. From 1906 to 1912, he served as general freight and passenger agent of the Nebraska and Wyoming division, with headquarters at Omaha, Neb. He was promoted to general freight agent in September, 1912, and held that position continuously up to the time of his recent promotion.



S. F. Miller

Mechanical

Coincident with the consolidation of divisions on the Chicago, Rock Island & Pacific, appointments and transfers have been made, effective May 1, as follows: **G. M. Stone**, master mechanic, with headquarters at Manly, Iowa, has been appointed general foreman, with the same headquarters. **B. H. Smith**, master mechanic, with headquarters at Fairbury, Neb., has been appointed general foreman, with the same headquarters. **W. E. Danvers**, master mechanic, with headquarters at Amarillo, Tex., has been appointed road foreman of equipment, with the same headquarters. **A. Hambleton**, master mechanic, with headquarters at El Dorado, Ark., has been appointed general foreman, with headquarters at Shawnee, Okla.

Engineering, Maintenance of Way and Signaling

H. Schantl, who has been appointed chief engineer of the Missouri-Illinois, with headquarters at Bonne Terre, Mo., was born at Festus, Mo., on September 8, 1876. He was educated at Washington University, St. Louis, graduating in 1903. He entered railway service in September, 1906, as an assistant engineer for the Mississippi River & Bonne Terre Railway. In December, 1918, he was promoted to engineer maintenance of way, and was serving in this position at the time of his appointment as chief engineer of the Missouri-Illinois. **Mr. Schantl** has also been appointed chief engineer

of the Mississippi River & Bonne Terre, in addition to his other duties, effective April 1.

Coincident with the consolidation of divisions on the Chicago, Rock Island & Pacific, appointments and transfers have been made, effective May 1, as follows: **A. C. Bradley**, division engineer, with headquarters at Colorado Springs, Colo., has been transferred to the Chicago Terminal division, with headquarters at Chicago, succeeding **C. P. Richardson**, who has been appointed assistant engineer, with headquarters at Fairbury, Neb. **G. Davis**, division engineer, with headquarters at Cedar Rapids, Iowa, has been transferred to Manly, Iowa, succeeding **H. T. Livingston**, who has been appointed master carpenter and division engineer on the Des Moines Valley division, with headquarters at Cedar Rapids, Iowa. **Mr. Livingston** succeeds **W. E. Heimerdinger**, who has been appointed office engineer, with the same headquarters. **B. A. Wait**, assistant engineer, with headquarters at Fairbury, Neb., has been appointed instrumentman, with the same headquarters. **J. G. Bloom**, division superintendent, with headquarters at El Dorado, Ark., has been appointed division engineer, with headquarters at Colorado Springs, Colo., succeeding **A. C. Bradley**. **R. Leas**, assistant engineer, with headquarters at El Reno, Okla., has been appointed instrumentman, with the same headquarters. **F. F. Tate**, assistant engineer, with headquarters at Amarillo, Tex., has been appointed instrumentman, with the same headquarters. **W. E. Brown**, division engineer, with headquarters at El Dorado, Ark., has been appointed roadmaster on the Nebraska division.

Purchasing and Stores

W. H. King, Jr., has been appointed general purchasing agent of the Seaboard Air Line, with headquarters at Norfolk, Va., succeeding **H. C. Pearce**, resigned to accept service with another company, effective April 11.

Special

H. B. Hull, general claim agent of the Illinois Central, with headquarters at Chicago, has been appointed editor of the Illinois Central Magazine in addition to his other duties.

Obituary

F. V. McDonnell, master mechanic of the Pennsylvania with headquarters at Ft. Wayne, Ind., died on April 26.

W. E. Phillips, formerly president of the Chicago & Western Indiana, died of heart disease at his home in Chicago on April 27.

J. W. Mulligan, real estate and tax agent of the Chicago, Rock Island & Pacific, died at his home in Chicago, on Saturday, April 23.

Z. V. Taylor, president of the Piedmont & Northern and vice-president of the Durham & Southern, died suddenly on April 18 on a train en route from Charlotte, N. C., to New York. **Mr. Taylor** was active in the promotion and organization of the Piedmont & Northern in 1912. He was also the founder and president of the Southern Public Utilities Company, which operates street railways and other public utilities at Charlotte, N. C., Winston-Salem, S. C., Greenville, N. C., and Anderson, S. C.

M. T. Pyne, who was general counsel of the Delaware, Lackawanna & Western from 1880 to 1892 and who served for a time as president of the Warren Railroad and the Cayuga & Susquehanna (companies subsidiary to the Lackawanna), died at New York on April 22. **Mr. Pyne** was born in New York on December 21, 1855. He graduated from Princeton University in 1877 and from Columbia University School of law in 1879. From the time of his retirement from the practice of his profession in 1892 until his death **Mr. Pyne** directed the affairs of several large estates and was a director in a number of industrial and financial concerns. **Mr. Pyne** had been identified with Princeton University as a trustee for the past 36 years.

EDITORIAL

Railway Age

EDITORIAL

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The action of the directors of the Pennsylvania Railroad in reducing the dividend rate on Pennsylvania stock from one and one-half to one per cent quarterly did not cause as much excitement as might have been expected from a step so important and far-reaching. The possibility of a reduction in the dividend had been discounted and students of the railway situation had felt that the action taken was such as was to have been looked forward to under the present conditions of railroading. The unfortunate feature of the whole affair is that the Pennsylvania stock is widely held by small investors, to whom the reduction in the dividend and the accompanying decline in the value of the stock represents a real hardship. The Pennsylvania is recognized as one of the leading railroads of the world; prior to federal control its physical standards, its management and the morale of its men were recognized as being a model that other properties could look up to. The Pennsylvania System was hit hard by the many sins of omission and of commission of federal control. The officers of the property are now engaged in the tremendous task of remedying the situation and of bringing the system back to its old standards of accomplishment. With the national agreements, high wage scales and the delays attendant upon the changing of these things, they are not, judging from the monthly reports of earnings, having what might be called a glittering success. If any one wants an argument in favor of some kind of action before it is altogether too late on the part of the Railroad Labor Board, we believe that this reduction in the Pennsylvania dividend is as good a one as can be found.

The legislature of Pennsylvania has repealed the full crew law of that state—after the said law has wasted about forty millions of dollars. The final vote was taken on April 28. Whether or not the news about the Pennsylvania's dividend, published the day before (that the company had been obliged to reduce the rate to a figure lower than that of any former year since 1880) had an influence on the minds of the legislators, does not appear; but the coincidence is noticeable. A good many citizens of Pennsylvania own stock in that railroad, and the legislators have, no doubt, heard from some of them. A reduction of 33 per cent in a stockholder's income will open some mouths which have long been silent. This Pennsylvania law has been in force almost ten years; and if there is any virtue in reviewing the mistakes of the past, these stockholders may well ponder this matter; may well ask themselves what kind of men they have been sending to the legislature during the years since 1911. Truth crushed to earth will rise again, though oftentimes it rises with exceeding slowness. The truth that full-crew laws are wasteful and unnecessary, and are substantially nothing but blackmail, has been fully evident, to everybody who cared to look, on every day since that law was passed. Railroad stockholders, outside of Pennsylvania, who may not be interested in the loss of 40 millions in ten years in that state, will do well to reflect that 40 millions in *one year* is the estimated aggregate of the present cost of the full-crew laws in all of the states

which keep up this foolishness. Not every stockholder can reach the legislators who rule his railroad—his position may be like that of an absentee landlord—but every stockholder has a duty to make his voice heard. If he can speak with the right tone and force, the Associated Press will telegraph his words to every state in the Union within 24 hours after they are uttered.

The recommendations of the governors' committee of the New England states, which are reproduced on another page of this issue, are to the effect that the executives of the New England roads have not shown that an increase of ten per cent in freight rates and passenger fares will remedy the New England situation or that with such an increase New England's interests will not suffer. This means that another of the several efforts of the New England carriers to remedy their situation has come to naught. The real gist of the committee's recommendations seems to lie, however, as much in its expressions of opinion concerning the railway situation of the country as a whole as in its comments on the desirability of the suggested increase in rates. The committee makes some rather far-reaching proposals, some of which will be generally agreed with and others of which will probably meet with opposition. It will be agreed that the government should be more prompt in fulfilling its obligations toward the railroads as to paying the amounts due them. The proposal that the period of federal guaranty should be extended, retroactive to September 1, 1920, will probably not be so readily accepted. One of the recommendations says, "We believe Congress should consider whether the present method of settling labor disputes is entirely adequate, and if not in what respect it may be remedied or altered." This is a thought that is undoubtedly being brought to the minds of many other observers; the expression of it emphasizes that the realization that railroad progress is waiting upon the Labor Board is becoming more wide-spread from day to day. It is rather evident from the committee's decision as a whole that the New England states are not prepared, as yet at least, to take it upon themselves to solve the New England railroad problem. They apparently feel that since it was the national government that brought on federal control, it is the national government's duty to bring about the remedy of the faults of federal control. Apparently, however, the committee does not believe that the government thus far has done as much to remedy the situation as might be wished.

Railroad repair shops and enginehouses are greatly in debt to the electric storage battery truck as a means for transporting material of all kinds from one department to another promptly and at a low cost. Second only to the scientific layout of shops, departments, machinery and equipment, is the need for wide, clear passage-ways and rugged, reliable, power-operated trucks. Hard, smooth walks should connect all shops and buildings and inside the shops passage-ways from one department to another should be kept clear. Some

New England Increases Opposed

One Full-Crew Law Repealed

Railroad Shop Transportation Systems

form of motor truck, operated either independently or with trailers, should be used for transporting locomotive parts and other material from one place to another. While other forms of motive power may be used, the electric storage battery truck, on account of its ease of operation, reliability and relatively low cost, has won high favor for this purpose. Not only should all possible hand trucking be eliminated but careless, irregular operation of motor trucks should also be discouraged. In many shops a schedule of truck operation has been installed whereby the trucks leave certain points at specified times; for example, every hour. This scheduling greatly facilitates the movement of material and in many cases has been developed to such a state that the shop may accurately be said to have a transportation system. As a means of obtaining more economical shop operation and increasing capacity, railway shop managers can hardly do better than attend to the construction or improvement of walks and passage-ways between shops and outline systematic shop transportation systems. The advantages consist not only in moving material at a reduced labor cost, but the actual production of individual departments will be increased. As soon as a machine part has one operation completed, it should be moved promptly to the next machine. This accomplishes two purposes; it shows the man who has just completed the operation that the part is needed and it enables the man who is to perform the next operation to see what work is ahead of him. No man is going to speed up his production if he sees only a little work ahead which can be completed in a short time. The result of promptly moving material and keeping work always ahead of the men will be a surprisingly large increase in shop output.

The retirement of William Hood from active service as chief engineer of the Southern Pacific, as noted elsewhere in this issue, marks the passing of a period

William Hood, Railroad Builder

in American railway history. William Hood has been a railway builder and his principal activities have been in that portion of the United States where pioneer railroading has had its longest lease of life. The railway engineer of the newer type studies the railroads as a field for more intensive development. Mr. Hood stands foremost among those who studied the undeveloped country as a place to build railroads. His career has been one of unusual human interest, notwithstanding the fact that his entire active railway service of over half a century has been devoted to one property. Of particular note is the fact that it commenced in 1867 with employment in a minor capacity on the construction of the Central Pacific through the Sierra Nevadas during the drive to complete the first transcontinental line. This initial section of the present Pacific system of the Southern Pacific was then only 90 miles long and the 7,000 miles of line which have since been added to the Pacific system were built largely under his direction, for whether he was locating engineer, assistant chief engineer, or chief engineer, the position he occupied for the last 37 years, his place was always out on the line where the location was being fitted to the country. Mr. Hood has always been a leader in that school of railway men who believe in the gospel of "It can be done." By the same token he has been no respecter of the conventional when it came to the selection of the method. The Lucin cut-off testifies emphatically to this and to his courageous loyalty to his established convictions. His particular value to his employers may be ascribed primarily to his profound knowledge of the detailed topography of the territory naturally tributary to the Southern Pacific lines. This made him a tower of strength in the days of competitive railway building and of particular economic value in the later days of more conservative railway projec-

tion. With the virtual closing of the period of great railway extensions in this country, Mr. Hood has earned a well merited retirement with his work completed.

Patience Needed in Rate Readjustment

THE OPINION is quite commonly held, particularly among people whose impressions and knowledge of railroad conditions are somewhat more general than those they hold regarding their own business, for example, that high freight rates are a very important, if not the most important factor in, or cause of, the general business depression which is attending our efforts to get readjusted from wartime to more normal conditions. Herbert Hoover, Secretary of Commerce, is one of the most prominent of those whose remarks, at least as quoted or reflected in the newspapers, would tend to create such an impression. President Harding is understood to have expressed similar views in his talks to newspaper men and such an impression might easily be gained from his address at the opening of Congress. We are not aware, however, that either of these gentlemen has expressed himself specifically on the question which is being much discussed as to whether rate reductions should precede or should merely be expected to follow important reductions in the operating costs which are the cause for the high rates.

Mr. Hoover's address before the United States Chamber of Commerce at Atlantic City last week indicates that perhaps he is less radical or less impatient on the subject than a mere statement that "rates are too high" might indicate. He refers to "complaints" that the latest increase in rates is stifling production, and he says "we must look forward to *ultimate* reductions in rates if the economic levels of the country are to find an equilibrium," but that is quite different from the demand being made in some quarters for an *immediate* reduction in rates as the primary requisite of the situation.

Since Mr. Hoover is so looked to as an oracle we should like very much to see him develop a little further the thought he expressed in saying, "Part of the bitterness of the situation arises from the inequalities in the progress of these readjustments in the different walks of life and in different branches of industry." To illustrate this he presented a table comparing recent commodity and labor indexes as compared with a 100 pre-war basis (apparently 1913) which showed that while railroad receipts per ton-mile have increased to 166, farm prices for crops are now at 115, farm prices for animals 123, wholesale food 150 and retail food 156, while building materials are 212, the New York Industrial Commission wage index is 212 and the Department of Labor union wage index is 199. He omits the Department of Labor index of wholesale prices, which was 162 for March, and we believe it is generally agreed that retail prices have fallen less than the wholesale prices. This table would seem to indicate that the freight rates are not so far out of line as to prove that they are the chief factor in the situation. It indicates that the producers of farm products, whose prices are fixed by the market without much reference to cost, are at present less successful than other industries in passing their costs along to the consumer, but we fail to find in it any argument that the railroads, that for 28 months were specifically limited to their pre-war profits and are now as a whole earning less than their operating expenses, should be the first to hasten to the aid of the farmers. The idea that they should is undoubtedly due to the fact that we have got into the habit of regulating freight rates while we have not developed to any great extent a practice of regulating prices, although to attempt to regulate prices through the medium of freight rates is to try to make the tail wag the dog. We refrain from saying that the farmer "got his" during the war,

while the railroads did not, because we are aware of his claim that the guaranteed price of wheat, which most people think represented a large profit, in reality represented a restriction, just as railroad men know that their guaranty, which the farmer thinks represented a huge profit, was in reality a restriction.

Possibly if we had an all-powerful Interstate Commerce Commission with a jurisdiction as broad as its name instead of being restricted mainly to the transportation side of commerce, it might proceed to correct the discrimination indicated by Mr. Hoover's table by ordering a general reduction of wages, a smaller reduction in wholesale and retail prices, somewhat less of a reduction in freight rates and perhaps an increase in the prices of farm products. Undoubtedly if every one knew that everybody else were to have his wages or prices cut he would soon discover that his own compensation could stand a cut of similar proportions, because of the increased purchasing power of his money, but it would seem rather hard to ask the last man to have his units of income inflated begin the process of deflation. Prices and wages have for several years kept a couple of jumps ahead of the increases in freight rates. The fact that the governmental policy which postponed the latest advance until some of the other prices had begun to fall naturally magnified the effect of the rate increase and leads to irritation but does not change the fact that freight rates are not relatively high.

Mr. Hoover questions "the continued use of an emergency horizontal basis of rate increases" and says that "even though the same total income must be earned by the railways there must be a commodity and class readjustment in rates both in the interest of the community and the railways themselves."

He adds that such a readjustment was forecast by the Interstate Commerce Commission as a necessity at the time of the rate increase and he might have added that no one disputes his point, except where it is made in total disregard of the cost of performing the service.

Limitations on Economical Speed of Trains

IN AN ARTICLE elsewhere in this issue, the effects of increasing running speeds on the energy required to perform a given train movement is discussed by G. S. Chiles and R. G. Kelley, whose conclusions are based on the results obtained in the University of Illinois train resistance tests. There has been some reluctance to accept the results of these tests so far as they apply to low speeds because in road tests conducted primarily for tonnage rating purposes or to study locomotive performance, other unmeasured variables have masked the effects of any tendency toward increasing train resistance for speed increases from five to fifteen or twenty miles an hour which might have existed. Considering the accuracy with which the University of Illinois test data were obtained and the care used in arriving at the conclusions stated, it seems probable that were a sufficiently large number of train movements considered to average out the effect of variable weather conditions and differences in the condition of equipment, the effect of speed increases in increasing train resistance would be evident within the common rates of freight train speeds. In any attempt to determine the most economical freight train speed this tendency cannot safely be dismissed without consideration.

Another factor which must also be taken into account is the characteristics of the locomotive itself. In most discussions of steam locomotive capacity there is a tendency to place great stress on its horsepower characteristics. From an engineering standpoint this may be justified, and in the case of passenger locomotives where the maintenance of schedules requires the

operation of the locomotive to its full capacity at high speeds, the horsepower is a practical unit for measuring capacity. In the case of freight locomotives, however, the horsepower unit is misleading. By inference it leads to the erroneous assumption that full power capacity may be utilized advantageously irrespective of whether it be attained at low speed with a high tractive effort or at high speed with a low tractive effort.

The full horsepower capacity of modern freight locomotives will probably not be reached at speeds much under 30 to 35 miles an hour and in operating to capacity the most economical fuel rate will not be reached short of these speeds. Now, considering the utilization of the locomotive purely from the standpoint of the amount of work produced per unit of distance rather than per unit of time, it will be found that a given tractive effort may be maintained with a materially smaller coal consumption per mile at speeds considerably below the maximum speed that may be attainable with that tractive effort.

This matter is of importance in considering the economical speed of freight trains because of the fact that the conditions which fix the maximum tonnage usually apply for a comparatively small portion of the total distance over an operating district and hence, if the full horsepower capacity of the locomotive is to be utilized with the reduced tractive effort required over the remaining portions of the district it can only be done by increasing the speed, frequently well beyond the point at which overtime ceases. From the standpoint of operating expenses such speeds are detrimental because of the fact that above, say, ten miles an hour the lower the speed at which a given tractive effort is maintained the lower the cost of fuel per 1,000 gross ton-miles. For instance, one modern Mikado type locomotive capable of developing about 65 per cent of its maximum tractive effort at a speed of 25 miles an hour can do so only at the expense of a 36 per cent increase in the amount of fuel per unit of work produced, over the amount required to maintain the same tractive effort at 20 miles an hour, while the increase in the fuel consumption per unit of work required to maintain the maximum speed of 25 miles an hour over that required to operate at 15 miles an hour is about 55 per cent. This fact is well recognized in every-day operating practice in the attempts which are made to determine the most economical cut-offs for a given set of conditions, rather than the cut-off which will produce the highest speed. In discussions of locomotive capacity in terms of horsepower, however, it is not infrequently overlooked.

The same effect on fuel consumption, though to a less marked degree, will be produced if the running speed of a freight locomotive is increased at the expense of the train load, that is, by keeping the cut-off within the economical range, which will probably be around 50 per cent in most cases. In a range of speed from 10 to 25 miles an hour under these conditions, there will probably be an increase in the cost of fuel per unit of work performed of 10 or 15 per cent. Whether running speeds higher than those now commonly employed are obtained by working the locomotive nearer to its horsepower capacity or by reducing the tonnage and maintaining the most economical cut-off, there is likely to be a material increase in the coal consumption per unit of work performed.

The tendency of speed increases to increase both the fuel cost per unit of work and the amount of work to be done for a given gross ton-mile movement creates a direct charge against the saving in wage costs effected by reducing overtime which may make it cheaper to pay some overtime if high running speeds are necessary for its complete elimination. In any case, it is evident that reductions in crew overtime can best be obtained by providing facilities, both road and terminal, by which delays may be eliminated. Fuel as well as wage costs will thus be reduced and there will not be the

increase in enginehouse expense which would follow the increase in train mileage made necessary if the higher running speeds were obtained by tonnage reductions.

The "Fancy" Salaries of Railway Officers

IN THE indictments which somebody always is drawing against the managements of the railways there always is included the charge that they pay their officers excessive salaries. Hardly a day passes that somebody does not publicly and solemnly allege that if the railways would eliminate the "waste" due to "fancy" salaries they could pay their employees more or reduce their rates. The other day a member of Congress introduced a bill to provide that in future no railway company pay any officer more than \$15,000 a year without the previous approval of the Interstate Commerce Commission.

Of all the asinine charges made against the managements of the railways this one about excessive salaries is perhaps the most asinine. It may cause some astonishment to those who believe the railways waste large amounts in salaries to be told that if in the year 1920 they had not paid a dollar of salary to any of their 22,000 general and divisional officers their total payroll would have been only 2.5 per cent less than it was, and their total operating expenses would have been only 1.7 per cent less than they were.

All of the alleged "fancy" salaries are included in those paid to the general officers. The general officers include all the chairmen, presidents, vice-presidents, general managers, traffic managers, and so on; and many people believe that since some of these officers receive \$50,000 to \$75,000 a year the total amount paid to them is enormous and the burden imposed on the railways and the public very great. People who think thus will be surprised to learn the statistics of the Interstate Commerce Commission show that if the railways in the year 1920 had not paid a dollar of salary to any of their general officers their operating expenses would have been less than six-tenths of one per cent less than they were. To state the matter in another way, if not a dollar of salary had been paid to any general officer the operating expenses would have been 99.42 per cent as much as they actually were.

Since the extravagant talk about railway salaries is always being renewed, we have had compiled and publish in

single officer the total expenses would have been from 97.8 per cent to 98.4 per cent of what they actually were.

In 1916 and 1917 salaries of all officers were 1.4 per cent of the total earnings; in 1918, 1.3 per cent, and in 1919 and 1920, 1.5 per cent. In other words, in these years, out of each dollar that the public paid for all kinds of railroad transportation, freight, passenger, mail and express, the officers as a whole received from 1.3 cents to 1½ cents. In 1920 out of each 100 cents the public paid the railways, the general officers, including all those with alleged "fancy" salaries, received 7.5 mills.

In recent discussions of needed reductions of the railroad payroll, it repeatedly has been suggested that if wages are to be reduced the salaries of officers should be reduced in proportion. Let us see, then, what have been the relative increases in salaries, on the one hand, and wages on the other, since 1916. In 1916 the average salary of a general officer was \$4,508, and in 1920 it was \$5,542, an increase of 20.7 per cent. In 1916 the average salary of a division officer was \$1,998, and in 1920 it was \$3,319, an increase of 66.1 per cent. The average pay of passenger locomotive engineers and motormen in 1920 was \$3,310, or only \$9 less than that of division officers. Between 1916 and 1920, however, the average compensation of all employees increased 104 per cent, and it is now almost 114 per cent more than in 1916. Since the advances in salaries of officers as a whole have been relatively less than half as great as in the wages of employees, and have not at any time even approached the increases in the cost of living, while the advances in wages have exceeded the increases in the cost of living, it is wholly unfair to suggest that if wages are to be reduced salaries shall be reduced in the same proportion.

The only year for which the salaries of all officers receiving \$20,000 or more have ever been published is 1917. The figures for that year showed there were 200 officers who received this much or more and that their total compensation amounted to \$6,644,074. This was 2.3 mills out of each dollar of operating expense the railways incurred in that year and 1.6 mills out of each dollar they earned. There were only 29 officers who received \$50,000 or more and their total compensation was \$1,900,000. This was two-thirds of one mill out of each dollar of operating expense the railways incurred and one-half of one mill out of each dollar of their total earnings. The ratios of the salaries amounting to \$20,000 or more and of those amounting to \$50,000 or more

	1916	1917	1918	1919	1920
Total compensation all officers and employees.....	\$1,468,576.394	\$1,739,482,142	\$2,613,813,351	\$2,843,128,432	\$3,698,216,351
Total compensation all officers.....	\$53,273,758	\$57,346,610	\$65,551,316	\$77,435,168	\$92,460,835
Per cent of officers' compensation to total compensation all employees.....	3.6	3.9	2.5	2.7	2.5
Total operating expenses.....	\$2,426,250,521	\$2,829,325,124	\$3,982,068,197	\$4,419,441,949	\$5,826,197,474
Per cent officers' compensation to total operating expenses....	2.2	2.0	1.6	1.7	1.7
Gross earnings.....	\$3,691,065,217	\$4,014,142,747	\$4,880,933,480	\$5,184,064,221	\$6,225,402,763
Per cent officers' compensation to gross earnings.....	1.4	1.4	1.3	1.5	1.5

an accompanying table statistics showing the total compensation paid to railway officers in each of the years 1916 to 1920 inclusive, together with the total compensation paid to all officers and employees, the total operating expenses incurred, and the total earnings earned in these years.

In 1916 the salaries of all officers, general and divisional, were 3.6 per cent of the total payroll (including both the salaries of officers and the wages of employees); in 1917, 3.9 per cent; in 1918, 2.5 per cent; in 1919, 2.7 per cent, and in 1920, 2.5 per cent. In other words, in these years the wages of the employees amounted to from 96.1 to 97½ per cent of the total payroll.

In 1916 the salaries of all officers were 2.2 per cent of the total operating expenses; in 1917, 2 per cent; in 1918, 1.6 per cent; in 1919 and 1920, 1.7 per cent. In other words, if not a dollar of salary had been paid in these years to a

total operating expenses and total earnings in 1920 undoubtedly were smaller than they were in 1917.

These figures demonstrate conclusively that no reduction of salaries that conceivably could be made would have any perceptible effect in reducing the operating expenses that the railways incur or the rates that they must charge. The fact is that salaries as a whole in the railway business are low as compared with those paid in other industries, and that even the largest salaries paid are small compared with the earnings of successful men in other lines of professional and business activity. When people talk about salaries of \$25,000 to \$75,000 a year in the railroad business being excessive, they do not stop to think that successful men in almost all other lines of business make larger incomes than this. There is hardly an opera star or a moving picture star who does not earn much more. The public goes to the movies night

after night and indirectly pays Charlie Chaplin many times as much for getting his face bespattered with pie as it pays any man in America for managing a great railroad system.

How long would men of ability and ambition enter or stay in the railroad business if they knew that there was no opportunity in it to earn incomes comparable with those earned in other lines of professional and business activity? Hardly a month passes when men of this kind do not leave the railroads to accept higher salaries than the railways will pay. Remove all the large prizes from the business and within a generation there will hardly be left in it a man of ambition and ability. But it is absolutely necessary to have such men in important positions if the railroads are to be efficiently developed and managed; and if they are not efficiently developed and managed their service is bound constantly to grow worse and more expensive to the public.

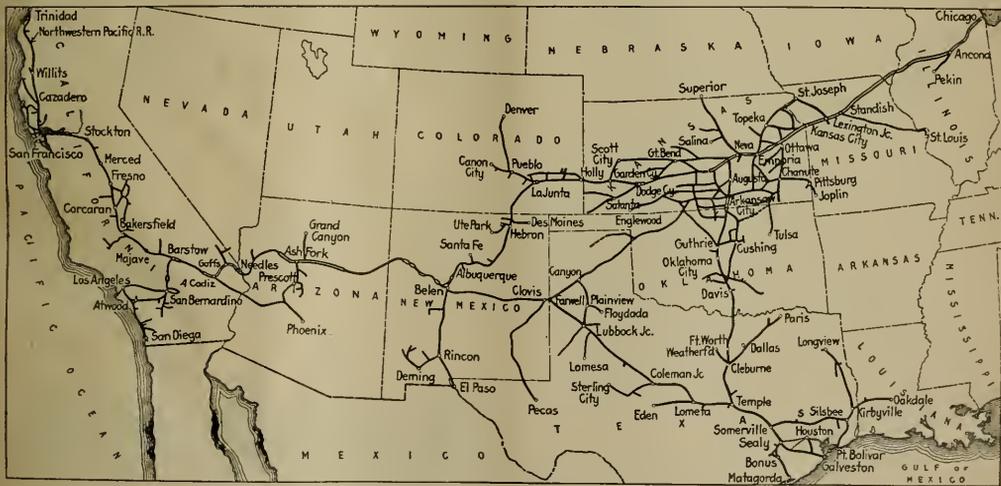
Atchison, Topeka & Santa Fe

THE ANNUAL REPORT of the Atchison, Topeka & Santa Fe for 1920 and the figures of operation of that system for the first two months of the present year furnish about the most effective reply that we have yet seen to the fanciful and misleading propaganda which the labor economist, W. Jt Lauck, has been expounding for the past few weeks. Mr. Lauck has secured wide circulation for the published statements containing his charges of inefficiency in railroad opera-

ferred and 6 per cent on its common stock, which, in 1920, amounted to \$19,649,795. These figures characterize the Santa Fe as very much of an exception.

The Santa Fe is recognized to be almost all that a railroad property ought to be. It is built through a territory of great traffic possibilities; its roadbed and equipment are in exceptionally good shape despite the deferred maintenance of the federal control period. The system is efficiently operated and the character of its high grade service, both freight and passenger, is too well known to need comment. The question that might arise is what is the system doing at present. Perusal of the monthly reports to the Interstate Commerce Commission shows that for the first two months of the present year it had a net railway operating deficit. It did not even earn its fixed charges, still less its dividends.

We submit that the fact that a road like this—one of the very few which earned a net for the government during federal control and which in 1920 earned enough from operations to have paid its usual dividends—failed to earn its fixed charges in the first two months of 1921, is most disconcerting. It indicates how really serious the railway situation has become and shows how prompt must be the measures taken to remedy it. We are nevertheless optimistic on the railway situation in general and particularly on the Santa Fe. Measures to remedy the situation in general are being taken by the one man who can probably do the most toward securing results, namely, President Harding. There can, of course, be no question that whatever improvement may be made in the



The Atchison, Topeka & Santa Fe

tion, which he has been issuing in his attempts to divert the public's attention from the real issues before the Labor Board.

The Santa Fe system is one of the very few properties that earned a net for the government during the federal control period. Its net railway operating income, as defined in the federal control act, for the 26 months of federal control, as stated on the federal books, was \$98,919,277, whereas the standard return for the federal control period was about \$95,000,000. This earning power was further evidenced during the year 1920. The net railway operating income for 1920, that is, without taking into consideration the standard return for January and February and the guaranty for the guaranty period, was \$24,005,615. In other words, the system would have been able, without the standard return or the guaranty, to pay the usual 5 per cent dividends on its pre-

ferred and in business, conditions will be promptly reflected in Santa Fe earnings.

The net railway operating income for operations in 1920 was given above as \$24,005,615. This compared with \$38,035,651 in 1919. The explanation should be made, however, that for the purpose of approximating the amount of the maintenance to which the company was entitled under the Transportation Act, it set up an equalization reserve for maintenance. In creating this reserve there was charged to maintenance of way and structures and maintenance of equipment an amount of \$13,374,956 in excess of the expenditures for such purposes and the normal depreciation and retirement charges usually made by the company. "The setting up of these equalization accounts, it is noted in the annual report, which has not heretofore been customary for this company, is

reflected in the amount of \$14,030,036 in the decreases in the net railway operating income (corporate and federal) for the year 1920.¹⁷

The corporate income account for the year, in which is taken into consideration the standard return for January and February and the guaranty for the guaranty period, shows a net corporate income of \$37,634,752 as compared with \$43,098,658 in 1919, or \$28,348,433 in 1918. The usual dividends of 5 per cent were paid on the preferred stock and 7 per cent on the common. These dividends with the addition of certain small appropriations to fuel reserve and sinking funds amounted to \$19,753,292, so that there was a surplus carried to profit and loss amounting to \$17,881,460.

The Santa Fe system in 1920 carried 36,850,553 tons of freight as compared with 31,811,576 in 1919. The revenue ton-mileage was 12,806,128,501 in 1920; in 1919, 11,931,107,874. The Santa Fe secures an unusually long haul on the freight it carries; in 1920 the average haul was 348 miles; in 1919 it was 375. Although the business done in 1920 was in excess of that done in 1919, it was about on a par with that done in previous good years. During the latter part of 1919 and up to the latter part of 1920, with the exception, of course, of the period last April, when operations were handicapped by the outlaw strike, the Santa Fe was handling a tremendous volume of freight traffic. This traffic did not continue during the last four months of 1920 when the road was operating on its own. The falling off since November has been especially marked, the traffic handled in December, January, etc., being at a low level.

The Santa Fe system as a whole comprises 11,675 miles of line. Covering such an extended area as it does, it is to be expected that its traffic should be well diversified. In 1920 products of agriculture made up 20.83 per cent of the total tonnage; products of animals, 4.08 per cent; products of mines, 35 per cent; products of forests, 7.75 per cent, and manufactures and miscellaneous, 27.39 per cent. Because of its well located line in the San Joaquin Valley of California and its many feeders in the region inland from Los Angeles the system is in an especially favorable position for handling the many varied products of that territory, and because of its direct line to the east it is able to offer a fast service on which it gets a long haul. The road's operations are not characterized, however, by heavy train loads or by a high figure of ton-miles daily per car. The net tons per train—revenue and non-revenue freight—in 1920 were 569. This compared with 557 in 1919 and represents a progressive increase over many years, the average train load in 1916 being 442; in 1917, 468, etc. In 1920 the average load per loaded car was 23.12 as compared with 22.23 in 1919. The average revenue per ton in 1920 was \$4.57; per ton mile 1.316 cents. The average haul was, as noted above, 348 miles.

The story of the expansion and improvement of the Santa Fe for the past two decades is one of the epics of American railroading. This expansion and improvement was continued in a degree during 1920. The mileage of the system at the beginning of the year was 11,483, at the end of the year, 11,674, an increase of 191 miles. This increase was brought about principally through the following developments: The Buffalo Northwestern, extending from Waynoka, Woods County, Okla., to Buffalo, Harper County, 51 miles, acquired while partly completed, was finished and placed in operation July 1. The North Texas & Santa Fe, Shattuck, Ellis County, Okla., to Spearman, Hansford County, Texas, 85 miles, was placed in operation July 1. Extensions of the Minkler Southern from Porterville, Calif., to Ducor, 12 miles, and from Oil Junction to Bakersfield, 3 miles, were placed in operation July 15. Trackage rights over the Southern Pacific between Ducor and Oil Junction, secured in a contract effective also July 15, give the Minkler Southern its necessary outlet.

Considerable improvement has also been effected in the way of equipment. The total number of locomotives owned on December 31, 1920, was 2,188. The average tractive effort of these locomotives was 37,898 lb. as compared with an average tractive effort of locomotives on January 1, 1920, of 36,741 lb., an increase of 3.1 per cent during the year. The Santa Fe was allocated 2,700 forty-ton double sheathed box cars by the Railroad Administration, which equipment was financed through the equipment trust agreement made between the Director-General, the Guaranty Trust Company and the railroad. None of the standard locomotives were allocated to the Santa Fe system by the U. S. R. A. During 1920, however, orders were placed by the road for 30 heavy Mikado, 10 Santa Fe and 10 Mountain type locomotives and for 500 gondola and 2,500 refrigerator cars. These orders have since been supplemented by orders placed in March, this year, for 1,300 gondola cars. The Santa Fe is noted for being a careful buyer of equipment, more particularly because it generally places an order or two in times of depression when prices are at their lowest. It is significant, therefore, that the order mentioned as placed in March this year is one of the very few which have been placed by railroads since January 1, 1921.

The figures for operation for 1920 as compared with 1919 are given as follows:

	1920	1919
Operating revenues—		
Freight	\$168,472,129	\$144,743,867
Passenger	63,473,165	52,982,906
Total operating revenues	254,249,002	209,500,004
Operating expenses—		
Maintenance of way and structures	*48,832,692	29,322,158
Maintenance of equipment	*63,039,846	46,020,979
Traffic	3,173,385	1,976,515
Transportation	98,515,309	75,529,553
General	5,216,198	4,421,588
Total operating expenses	218,077,115	156,642,823
Net operating revenue	36,171,887	52,857,181
Railway tax accruals	12,004,141	12,510,735
Railway operating income	24,117,711	40,304,204
Net railway operating income	24,005,615	38,035,651

* Including equalization charges.

The corporate income account is given in brief as follows:

	1920	1919
Standard return, 1919		\$44,615,087
Standard return, Jan. and Feb., 1920	\$7,699,531	
Guaranty, Mar. 1 to Aug. 31	22,533,225	
Operating income, Sept. 1 to Dec. 31	12,983,725	
Other income	9,842,116	15,100,116
Gross income	53,078,597	59,715,203
Net income	37,634,753	43,098,658
Dividends—		
Preferred, 5 per cent	6,208,685	6,208,685
Common 6 per cent	13,441,110	13,351,695
Surplus	17,881,460	23,438,819



Photo by Keystone

British Reinforcements Arriving at Kingstown, Ireland



The Enginehouse and Machine Shop Layout

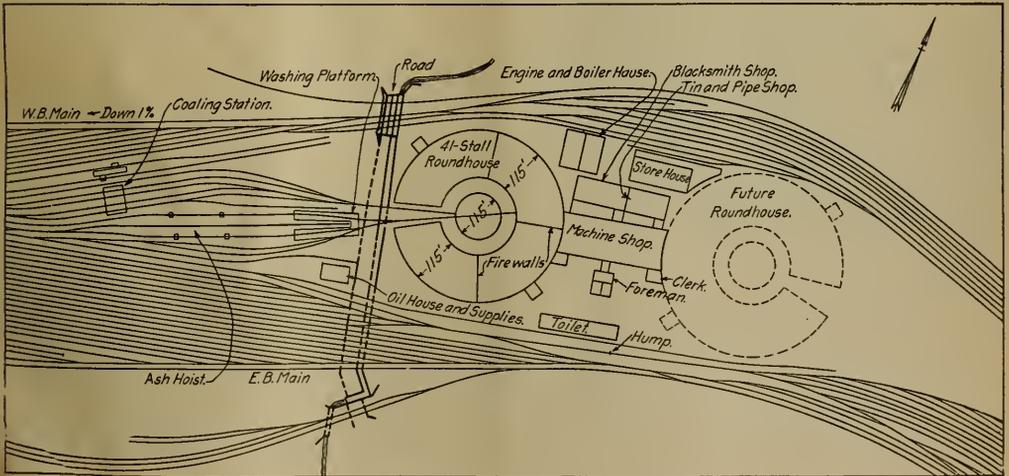
Improving Terminals for Mallet Operation

Facilities for Norfolk & Western at Roanoke, Va., Form
Part of Progressive Development Plan

AS A STEP in the provision of more adequate terminal facilities, the Norfolk & Western has recently completed and put into operation three 115-ft. enginehouses with complementary buildings. These structures are of modern type and construction and are designed primarily for the housing and care of Mallet locomotives. The completion of the enginehouses is another step farther in a long

ments at the latter location are by far the most comprehensive in their scope and because of that fact as well as the engineering and operating conditions created by the geographical location of the terminal and yard, they form the most interesting of the three developments.

The new structures have been built about two-thirds of a mile west of the existing engine facilities. This location has



Layout of the New Engine Terminal at Schaefer's Crossing

term program of development of yard and terminal facilities which was started previous to government control, carried forward to some degree during that period and since continued progressively at Roanoke, Va., Bristol, Tenn., and Shenandoah, Va. The work at the latter two places is practically completed in its final form. The work at Roanoke is, however, completed only up to and including the fourth step of what might be termed a six-step program. The improve-

ments at the latter location are by far the most comprehensive in their scope and because of that fact as well as the engineering and operating conditions created by the geographical location of the terminal and yard, they form the most interesting of the three developments. The new structures have been built about two-thirds of a mile west of the existing engine facilities. This location has

of roundhouse operation. A large machine shop will connect the two enginehouses, while the enginehouses and machine shop as a unit will be flanked by supporting structures, such as a power plant, wheel, forge and tool shops, offices, oil storage, lavatories and locker rooms, etc. Coal is supplied by means of a 1,200-ton Roberts & Schaefer coaling plant, now in full operation.

The yard work, of which little has been done so far, will consist of some re-arrangement of the present tracks, but chiefly of the extension of practically all of the existing yards in order to provide a minimum capacity of 100 cars per track. The old engine facilities at West Roanoke will be abandoned and the area so obtained utilized in the extension of the yards. The four steps so far completed, or about to be completed, include the construction of the coaling plant, the enginehouse, a 2,000,000-gal. water storage reservoir, a pump house, a water treating plant and parts of the supporting structures necessary to meet immediate needs. The fifth and sixth steps will consist of the completion of the second enginehouse and the remaining portions of the other buildings and shops and the extension of the yard tracks along with the necessary re-arrangement of the tracks caused by the elimination of the old enginehouses.

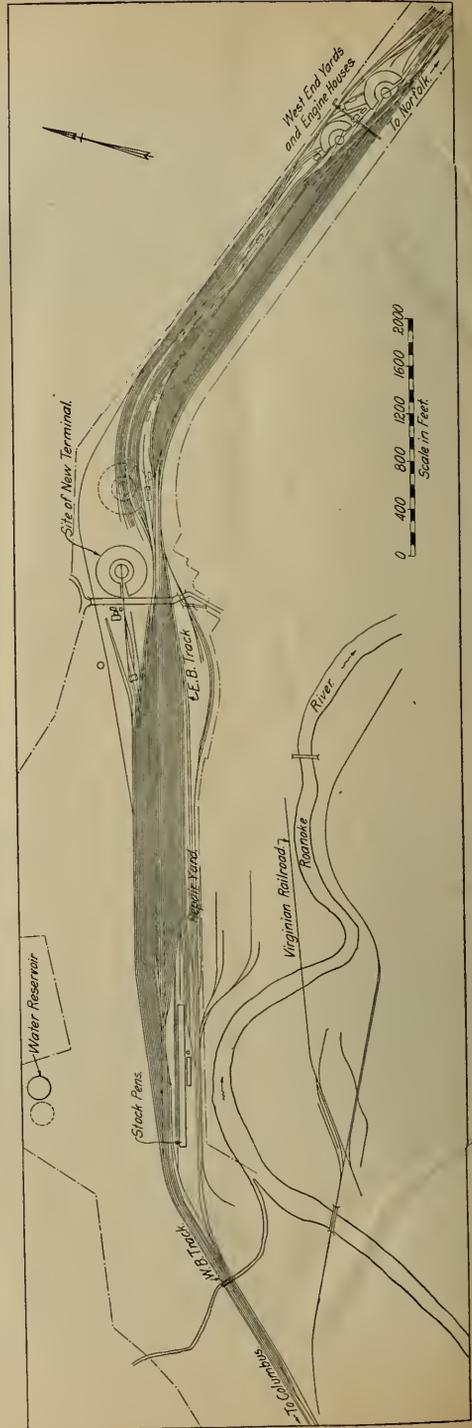
The Trend of the Yard Development

The Norfolk & Western, in passing through the city of Roanoke, follows the line of a valley located between surrounding low-lying hills upon which the city proper is built.



The Concrete Viaduct Over Schaefer's Crossing

From a point about two miles west of the passenger station and continuing west, the right of way practically parallels the low hills on one side and the Roanoke river on the other. In the earlier days, the yard developments, such as there were, were to the east and to the west of Jefferson street, one of the main thoroughfares of the city adjoining the passenger station. With subsequent increased traffic, additional yard and terminal facilities were made chiefly to the west of the station, the other facilities being used for car and locomotive shops. This development, however, was more of an end-to-end increase because of the limiting conditions imposed by the growth of the city on both sides of the railway's right of way and, to some extent, by the topographical conditions. This resulted in making the west end yards a string of small yards with capacities ranging from 340 cars up to 1,215 cars, which extended over a length of approximately five miles. The two enginehouses remaining from the older development work have been kept in operation and will probably be retained for this purpose until the completion of the second new house. These houses have respectively 23 stalls, 100 ft. in length and 20 stalls, 71 ft. in length.



The West End Yards of the Norfolk & Western at Roanoke, Va.

The city of Roanoke forms the receiving and dispatching center for five operating districts. These include the lines to and from Norfolk, Va., Hagerstown, Md., Winston-Salem, N. C., Bristol, Tenn., and Bluefield, W. Va. The double track main line extends from Columbus, Ohio, on the west through Bluefield and Roanoke to Norfolk or more strictly speaking to Lamberts Point, the deep water terminal of the Norfolk & Western. The traffic to and from Bristol and Bluefield is considered as a "west" movement, the remaining

movement through the yard from west to east follows the so-called south half of the yard. Freight from Bristol consists chiefly of lumber, merchandise and live stock, while the freight from the north, i. e., from Hagerstown, consists very largely of merchandise consigned to Bristol and other points farther south and to the west. Other freight from the north comes via water to Lamberts Point and moves chiefly west through Roanoke, although there is a small southern distribution. Freight from Winston-Salem generally moves



Showing the Interesting Construction of the Inner Circle

districts being classified as north, east and south movements. Thus, Roanoke actually forms the neck of a bottle and during normal freight hauling periods, a passenger or freight train is received or dispatched on an average of about every eight to nine minutes during the 24 hours. The engine turnover is approximately 180 locomotives a day, of which about 60 per cent are Mallets.

The movement from west to east is chiefly coal from the fields west of Bluefield, a majority of the trains entering

west. In spite of the large westward merchandise movement, a large proportion of the total westward movement is empty coal cars. Each of these movements, merchandise, empty coal cars, etc., is received and handled through the Roanoke yards and with a few exceptions the movement is continuously in the direction that these cars are to go.

Broadly speaking, the yards are divided into north and south sections, that is westbound traffic both on the main line and in its movement through the yards follows the more



A String of Mallet Locomotives at the Old Terminal

Roanoke being routed directly to Lamberts Point in solid trains that require little or no change in their make-up while in the Roanoke yards. The trains are received and dispatched from a receiving yard now containing 11 tracks with a capacity of 840 cars. Miscellaneous coal, merchandise and time freight form the balance of the traffic from Bluefield and other points west on the main line. This is received in a four-track yard from which it is humped into a centrally-located yard having 19 tracks of 1,215 cars capacity. The

northerly tracks. In this way back-up movements are eliminated as far as possible and with the proposed extension it will not be necessary to break trains. In addition, the location of the new engine facilities, plus the more modern and increased equipment there, will permit better housing and care of the locomotives as well as a probable decrease in the time required for their turnover.

The complete rehabilitation plans for this work will eliminate the two old enginehouses, as stated, as well as their

9-in. by 18-in., and 12-in. by 18-in. rafters supported on the outer walls and two circumferential lines of 12-in. by 12-in. posts. The second or super monitor is also carried by this construction and extends 12 ft. each way from the center post of the monitor section, making it 24 ft. wide over all and giving a total clearance at the center post of 43 ft. 3 in. This second monitor also carries a continuous ventilator with clear openings on two sides 1 ft. 4 in. in height. The main ventilation is provided, however, by means of the smaller monitor which has opposed openings 5 ft. high fitted with louvers.

Additional ventilation as well as light is obtained by a row of pivoted sash running around the entire inner circle of the monitor section and by pivoted sections in the sash



One of Old West End Enginehouses

windows, forming a part of the rear walls. With a distance of 30 ft. 7 $\frac{3}{4}$ in. from center to center of pilasters and a clearance of 31 ft. 2 in., ample opportunity is afforded for a large light area. This has been accomplished through the construction of extra large sash windows covering almost the entire available space. The total width of each installation, consisting of three sections, is 21 ft. 10 $\frac{1}{2}$ in. with minimum and maximum heights of windows of 22 ft. 6 in. and 24 ft. 11 in. respectively. The entrance doors, with clear openings of 13 ft. 11 $\frac{3}{8}$ in. and clearances of 17 ft. 7 in. above the base of rail, have been built to correspond with the general lighting plan. Each half of the door contains 20 panels of glass, 11 in. by 18 in. in size, while two smaller sections of sash, consisting of six panels, each of the same size glass, have been installed in the walls just over the doors.

The locomotive exhaust gases are carried off by means of 4-ft. by 15-ft. asbestos smoke jacks, this size being used in all of the stalls except the 12 stalls mentioned in reference to the change in roof structure. In these stalls large 12-ft. by 15-ft. smoke jacks have been installed since it was necessary to raise them considerably higher than usual. This was necessitated because of the installation of a 10-ton traveling crane.

In order to accommodate this crane, the use of which was decided upon after the structure was under construction, the center posts of the monitor section were removed throughout the 12 stalls and another line set up directly under the outer edge of the secondary monitor. This provided an open bay 43 ft. wide along the center line of the stall and necessitated the use of a truss to support the roof structure. The crane runways were supported on additional posts fastened to the original line of posts under the inner circle of the main monitor section and the new line just mentioned. The clearance at the bottom of the truss was 28 ft. in this case. With the exception of this change in 12 of the 40 stalls, the superstructure is the same throughout, the roofing being of the built-up type mentioned, with tar and gravel roofing, all on a slope of $\frac{1}{4}$ in. per ft. All posts are supported on 2-ft.

6-in. square concrete foundations extending from 2 ft. to 6 ft. down into solid earth.

The Foundations Varied to Fit Conditions

Because of the wide irregularities of the earth contours at the site of the building over one half of it is on filled land, requiring up to 20 ft. of filling as a maximum. As a result it was necessary in about 20 stalls to support the walls on heavy 4-ft. by 6-ft. concrete piers placed under each pilaster. These piers in turn support reinforced concrete girders 2 ft. 6 in. in depth and 1 ft. 10 in. thick. The remainder of the house rests on solid concrete foundations carried down to solid earth. The irregular topography also had an effect on the design of the engine pits, the base of the pits on filled-in ground being made 10 ft. wide and reinforced with old rails in contrast to the pits of 8 ft. width used on firm ground. The latter pits were of mass construction. The engine pits, of which there is one for each track in the house, are 95 ft. long with 2-ft. by 5-ft. side walls poured integral with a base 1 ft. 3 in. thick which has been given the customary crown. The track is laid on two longitudinal lines of 12-in. by 12-in. timbers, the tops of which are 4 in. below the general floor level. A complete system of wheel pits following the same general idea regarding reinforcement and bearing area, etc., has been included in 8 of the 40 stalls. This layout consists of four complete sets of engine wheel drop pits, one set of which covers two tracks, two trailer pits for Mallet locomotives and two drop pits for tender trucks. The engine-house floor consists of 6 in. of limestone rock which is free from mud or clay and which has been sprinkled thoroughly and tamped as placed.

Pit drainage has been secured by giving the base of the pits a slope of 0.5 per cent toward the door end where they empty into a concrete trough 4 ft. wide just inside the en-



A Modern, Large Capacity Coaling Plant Rounds Out the Necessary Facilities

ginehouse doors. The major part of the roof drainage is toward the door end of the house and is emptied into the same concrete trough through down spouts. The drainage of the outer roof circle is handled in a similar manner, the trough in this case being on the outside of the building. Both arrangements are connected with a regular tile underground drain system.

The Second Enginehouse and Supporting Buildings

The second enginehouse, when completed, will be located 685 ft. center to center of turntables and to the east. It will also have 40 stalls constructed similarly to the first house except that their length will be 130 ft. As already stated, these two buildings will be connected into a unit by a machine shop 100 ft. wide and 250 ft. long, the center line of

which will correspond to the center line connecting the turntables. A standard gage track will be laid along this line, thus forming an extension to the stall tracks at each end. The shops will be equipped to handle all ordinary running repairs and, for the purpose of facilitating this work, a complete 5,000-lb. monorail crane system will be installed.

In cross-section, the machine shop is of the monitor type with three bays of approximately equal widths. The clearance of the side bays is 21 ft. and of the central bay 26 ft. 5 $\frac{3}{8}$ in. The side walls are of brick carried on concrete foundations, a form of construction similar to that of the enginehouse and one that is used practically throughout all of the buildings. The roof structure, however, is entirely different, being steel trusses supported on built-up steel posts. The monitor has a rise of 12 ft. 5 $\frac{3}{8}$ in. and, for the purpose of light and ventilation, is equipped on each side with two longitudinal rows of steel sash and wire glass windows, the upper row of which is hinged. As the sides of the monitor are inclined inward 60 deg. from the horizontal, it was necessary that the sash of the top row overlap those of the bottom and likewise that the bottom row overlap the extension of the roofing at the base of the monitor in order to prevent the rain from beating in. The roof drainage is not permitted to run down over the sash windows, galvanized iron gutters and down spouts being installed for that purpose. Lighting in the side walls is obtained by double rows of sash windows installed the full length of the building.

The design of the enginehouse layout has made it possible to secure a very compact arrangement of supporting buildings, such as offices, carpenter shop and store house, etc. With the exception of a 35-ft. by 200-ft. toilet and wash-room building and a 50-ft. by 60-ft. office building, the remainder of the terminal structures have been located just to the north of the machine shop and between the two enginehouses. The smaller shops, such as carpenter, pipe, forge, etc., will be housed in a 60-ft. by 230-ft. building, connected to the machine shop at the center by a tool room. The other two structures of the unit will consist, when completed, of a 60-ft. by 150-ft. store house and a 94-ft. by 94-ft. engine and boiler house. Heavy concrete pavements or runways will be laid between and connecting all of the structures and a system of tractors and trailers installed to handle the necessary stores and materials.

When completed, the store house will have a platform around three sides of the building with a ramp leading down from the platform level to the level of the concrete pavement between the various structures. The interior will be arranged with lines of racks, giving aisles 10 ft. wide over which will be hung trolley beams in order that stores materials may be handled by either traveling trolleys or by the electric trucks and trailers.

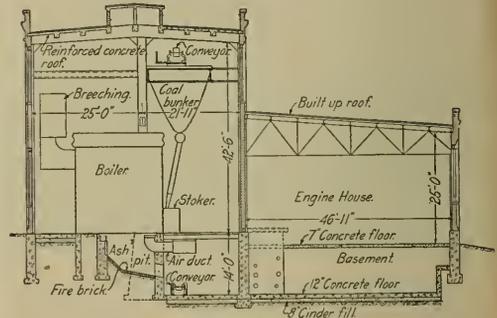
The engine and boiler house is of concrete construction practically throughout. The roof structure is supported on steel columns encased in brick while the roof proper has been built up of reinforced concrete roof beams and girders upon which concrete slabs have been laid. The present installation consists of four 300-h.p. boilers and an automatic coal and ash handling conveyor system. Coal, when delivered in cars, is elevated by this conveyor and dropped into parabolic hoppers which in turn feed it automatically to the boilers. Ashes are dropped into concrete pits underneath, where they are picked up by the conveyor and carried around to one end of the building and up to an ash storage bin.

A Large Capacity Water Supply System Installed

The Norfolk & Western has in the past purchased all of its water for both the East Roanoke and west end shops. However, owing to the restricted supply available for its use, it became necessary to furnish its own water at this new terminal. For this purpose a modern pumping unit was installed on the bank of the Roanoke river which supplies water

through an 18-in. main to a 2,000,000-gal. reservoir situated on a hilltop adjoining the railway's right of way. This reservoir, which consists of a large circular concrete tank with a baffle wall through the center to aid sedimentation, delivers water through about 3,800 ft. of 18-in. pipe to the new enginehouse, etc. Various piping arrangements have been installed in order that its flow may be directed to either a 100,000-gal. per hour water softening plant or, if so desired, direct to a 200,000-gal. concrete tank and thence to the numerous stand pipes. The flow can also be cut off from the reservoir proper and the water obtained directly from the pumping plant on the river site. The estimated consumption at this point is about 2,000,000 gal. per 24 hours.

The coal handling installation consists of a 1,200-ton re-



A Section Through the Power House

inforced concrete coaling plant of Roberts & Schaefer design, completely equipped with automatic bucket hoists and tram cars, a wet sand storage plant, a sand dryer and a coal crusher and cleaner for stoker coal. This plant serves six tracks, and is so located that a continuous movement of locomotives may be obtained direct from the receiving yards to the coaling plant, ash plant and washing platforms and into the roundhouse. The ash handling facilities consist of five hoists of a type whereby the ashes are dropped direct from the engine into buckets located in pits under the tracks. These buckets are then elevated by means of an inclined track and dumped automatically into open top cars on an adjoining track. Among the other facilities to be completed are an inspection pit serving two tracks and a concrete washing platform also serving a like number of tracks leading direct to the roundhouse.

The new facilities at Roanoke, Va., as well as those at Bristol and Shenandoah were designed by and erected under the direction of the engineering department of the Norfolk & Western, J. E. Crawford, chief engineer; W. P. Wiltsee, assistant engineer; F. P. Turner, engineer of bridges and buildings, and A. Bruner, assistant engineer in direct charge of the field work. The contractor doing the work was J. P. Pettyjohn & Co., Lynchburg, Va.

A PETITION has been filed with the Interstate Commerce Commission by F. B. Whitney, of Waukegan, Ill., as a railroad stockholder and a citizen of the United States, proposing the consideration by the commission for a plan of railroad consolidations through a limited number of transcontinental systems running in an east and west direction with roads running northerly and southerly as laterals, with particular reference to providing facilities for export and import trade. Mr. Whitney was formerly a member of the transportation committee of the American Manufacturers' Export Association.

Proposes C. P. R. Operate Canadian National

Searching Review of Canadian Crisis—Suggestion That Government Lines Be Handed Over to Canadian Pacific

LORD SHAUGHNESSY, chairman of the Canadian Pacific, has proposed to the Canadian Government that his road operate all of the principal Canadian lines, except the Grand Trunk, and that a contract for that purpose be negotiated. This proposal, as was noticed briefly in the *Railway Age* of April 29, page 1045, was embodied in a letter to Prime Minister Arthur Meighen, in a letter dated April 6, but not made public until April 24.

In the letter, Lord Shaughnessy refers to the fact that he made a similar proposal in 1917 which evidently the government did not care to entertain lest such a monopoly (real or supposed) would be rejected by the country. Now, however, the situation demands drastic action; for the present burden on the public treasuries amounts to about \$200,000 a day. He says that the Canadian Pacific has no concealed purposes in the matter. Indeed, the chairman is not sure that this plan would be approved either by the directors or the shareholders; but something must be done, and the loyal citizen cannot remain silent.

Following is Lord Shaughnessy's proposal, substantially in full:

Since 1917 conditions have substantially changed. Capital expenditures that might have been avoided have been incurred, and the deficits of the weaker lines have increased by leaps and bounds.

It is not my purpose to discuss the railway policy of successive governments, federal and provincial, during the past thirty-five years. In most cases the legislation defining the policy received the approval of the electorate at the polls, and therefore if serious and expensive blunders were made, we should be prepared to pocket our chagrin and foot the bills with equanimity. We have, however, the obligation to try to discover and develop plans that may serve to relieve the Canadian people from some part of the distressing and dangerous financial results now in evidence and which threaten the future.

Canada has now about 40,000 miles of railway lines, of which 37 per cent earn annually their interest charges and give a return on the share capital; 54 per cent fail to earn their working expenses, and 9 per cent earn interest on some of their major securities, but have nothing to apply as dividend on the share capital.

Grand Trunk System

Included in the last mentioned is the Grand Trunk Railway System, which is international in character, owning or controlling important railways in the United States with termini at Chicago, Portland and elsewhere. Serving considerable portions of the Provinces of Ontario and Quebec, the Grand Trunk System enjoys a substantial volume of Canadian traffic; but its international business yields the greater part of its gross revenue. Relieved of the handicap that was imposed by the Grand Trunk Pacific, the parent company should, in normal times, be in a position to pay the annual interest on most of its securities that take precedence of the common stock, but a return on the common stock would appear to be exceedingly remote in any circumstances. This railway system is, however, of national importance, and it would be unfortunate from our Canadian standpoint, if, hampered by the methods and ambitions of previous managements, the company should be kept in a state of embarrassment and should be prevented from carrying out plans for increased efficiency and economy. It would be still more unfortunate if by any process the Grand Trunk should be placed in a position that would have the effect of destroying, either on sentimental grounds or others, the movement through Canada of international traffic to and from its feeders in United States territory.

Even at this advanced stage it would be wise for the Dominion Government to drop all measures looking to the acquisition or control of the Grand Trunk to relieve that company of all obligations in connection with the Grand Trunk Pacific and to grant easy terms covering a period of years, for the repayment of any amounts advanced by the government to the Grand Trunk or secured on the credit of the government in the last two years.

The Transcontinental Line

The National Transcontinental-Grand Trunk Pacific scheme of a line from Moncton to Prince Rupert was a deplorable blunder in its inception and execution. Doubtless the Grand Trunk objected to the line from Cochrane east, and only yielded under pressure, but the eastern and western termini of the line having been once determined, the Government was, I know, guided by the advice and wishes of the Grand Trunk management of that day in fixing the location and standard of construction. It was pointed out that grades of 0.4 per cent and light curvature would make for economical operation, because of the increased weight of the train that could be hauled over the line by a single engine. The theory was all right, but the basic essential was ignored. The traffic was not available and would not be available for a long period of time to furnish loads for these heavy trains, and therefore the advantages could not be utilized unless the practice were pursued of holding traffic until a sufficient amount was accumulated, with the consequent delay and expense and the dissatisfaction of patrons. A railway quite sufficient for any traffic likely to develop for many years could have been built in less than half the time, and at a saving of 50 per cent to 60 per cent in cost, and as business increased and revenue improved, the requisite changes to meet new demands could be carried out, as in the case of the Canadian Pacific.

Recognizing the National Transcontinental portion of the route as a national incubus, the Borden Government soon after coming into power, relieved the Grand Trunk Company from financial responsibility with reference to it, and the burden fell on the country.

Grand Trunk Pacific

The extravagantly constructed Grand Trunk Pacific with its terminal at Prince Rupert, proved a most disappointing enterprise, because over most of the route there was no traffic to yield revenue sufficient to meet the interest charges on its mandatory securities, or, indeed, to cover the cost of maintenance and operation; meantime these interest charges, as well as any operating deficits, had to be met at regularly recurring periods, and the Grand Trunk Company could not have shouldered the burden without incurring financial disaster.

The Dominion Government finally took over the Grand Trunk Pacific; but coupled with it was the decision to acquire the Grand Trunk Railway System as well. Clearly this was a mistake, as all the advantages that would result to the Grand Trunk Pacific and other portions of the Canadian National Railways could have been secured by a traffic agreement.

By its Grand Trunk policy the Government is unnecessarily adding to its burdens, and the Grand Trunk System, as I have stated before, would now and hereafter be a much greater asset to Canada if privately owned and operated than it can possibly be if merged into the National System.

While the transfer of the Grand Trunk Pacific to the Government of Canada, and the consequent relief of the Grand Trunk Railway Company would appear to be a jug-handled transaction, it is not without its justification, because when the Dominion Government was framing its policy with reference to the route and character of the line the objections, and, indeed, dangers of the policy were frequently pointed out to the Government by those who had the requisite knowledge of the country and the technical experience to entitle their opinion and advice to more consideration than they received. The Government cannot escape its share of the blame.

The Canadian Northern

The Canadian Northern System was by over-expansion made a hopeless business proposition. Without wishing to criticise the policy pursued by the company, it is evident that the future of the property was founded on the assumption that the prosperity and expansion which Canada enjoyed for a period of eight or ten years would continue indefinitely, and the mileage of the system was increased year by year until the annual interest charges of the company reached a sum out of all proportion to present or prospective revenue. Had the promoters confined themselves to the territory between Lake Superior and Edmonton, their venture would have been of advantage to the country and profitable to themselves, but their exploits east of Port Arthur and west of Edmonton were untimely and disastrous. It became clear that the company must collapse unless kept alive by very

large grants from the public treasury. For this there could be no justification, and the only other alternatives for the Government were to permit default and liquidation or to take the property over under the terms of the Act of 1914. The Dominion Government, having become a partner in the enterprise by accepting 40 per cent of the share capital at a cost to the country of \$57,000,000 in subsidies and guarantees, and being guarantor of the company's securities to a large amount, default and a receivership would have had their disadvantages. While it is probable that in the circumstances the country's interests were best served by the acquisition of the property, the legislation relating to the transaction would have been the subject of less criticism had provision been made for the payment of a very substantial honorarium to the men who had devoted nearly twenty years of their lives to the establishment and development of the enterprise instead of the creation of a tribunal to determine the value of something that in the minds of the large section of the public was valueless.

With the ownership or control of the Intercolonial, National Transcontinental, Canadian Northern and Grand Trunk Pacific lines vested in the Dominion Government, the Canadian people are now the proprietors of about 17,000 miles of railway, with a capital investment of say \$850,000,000, and an annual interest charge of something like \$34,000,000. In the annual interest charges nothing is included for the Intercolonial and Prince Edward Island Railways, for these have long been with us as unproductive and expensive property; nor for the National Transcontinental absorbed in the Consolidated Fund.

There is no rolling stock equipment nor are there terminal yards, freight facilities, repair shops or other requirements commensurate with a system of this magnitude, and the cost of providing them will be very great indeed.

Operating Revenues

The operating revenue of the Canadian National Railways, including the Grand Trunk Pacific, for the year 1920, was as follows: From passengers, \$23,713,834; from freight, \$90,982,832. The train mileage required to earn this money was as follows: Passenger trains, 13,322,587 miles; freight trains, 24,485,286 miles. In the same period, Canadian Pacific earned from passengers \$49,125,738, and from carriage of freight, \$145,303,399, with passenger train mileage 20,538,038, and freight train mileage 26,281,627.

The train mileage on the Canadian National System is out of all proportion to the revenue, taking the Canadian Pacific as a standard. Were it possible to effect a reduction in train mileage on the National System to make the ratio of train miles to earnings, the same as that on the Canadian Pacific, the saving in transportation alone would represent upwards of \$22,000,000 per annum. This, however, is out of the question, because, while there might be a substantial shrinkage of train mileage without serious public inconvenience, the great mileage of the National System to be served and the limited traffic available prevent a proper relation between traffic and train miles.

The Canadian Pacific handled traffic representing revenue 71 per cent in excess of the Canadian National, with an additional cost of transportation of only 13 per cent. This is accounted for to some extent by the greater expense per train mile for transport on the National System. In this unit of operating expenses there would have been a saving of about \$6,500,000 if the Canadian Pacific basis had been reached.

Maintenance Costs

Maintenance of way and structures cost the Canadian National about \$43,000,000 for 17,000 miles of railway, or an average of \$2,520 per mile. On the same account the Canadian Pacific expended \$32,574,000 on 13,402 miles of railway, an average of about \$2,430 per mile. Doubtless considerable expense was involved in bringing to a higher standard main lines of the National System that had been permitted to run down, but so large a percentage of the system consists of unimportant branches with light traffic where maintenance charges should be comparatively low that the average for the whole system would appear to be rather excessive. If it be assumed that destroyed and obsolete cars and locomotives were replaced in accordance with the Canadian Pacific practice, the expenditure for maintenance of equipment was not excessive, based on the Canadian Pacific average cost in the same year per locomotive and per car. Taking into account the extent of the System, the traffic and general expense of the Canadian National Railways are not excessive.

If the very large annual deficit resulting from the operation of these lines is to be reduced, it must come either from a substantial increase in revenue from traffic or a shrinkage in the cost of operating.

If immigration and settlement are not restricted by legislation or other conditions, there will in the ordinary course of events be a continuing growth of traffic, but at best this growth is apt

to be slow and quite insufficient to make any important impression on the annual results for some years to come.

Meanwhile the Canadian people will be compelled year after year to raise, by taxation, sufficient money to meet the appalling annual deficits, unless by some process the cost of the maintenance and operation of the National Lines can be brought to much lower figures. This, however, would not appear to be practicable, as the National System engaged in competition for traffic with another very strong railway company would be at serious disadvantage unless in train service, equipment and in other respects it offered the public facilities approaching those obtainable on other lines.

Reduction of Rates

I have made no reference to the economies that will result from a revision of the schedule of wages and working conditions, which are on a fictitious basis and must be amended, because concurrent with this will be a reduction in the rates for the carriage of commodities that are essential if the country's basic industries are to be kept alive.

The situation is a serious one and almost hopeless unless some plan can be devised that will promptly and effectively bring to this National Railway System additional financial strength and sustenance.

With but one set of shareholders, the Canadian Pacific Railway Company is really two separate entities. The shareholders have their railways constituting the Canadian system of over 14,000 miles, with lake, river and Pacific coast steamship lines, express and other accessories whose income is included in last year's total of \$216,000,000, and the net revenue of \$33,000,000. And then they have their other assets that are dealt with in a separate account, consisting of their ownership in railway companies in the United States that are under separate management, but that interchange traffic with the company at the frontier, the ocean steamship lines, lands still owned and payments accruing on lands already sold, mining and other interests, in all representing a substantial sum from which revenue is derived to supplement the distribution to the shareholders from the proceeds of the railway operations.

If by some arrangement with the company these assets could be segregated and the railway property added to the government system that I have just described, the system would comprise 31,000 miles of railway with a considerable amount of parallel lines unimportant or useless.

Price to Be Paid C. P. R.

The consideration to be given the shareholders of the Canadian Pacific in exchange for the properties above defined would, I imagine, be in the nature of an undertaking by the Government of Canada to pay to the shareholders in perpetuity a fixed annual dividend on the share capital, to be supplemented by a further payment when the whole property was yielding a specified return.

The extraneous assets of the Canadian Pacific would be transferred to and administered by trustees or by a subsidiary company with another board of directors, so that the directors of the railway company would be interested only in the administration of the trust placed in their hands by the people of Canada. There would be no motive for selfishness, if such a thing were possible in the circumstances. The income on their shares being fixed and unchangeable, excepting as above provided, the Canadian Pacific shareholders could receive no advantage from preferential treatment given to any particular portion of the railway system. The directorate would have every incentive for wise, prudent and business-like administration.

Of course there are many details that would have to be worked out, but it is not necessary to refer to them here.

C. P. R. a Comprehensive Organization

Now, having brought these properties together, we are faced with the most serious problem of all, namely, that of administration and operation. Political management would be impossible, because among other reasons, policy and management must have the elements of continuity and could not be changed with each change of Government without ruinous results. While I have great regard for the opinion of my friends, Sir Henry Drayton and Sir William Acworth, I do not agree that their plan of management would eliminate the danger of political interference, because it could be changed at any session of Parliament. My suggestion would be that if an agreement with the Canadian Pacific on the lines that I have indicated were found feasible, that company would be used under the terms of a contract approaching perpetuity in its duration to administer and operate the whole property for account of the Canadian people. I mention the Canadian Pacific because the magnitude, scope and variety of its operations compel a comprehensive organization, and this could be supplemented by judicious selections from the staffs of the other companies to meet the demands of the larger work.

Savings to be Effected

On the returns for the year 1920, the gross earnings of the combined system would be \$342,283,000, and the operating expenses \$345,973,000, a deficit in operation of approximately \$3,700,000. The annual fixed charges of the whole system, including the dividend on Canadian Pacific Preference Stock, would be \$47,490,000, or a total deficit of about \$51,190,000.

Essential expenditures on capital account from time to time will tend to swell these charges, but by the addition of the Canadian Pacific with its ample rolling stock equipment, its splendid terminals and other facilities, in the use of which the whole system would participate, important expenditures which could not be avoided in other circumstances would be rendered unnecessary.

To this amount of \$51,190,000 per annum, of course it would be necessary to add the guaranteed dividend on Canadian Pacific common stock hereafter to be determined, but if we set aside an estimated amount for that purpose, the total deficit, including everything, would be approximately \$80,000,000. In the light of these figures, present conditions would not be improved, but then we must take into account the saving that would result from the consolidation by the elimination of unnecessary train service and of duplicate work at important terminals and at other points; the restriction of maintenance work on unnecessary duplicate lines; the decrease in general as well as traffic and agency expenditures; the common use of cars and locomotives, reducing to a minimum capital expenditures on that account with greater economy in the maintenance of equipment and the stoppage of outlay in many other directions.

Operating Ratio Should Be 80 Per Cent

In 1920 the operating cost of the combined system was about 101 per cent of the gross earnings. The Canadian Pacific cost was 84.7 per cent of its gross earnings. If the average for the combined system could be brought to the Canadian Pacific level it would represent a saving in the cost of operating of about \$56,000,000 per annum. There would still be a deficit of \$24,000,000 per annum, but for a number of reasons, 1920 was an expensive year, and I see no reason why the operating ratio should not be brought as low as 80 per cent at most, which would reduce the total deficit to eleven or twelve million dollars. To catch up with this a growing volume of traffic would have to be relied upon, but with immigration settlement and development this should come in gradual stages, and the saving to the country in the meantime would be very large.

In connection with these transportation matters there are sure to be miscalculations and disappointments, but the consolidation that I have outlined above would appear to be the most logical and economical policy.

Besides the National Railways, Canada would then have an International group consisting of the Grand Trunk, the Canada Southern, the Toronto, Hamilton & Buffalo, and the Pere Marquette Railways of 4,600 miles, and other lines of local or provincial character. These latter lines may well be left to work out their own salvation, and if they require aid, the provinces, having been relieved of their major liabilities under their guarantees, can well afford to give it.

I am not giving expression to these views as chairman, director or shareholder of the Canadian Pacific Railway Company, and it is quite possible that neither my fellow directors nor the shareholders would be in accord. The Canadian Pacific, with its low capitalization and capacity for securing and handling a vast volume of traffic, should, as time passes, yield a larger return to its owners than at any time in the past. Indeed, about this there is little room for doubt, but with a satisfactory annual dividend guaranteed in perpetuity by the Canadian Government, the shareholders could probably be induced to forego their speculative benefits, as their shares would then have the security and stability of government bonds.

It is my sole purpose to assist if I can in the solution of what is beyond doubt the most serious and menacing problem that faces our country, and to frankly outline the policy that I would adopt and carry into effect if the responsibility were upon me to act as the representative and trustee of the Canadian people in safeguarding the present and future railway transportation interests of the Dominion, and in endeavoring to stop, or at any rate minimize the vast demands on the treasury and the credit of the country that are pretty sure to be made yearly if the present policy is continued.

FOR THE THREE MONTHS ending March 31, 1921, only two out of 1,122 Louisiana & Arkansas passenger trains were late at junction points or terminals. One of the delays was directly chargeable to the Louisiana & Arkansas, while the other was occasioned by the derailment of a freight train of another line on joint track.

Governor's Committee Opposes Rate Raise in New England

THE JOINT COMMITTEE appointed recently by the Governors of the New England States, in a report signed by each of the 31 members of the composite committee published on April 29, declared that the railroad executives had failed to show that the desired general advance of ten per cent in freight rates for a limited time would remedy the situation, or that by such an increase New England interests would not suffer. The committee recommends:

"1. The Federal Government should be asked to give assistance to the railroads in their extremities, not as an act of paternalism but as an act of justice. The obligation of the government to return the railroads in the same condition in which they took them over has not been fulfilled. The period of Federal guarantee should be extended (retroactive to September 1, 1920) and arrangements should be made at once for the payment of the amounts claimed by the railroads to be due them from the government, leaving exact determination to be made afterward. A memorial should be addressed to the President of the United States, pointing out to him the present conditions of the railroads in New England and asking him to take prompt measures to fulfill the obligations of the government.

"2. The prevailing wage scale and the terms of the so-called national agreements have been a large factor leading to the present financial condition of the railroads; and Congress should consider whether the present method of settling labor disputes is entirely adequate, and if not in what respect it may be remedied or altered.

"3. * * * The Interstate Commerce Commission might well avail itself of its authority and make without delay such investigation as may be desirable toward a permanent solution of the railroad difficulties."

To carry out the foregoing recommendations the committee desires to be authorized to present these considerations to the President of the United States, the Railroad Labor Board and the Interstate Commerce Commission, and to take such further action as may be found necessary.

The committee finds the financial condition of the separate roads not the same. The Boston & Albany took no part in the request for advance in rates. The Rutland Railroad in January and February showed a deficit of \$121,091 and the committee thinks that it can continue to operate for the present without serious difficulty. The Bangor & Aroostook asked for an increase of rates only on one-half of one per cent of its entire business.

For the six months ended February 28, 1921, deficits after payment of fixed charges have been as follows: Maine Central, \$915,359; Central Vermont, \$918,652; Boston & Maine, \$8,292,846; New York, New Haven & Hartford, \$11,212,022.

In its summing up the committee says: "There is grave doubt in our minds whether the proposed increase would produce the amount of revenue which the railroad executives estimate and which would be really necessary for any effective relief. There is, of course, a point where traffic will not move.

"The idea of New England as a distinct district for rate making purposes has been resisted heretofore by the New England public and ought, in our opinion, to be objected to upon every occasion when it is proposed. It seems to us that neither New England railroad executives nor any other persons in the New England community ought to propose or assent to a scheme of rate making which will so surely react to the disadvantage of New England industry, and likewise of the railroads themselves. In all essential respects there is no New England railroad problem as such. It is a railroad problem for the whole country."

The committee is not convinced that the borrowing ca-

capacity of the railroads has been exhausted. Special stress is laid on the "unfortunate precedent" that would be established if freight rates were advanced in New England, without a full hearing, when not advanced in the rest of the country. The Interstate Commerce Commission has made it a rule not to allow advances without full hearings; and the commission should not be asked to break that rule now. New England mercantile interests surely will make objections and, therefore, there must be delay. At the same time the railroads say they must have relief now if ever; they say they cannot wait. However, the danger of financial ruin, due mainly to the delay in getting decisions from the Labor Board, affects not New England alone, but the railroads of the whole country. The committee undertook to confer with the leaders of the railroad brotherhoods, but those leaders declined to confer. The delays incident to the restoration of conditions by the Federal Government are characterized as a "mockery of fair dealing."

The committee's action on this report was unanimous. The president is George R. Nutter, president of the Boston Chamber of Commerce, and its secretary is Charles A. Andrews, president of the Associated Industries of Massachusetts.

Comments by New Haven Executive

President E. J. Pearson, of the New Haven road, commenting on this report, said: "The present situation of the New England railroads is

The first is common to all roads; the second is that of adequate compensation through divisions for the handling of intertrunk line freight, which comprises about 80 per cent of the traffic in ton miles on the New Haven system. The New Haven has presented the facts in these matters to the proper governmental authorities and is confident they are receiving careful and full consideration."

Freight Car Loading

WASHINGTON, D. C.

THE NUMBER OF CARS loaded with revenue freight during the week ending April 23 showed a slight increase as compared with the previous week to 704,527. This represents the third consecutive week of increase but the increase as compared with the week before is only 631. For the corresponding week of 1920, which was affected by the switchmen's strike, the loading was 717,772. For 1918 it was 715,042. Increases are shown as compared with the corresponding week of the previous year in the loading of grain and grain products, and merchandise and miscellaneous freight. Increases as compared with last year are also shown in the Eastern, Allegheny and Southwestern districts. As compared with the previous week, however, there was a decrease in grain and grain products, forest products, and merchandise and miscellaneous freight, although there was an increase in livestock, coal, coke and ore. Merchan-

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY—ALL DISTRICTS: COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO. FOR WEEK ENDED SATURDAY, APRIL 23, 1921

Districts:	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Merchandise L.C.L.	Miscellaneous	Total revenue freight loaded		Received from connections	
										This year	Corresponding year	This year	Corresponding year
Eastern	1921	5,294	2,769	3,348	1,552	873	2,371	27,937	172,298	156,355	187,328	145,696	188,296
	1920	4,366	2,868	44,339	1,595	2,201	826	42,240	142,940	169,471	95,543	73,844	103,694
	1919	2,481	3,166	42,976	2,377	2,328	5,000	31,676	49,304	141,704	140,308	12,797	12,445
Allegheny	1921	1,661	2,971	43,544	4,894	2,654	1	2,355	6,469	29,769	33,893	62,281	71,559
	1920	89	115	18,996	657	1,618	251	150	8,493	25,181	29,769	40,179	43,690
	1919	2,831	2,073	19,105	565	12,936	805	37,971	36,702	112,988	100,821	100,257	39,071
Southern	1921	2,621	2,401	21,062	140	17,144	2,636	33,785	43,655	123,447	112,057	42,933	43,197
	1920	8,407	7,246	3,296	529	14,062	1,888	26,474	90,928	110,001	103,129	44,979	46,653
	1919	7,474	7,969	3,200	341	20,498	7,723	20,024	37,992	110,001	103,129	44,979	46,653
Northwestern	1921	9,029	11,844	14,205	155	4,738	737	30,191	29,369	99,908	100,821	100,257	42,933
	1920	6,439	12,678	16,244	395	4,777	2,586	19,423	38,279	100,821	100,257	42,933	43,197
	1919	4,574	2,412	4,213	140	6,231	545	16,381	22,768	55,675	55,927	486,040	426,958
Central Western	1921	3,333	2,655	5,930	162	6,180	440	14,959	22,864	55,675	55,927	486,040	426,958
	1920	26,265	31,657	155,765	8,684	60,712	5,691	211,627	235,010	704,527	717,772	151,642	151,642
	1919	38,857	30,320	139,294	.....	55,164	25,232	.....	426,175	.....	715,642	39,082	35,951
Total, all roads	1921	32,715	29,602	138,576	4,595	46,711	5,691	211,627	235,010	704,527	717,772	151,642	151,642
	1920	26,265	31,657	155,765	8,684	60,712	5,691	211,627	235,010	704,527	717,772	151,642	151,642
	1919	38,857	30,320	139,294	.....	55,164	25,232	.....	426,175	.....	715,642	39,082	35,951
Increase compared 1920	1921	6,450	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Decrease compared 1920	1920	.....	2,055	17,189	4,089	13,361	15,566	63,640	31,075	13,245	.....	.....	.....
Increase compared 1919	1921	.....	.....	.....	4,595	.....	.....	211,627	.....	.....	.....	.....	.....
Decrease compared 1919	1919	6,142	718	718	.....	8,453	19,541	.....	191,165	10,515	.....	35,951	.....

L. C. L. merchandise loading figures for 1921 and 1920 are not comparable as some roads are not able to separate their L. C. L. freight and miscellaneous of 1920. Add merchandise and miscellaneous columns to get a fair comparison.

developing closely in accordance with the information and forecast which have been furnished to the Federal authorities and to the New England Governors. The public has been receiving transportation from the New Haven system at less than cost. The deficits for the New Haven and Central New England, excluding Federal guarantees, were \$8,000,000 in 1918, \$8,900,000 in 1919, \$30,000,000 in 1920 and \$7,675,000 for the three months of January, February and March, 1921; a total for such period of \$54,575,000.

"These accruing deficits have compelled reduction of service, the deferring of maintenance, and have resulted in the accumulation of obligations which will compel the continuance of reduced service for a considerable time ahead in order that the amount of deficits which are in excess of Federal guarantees may be liquidated when conditions become more favorable and make such action possible. There are two essential features in the New England railroad problem.

dise and miscellaneous freight has heretofore been increasing practically every week, but this represents the third consecutive week of increase in coal loading after a steady drop from January 1 to about April 1. The summary as reported by the Car Service Division of the American Railway Association is shown in table above.

Owing to an increased demand for open top cars for the transportation of coal, a further decrease of 16,412 in the total number of idle freight cars was shown for the week ending April 23. The number of surplus cars was 483,067 as compared with 499,479 for the week of April 15. Surplus coal cars totaled 235,275, which was a decrease of 16,735. A slight increase was reported, however, in the number of idle box cars, which totaled 177,360 or an increase of 555. Compared by districts, decreases in the number of cars for which there was no freight were reported in all except the Northwestern district.

Designing Large Locomotives for Maximum Utility*

Power Should Not Be Dwarfed by Physical Limitations of the Road—Co-operation Needed for Further Development

By M. H. Haig

Mechanical Engineer, Atchison, Topeka & Santa Fe

THE DESIGN of a large locomotive depends on the service to which it is to be assigned. The service varies with the weight of the train to be hauled and the number of cars in the train, and is affected by the topography of territory on which it is to operate, ruling grades in each direction, length of grades, average speed between terminals, method of dispatching, whether single or double track between terminals, etc. This information being available, it is a reasonably simple matter to determine upon the leading features of a locomotive to meet the requirements.

Restrictions and Limitations Imposed

For a locomotive to give practically 100 per cent service, its design and construction must not be restricted by personal opinion or by physical limitations of the road. If the weight needed for adhesion in starting a given train is restricted by an opinion that certain wheel loads should not be exceeded or because bridges and track are not capable of carrying the necessary weight, then the capacity of the locomotive is restricted and the train must be adjusted to the locomotive, instead of the locomotive being built to suit the train. This in turn has a tendency to limit a division or a railroad as a whole. Limitations such as these, together with clearances of bridges and structures, obstructions along the right of way, etc., affect the locomotive design and construction. The locomotive as a whole is dwarfed, or some of its vital or essential parts are so dwarfed as to cripple the machine as a whole.

A railroad is a plant, establishment or organization for manufacturing transportation. The locomotive is a very important part of the plant and is one of the most direct earners of revenue from which the transportation-manufacturing plant obtains its income. As such, it is a matter of business and economical principle to adjust some of the physical conditions of the road to meet the requirements of the locomotive, to prevent dwarfing it and to prevent sacrificing its power. Meeting these requirements of the locomotive amounts to meeting the necessary requirements of traffic. No turntable installed at a principal roundhouse should be less than 100 ft. long, and in many cases the length should be 125 ft. The distance between the walls of a modern roundhouse should be great enough to permit closing the door behind the tender of a Santa Fe or Mikado type locomotive and have ample room for trucking between the locomotive pilot and the outer wall of the roundhouse. Passing tracks should be long enough to take trains justified by the business and traffic of the division or territory. Bridges, rail and roadbed should be capable of carrying a static wheel load of at least 65,000 lb. per pair and of permitting the additional stresses resulting from a freight speed of at least 45 miles per hour. In meeting the requirements of rail stresses particular attention should be given to the employment of heavy rails on curves.

Unless these physical conditions are provided, a locomotive cannot be designed and constructed without restriction and proper power cannot be furnished to meet requirements. The only governing factors should be the size of train and the traffic of the territory.

Leading features of locomotive construction such as rela-

tive size of cylinders, length of stroke, total heating surface, superheating surface, grate area, etc., have been well covered by handbooks and pamphlets issued by locomotive builders and by reports to the various associations, as well as by articles in the technical press. Tables of principal dimensions of large locomotives are obtainable from the same sources, together with detailed descriptions of features of design and construction which have met with general favor and some which have been short-lived. A discussion or comment on these features would therefore be largely a repetition of facts already presented and easily available.

Leading Features of Locomotive Construction

Features which have not been so generally discussed and exploited are those which keep a locomotive in service a maximum length of time, reduce engine failures to a minimum, reduce cost of maintenance and repairs, and increase revenue-earning power. Among these, durability of material and accessibility of parts are important factors. The latter implies arrangements by which a locomotive is made free from complications in construction, inexpensive to repair, easy to maintain, and so put together that needed repairs can be made handily and quickly.

Almost as important as providing a locomotive that will meet the requirements of trains to be hauled and traffic conditions, is providing one that requires minimum repairs—a locomotive that after one trip is ready to be turned for the next trip.

A locomotive is in revenue-earning service only when it is hauling trains. Any road can make a study and determine what proportion of its locomotives are unserviceable and what percentage of the time its serviceable locomotives are on the road. Such information will show what percentage of the time its engines are earning revenue.

To maintain the advantages of designs already existing and to develop these still further requires the unlimited co-operation not only of the mechanical, civil engineering and operating forces of the railroads, but also of the locomotive builders, and particularly of the manufacturers of material. The necessity for unlimited co-operation by manufacturers of material is evident from the study of failures of parts both large and small.

Mr. Haig discussed in detail problems in the design of important parts of the locomotive, including counterbalancing crosshead and crosshead pins, piston rods, cylinders, driving wheels, frame braces, boiler braces, tube sheets, ash pans, brake rigging, water columns and cab equipment, concluding with the following discussion of the advantages of high capacity tenders.

Tender Capacity

Tender capacity should be arranged so as to reduce to a minimum the time a locomotive is detained from the productive work of hauling trains for the purpose of taking water and fuel. This implies large fuel and water capacities, but in arranging for suitable tender capacity care must be taken to avoid unnecessary weight, as any increase in the weight of the tender produces an equal decrease in the weight of train that can be hauled behind the tender.

Tender fuel space should be arranged so as to enable the

*Abstract of a paper to be presented at the railroad session of the spring meeting of the American Society of Mechanical Engineers, Chicago, May 26, 1921.

locomotive to handle a full train with as few stops for fuel as may be feasible.

On territories equipped for water to be taken on the run or when stops for purposes other than taking fuel or water are made regularly at stations where water may be taken, the water capacity should be only sufficient to supply the locomotive when handling a full train, between water stations.

On territories handling a large percentage of through trains with few stops, tenders of large capacity are desirable as they permit keeping locomotives more continuously at work.

In addition to reducing time consumed by trains on the road, together with overtime pay to train and engine crews, large-capacity tenders effect a substantial saving by reducing the fuel consumed in starting and accelerating trains as well as the damage to locomotive machinery, draft rigging, tires and rail which frequently results from stopping and starting long freight trains. Train dispatching is simplified and the movements of superior and opposing trains is expedited, as a train which keeps moving interferes less with the movements of other trains.

Railroad Hearings Before Senate Committee

WASHINGTON, D. C.

HEARINGS BEFORE the Senate committee on interstate commerce, which has been directed by a Senate resolution to make a general inquiry into the railroad situation with particular reference to the increases in expenses and what should be done to reduce the cost of transportation, will begin on Tuesday, May 10, with representatives of the railroad executives as the first witnesses. Among those expected to testify are Thomas De Witt Cuyler, chairman, and Alfred P. Thom, vice-chairman and general counsel, of the Association of Railway Executives; Daniel Willard, president of the Baltimore & Ohio, and Julius Kruttschnitt, chairman of the Southern Pacific. The railroads have made extensive statistical preparations for the hearing and other witnesses will be called later. The hearings are expected to run for several weeks and may last well into the summer. The railroad testimony will probably consist largely of a demonstration of the effect of the war and of federal control upon their operations, in order to show why repeated rate increases have failed to offset the increases in wages and other items of operating expenses. S. Davies Warfield is expected also to present his plan for a reorganization of the railroads and labor leaders and shippers will be heard from.

Senator Cummins, in a newspaper interview, expressed a hopeful view of the prospects for a readjustment of the railroad situation.

"The railroads," Senator Cummins said, "are in no different situation from the other industries of the country. Like many other producing industries they are confronted with a sudden and violent shrinkage of business which helps to make the selling price of what is produced lower than the cost of production. They will have to solve the problem in the same way as other producers are trying to solve it; by the bringing of the cost of materials and the cost of labor into line with the proceeds of what they have to sell.

"To assume the contrary would be to assume that a national transportation system cannot be self-supporting in this country. If that were so, there would be nothing to do but for the government to take it over and pay the annual deficit, however heavy, out of the Treasury. The country must have its transportation system.

"But there is no reason to imagine anything of the kind. There will be a very large saving in cost of materials. Coal will be lower this year, ties are lower, steel and iron material

is lower except rails, and rails will also have to come down. The question of the wage scale is in the hands of the Labor Board.

"When railways were placed in receiverships and their mortgages foreclosed in the past, there were two motives for such procedure—to get rid of an incapable management or to reorganize and recapitalize the roads. At present the latter motive, at least, does not exist. Foreclosure would not help the bondholders. The circumstances give reasonable assurance of adequate net revenue in due course to meet all interest, due or overdue. What reason is there, then, that in such a case the bondholders should not consent to forego their interest temporarily until the readjustment of cost to revenues shall have been effected?"

President Harding and his cabinet appear to have dropped for the time being their efforts to find a quick solution of the railroad problem, having come to the conclusion that time will be required to work it out and that the subject is one which does not lend itself to executive interference in view of the fact that jurisdiction over the most important phases of the problem has been vested by law in the Interstate Commerce Commission and the Railroad Labor Board and that rate-making is a legislative function. For the first time in several weeks the railroads were not discussed at the cabinet meeting on Tuesday and in his last two conferences with the newspaper correspondents the President has had very little to say on the subject except to point out that the matter is largely in the hands of the Interstate Commerce Commission and the Labor Board and to indicate his pleasure at news that the railroads had voluntarily agreed to some readjustments of rates. The President hopes that the hearings before Senator Cummins' committee may suggest some form of improvement in the governmental machinery for dealing with transportation questions, if the investigation shall develop the need for any change, but while he is anxious to see rates reduced he has apparently been convinced that nothing can be accomplished by efforts on his part to hurry matters unduly.

The President made it clear when he first took up the problem that he did not believe in going over the heads of the commission or the board, but it is thought that he may have made suggestions to both of them calculated to stimulate their handling of the questions involved and that some of the results may be seen in the fact that the Labor Board handed down its decision on the National Agreements sooner than was expected, and that it is apparently handling the wage reduction case in a somewhat more expeditious fashion than it did the National Agreement case. The Interstate Commerce Commission has been active in working with the railroads and shippers on rate readjustments, and it is understood that more has been accomplished than has been given publicity, but the commission has taken a firm stand against the idea that the situation could be improved by rate reductions regardless of the cost of operation. It is understood that the railroad question was brought up at one of the cabinet meetings in March by Vice-President Coolidge in connection with the serious condition of the New England lines, and that it was first approached as a question of what should be done to avoid wholesale railroad bankruptcies. The propaganda to the effect that high freight rates were stifling business and that the railroads would do better if rates were reduced, at least on some commodities, was then brought forward and was fostered in the President's mind by delegations of farmers and shippers of coal, building materials and other commodities that the public has been slow to buy at the prices asked or at prices satisfactory to the producers. The same view has been presented by many members of Congress who have been receiving complaints from their constituents. The President, however, made up his mind to obtain information from all sides of the question.

Employees Begin Fight on Wage Reductions

Labor Board Hears Defense of Present Rates of Pay—Unions Vigorously Oppose Reductions

RAILWAY LABOR'S DEFENSE of the justness and reasonableness of the rates of pay established by the Railroad Labor Board last July, will be based largely on (1) the fact that there have been no decreases in the wages of the workers in the coal and steel industries up to the present time; (2) the reiteration of the hackneyed charges regarding the "inefficiencies and inadequacies of management" and (3) a flat denial that the decreases in the cost of living justify wage reductions at this time. This was clearly indicated in statements made before the Board by various labor leaders on April 28, when hearings in the controversy over wages were resumed.

The presentation on behalf of the railroads in this controversy was described in the *Railway Age* of April 22, (page 988). After a recess of one week, the employees presentation was opened by B. M. Jewell, spokesman for the labor organizations, who said:

The Board can make no reduction in railroad wage rates at this time because there have been no reductions in wages paid in the basic industries comparable to the transportation industry, and because there has not been a sufficient reduction in the cost of living to justify a reduction in wage schedules that were inadequate to meet living costs at the time they were established. Coal mining and the steel industries are the only basic industries that may be compared to the railroad industry, and it is well known that there have been no wage cuts for the miners or for the steel workers.

In addition to the facts which bear directly upon the principles which have been set up as a guide for the Board in wage determinations, there are also other and more fundamental conditions of which the Board must take judicial notice.

He then reiterated the spectacular but fallacious charges of mismanagement which have been used as a smoke screen in this and in the national agreements controversy, drawing from these charges the conclusions that "the Board cannot entertain a plea from the railroad managers for a reduction in wages under any circumstances until the inadequacies of management and the high operating costs resulting therefrom have been eliminated" and that "this Board should not consider any complaints relative to the rates of pay of railway employees until it is satisfied that the railroads are not being forced to purchase their fuel, equipment, oil, timber and other supplies at exorbitant prices."

Mr. Jewell continued:

We shall hold and we shall submit data and argument to show that no action looking towards a reduction in wages can now be taken by the Board which can be predicated upon any sound basis. No justification can be found in ethics, in economic reason, or in the cold, concrete facts of present-day industrial life and activity, to support the Board in making any changes in the existing rates of pay to railroad employees.

For 18 months preceding Decision No. 2 of this Board, when living costs were steadily and rapidly rising, railroad employees sold their Liberty Bonds at a sacrifice, went into debt, deprived themselves of even the necessities of life, and waited for some measure of relief. If the cost of living should decline in the future as rapidly as it did from June to December, 1920, it would be three years before railroad employees, with the increased purchasing power arising from the maintenance of existing rates of pay, would be able to recoup the losses which they sustained during the war period by the failure of their earnings to keep pace during that time with the increased cost of living.

In the first place, the cost of living has not declined since the wage decision of this Board which was manifestly based on the official returns not for June, 1920, but for December, 1919. Any reduction in food prices since the first of the year have been practically neutralized by increases in house rents and fuel. Furthermore, an examination of official figures for past years, even for the war period itself, show that there has always been a down-

ward fluctuation during the early months of each calendar year followed by a trend upward. Finally, it is the consensus of the best opinion available that the lowest point in the existing depression has been passed, that wholesale prices have practically become stabilized, and that retail prices, or the measure of the workingman's cost of living, will probably advance in the future.

In the second place, the Board has accepted in its last wage award the principle of a living wage for the lowest paid railway employees. In the light of this fact, we feel assured that the Board will not accept the supply and demand theory of wage-fixing which has been urged by the representatives of the railroads as a justification of wage-reductions. We shall show that the Board cannot reduce the rates of pay of unskilled workers without rejecting the principle of the living wage, or impairing the maintenance of an American standard of living by the unskilled groups of employees.

In the third place, we shall not deny that rates of pay have declined in certain outside industries, but we shall show that the facts submitted by the railroads do not afford any justification for a wage-cut in the transportation industry. We shall point out that the comparisons made by the railroads are not in point, that the instances of wage-cuts which they have submitted are not characteristic of basic industries analogous to the transportation industry such as coal-mining or iron and steel making, and finally, we shall claim in this connection that rates of pay which have been arbitrarily imposed upon workers in other industries without regard to principles or standards which public policy has sanctioned should not be cited or accepted as precedents upon which to base action from this Board.

In the fourth place the increases granted to the federated shop craft employees of the railroads have not in any sense kept pace with the rising cost of living computations, which show that the mechanics whom the shop crafts represent have received increases totaling over 100 per cent since 1915, are founded upon the false basis that increases can be shown in terms of hourly rates. The only fair basis of comparison is the average daily earning power of the employee based upon the standard measure of the recognized work day. We shall show with data drawn from authoritative sources that not one of the shop crafts has received increases in daily earnings since 1915 totaling as much as 100 per cent and that the weighted average total increase in daily earnings granted to railroad shop mechanics since 1915 amounts to approximately 83.5 per cent.

Finally, we wish especially to emphasize our contention that there should be no action taken by the Board relative to rates of pay until conferences have been held and new working conditions agreed upon, in accordance with the recent decision of the Board in connection with national agreements. Manifestly there can be no just determination of wages until it is known what the new working conditions or rules will be.

Other Employees' Representatives Testify

Mr. Jewell was followed by E. J. Manion, representing the Order of Railroad Telegraphers; D. W. Helt, president of the Brotherhood of Railroad Signalmen of America; Timothy Healy, president of the International Brotherhood of Stationary Firemen and Oilers; J. G. Luhrsens, president of the American Train Dispatchers' Association, and Mr. Lauck, speaking on behalf of the organizations represented in Groups 2 and 3.

The testimony of Mr. Helt and Mr. Luhrsens dealt with the seven relevant factors which the Board must take into consideration in fixing just and reasonable wages, both maintaining that there is no comparable work in any industry to that performed by the men they represent and that the decreases in the cost of living do not justify a wage cut at this time.

Mr. Manion followed the same reasoning, basing his arguments as to the cost of living on the statement, "that rates of wages in relation to the cost of living extend far back of the period the railroads use in their exhibits as a base and we can never subscribe to the inferred theory that an ideal condition existed during the year of 1915. This Board cannot and must

not proceed on the assumption that a just comparison can be made between wages and the cost of living by using 1915 as a common basic starting point."

Mr. Healy's testimony was directed mainly at the refutation of the statistics given to the Board by the carriers regarding the wages being paid for similar work in outside industries. He presented numerous reports of the Board of Estimate and Apportionment which sets forth rates for employees in building trades in New York City.

W. Jett Lauck Presents Numerous Exhibits

Mr. Lauck then began the presentation of a large number of exhibits. His preliminary statement was directed at minimizing the importance of the cost of living as a factor in the determination of a just and reasonable wage, the contention being that "the living wage principle must first be applied," that "the cost of living principle was only a wartime emergency measure" and that it was not therefore intended as a permanent standard.

In justifying the presentation of his exhibits, Mr. Lauck said in part:

Mr. Jewell stated that we would not limit our presentation to the specific principles upon which the railroads base their contentions, but that we would enter into a discussion of the fundamentals which underlie the entire question. We are conscious of the fact that among the unthinking and the prejudiced it may provoke some criticism. It will be thought perhaps that we are introducing irrelevant material or indulging in what has been popularly termed as muckraking. We were conscious of the same criticism during the hearings on national agreements. The constant inquiry was made as to when we were going to discontinue the submission of irrelevant matter and confine ourselves to the discussion of "the reasonableness or unreasonableness" of rules.

The results of that case justified our insistence upon fundamentals. In the present case we shall also proceed upon the basis of the fundamentals, not because the consideration of such matters may be colorful, sensational or distracting from what some persons at first blush may consider the real issue but because they are fundamental in industrial justice and equity, and in the consideration of matters which affect the economic and human well-being of ten million men, women and children; and because justice and equity can not come from any decision in this case unless these fundamentals are seriously and deeply considered. We have no doubt that ultimately, as in the case of national agreements, these fundamentals will be recognized and sanctioned.

Financial History of the Railroads Reviewed

Again in submitting several volumes on the financial history of the railroads, Mr. Lauck justified his action by saying:

In connection with these exhibits we wish to say at the outset that we are not presenting these exhibits to show that if the railroads had not improperly used their resources in the past they would now have abundant funds and it would not be necessary at the present time to ask for wage reductions. We realize that most fortunately the conditions described in these exhibits have been corrected by the Transportation Act and are no longer possible. Our purpose in submitting these data is threefold:

1. To place on record in this case the fact that large resources have been dissipated or unwise distributed by railroad financial management in the past, or that railroad management by its issuance of fictitious securities imposed a perpetual drain upon railroad operating revenues and

2. That the funds which have been dissipated or absorbed, if they had been used to cover depreciation and maintenance, or used for improvement, or, as a basis for credit to secure permanent additions and betterments, would have obviated the existing inadequacies of railroad management.

3. Finally, that these resultant inadequacies of management must be met before in reason or equity a wage reduction can be properly considered.

It is not our purpose to develop the fact that if the results of financial mismanagement had not been as they had been, there would not be in existence now about a billion dollars' worth of securities now drawing dividends and which amount to about \$55,000,000 per year, and that the funds which have been absorbed by fictitious securities in the past would have been available to the financial officers and operating officers to keep up maintenance and cover depreciation of equipment and carry on improvements which they have not been able to do under the cir-

cumstances and which are now deferred. The employees should not be made a vicarious sacrifice for this past financial mismanagement. That does not help the railroads, but they will have to find some other means than deflating labor to cover the increased costs of operation which have resulted from the happenings in their past history.

All of the Board's session on April 29 was consumed by Mr. Lauck in the presentation of exhibits regarding the "inadequacies of management." The character of Mr. Lauck's contentions regarding the efficiency of the country's transportation system has been outlined in previous issues of the *Railway Age*. Part of the material filed at this time had previously been filed in the controversy over national agreements. However, the scope of the exhibits has been greatly enlarged. Throughout the volumes regarding the alleged "inadequacies of management," the *Railway Age* is quoted extensively, particularly the Six Billion Dollar Number published in January, 1920.

The exhibit on alleged "inadequacies of railway management" is in four volumes, the first two volumes of which deal with alleged economies possible without additional capital investment, the third volume with the economies possible through additional capital expenditures, and the fourth volume with economies possible under unified management.

The manner in which this material is being received by the Board was indicated by Chairman R. M. Barton, who, in discussing the continuation of the employees' presentation, said, "I think it is all far afield, but we want to let in all of the light that is possible on the matter. Your argument is that if we are going to look to the financial condition of the railroads at all, we should consider the fact it is not your fault and the high wages being paid is not the cause of the present condition, but is due to general mismanagement of the past, and in some cases the sins of the fathers have been visited on the children."

To this Mr. Lauck replied: "We go farther than that, we claim that the present plight of the railroad in this time of depression is the result of accumulated evils of financial mismanagement which are expressed now in physical infirmities and impossibility of economical operation, and it would not be equitable to grant a reduction of wages of employees to give financial relief to the railroads until these infirmities of the railroads, which the operating management has inherited from past financial mismanagement, are rectified."

The session was closed with the presentation of additional exhibits regarding the causes of the present industrial depression, Mr. Lauck contending that the influences which have caused this depression have spent most of their force, that the factors of revival have begun to be felt.

Public hearings were resumed on May 2, when representatives of the various independent organizations presented their arguments against wage reductions to the Board. The bases of these arguments were that the wages being paid to the various employees represented are still below those paid for comparable work in other industries and that the cost of living has not declined enough to justify a wage reduction at this time. The independent organizations appearing before the Board at that time include the United Association of Railway Employees of North America, the International Association of Railroad Supervisors of Mechanics, the Order of Railroad Station Agents, the American Federation of Railroad Workers, the International Longshoremen's Union, Knights of Labor, Brotherhood of Station Employees, Railroad Yard Masters, Lighter Captains' Union of the Port of New York, International Union of Steam and Operating Engineers, Dining Car Conductors, Brotherhood of Dining Car Employees, Cooks and Waiters, Philadelphia & Camden Ferry Employees, Railway Men's Benevolent & Industrial Association.

The Board recessed until May 4 when representatives of the train service employees were heard.



Where Traffic is Facilitated

Outlying Switch Control Facilitates Train Movements

Development of Low-Voltage Mechanisms Controlled from a Central Point Has Expedited Traffic

By C. C. Anthony

Consulting Signal Engineer, Santa Rosa, Cal.

LOW-VOLTAGE electric switch mechanisms were developed by the manufacturers to meet a demand that was somewhat hesitatingly expressed by certain railroad signal men six or seven years ago. It was felt that real economy could be effected by the power operation of certain switches located too far from available points of operation to be reached with mechanical connections. As in so many cases dealt with by the signal engineer, however, there was some uncertainty whether money savings could be proved. At the same time there was a question as to the satisfactory operation of such mechanisms.

It was evident that any net return over the usual items of maintenance cost, interest on investment, etc., would have to come almost entirely from the saving of the cost of stopping and starting trains—unless, in a given case, the operation of one or more switches from an existing interlocking plant or station would save the employment of switchmen or the installation and operation of an additional interlocking plant. And not only was the cost of stopping a train an unknown quantity, but the saving, whatever it should be, might be undiscoverable in the expense accounts. If, then, the financial gain should be invisible, purely theoretical, and the train delays, due to even a few switch failures, would prove to be serious, the signal engineer might be sorry that he had ever urged a low-voltage switch installation. Happily, the step was taken, and the experience of the last few years seems to have proved its wisdom.

Where Low-Voltage Machines Are Advantageous

The situations in which low-voltage switch machines may be used to advantage are of three general classes. First, in connection with existing mechanical or electro-mechanical interlockings, where one or more switches and the necessary signals at too great a distance for mechanical working, may be operated from the existing plant. Second, where switches

and signals at such distances may be operated from a station at which operators are continuously on duty; and, in some cases, it may even pay to employ an additional operator for the sake of saving the delay and expense of stopping many trains each day for switches to be thrown by the trainmen. Third, where a power interlocking is necessary and can be installed at a cost less than that of a high-voltage electric plant; as at a drawbridge, where, on account of long bridge approaches, derails must be located at too great distance for mechanical operation.

Interlockings to which remote switches might be connected with advantage are almost numberless. Thus there is frequently a mechanical interlocking at the end of a yard, handling the crossover and yard switches; but, to facilitate train movements double track through the yard has been extended several thousand feet beyond. From the point of view of both safety and economy, it is evidently of advantage to connect up the switch at end of double track, at no increased cost for signalmen, as such a switch has to be thrown twice for each of practically half the trains on the road. So, too, many double-track, and not a few single-track, lines are well provided with mechanical or electro-mechanical interlockings at passing sidings. Progressive railroad officers already realize the absurdity of having an operator sit idly by while a train stops for a switch to be thrown directly in front of the office, when an interlocking of moderate cost would eliminate the stops and increase the safety of operation. But such an interlocking can handle only one switch of each siding, although it is just as desirable that the remote switches be operated from the plant; and this can be done at an operating cost insignificant in comparison with that of the original plant, since there will be little if any increase in the principal item, wages of signalmen.

Similar conditions are met with at many stations where interlockings have not heretofore seemed to be justified. For

example, the operators at a station located at about the middle of a passing siding can readily operate both switches with low-voltage machines; whereas, a mechanical interlocking at one end would do only half the work at a greatly increased cost for additional men. In addition to drawbridges, previously mentioned, a gauntlet through a tunnel or over a bridge can be handled by one set of men at a single interlocking located at one switch, mechanically connected, while the other switch is operated by a low-voltage machine. The work can be done at least as well as, and much more economically than, by two sets of men.

The First and Subsequent Installations

The Northern Pacific is believed to have been the first road to use low-voltage machines. Two were installed in 1914 at the entering ends of passing sidings on double track on either side of the single track through Bozeman Pass tunnel. The purpose was to enable heavy freight trains, on the ascending grades approaching the tunnel, to enter the sidings without stopping. This installation is described in the *Railway Age* of April 16, 1915, page 831. It is said to have worked so far without failure and to have shown a great saving in operating tonnage trains on heavy grades where they are compelled to take siding.

In 1916 five machines were installed on the Nashville, Chattanooga & St. Louis. Four of these are on crossovers at the ends of a short section of double track on a 2 per cent grade, ending at a single-track tunnel at the summit. Cross-overs are necessary on account of an engine track at the summit and a runaway track at the lower end. The fifth machine operates an end of double track switch at the foot of the grade, two miles from the point of operation. A sixth machine was installed in 1917 at an end of double track one mile away and across a river from the point of operation. These installations are described in the *Railway Age* of May 31, 1918, page 1323.

Probably the largest single undertaking of this kind is that started by the New York, New Haven & Hartford in the latter part of 1918. This involved the use of about 25 machines at a cost, with signal changes, of approximately \$100,000. These machines provide for the operation of all the passing-siding switches not previously interlocked, on the Shore Line between New Haven, Conn., and Readville, Mass., 147 miles. On this double-track line there were already interlocking plants, nearly all mechanical, at the passing sidings, but, of course, only one switch of each siding was connected. With the very heavy train movement, both passenger and freight, it was felt that the expenditure would be amply justified by the saving of delays due to stopping heavy freights for switches to be thrown. The decision to make this extensive installation was based on favorable experience with one of the low-voltage machines that had been in use on that line about two years. The installation, as proposed, was fully described in the *Railway Age* for April 19, 1918, page 1041.

A very advantageous installation on the Philadelphia & Reading consists of the switch and two derrails at the end of a third main track operated from a station about 4,500 ft. distant. An average of 39 trains daily pass over this switch, and as a considerable proportion of these trains would have to stop for the switch to be thrown by hand, it may well be admitted that "the time lost in stopping and starting would, when capitalized, amount to much more than the interest on the cost of the present interlocking installation." If there is any doubt about this the other items in the cost of stopping trains should easily show a favorable balance.

In the annual interlocking statistics it is probable that not all the low-voltage switch machines installed were reported. But the information furnished shows that two were installed at the ends of a gauntlet on the St. Louis-San

Francisco in 1916, and in 1917 a good many were installed or under construction on the Delaware & Hudson, the New York Central, the Norfolk & Western, the Southern Pacific and the Buffalo, Rochester & Pittsburgh. In 1918 others were installed on the Southern Pacific and one on the Oregon Short Line at a junction switch 1.6 miles from the point of operation. Several are in use also on the Pennsylvania. The Southern Pacific now has 15 machines in service, several at drawbridges where the derrails are too far away for mechanical operation. The questions of reliability and of the delays that might result from failures, which, it was felt, required answers from experience, are now regarded as settled in favor of the machines.

The Circuits Required

There seems to be a rather wide choice of circuits for the control of low-voltage switch machines and the signals operated in connection with them. Circuit plans are given in the article on the Northern Pacific installation referred to above. It is evident that line wire may be an important item in the cost of installation, especially if the number required is so great that it is difficult or impossible to provide for it on an existing pole line. Ingenious circuits that economize line wire, while providing all the usual safeguards of power interlocking, have been worked out on the Pennsylvania. Taking the case of a switch, or switch and derail, at an end of double track or siding, with signals for all movements: the primary controls require only five lines, including a common return; one with polarized relay for the switch control; one, with three-position lever and polarized relay selecting the signals as to direction, for the control of all the signals—the selection of signals as to routes being made through circuit controllers on the switch; one with polarized indicator and relay for the indication of both switch and signals; one for track-circuit locking of the switch lever and a stick indicator providing for semi-automatic operation of the signals, and one for the common return. Even at more elaborate single-track layouts, with mechanical interlocking at one end of a siding, and a low-voltage switch machine, and complete signaling at the other, three-position signals, inter-control of the third positions of the main-line signals, track-circuit control of main-line signals between the ends of the siding, and time (not approach) locking, only nine or ten lines are used.

Anticipated Objections to Low-Voltage Machines

The anticipated objections to the use of low-voltage switch machines were the slow movement of the switches and the possible excessive train delay in case of a switch failure. In a great many cases slow movement of the switch is of no consequence, as it can be thrown in ample time before a train is to pass. Even when a train is waiting for another at an end of double track or siding, and should start as soon as the other clears the switch, the delay of, say, 30 sec. while the switch is operating, is insignificant compared with the time that would be lost in stopping or moving very slowly to allow the switch to be set normal by a trainman. It was naturally felt, however, that the delay in case of a switch failure might be very serious. There would be no maintainer close at hand, as there usually is at a power interlocking of any considerable size at least, to clear the trouble or throw the switch promptly. And it would be out of the question for the signalman to leave his office and walk a mile, more or less, to the switch. The usual provision of a crank, accessible to the trainmen, with which the switch machine can be operated by hand, seemed an uncertain reliance because of the possibility that the trainmen, having little experience in its use, might become confused and lose a great deal of time in getting the switch lined up for the required movement. This difficulty, however, seems not to have proved serious in practice. Tele-

phones are, of course, provided so that the trainmen can get instructions as soon as a train is stopped by signal at such a switch. If necessary, no doubt the signalman can usually explain clearly enough what is to be done when the switch has failed to operate.

The Advantages of Low-Voltage Machines

The advantages to be gained by the use of low-voltage switch machines are increased safety and economy. Safety should be increased exactly as in any other case where one or more switches are interlocked and movements over them governed by fixed signals. As specific instances: The switch being under the absolute control of a signalman, a train may sometimes be held on double track or on siding when otherwise, through oversight on the part of the train crew, it might have proceeded before the passing of the last of two or more trains for which it should have waited; although, of course, block signals might prevent any disastrous result from such an error. Or a side collision with a train pulling out of a siding may be prevented; for flag protection in this case is apt to be particularly desultory.

Economy, as previously remarked, is sometimes difficult to prove. Leaving out of account the more obvious cases, such as the operation of derrails at too great distance for mechanical connection—where an interlocking plant is a necessity and would otherwise have to be a small power interlocking with its own power plant, any economy in the low-voltage operation of remote junction, passing-siding or end of double track switches, must usually be found in the saving of train delays and the more direct cost of stopping and starting trains. On this subject an article by the writer in the *Railway Age* for May 2, 1919, page 1105, may be of interest. It is perfectly clear that it costs money to stop a train at an intermediate point. The only question is, how much. It may not be possible to do better than make a conservative estimate of the cost, direct and indirect, for given conditions. But an amount having been arrived at which is deemed reasonable by those having to pass upon the proposition, it is a simple matter of arithmetic to find out whether it will pay to install one or more low-voltage switch machines at any point under consideration. There is practically no doubt, however, that, at numerous places all over the country, it will pay, and pay well, to make use of these machines.

The Cost of Transportation In Relation to Other Cost Factors

By Julius H. Parmelee

Director Bureau of Railway Economics

IN A TIME of economic readjustment, when prices, wages and costs are constantly shifting, and no one factor in production and distribution is stable with respect to any other factor, the problem of ascertaining the relative position of any one of the factors is difficult. For example, it may be asked whether the cost of transportation to the users of the railways, that is, the level of railway freight and passenger rates, has increased in greater ratio than other production costs, whether it has remained stationary, or whether it may even have declined, relatively speaking. The inquiry is pertinent at any time, especially so when, as at present, the whole fabric of railway expenses and charges is being closely scrutinized; expenses, through the examination of wage levels now being conducted by the Railroad Labor Board, and charges, through daily analysis by the Interstate Commerce Commission of the effect of increased railway rates.

The fundamental reasons why there is so much interest in railway rates at present, and in their effect on and relation to production costs and general prices, are two: First, economic

conditions are in process of post-war liquidation, and the effect of every factor on all other factors becomes of relatively greater importance than usual; secondly, the increased rates instituted by the Interstate Commerce Commission in August, 1920, became effective at almost the same time that prices commenced to decline, a decline that has been maintained virtually without interruption to the present moment. Prices were at their peak in the months of May and June, 1920, and the present decline started in July. The decline in prices has led many to inquire whether railway rates may not now be at a relatively higher level than before the war, and whether they ought not to be reduced. By "relatively higher" is meant an upward trend in rates greater in degree than the upward trend in prices. If rates go up 60 per cent during a given period, and prices 50 per cent, rates are relatively higher at the end than at the beginning of the period.

Before taking up the question of the relative position of railway rates, it is well to note that even if rates are found to be relatively higher than formerly, such a result would not *per se* call for their reduction. What determines the level of freight and passenger rates is not primarily their relation to other economic factors (although that relation cannot wholly be ignored) but the financial needs of the railways. Of necessity, if the United States is to have an adequate and efficient transportation system, the public must pay for their transportation service such rates as will meet the cost of the service plus a reasonable return on the investment. So, and only so, can the service be continued efficiently and satisfactorily. If under these conditions transportation rates should at any time become, and remain, relatively a greater proportion of the cost of production, then the economic structure must be adjusted to such greater proportion, for without adequate rates the transportation system would break down, and with its breakdown all economic processes would go to their ruin.

As a matter of fact, compared with the situation in the last normal pre-war year of 1913, transportation rates have not assumed a relatively greater weight among the cost factors in the production, but have lagged behind. For the greater part of the period since 1913 they have lagged far behind, although the rapid decline in prices during the latter half of 1920 went far toward closing the gap.

In showing the facts underlying this statement, the year 1913 will be taken as the base year, and later data will be related to the averages for that year. The year 1913 is selected as the base year because that was the last complete year prior to the outbreak of the war in 1914, also because the Department of Labor's price statistics are related to the year 1913 as a base. The average receipts per ton mile in 1913 were lower than in any other year save two. This being so, the increase in any subsequent year will be greater than if the comparison were made against most other years: that is, selection of 1913 tends to weight the scale against the railway rates, and makes it by so much the harder to prove either that rates have gone up at a relatively lower rate than prices, or that they have increased at a greater rate, but only slightly greater. The lower the point from which a given increase is measured, the greater the increase will be, and the higher the percentage of the increase, because computed on a lower base as divisor.

Comparison will be made of the increase in freight rates (stated in terms of average receipts, or price per ton mile) from 1913 to the latest date for which statistics are available, and the increase in the average wholesale price of 327 commodities, as determined by the Bureau of Labor Statistics of the U. S. Department of Labor. These are official statistics, the large number of commodities included makes it sure that the basis of measurement is a broad and representative one, and the several commodities are averaged together in proportion to their relative importance. The prices are whole-

sale prices, it is true, but speaking generally, the trend in wholesale prices in the long run tends to parallel the trend of retail prices. In fact, changes in wholesale prices usually precede corresponding changes in retail prices, and the recent sharp declines in wholesale prices have not been fully reflected as yet in retail prices. In this respect, as well as the one indicated above, the comparison will run against the railways.

Beginning with the year 1913, the changes in average receipts per ton mile (stated both in actual figures and in percentages of the 1913 average) and in the index number (or relative average price) of all commodities have been as follows:

Year or month	Average receipts per ton mile Actual-cents relative	Index number of wholesale prices
1913	719	100
1914	723	100
1915	722	100
1916	707	99
1917	715	100
1918	849	118
1919	973	135
1920	1,052	146
September, 1920	1,151	161
October, 1920	1,226	170
November, 1920	1,363	177
December, 1920	1,309	189
January, 1921	1,192	166

This comparison shows that as late as January, 1921, prices were 11 points higher than rates, even after the considerable decline in prices since the summer of 1920. The index number of prices was 177, while the relative of rates was 166.

It should also be observed that up to the close of 1920 rates lagged far behind prices. In 1916 rates were at 99 and prices at 124; in 1917 the spread was between 100 and 176, prices being up three-quarters with no appreciable change in rates; in 1918 the spread was 118 and 196; in 1919, 135 and 212, and in 1920, 146 and 243. In 1920, therefore, prices had outrun rates by almost 100 points, that is, by 100 per cent of the 1913 base.

The turn came in September, 1920, when rates started up to 160, then to 171, then to 177, and finally declined to 168 and 166; whereas prices declined from 242 in September to 225 in October, and then to 207, 189, and finally to 177.

In February, 1921, the price relative was 166, while rates were at probably the same point. For the first time since 1914, therefore, freight rates had become relatively as high as prices. It must be recalled in this connection, however, that railway rates in the years 1913 to 1917 were the lowest on record, and that the railways were even then finding their revenue inadequate to meet expenses and fixed charges. It was during those years that the railways were appealing for higher rates, in the Five Per Cent Case of 1913-14, the Western Rate Case of 1915, the C.F.A. Class Scale Case of 1916-17, and the Fifteen Per Cent Case of 1917. Thus in February the situation had temporarily assumed the same relation as in 1913-1914, when rates were low, in fact too low for the financial security of the carriers.

One point in this connection deserves comment, and that is the effect of increased rates on prices and on business. It was freely predicted in August, 1920, that increased freight rates would still further increase prices, and would shut off traffic. *Both predictions proved incorrect.* As already pointed out, prices have been declining ever since the increased rates went into effect, so that the effect of the higher rates has not been in the direction of boosting prices. Respecting the effect on traffic, the months of September and October, following the rate increase, showed no ill effects from the increased rates. On the contrary, September traffic was good, while October traffic was with one exception the greatest ever handled by the railways in a single month. Beginning in November, traffic has declined heavily, but the underlying reason has been not the increased rates, but the general business depression.

The Peculiar Position of the Denver, Boulder & Western

By J. B. Day

A SITUATION apparently without parallel in the history of rail transportation has been precipitated by a decision and order of the Colorado Supreme Court, stipulating that the defunct Denver, Boulder & Western Railroad, which operated from Boulder to Ward and Eldora, in the north-central part of Colorado, shall resume operations, notwithstanding the fact the road was junked nearly two years ago—its rails torn up, its locomotives sent to China, South America and other far parts of the globe, and its coaches and freight cars sold to other lines.

Asserting, in effect, that Humpty Dumpty cannot be put together again, officers of the defunct road have, through E. E. Whitted, the road's attorney, filed with the state public utilities commission, the medium through which the decision of the Supreme Court was passed on to the company, a petition asking that they be excused from obeying the order. There the matter rests at present. Attorneys, railroad men and Colorado residents, generally, are awaiting the final outcome with keen interest.

The history of the Denver, Boulder & Western road, known as "The Switzerland Trail of America," because of the scenic grandeur along its route, makes one of the most absorbing chapters in the romantic story of the Centennial State.

But a score of years ago, to tap rich mining fields and unfold for the benefit of Coloradans and visitors within the state's borders a panorama of nature's wonders declared to be unsurpassed anywhere in the United States, the road represented a vast outlay of money, and was considered one of the greatest engineering feats accomplished up to that time.

The road was built in the shape of a "Y," having for its stem a 13-mile stretch of track from Boulder to the town of Sunset. At Sunset the road branched, one line running southeast, to Eldora; the other northeast, to Ward. The Eldora branch was 20 miles long; the Ward branch, 13 miles. From the terminus at Eldora a wagon road extended to the famed Arapahoe peaks and glacier. An automobile stage road connected the Ward terminus with the celebrated Estes park.

Some idea of the engineering feat involved in the building of the road may be gained from the fact that in the 26 miles between Boulder and Ward it climbed from an altitude of 5,333 feet to 9,450 feet, without a tunnel. In a nine-mile stretch between Sunset and Glacier Lake, on the Eldora branch, the road ascended 1,300 feet, winding and twisting in and out like a huge serpent.

But the road, according to its officers, was never a financial success. In 1917, when the soaring costs of materials and labor added to its financial burden, officers of the road petitioned the public utilities commission for permission to discontinue service and junk the property. The petition was resisted by various residents and mining companies in the territory tributary to the road, and the commission ordered the company to continue operations, granting it permission to increase freight and passenger rates as a means of coping with its financial difficulties. On July 23, 1919, the company again petitioned the commission for permission to junk the road, asserting the increased rates had not proven sufficient to balance operating costs. The petition was granted the following month, and the work of dismantling the road was begun shortly afterward.

The city of Boulder, the Boulder Commercial Club, and various mining companies along the route of the road protested the order, and when the commission declined to grant their petition for a rehearing they took the case into the Supreme Court. They failed, however, to ask for an order to stop the dismantling of the road pending the decision of

the court, with the result that the junking process was practically complete when, in July, 1920, the court handed down its decision holding the public utilities commission should not have permitted the road to discontinue service. The court declared in this decision that it had not been conclusively shown that the road could not be operated at a profit under normal conditions, if allowed certain concessions in the way of increased freight and passenger rates.

A rehearing of the case was asked for and granted. On March 7, 1921, the court handed down a decision upholding its previous finding, and two days later issued an emphatic order to the utilities commission to vacate the permit under

throughout the junking process, and that the mining companies and other protestors should have taken steps to stop the work of dismantling the road until the decision on the protest had been arrived at.

Quoting the language of the act under which the state public utilities commission was established, in 1915, the petition seeks to show the company was entirely within its rights in proceeding with the junking process, because of the failure of the protestors to ask the Supreme Court to stay the work of dismantling.

The act states specifically that the pendency of a writ of review from an order or decision of the utilities commission



Scenes on the Denver, Boulder & Western

A—The climb above Sunset station. This photograph gives an excellent idea of the topography of the territory through which the road passed, and of the engineering difficulties encountered in building it; B—Glacier lake, on the Eldora branch. This lake is formed by the snow waters from the famed Arapahoe peaks and glacier; C—Four Mile canyon at what was known as "The Parting of the Ways," where the road forked, one branch to Eldora, the other to Ward; D—A view of the famed Long's Peak, Estes Park.

which the road discontinued operations. In the meantime, the junking of the road had been completed.

In compliance with the mandate of the court, the commission, on March 14, issued an order requiring the road "to resume operations until it shall have made a fair test of its ability to earn the necessary income to justify its further operation."

On March 26, Attorney Whitted filed the supplementary petition with the commission, asking that the road be excused from complying with the order.

The petition asserts that it is physically and financially impossible to obey the order; that the company acted lawfully

"shall not of itself stay or suspend the operation of the order or decision," and that, in the event a stay is asked for and granted, it "shall not become effective until a suspending bond shall first have been filed with and approved by the commission."

Continuing, the petition says that several hundreds of thousands of dollars more than the price received for the junked material would be necessary to rebuild the road and resume operations, and that the company has no money and insufficient credit to undertake the rebuilding.

The petition declares further that there is not and never has been sufficient business tributary to the road to provide

a return large enough to pay operating expenses and taxes, and that to require the company to obey the order to resume operations would be, in effect, confiscatory. In conclusion, the petition asks that the commission find that the road's acts have been lawful throughout the proceedings; that the commission set aside its order requiring the road to resume operations, and that the road be exonerated and excused from obedience to the order.

Charles D. Marvin, of Boulder, was president of the company which operated the now defunct road, and William M. Culbertson, of Erie, Pa., was vice-president. L. R. Ford, of Boulder, was general manager.

Open Executive Committee Meeting of Air Brake Association

IN LIEU OF THE twenty-ninth annual convention, which was postponed because of the prevailing business depression, the Executive Committee of the Air Brake Association held an open meeting at the Hotel Sherman, Chicago, on May 3, for the conduct of the essential business of the Association and to receive the committee reports and papers prepared for presentation and discussion at this year's convention. The reports and papers were presented in abstract only and were received without action or discussion, it being the plan of the Executive Committee to issue them to the membership in proceedings form and to bring them up at the next regular convention for final disposition by the membership as a whole.

The following reports and papers were presented.

Report of the Committee on Recommended Practice; Tests of Steam Heating Apparatus on Locomotives and Passenger Cars, Montreal Air Brake Club; Terminal Tests to Insure Effective as Well as Operative Brakes, Pittsburgh Air Brake Club; The Schedule "U C" Brake; The Brake Pipe Vent Valve, Central Air Brake Club; and Report on Air Consumption of Locomotive Auxiliary Devices.

A Terminal Test to Secure Effective Grade Brakes

The paper presented by the Pittsburgh Air Brake Club suggests an extension to the retaining valve and pipe of the same close attention which has been so effective during the past few years in reducing brake cylinder leakage to a point where practically 100 per cent of all brakes are now operative, pointing out the importance of the retaining valve as a factor in making operative brakes effective in grade work. An abstract of the paper follows:

The method used in making the terminal test has become well established practice, its object, of course, being to determine the number of operative brakes in the train. This insures that as far as ordinary stops are concerned the trains can be stopped in a reasonable distance, but it does not insure that these same trains can be controlled and stopped on certain grades. It is for this reason that the recommendations in this paper are presented for the consideration of this Association.

A very few years ago it was found by actual terminal tests of freight trains that approximately 30 per cent of 51 trains tested had less than the required 85 per cent operative air brakes. This condition, of course, was due to excessive brake cylinder and cylinder pipe leakage.

During the 1917 convention a paper was presented by R. C. Burns, then chief air brake inspector of the Pennsylvania, recommending that, instead of doing this kind of work on the repair or shop track, the piston and leather should be taken to a shop provided with necessary facilities for proper cleaning, lubricating and testing of packing leathers.

The recommendations suggested at that time have since been recommended by the American Railway Association and

most of the large railroads of the country are now using this method for taking care of brake cylinder packing leathers. As a result brake cylinder leakage has been reduced very materially, since recent tests of a large number of trains show that operative brakes are now very close to 100 per cent.

It is well known that in order to control heavy tonnage freight trains down heavy grades with air brakes exclusively, the air brakes must be in good condition. In order to assist in increasing the per cent of effective brakes up to the point where they will equal the per cent of operative brakes, the Pittsburgh Air Brake Club recommends that the present terminal test be modified to insure an effective grade brake as well as an operative brake.

A terminal test of a number of freight trains in any yard no doubt will disclose trains with 95 per cent to 98 per cent operative brakes. But subject these same trains to a retaining valve test and it will be found in all probability that there are only 45 per cent to 55 per cent effective air brakes.

To insure a full recharge of the brake system between the time of release and the time of next application, the retaining valve and pipe should be in such condition that the brakes will remain applied from two to four minutes, and have a good exhaust of air from the brake cylinder when the retaining valve handle is turned down.

In order to ascertain the percentage of effective brakes, a retaining valve test should be made with all retaining valves in holding position. Following an initial fuel service application and release, succeeding full service applications and releases are made at four-minute intervals until the train crew or inspectors have completed the inspection of the train. Following the whistle signal at the first application the crew or inspectors, stationed at the front and rear of the train, wait two minutes after the release of the brakes is heard and then start over the train, turning down retaining valves as they go. They continue to do this until the signal for the next application is given and two minutes after the next release, repeat the process. This is continued until the retainers are all released. Ineffective brakes are indicated by a lack of exhaust, or only a faint exhaust at the retainer when the handle is turned down.

If this test could be substituted for the present terminal test, there is no reason why the latter could not be eliminated for the reason that the retaining valve test determines both the number of effective brakes and the number of operative brakes as well.

The retaining valve test was conducted on eight freight trains last summer, all coal trains, 50 cars per train, and it was found that a fast man would turn down as many as 10 retaining valves in the two minutes allotted between the release and application of the brakes, but the average was found to be about eight cars in each two-minute period. It would, therefore, require on a 50-car train approximately 12 minutes to make the test with two men, one starting at the front and the other at the rear end of the train.

The tests of the eight trains just referred to developed the fact that with from 88 per cent to 100 per cent of the brakes operative only 40.7 per cent to 71.7 per cent of the brakes were effective. The tons per effective brake ranged from 112 to 143. If every operative brake had been an effective brake the tons per good brake would have ranged from 62 to 83.

It is also recommended that when cars are going over repair or shop tracks, even though they are in date, they should be submitted to a retaining valve test and if the combined leakage of brake cylinder, retaining valve and pipe, exceeds 12 lb. per minute, the brake equipment should receive attention.

It is believed that if these recommendations are adopted by the railroads in general, only a short time will elapse until all freight grades will be in condition to control trains down average grades.

Effect of Train Speed on Energy Consumption

This Relationship Directly Involves One of the Largest Expenses of Freight Train Movement

By G. S. Chiles and R. G. Kelley

ESSENTIALLY, the movement of traffic between terminals is simply a problem of the application of mechanical energy to overcome train resistance. Many conditions affect the cost of producing and applying this energy as well as the amount of energy which must be expended. Some of these conditions are beyond control, but others, such as train loading and speed, are subject to a considerable measure of control. The following discussion will be confined to a consideration of the effect of train speed on the amount of energy which must be applied to effect a given freight train movement, or in other words, to produce a given number of gross

rate of doing work. It is important that work and power should not be confused. In the case of train movement, the distance (the operating district) is fixed and the work done in completing a movement is directly proportional to the force required to effect the movement under its particular set of conditions. The power required will depend on the time allowed for the completion of the movement.

The values for the resistance of cars of 20 tons, 40 tons and 75 tons gross weight, taken from the curves in Fig. 1, are shown in the table and may be considered as typical of the minimum, the average and the maximum car weights generally encountered in freight train make-up.

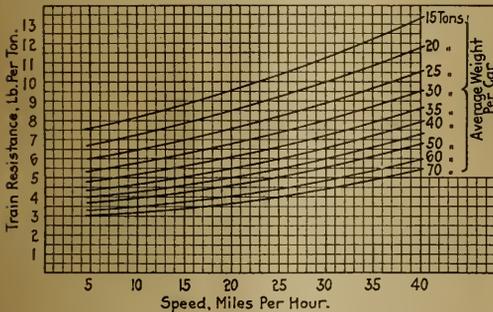


Fig. 1—The Relation Between Resistance and Speed, for Various Average Weights per Car

ton-miles. This consideration is of importance because it directly involves the locomotive fuel bill, which constitutes practically one-half of the direct expense of train movement.

In considering the amount of work or mechanical energy expended in freight car movement it is always somewhat difficult to determine the influence of any one of the several factors, such as the number of cars, weight of cars, train speed, condition of rail and right of way, weather conditions, etc., all of which enter into that complex quantity termed freight train resistance. In car resistance formulas there are usually three variables recognized as affecting car resistance, viz., speed, average weight of cars, and air temperature or weather. However, in order to analyze the effect of speed alone on the energy expended, the other variables will be eliminated by the assumption of constant car weight and weather conditions.

The best available data on freight train resistance were developed by Edward C. Schmidt as the result of an elaborate series of tests on the Illinois Central, published in 1910 in Bulletin No. 43 of the University of Illinois Experiment Station, and the resistance curves determined from these tests will be used. These are shown in Fig. 1.

When force is applied to the draw-bar of a car and is sufficient in amount to cause the car to move, work is performed. The amount of work performed depends on just two factors, namely, the force applied and the distance through which it acts. If the car is moved at a uniform rate of speed on straight, level track in still air the force acting, expressed in pounds per ton, is equal to the train resistance, as shown in Fig. 1.

Work is the product of force and distance. Power is the

EFFECT OF SPEED ON TRAIN RESISTANCE OF 20-TON, 40-TON AND 70-TON CARS, ON STRAIGHT, LEVEL TRACK

Speed m.p.h.	Train resistance					
	20-ton cars		40-ton cars		75-ton cars	
	Lb. per ton	Per cent inc. over 10 m.p.h.	Lb. per ton	Per cent inc. over 10 m.p.h.	Lb. per ton	Per cent inc. over 10 m.p.h.
5.....	6.5	...	4.4	...	3.0	...
10.....	7.3	...	4.7	...	3.2	...
15.....	7.9	8.0	5.1	8.3	3.4	6.0
20.....	8.5	16.3	5.5	17.0	3.7	15.5
25.....	9.3	27.0	6.0	27.5	4.0	25.0
30.....	10.0	37.0	6.6	40.0	4.5	40.5
35.....	10.9	49.5	7.2	53.0	4.9	53.0
40.....	11.8	62.0	7.9	68.0	5.5	72.0

Referring to the table, and using as a base 10 miles an hour, which is the lowest speed likely to be maintained for any great length of time, it will be seen that there is a well defined proportionate increase in the amount of energy required to move trains made up of cars averaging respectively 20 tons, 40 tons and 75 tons gross weight per car for all speeds above 10 miles an hour and that within the range of speeds likely to be encountered in freight train operation, this proportionate increase does not vary materially for cars of the

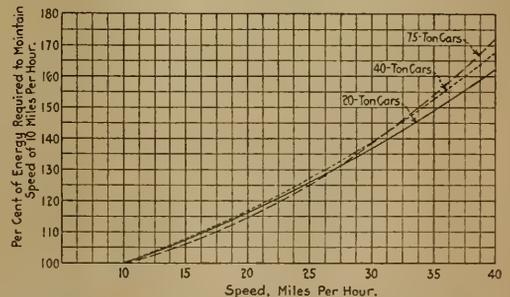


Fig. 2—Proportionate Increases in Energy Required to Move Cars at Speeds Above 10 m.p.h. on Straight Level Track

different weights. These facts are shown graphically in Fig. 2.

It, therefore, seems evident that the total work expended in freight car movement is materially influenced by changes in the speed of train movement anywhere within the whole range of practicable freight train speeds. Maximum efficiency in ton-miles produced per unit of mechanical energy expended would evidently be attained at about five miles an hour. Of course, the savings to be effected in train and engine crew

wages, fixed charges on investment, and in the improved efficiency of conversion of the chemical energy of the coal to mechanical energy at the drawbar, actually fix the most economical running speed considerably above five miles an hour.

The final determination of the best speed for freight train operation is a complex problem which can only be solved after taking into account the many special conditions affecting each case as well as the fundamentals of general application. This article will have served its purpose if it clearly draws attention to one of the latter which has not generally been taken into account in discussing the possibilities of increasing freight train speeds. Its importance is evident from the fact that even under present conditions, with punitive rates for overtime, the fuel cost of train movement is but a fraction of one per cent less than the cost of engine and train crew wages.

Commercial Stocks of Coal

WASHINGTON, D. C.

A PRELIMINARY REPORT on commercial stocks of coal as of April 1 has just been made public by the United States Geological Survey, giving results of an inquiry conducted in part for the purpose of ascertaining whether the low production of coal thus far this year has been due mainly to undue postponement of coal purchases or whether it has not been due in part to the accumulation of reserves as a result of decreased consumption. The preliminary estimate indicates that on April 1 the stocks on hand of bituminous coal were approximately 37,000,000 tons as compared with about 45,000,000 tons on January 1. If the draft upon stocks is not soon checked, the report states, reserves will fall below the level of safety, but the report indicates that the slump in production is to a considerable extent due to decreased consumption. The railroads on April 1 had a reserve of about three weeks and five days' supply or about the same as on January 1. An abstract of the report of which the figures are still subject to revision, follows:

Stocks of coal are significant because they are the consumers' reserve against a possible interruption in supply. Such interruptions have occurred in the past through mine strikes, traffic congestion on the railroads, or severe weather interfering with the delivery of loaded coal. When stocks are large, consumers can delay purchasing until offered favorable terms. Small stocks, on the contrary, drive many consumers to enter the spot market and conduce to higher prices. The condition of stocks, therefore, has an important effect on the coal market, and is a matter of consequence to all who buy and sell coal in quantity. In considering stocks, a sharp distinction must be made between anthracite and bituminous coal.

Current Production and Consumption

Production of bituminous coal declined steadily from December, 1920, to the end of the coal year, March 31. In late March and early April, the soft coal miners were working on the average only two or three days a week. Mine capacity and demonstrated transportation facilities sufficient to produce another 6,000,000 tons of coal every week, were and still are lying idle. An army of men dependent on the mines for livelihood are unemployed, or at best, working but a few hours a week. From a maximum of 12,800,000 tons a week in December, production had sunk to a bare 6,000,000 tons, the lowest point (except, of course, for the great strike of 1919) touched since April, 1914. Indeed, if the growth in the country's requirements during the past seven years be considered, the present depression in the soft coal industry is more acute than that of 1914, and one must go back to the panic of 1893 to find its parallel.

At first thought, this profound slump in production might give ground for alarm as to the sufficiency of next winter's supply of coal. Before, however, it is assumed that the slump in output foretells a shortage of coal, two other facts must be taken into account. The first fact is that the slump was preceded by several months of heavy production, which brought the total output in 1920 up to 556,000,000 tons, exceeding even the war year, 1917, and approaching the record production of 1918—579,000,000 tons. Not all of this large output was consumed or exported. Some millions

of tons of it were added to consumers' stocks, and it was to be expected that these stocks would be drawn upon during the late winter. The second fact to be remembered is that the slump in output was accompanied by a great cut in consumption. While complete data on current consumption are lacking, there is enough evidence to show that the combined domestic consumption and exports during the first quarter of 1921 were 20 per cent less than during the first quarter of 1920. Comparing the month of March, 1921, with March, 1920, the decrease was about 30 per cent.

Piecing together the available facts concerning production, consumption and stocks, it appears that the output during the first quarter of the year 1921 was 100,000,000 tons; that consumption and exports were in round numbers 108,000,000 tons, and that the deficit between production and consumption was made up by a draft upon consumers' stocks of about 8,000,000 tons.

Moreover, this draft upon stocks did not end with March 31. Although the returns for the week ended April 23 show an increase in production, the total output for April will fall short of the total consumption. Six million eight hundred and twenty-nine thousand tons a week is not enough to meet our current requirements, even in the present atmosphere of business depression.

A final estimate of the total stocks on hand can not be made until more complete returns are received from consumers. It is, however, possible to state that the stocks on hand as of January 1, 1921, were somewhere between 42 and 48 million tons—say 45 million, and that on April 1 they had fallen to somewhere between 34 and 39 million—say 37 million. In the following table are given the stocks at various times in the past:

Estimated Total Commercial Bituminous Coal in the United States (Net Tons.)

October 1, 1916.....	27,000,000	January 1, 1919.....	57,900,000
October 1, 1917.....	28,100,000	April 1, 1919.....	40,400,000
July 15, 1918.....	39,700,000	March 1, 1920.....	24,000,000
October 1, 1918.....	59,000,000	June 1, 1920.....	20,000,000
Day of the Armistice.....	63,000,000		

Coal in transit not included.

Stocks Held by Different Consumers

Retail Yards.—Stocks of bituminous coal in the yards of retail coal merchants were greater on April 1, 1921, than on the corresponding date two years before, and very much greater than last year. The 1,107 dealers reporting had an average of four weeks' and two days' supply on January 1. They reduced their stocks by 15 per cent during the three months from January to March, and on April 1 their supplies were sufficient for three weeks and five days. The maximum stock carried by retailers during the period over which the records of storage coal extend was five weeks and four days on January 1, 1919.

Railroad Fuel.—The railroads of the country had about three weeks' and five days' supply of coal in cars, stock piles and chutes on April 1. Reports from 283 roads had been assembled by the American Railway Association up to Friday, April 29, and complete returns for all roads are promised. The 283 roads had on hand 6,741,000 tons as of January 1, and almost exactly the same amount—6,737,000 tons—on April 1. This was equivalent to 26 days' requirements at the going rate of consumption. Thus while the quantity of coal purchased currently by the roads apparently decreased, their consumption had so decreased that their takings sufficed to maintain their reserves. It is not yet possible to state the railroad fuel stock in tons, but by expressing it in terms of weeks' supply, it may be compared with the stock on other dates. Like the majority of other consumers, the railroads are much better stocked with coal than they were in 1920, but have no such reserve as they carried in 1918 and early 1919.

The coal in transit forms a sort of mobile reserve as opposed to the stationary reserve in the bins of consumers. This mobile reserve includes not only the coal in cars, but also the coal on the commercial docks at the head of the Lakes. The tonnage on the docks is normally greatest in the fall at close of navigation, and least in the spring when navigation opens.

Complete returns concerning the carry-over on April 1, 1921, are not yet available, but the total is thought to be at least 2,250,000 tons. The following statement shows the bituminous coal on hand at the opening of navigation, held by companies now reporting to the Northwestern Coal Dock Operators' Association. Though incomplete, the figures cover an identical group of companies operating at Duluth, Superior, Ashford and Washburn:

1917.....	387,968
1918.....	987,246
1919.....	2,439,749
1920.....	514,902
1921.....	1,643,034

Though smaller than in 1919, the 1921 carry-over was much larger than in either of the war years, and three times as great as last year.

General News Department

The hearing before Examiner Barclay of the Interstate Commerce Commission on the cost of repairs to locomotives sent by the New York Central to outside shops, originally set for hearing at New York on May 9, has been postponed until May 23.

The New England Railroad Club, at its regular meeting to be held at the American House, Boston, on Tuesday evening, May 10, will listen to a talk by E. S. Jones, official photographer of the Boston & Maine, on New England: its lakes, rivers, mountains, seashore and history. The lecture will be illustrated with original colored lantern slides.

Express messengers and others who, for several weeks, have been on trial in the federal court at Macon, Ga., on charges of a conspiracy to rob the American Railway Express Company, were sentenced on April 30. Thirteen men were sentenced to terms in the penitentiary, and 28 others were fined in amounts ranging from \$300 to \$3,000.

In a bold theft of mail bags at the station of the Central of New Jersey at West Eighth street, Bayonne, N. J., on the morning of April 30, the baggageman at the station was shot and wounded. The robbery occurred before daylight, immediately after the bags had been left by a southbound train. Seven men were arrested soon afterward and were held in \$25,000 bail, each, for a hearing this week.

The Missouri Pacific has abolished its Valley division, effective May 1, and has assigned the Pine Bluff district from Little Rock, Ark., to McGehee, to the Arkansas division, the McGehee district, from McGehee to Monroe, La., and the Hamburg district, to the Louisiana division and the Lake Providence district, the Eudora district and the Arkansas City and Warren branches to the Memphis division.

Officers of the Mobile & Ohio and representatives of the two organizations representing unskilled employees of that road, have agreed upon a reduction in wages of approximately 20 per cent below the rates prescribed in the United States Railroad Labor Board decision No. 2. The new rates became effective April 16. The reductions apply in all departments of the service where unskilled laborers are employed, including track, bridge, building, shop, coal chute, cinder pit, dock and freight house workmen.

The full crew law of Pennsylvania, which has been in force in that State since July, 1911, will be repealed by an act passed by the legislature last week, and since signed by the governor, authorizing the Public Service Commission to regulate the number of men to be employed in each train crew. The House adopted this bill by a vote of 110 to 88. In 1915 the legislature voted to repeal the full crew law, but its action was vetoed by Governor Martin G. Brumbaugh.

Senator Frelinghuysen has introduced in the Senate a bill to provide for the payment of a salary to Henry J. Ford, who served as a member of the Interstate Commerce Commission until March 4 under a recess appointment, after the Senate had failed to confirm the original appointment. M. W. Potter, who served in the same way, is entitled to his salary for the period because he was later reappointed and the Senate voted confirmation. Mr. Ford has been retained by the Interstate Commerce Commission as special assistant.

Three of the five bandits who participated in seizing the ticket receipts of the New York Central at Toledo, Ohio, on January 17, as the money was being moved from the station to the bank when two railroad detectives were murdered, have been captured. Frank Seward, the last of the robbers apprehended, was injured in trying to make his escape from

officers who had been sent to arrest him at Omaha, Neb., on April 25, and later died from self-inflicted wounds. The other two bandits captured have been sentenced, one to life imprisonment and one to be hanged.

Bird M. Robinson, President of the American Short Line Association, says that about 75 per cent of the employees of the short lines of the country have accepted reductions in wages. The amount of the reductions is not known with precision, but Mr. Robinson thinks the percentages were as great, and perhaps in some cases greater than, the reductions proposed by the larger railroads. It is said that nineteen disputes now before the Railroad Labor Board involve "short lines" and Mr. Robinson plans to go before the Board and show that that body has no jurisdiction of roads which were not operated by the government during the war.

V. Fitzpatrick, speaking for 15 organizations of strikers who left the services of the Atlanta, Birmingham & Atlantic on March 5, wrote last week to B. L. Bugg, receiver in charge of the road, requesting a conference, as suggested by the Railroad Labor Board, in its decision on the A. B. & A. controversy (reported in the *Railway Age*, April 29, page 1036); but Colonel Bugg, in a long reply, declines to confer; his new employees are satisfactory; the public is being served, by both passenger and freight trains, and Mr. Fitzpatrick's constituents, having voluntarily left, are not now employees and have no standing before the Labor Board. Colonel Bugg calls attention to the fact that Judge R. M. Barton, chairman of the Railroad Labor Board, filed a dissenting opinion, declaring that the decision of the Board in this matter was based on a misconception of the law. Judge Barton believes that the action of the Federal Court in Georgia was wise, and fully justified.

Railroad Surgeons' Meeting

The first annual meeting of the Medical and Surgical Section of the American Railway Association is to be held at Hotel Westminster, Boston, Mass., on Friday and Saturday, June 3 and 4. Members attending this meeting will be accorded half rates on Pullman sleeping cars, for themselves and their families, the arrangement being to pay full fare both ways, taking receipt, and then making application for refund, afterward, through the secretary of the Section, J. C. Caviston, 75 Church street, New York city.

Elimination of Transportation Taxes Not Included in Tax Revision Plan

Secretary of the Treasury A. W. Mellon, in a letter to the chairman of the Congressional committee, proposes a plan of tax revision, including a repeal of the excess profits tax on corporations and a possible substitution of a flat additional tax on corporations. He recommends the retention of the transportation tax on freight and passengers. It is objectionable and he wishes it were possible to recommend its repeal; but it produces about \$330,000,000 in revenue per year and could not safely be repealed or reduced unless Congress is prepared to provide an acceptable substitute.

St. Paul Employees Want to Acquire Stock

Employees of the Chicago, Milwaukee & St. Paul have started a movement to acquire stock in the company. At a recent informal dinner of the employees of the auditor's office, 189 employees subscribed for 379 shares of the stock. They formed the "Action Club" and each employee owning a share of stock will wear a button on which will be inscribed, "I Am An Employee Stockholder." When the subject was discussed at the dinner the

clerk who proposed the purchase of stock by employees said the company offered nothing and that officers of the road were in no way back of the proposition. Arrangements will be made to purchase the stock through brokers and payment will be made on the installment plan.

New Rules for Classification of Employees

New rules governing the classification of employees for statistical and reporting purposes, to go into effect on July 1, have been issued by the Interstate Commerce Commission. They provide for more detailed reports than have hitherto been required. The resulting statistics are intended to meet the needs of both the Railroad Labor Board and the Interstate Commerce Commission. The classification is made largely in accordance with the recommendations of the director-general of railroads. It is requested that duplicate copies of the reports be sent to the Labor Board. There will be 148 classes of employees, in place of the 68 classes heretofore used by the commission. The number of employees is to be counted 12 times a year as of the 15th of the month, with additional counts for certain occupations.

New Acting Secretary Announced for A. S. C. E.

At the regular meeting of the American Society of Civil Engineers on May 4, notice was presented that E. M. Chandler, formerly chief engineer, Washington State Reclamation Service, Olympia, Wash., had been elected acting secretary of the society. Following this, Ernest E. Howard, Kansas City, Mo., presented a paper on Vertical Lift Bridges. With the aid of lantern slides, Mr. Howard presented and described the development of the lift bridge, the general elements of the design as well as going into considerable detail over the methods used in constructing some of the more notable of the structures illustrated. The greater part of the paper covered data relative to the design, etc., of the Columbia River Interstate bridge, the North Kansas City bridge and the Harriman bridge at Portland, Ore. The discussion was chiefly by D. B. Steinman and Shortridge Hardesty who compared the relative economies of the vertical lift bridge and the bascule span.

Cost of Train Operation in January

A further increase in the cost of train operation as indicated by selected accounts is shown by a statistical bulletin issued by the Interstate Commerce Commission for the month of January. The average cost per freight train mile for the selected accounts was \$2.16 as compared with \$1.87 in January, 1920, an increase of about 16 per cent. The cost of locomotive repairs increased from 45.7 to 54.8 cents, engine house expenses from 11 to 13.9, engine men from 27.6 to 28.5, trainmen from 31.4 to 33.7, fuel from 60 to 73 and other locomotive and train supplies from 11.3 to 12.4 cents. The cost of coal per net ton, including freight, was \$4.61 as compared with \$3.71. The average cost of train operation per 1,000 gross ton miles was \$1.59 as compared with \$1.41. The cost per passenger train mile, selected accounts, was \$1.16 as compared with \$1.01.

March Income Shows Some Improvement

A preliminary compilation of revenues and expenses as reported by the railroads to the Interstate Commerce Commission for the month of March makes a better showing than that for the preceding three months. As the result of a considerable reduction in operating expenses, which show a decrease of 5 per cent as compared with March, 1920, 181 Class I roads show a net operating income for the month amounting to \$28,000,000, as compared with \$12,000,000 for the corresponding month of last year. To receive a 6 per cent return for the year the Class I roads should earn about \$81,000,000 net in March, but in January and February the roads had deficits and in December the net operating income was only about \$10,000,000. Total operating revenues of the 181 roads for March were \$434,000,000, or almost exactly the same as those for March, 1920. Operating expenses were \$380,000,000, a reduction of \$20,000,000. The more detailed statement which will be issued later is expected to show, however, that this reduction was accomplished largely at the expense of maintenance. The Eastern roads had a net operating income of \$10,000,000, the Southern roads \$7,000,000 and the Western roads \$10,600,000.

Opposition to Sale of Chicago Junction

Luther M. Walter, attorney for eight railroads, opposing the purchase of the Chicago Junction belt line by the New York Central, sent a letter to the shippers along the Belt Lines on April 26, urging them to write to the Interstate Commerce Commission to the effect that they preferred to have the property remain under its present ownership, management and operation, since learning the facts regarding the present financial condition of these properties. "When the New York Central entered into its agreement to buy the Belt Lines on September 27, 1920," said Mr. Walter in his letter, "the lines were in poor condition financially. However, substantial increases in allowances by all the connecting trunk lines have made possible sufficient revenues to adequately maintain and expand the property as well as to return a fair rate of interest on the investment." Mr. Walter stated that the trunk lines would continue the present rates and allowances that have made the increased revenues possible, would continue to absorb the present switching charges and would retain the present flat rates to and from industries.

Traffic and Operating Statistics for January

The net ton miles of revenue and non-revenue freight handled by the railroads in January, 1921, aggregated 29,817,000,000 as compared with 34,964,000,000 in January, 1920, a decrease of 14 per cent, according to the monthly statistical bulletin issued by the Interstate Commerce Commission, covering 169 Class I roads. The average carload for the month was 30.2 tons as compared with 28.3 in the corresponding month of 1920, and the average mileage per car per day was 23.2 as compared with 22.8. The average number of unserviceable cars was 8.7 as compared with 6.5.

The average haul of freight per railroad was 187.62 as compared with 182.10 in 1920, in spite of the increase in the rates. The average revenue per ton mile was 1.21 cents as compared with 0.969 in 1920.

The number of passengers carried one mile was 3,358,000,000 as compared with 3,501,000,000 and the revenue per passenger mile was 3.11 cents as compared with 2.61 cents. There was a slight increase in the average journey per road, from 35.95 to 35.99, but there was a decrease in the number of passengers per car from 18.66 to 17.19.

A. R. A. Committee for Coal Hearings

The board of directors of the American Railway Association announces the appointment of a committee of six railway officers to look out for the interests of member roads at the hearings which are to be given by the Interstate Commerce Commission in its investigation of the practices of railroads in the distribution of private cars used in coal traffic and cars used for railroad fuel. The commission is to conduct these hearings at a number of points in different parts of the country. The committee now appointed is to co-operate with Col. A. P. Thom, general counsel of the Association of Railway Executives. It consists of C. H. Markham (I. C.); F. H. Alfred (P. M.); H. E. Byram (C. M. & St. P.); Elisha Lee (Penn.); E. E. Loomis (L. V.) and W. D. Robb (G. T.).

This committee has appointed a committee of railroad counsel to handle the case in behalf of the members, as follows: R. V. Fletcher (I. C.); H. W. Bikle (Penn.); John C. Bills (P. M.); W. S. Bronson (C. & O.); E. G. Buckland (N. Y., N. H. & H.); K. F. Burgess (C. B. & Q.); H. T. Dick (C. & E. L.); O. W. Dynes (C. M. & St. P.); E. S. Joutet (L. & N.); J. G. McMurray (D. & R. G.); and Chas. J. Rixey (Southern).

A. G. Gutheim, of the car service division, A. R. A., is also associated with the committee.

A Full Day's Work for a Full Day's Pay

Francis H. Sisson, vice-president of the Guaranty Trust Company, New York city, speaking before the American Newspaper Publishers' Association at its annual convention last week, called the attention of farmers and other persons making insistent demands for freight rate reductions to the fact that the railroads, like every other institution, must have an income at least equal to their expenses. "Railroad rates are unquestionably too high in instances, not only for the wel-

fare of business generally, but also for the best interests of the railroads themselves. There they should be reduced. But the farmers and business men who are clamoring for a general readjustment of these rates to a pre-war basis should realize that they are demanding drastic action on the part of the Interstate Commerce Commission which would mean financial disaster to the railroads and eventually to the commerce of the country. Here is a striking instance of the lack of knowledge on the part of some of our people regarding one of the most vital domestic problems of the day. It should be patent to all that to reduce rates without first reducing railroad operating costs would be calamitous. Operating costs, however, cannot be materially curtailed so long as 63 per cent of railroad revenue is absorbed in wages, as contrasted with only 43 per cent in 1917. So, in the final analysis the farmers' quarrel is not with the railroad managements but with organized railroad labor, which is opposing a reduction in the largest item of operating cost and thereby penalizing the farmer and all other producing interests in the country. Instead of applying pressure on the Interstate Commerce Commission, the farmers should address themselves directly to the railroad brotherhoods and demand a deflation of unjustifiable war wages and a full day's work for a full day's pay.

Program for Annual Meeting of

Mechanical Division A. R. A.

The Mechanical Division of the American Railway Association has issued a program for the business meeting to be held at the Drake Hotel, Chicago, June 15 and 16. The sessions will convene at 10:00 a. m., city time, which is 9:00 a. m., central standard time, and continue all of each day with luncheon period from 12:30 to 2:00 p. m.

Reports from the following committees will be considered:

WEDNESDAY, JUNE 15

General Committee.
Committee on Nominations.
Arbitration Committee.
Committee on Prices for Labor and Material.
Committee on Loading Rules.
Committee on Standard Method of Packing Journal Boxes.

THURSDAY, JUNE 16

Committee on Car Construction.
Committee on Brake Shoe and Brake Beam Equipment.
Committee on Train Brake and Signal Equipment.
Committee on Tank Cars.
Committee on Specifications and Tests for Materials.
Election of officers will be held Wednesday, immediately after report of Nominating Committee is presented. Advance copies of the reports to be considered will be mailed to the members before the meeting.

For Reasonable Railroad Regulation

The Chamber of Commerce of the United States, in resolutions adopted at its ninth annual meeting at Atlantic City, N. J., declared safe and adequate rail transportation, at the lowest rates consistent with fair wages to employees and with just returns to the owners and also sufficient to insure constant growth and improvement in facilities, to be essential to the upbuilding of the nation.

"Reasonable returns on fair value are necessary, not only as an act of justice, but also to attract new money for expansion, and to promote the safety of railway securities. Proper aggregate earnings must be maintained, but rates and the relation of rates between various commodities, particularly the products of agriculture, should be established with great care. In a country of great distances it is important for the farmer, the laborer and every producer and every consumer to have the widest distribution of commodities.

"The unrivaled railway system of the United States was created through the courage, energy, brains and money of individuals, . . . and the nation, speaking through the last Congress, decided that it wishes its railway system owned and operated by individual citizens, subject to regulation by Federal and State authority; and that it does not want government ownership or operation.

"The Chamber of Commerce of the United States reiterates its opposition to government ownership or operation. Regulation is reasonable only when it is not so restrictive as to cripple initiative and when it permits prompt action by those responsible for results. Unduly restrictive laws retard the railways rather than assist them and, in the long run, work in the direction of increased rather than reduced rates. . . ."

Railroad Regulation Gone Too Far

Otto H. Kahn, of New York, speaking before the Traffic Club of Pittsburgh on April 28, made a strong plea for such modification of federal control over railroads as shall give the directors of the companies adequate powers of initiative.

"I venture to hope—though I know it to be a daring hope," said Mr. Kahn, "that out of the investigation which shortly will be inaugurated by Senator Cummins' committee into the railroad situation there will come recognition that regulation and control have gone too far, and that more scope again must be allowed to the old American method of personal initiative, enterprise and responsibility, if the railroads are to be enabled to give the fullest and best measure of service to the people."

Mr. Kahn would continue a flat tax on corporate earnings, would abolish the excess profits tax, eliminate minor irksome and invidious special taxes and broaden the basis of indirect taxation. He would favor a sales tax, believing that the various practical objections brought forward by its opponents can all be met.

In speaking of the railroads, Mr. Kahn said:

"Practically nothing of any importance can be done without a hearing before the nine governmental appointees in Washington. Initiative has been blunted, vision deadened, daring rendered impossible, decision removed, the qualities of leadership dispossessed, men of commanding ability discouraged from entering the railroad field.

"The Interstate Commerce Commission is both an advantage and a necessity. But it should be entirely possible to attain both the things which I believe a majority of our people desire to see preserved: government surveillance and authority, and private initiative, resourcefulness, zest and responsibility. . . . It is greatly to be hoped that the bulk of employers will use the present emergency not to get even with labor, but to set an example of fair and considerate dealing."

Commission Asked to Amend Valuations

The Kansas City Southern and the Los Angeles & Salt Lake have filed motions with the Interstate Commerce Commission asking that the supplemental tentative valuations issued by the commission on March 31 be amended to set forth an analysis of the methods of valuation employed and the reasons for any difference between the final value found and the cost schedules or cost values stated by the commission. It is stated that the valuation act requires such an analysis of the methods and that the commission in failing to give it has not complied with the plain and express terms of the valuation act.

The Kansas City Southern motion states that the carrier is deprived of the right given by the valuation act to protest against the rules, principles, methods and procedure which have been employed and that it cannot prepare intelligently its protest against the supplemental tentative valuation. As an illustration, the carrier points to the fact that the value stated as the final value of the carrier is less than the cost of reproduction new as computed by the commission and in excess of the cost of reproduction less depreciation as computed by the commission, but it is nowhere stated by what method or processes such value has been reached. Objection is also made that there is no ascertainment of other values and elements of value and that the valuation does not give or purport to give the commercial or pecuniary value of the property. The final figure given is described as "an arbitrary and artificial sum determined by some undisclosed process and not a compliance with the law."

The Los Angeles & Salt Lake has also filed a protest against the supplemental tentative valuation stating that a valuation as of June 30, 1914, will not comply with the act or serve any purpose thereunder. Protest is also made against the finding of a final value of \$45,871,093 and the company alleges that the value of its property was not less than \$70,000,000. It is also

stated that the commission in finding a value "as that term is used in the interstate commerce act" has employed language which is indefinite and subject to misconception and misunderstanding, in view of the fact that there is an important controversy whether the value to be reported shall be "real or pecuniary value" or simply an amount to be designated as the value for rate-making purposes.

Meetings and Conventions

The following list gives names of secretaries, dates of next or regular meetings and places of meetings:

AIR BRAKE ASSOCIATION.—F. M. Nellis, Room 3014, 163 Broadway, New York City. Exhibit by Air Brake Appliance Association.

AIR BRAKE APPLIANCE ASSOCIATION.—Fred W. Venton, 836 So. Michigan Ave., Chicago. Meeting with Air Brake Association.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—F. A. Pontious, Supervisor of Demurrage and Storage, C. & N. W. Ry., Chicago.

AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—S. W. Derr, Philadelphia & Reading, Philadelphia, Pa.

AMERICAN ASSOCIATION OF ENGINEERS.—C. E. Drayer, 29 S. La Salle St., E. L. R. N. 2, South Michigan Ave., Chicago. Annual convention, May 9-11, La Fayette Hotel, Buffalo, N. Y.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—J. Rothschild, Room 400, Union Station, St. Louis, Mo. Next convention, August 24-26, 1921, Kansas City, Mo.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Burritt, 8 W. 40th St., New York.

AMERICAN RAILROAD MASTER TINNERS', COPPERSMITHS' AND PIPE FITTERS' ASSOCIATION.—C. Borcherdt, 202 North Hamilton Ave., Chicago, Ill. Next convention September 12-14, Hotel Sherman, Chicago.

AMERICAN RAILWAY ASSOCIATION.—J. E. Fairbanks, General Secretary, 75 Church St., New York, N. Y. Next regular meeting, November 16, 1921.

Division I—Operating, W. J. Fripp (Chairman), General Manager, New York Central Railroad, Eastern Lines, New York, N. Y.; R. E. New (Vice-Chairman), General Manager, Central Region, Pennsylvania System, Pittsburgh, Pa.

Freight Station Section (including former activities of American Association of Freight Agents), C. E. Fish (Chairman), Freight Agent, Baltimore & Ohio Railroad, Cincinnati, Ohio; J. C. Gilmore (First Vice-Chairman), Agent, Pennsylvania System, Eastern Region, Philadelphia, Pa.; M. Teschemacher (Second Vice-Chairman), General Agent, Chicago & Alton Railroad, Chicago, Ill.; R. O. Wells (Secretary), Freight Agent, Illinois Central Railroad, Chicago, Ill.

Medical and Surgical Section, D. Z. Dunott (Chairman), Chief Surgeon, Western Maryland Railway, Baltimore, Md.; G. G. Dowdall (First Vice-Chairman), Chief Surgeon, Illinois Central Railroad, Chicago, Ill.; Duncan Eve (Second Vice-Chairman), Chief Surgeon, Nashville, Tenn.; J. C. Nashville, Chattanooga & St. Louis Railway, Nashville, Tenn. Annual meetings, Caviston, secretary, 75 Church Street, New York. Annual meetings, June 3 and 4, Hotel Westminster, Boston.

Protective Section (including former activities of the American Railway Chief Special Agents and Chiefs of Police Association), R. S. Mitchell (Chairman), Chief Special Agent, Missouri Pacific Railroad, St. Louis, Mo.; H. L. Denton (First Vice-Chairman), General Superintendent of Police, Baltimore & Ohio Railroad, Baltimore, Md.; Emmett Gregg (Second Vice-Chairman), Superintendent Special Agents, Santa Fe Railway, Topeka, Kan.; J. C. service, Atchison, Topeka & Santa Fe Railway, Topeka, Kan.

Telegraph and Telephone Section (including former activities of the Association of Railway Telegraph Superintendents), H. Hellatt (Chairman), Manager of Telegraphs, Grand Trunk Railway, Montreal, Que.; W. H. Hall (First Vice-Chairman), General Superintendent of Telegraph, Missouri, Kansas & Texas Lines, Denison, Texas; R. F. Finley (Second Vice-Chairman), Superintendent Telegraph, New York Central Lines, West of Buffalo, Cleveland, Ohio; W. A. Fairbanks (Secretary), 75 Church St., New York, N. Y.

Division II—Transportation (including former activities of the Association of Transportation and Car Accounting Officers), E. J. Pearson (Chairman), President, New York, New Haven & Hartford Railroad, New Haven, Conn.; J. J. Bernet (Vice-Chairman), President, New York, Chicago & St. Louis Railroad, Cleveland, Ohio; C. W. Crawford (Chairman, General Committee), 431 South Dearborn St., Chicago, Ill.; G. W. Covert (Secretary), 431 South Dearborn St., Chicago, Ill.

Division III—Traffic, G. H. Ingalls (Chairman) Vice-President, New York Central Lines, New York, N. Y.; J. Gottschalk (Secretary), 143 Liberty St., New York, N. Y.

Division IV—Engineering, H. R. Safford (Chairman), Assistant to the President, Chicago, Burlington & Quincy Railroad, Chicago, Ill.; C. I. Kelloway (Vice-Chairman), Superintendent of Signals, Atlantic Coast Line Railroad, Wilmington, N. C.; E. H. Fritch (Secretary), 431 South Dearborn St., Chicago, Ill.

Construction and Maintenance Section, H. R. Safford (Chairman), Assistant to the President, Chicago, Burlington & Quincy Railroad, Chicago, Ill.; E. H. Fritch (Secretary), 431 South Dearborn St., Chicago, Ill.

Electrical Section, George Gibbs (Chairman), Chief Engineer of Electric Traction, Long Island Railroad, New York, N. Y.; E. B. Kette (Vice-Chairman), Chief Engineer Electric Traction, New York Central Railroad, New York, N. Y.; E. H. Fritch (Secretary), 431 South Dearborn St., Chicago, Ill.

Signal Section (including former activities of the Railway Signal Association), F. O. Piesing (Chairman), Signal Engineer, Union Pacific Railroad, Omaha, Neb.; F. B. Wiegand (First Vice-Chairman), Signal Engineer, New York Central Railroad, Western Lines, Cleveland, Ohio; C. A. Balliet (Vice-Chairman), Signal Engineer, Northern Pacific Railway, St. Paul, Minn.; H. S. Balliet (Secretary), 75 Church St., New York, N. Y. Annual meeting, June 6-8, Hotel Drake, Chicago.

Division V—Mechanical (including former activities of the Master Car Builders' Association and the American Railway Master Mechanics' Association), W. J. Tollerton (Chairman), General

Mechanical Superintendent, Chicago, Rock Island & Pacific Railway, Chicago, Ill.; J. Coleman (Vice-Chairman), Assistant to General Superintendent Motive Power and Car Departments, Grand Trunk Railway, Montreal, Que.; V. R. Hawthorne (Secretary), 431 South Dearborn St., Chicago, Ill. A business session at the Hotel Drake, Chicago, will be held on June 15 and 16, instead of the convention at Atlantic City, N. J. Exhibit at this convention of Railway Supply Manufacturers' Association has been cancelled.

Equipment Section (including former activities of the Master Car and Locomotive Painters' Association), E. L. Younger (Chairman), Foreman Painter, Missouri Pacific Railroad, Little Rock, Ark.; J. G. Kell (First Vice-Chairman), Foreman Painter, New York Central Railroad, Western Lines, Elkhart, Ind.; J. E. Ayers (Second Vice-Chairman), General Manager Paint, Canadian Pacific Railway, Montreal, Que.; V. R. Hawthorne (Secretary), 431 South Dearborn St., Chicago, Ill.; A. P. Dane (Assistant Secretary), Foreman Painter, Boston & Maine Railroad, Reading, Mass.

Purchases and Stores (including former activities of the Railway Storekeepers' Association), H. C. Pearce (Chairman), General Purchasing Agent, Seaboard Air Line Railway, Norfolk, Va.; H. E. Ray (Vice-Chairman), General Storekeeper, Atchison, Topeka & Santa Fe Railway, Topeka, Kans.; J. F. Murphy (Secretary), General Storekeeper, New York Central Railroad, Western Lines, Collinwood, Ohio; W. J. Farrell (Assistant Secretary), 75 Church St., New York, N. Y. Second annual meeting June 9-11, Hotel Blackstone, Chicago.

Division VII—Freight Claims (including former activities of the Freight Claim Association), H. C. Pribble (Chairman), General Claim Agent, Atchison, Topeka & Santa Fe Railway System, Topeka, Kans.; H. C. Howe (First Vice-Chairman), Freight Claim Agent, Chicago & North Western Railway, Chicago, Ill.; D. C. MacDonald (Second Vice-Chairman), Assistant General Claim Agent, Canadian Pacific Railway, Winnipeg, Man.; Lewis Pilcher (Secretary) 431 South Dearborn St., Chicago, Ill. Next meeting, May 17-19, Hotel Sherman, Chicago.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichtig, C. & N. W. Ry., 319 Waller Ave., Austin Station, Chicago. Next convention, October 18-20, 1921, New York City. Exhibit by Bridge and Building Supply Men's Association.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—(Works in co-operation with the American Railway Association, Division I.) E. H. Fritch, 431 South Dearborn St., Chicago. Exhibit by National Railway Appliances Association.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—(See American Railway Association, Division 5.)

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—R. D. Fletcher, 1145 East Marquette Road, Chicago. Next convention, August 9-11, Hotel Sherman, Chicago. Exhibit by Supply Association of the American Railway Tool Foremen's Association.

AMERICAN SHORT LINE RAILROAD ASSOCIATION.—T. F. Whittlesey, Union Trust Bldg., Washington, D. C. Next meeting, May 18, Washington, D. C.

AMERICAN SOCIETY FOR STEEL TREATING.—W. H. Eiseaman, 4600 Prospect Ave., Cleveland, Ohio. Next convention, September 19-24, Indianapolis, Ind.

AMERICAN SOCIETY FOR TESTING MATERIALS.—C. L. Warwick, University of Pennsylvania, Philadelphia, Pa. Annual meeting, June 20-24, New Monterey Hotel, Ashbury Park, N. J.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Col. H. S. Crocker (acting secretary), Engineering Societies Building, 33 W. 39th St., New York. Next convention, April 27, 1921, Houston, Texas. Regular meetings, 1st and 3d Wednesdays in month, except July and August, 33 W. 39th St., New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York. Next meeting, May 23-26, Congress Hotel, Chicago.

TRAIN DISPATCHERS' ASSOCIATION.—C. L. Darling, Northern Park City, Spokane, Wash. Next convention, June 20, 1921, Kansas City, Mo.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—George M. Hunt, Chemist, Forest Products Laboratory, Madison, Wis.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—Willis H. Failing, C. R. R. of N. J., Jersey City, N. J. Next meeting, May 18-20, at St. Louis, Mo.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Joa. A. Andreucetti, C. Association of Railway Manufacturers' Association.

ASSOCIATION OF RAILWAY EXECUTIVES.—Thomas De Witt Cuyler (chairman), 61 Broadway, New York, N. Y.

ASSOCIATION OF RAILWAY SUPPLY MEN.—A. W. Clokey, 1658 McCormick Bldg., Chicago. Meeting with International Railway General Foremen's Association.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—(See American Railway Association, Division 1.)

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—(See American Railway Association, Division 2.)

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—A. J. Filkins, Paul Dickenson Company, Chicago. Meeting with convention of American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—W. A. Booth, 131 Charron St., Montreal, Que. Next meeting, April 12.

FOREMEN'S ASSOCIATION OF CHICAGO.—Aaton Kline, 626 North Pine Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, New Morrison Hotel, Chicago.

CAR FOREMEN'S ASSOCIATION OF ST. LOUIS.—Thomas B. Koenke, Federal Reserve Bank Bldg., St. Louis, Mo. Meetings, first Tuesday in month at the American Hotel Annex, St. Louis.

CENTRAL RAILWAY CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 2d Thursday in November and 2d Friday in January, March, May and September, Hotel Statler, Buffalo, N. Y.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S ASSOCIATION.—W. P. Elliott, Terminal Railroad Association of St. Louis, East St. Louis, Ill.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S SUPPLY MEN'S ASSOCIATION.—D. B. Wright, 34th St. and Artesian Ave., Chicago.

III. Meeting with Chief Interchange Car Inspectors' and Car Foremen's Association.

CINCINNATI RAILWAY CLUB.—W. C. Cooder, Union Central Bldg., Cincinnati, Ohio.

EASTERN RAILROAD ASSOCIATION.—E. N. Bessing, 614 F St., N. W., Washington, D. C.

FREIGHT CLAIM ASSOCIATION.—(See American Railway Association, Division 7.)

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 321 Grand Central Sta., Chicago. Regular meetings, Wednesday preceding 3d Friday in month, Room 856, Insurance Exchange Bldg., Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—W. J. Mayer, Michigan Central R. R., Detroit, Mich. Next convention, August 16-18, 1921, Hotel Sherman, Chicago.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—J. G. Crawford, 702 E. 51st St., Chicago. Next annual meeting, May 24-26, 1921, Hotel Sherman, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 1061 W. Wabasha St., Winona, Minn. Next convention, September 12-15, Hotel Sherman, Chicago. Exhibit by Association of Railway Supply Men.

MAINTENANCE OF WAY MASTER PAINTERS' ASSOCIATION.—E. E. Martin, Union Pacific R. R., Room No. 19, Union Pacific Bldg., Kansas City, Mo. Next convention, October 4-6, 1921, Buffalo, N. Y.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York. Next convention, which was scheduled to be held May 23-26, 1921, Planters' Hotel, St. Louis, Mo., has been deferred.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—(See American Railway Association, Division 5, Equipment Painting Section.)

MASTER CAR BUILDERS' ASSOCIATION.—(See American Railway Association, Division 5.)

NATIONAL ASSOCIATION OF RAILROAD TIE PRODUCERS.—E. E. Pershall, T. J. Moss Tie Company, 720 Security Bldg., St. Louis, Mo.

NATIONAL ASSOCIATION OF RAILWAY AND UTILITIES COMMISSIONERS.—James B. Walker, 49 Lafayette St., New York.

NATIONAL FOREIGN TRADE COUNCIL.—O. K. Davis, 1 Hanover Square, New York. Next annual convention, May 4-7, Cleveland, Ohio.

NATIONAL RAILWAY APPLIANCE ASSOCIATION.—C. W. Kelly, Kelly-Derby Co., Peoples Gas Bldg., Chicago. Meeting with American Railway Engineering Association.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, excepting months of June, July, August and September.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meeting, 3d Friday in month, except June, July and August, 29 W. 99th St., New York.

PACIFIC RAILWAY CLUB.—W. S. Wollner, 64 Pine St., San Francisco, Cal. Regular meeting, 2d Thursday in month, alternately in San Francisco and Oakland.

RAILWAY ACCOUNTING OFFICERS' ASSOCIATION.—E. R. Woodson, 1116 Woodward Building, Washington, D. C. Next annual meeting, June 8, 1921, Hotel Traymore, Atlantic City, N. J.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 600 Liberty Bldg., Broad and Chestnut Sts., Philadelphia, Pa.

RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, 515 Grandview Ave., Pittsburgh, Pa. Regular meetings, 4th Thursday in month, except June, July and August, Americus Club House, Pittsburgh, Pa.

RAILWAY DEVELOPMENT ASSOCIATION.—D. C. Welty, Missouri Pacific R. R., Little Rock, Ark.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, General Electric Co., Chicago. Annual meeting with Association of Railway Electrical Engineers.

RAILWAY EQUIPMENT MANUFACTURERS' ASSOCIATION.—R. J. Himmelright, American Arch Company, Inc., 17 East 42nd St., New York. Meeting with Traveling Engineers' Association.

RAILWAY FIRE PROTECTION ASSOCIATION.—R. R. Hackett, Baltimore & Ohio R. R., Baltimore, Md.

RAILWAY REAL ESTATE ASSOCIATION.—R. H. Morrison, C. & O. Ry., Richmond, Va.

RAILWAY SIGNAL ASSOCIATION.—(See American Railway Association, Division 4, Signal Section.)

RAILWAY STOREKEEPERS' ASSOCIATION.—(See American Railway Association, Division 6.)

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 1841 Oliver Bldg., Pittsburgh, Pa. Exhibit at June, 1921, convention of American Railway Association, Division 5.—Mechanical has been cancelled.

RAILWAY TELEPHONE AND TELEGRAPH APPLIANCE ASSOCIATION.—G. A. Nelson, Waterbury Battery Co., 30 Church St., New York.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—P. J. McAndrews, C. & N. W. Ry., Sterling, Ill. Next annual convention, September 20-22, 1921, Chicago. Exhibit by Track Supply Association.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, Schroeder Headlight & Generator Co., New York City. Meeting with American Railway Association, Signal Section.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—L. W. Cox, 1217 Commercial Trust Bldg., Philadelphia, Pa.

SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, P. O. Box 1205, Atlanta, Ga. Regular meetings, 3d Thursday in January, March, May, July, September and November, Piedmont Hotel, Atlanta.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, Western Ry. of Ala., Atlanta, Ga.

SUPPLY ASSOCIATION OF AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—C. N. Thulin, Duff Manufacturing Company, 935 Peoples Gas Bldg., Chicago.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Meets with Roadmasters' and Maintenance of Way Association.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, 117 East 98th St., Cleveland, Ohio. Exhibit by Railway Equipment Manufacturers' Association.

WESTERN RAILWAY CLUB.—Bruce V. Crandall, 14 E. Jackson Boulevard, Chicago. Meeting third Monday each month except June, July and August.

Traffic News

The New York Central, beginning May 15, will place in effect a 30 per cent reduction in round trip passenger fares from Chicago to all Michigan resorts for the summer season.

The Illinois Central and the Nashville, Chattanooga & St. Louis have established new fast freight-train schedules from Chicago, St. Louis and points north and west to Atlanta, Ga., Jacksonville, Fla., Havana, Cuba, and other Georgia, Florida and Cuba destinations.

The portrait of the owner will be required on commutation tickets of the Long Island Railroad if the company carries out its conditional proposal announced last month in notices to passengers. These tickets are very frequently used wrongfully by persons who do not own them, and the company has appealed to all ticket holders to use their influence to stop this unlawful practice.

The San Diego & Arizona has completed arrangements with the Southern Pacific and with the Acheson, Topeka & Santa Fe for an interchange of passenger traffic at San Diego, Cal., on both one-way and round trip business, tariffs to become effective May 1. This will permit passengers from the east to travel over the San Diego & Arizona to San Diego and then to Los Angeles or San Francisco without extra cost.

The Southern Railway has established district claim offices under the direction of the following traffic officers: J. H. Drake, general freight agent for Virginia, North Carolina and the District of Columbia, with headquarters at Richmond, Va.; W. H. Paxton, general freight agent for Georgia, South Carolina and Florida, with headquarters at Atlanta, Ga.; W. C. Stephens, district freight agent, for Alabama, Tennessee and Mississippi, with headquarters at Chattanooga, Tenn.; K. B. Hennigan, general freight agent for Illinois, Indiana, Ohio and Kentucky, with headquarters at St. Louis, Mo.; J. B. Bannon, assistant general freight agent for the New Orleans & Northeastern for the territory between New Orleans and Meridian, Miss., with headquarters in the latter city.

An adjustment of rates on grain from Missouri river points to Chicago via Minneapolis is to be put into effect on May 15 with the authority of the Interstate Commerce Commission. A committee representing the carriers and shippers called on Chairman Clark of the commission on April 29 and suggested the making of a rate to apply through Minneapolis with transit at that point of 11 cents over the rate on direct routes from the Missouri river to Chicago. This represents a reduction in the rate, but it is stated it will give a larger revenue to the roads than if the same grain were shipped south through the Gulf ports. The proposed readjustment of export grain rates recommended by the commission as a modification of proposals made by the shippers and the carriers was put into effect by the Eastern roads on May 5.

Lake Cargo Coal Rates to Be Reduced

For the purpose of stimulating the movement of coal to the northwest, by water, in order to avoid congestion and car shortage later in the year, the railroads serving the lower lake ports have asked, and the Interstate Commerce Commission has granted, a sixth-section permission-order authorizing the publication on five days' notice of tariffs providing for a reduction of 28 cents a ton in the rates on coal shipped to the lower lake ports and trans-shipped across the lakes. The tariffs are to be in effect only until October 31, which is about the latest date when coal can leave the mines for lake shipment before the close of navigation. They require payment of the established rate, refund to be made on proof that the coal has been trans-shipped. They do not cover coal moving to Chicago or points south of the Illinois-Wisconsin line and the commission has received a large number of telegrams from shippers of Illinois and Indiana coal complaining of discrimination.

Senators Try to Reduce Rates

Senator Robinson of Arkansas has introduced in the Senate a bill to prevent increases in rates, fares, charges or classifications until approved by the Interstate Commerce Commission.

Numerous bills have been introduced by both Senators and Representatives authorizing and directing the Interstate Commerce Commission to issue interchangeable mileage books for 1,000 to 5,000 miles at reductions from 20 to 33½ per cent from the established rates.

Senator Trammell of Florida has introduced a bill in the Senate to repeal Section 15-a of the act to regulate commerce, which contains the 5½ to 6 per cent rule of rate-making.

Construction Material Interests Ask Reduction in Freight Rates

Representatives of the industries interested in road-building and construction materials that have been urging the President and the Interstate Commerce Commission to assist them in getting a reduction in freight rates have arranged for a conference at Washington on May 13 with representatives of the railway executives and the Interstate Commerce Commission to discuss the subject. A meeting was arranged with President Willard of the Baltimore & Ohio, who agreed to such a conference with the understanding that representatives of both sides in interest be prepared to discuss the matter in its broadest aspects and with a spirit of co-operation. He stated that he doubted if much would be accomplished by such a conference if the discussion were confined merely to the matter of railway rates. A delegation of representatives of the construction and road-building interests urged a reduction in freight rates at a conference with President Harding on April 29, at which they presented a memorial stating that the situation is urgent and can not await the ordinary process of appeal for relief through the Interstate Commerce Commission. It was stated that the chief cause of deferment in building work is excessive freight rates applying on that class of materials which are heavy loading and of no value and that freight rates on buildings and road materials have increased an average of 110 per cent since 1917, or far beyond the point the traffic will bear. It is understood that Chairman Clark asked whether the producers would be willing to reduce prices and was told that such steps would be considered provided the railroads would cut rates.

Average Revenue Per Ton and Per Passenger Per Mile

The average revenue received by the railroads of the United States for transporting a ton of freight one mile is less under the present rates than it was during the period before the creation of the Interstate Commerce Commission, according to a compilation just made by the Bureau of Railway Economics comparing the statistics for the years 1882 to 1887, reported in Poor's Manual of Railroads, with those reported by the Interstate Commerce Commission for the years since. In 1882, according to Poor's Manual, the average receipts per ton mile were 1.23 cents. In 1920, according to the Interstate Commerce Commission, the average was 1.05 cents. The latest increase in freight rates, however, was in effect for only the last four months of 1920. For January, 1921, the average receipts of the railroads for hauling a ton one mile were 1.21 cents. In 1887, the year of the organization of the Interstate Commerce Commission, the average was 1.6 cents and there was a steady reduction until 1916, when the average was 7.7 mills per ton mile. There has been an increase in each year since 1916; in 1917 to 7.15 mills, in 1918 to 8.49 mills and in 1919 to 9.73 mills. The average receipts per ton mile are affected by other factors than changes in the freight rates, notably by changes in the character of the tariff which make an increase or decrease in the proportion of commodities which pay a lower rate than others, but the average receipts afford the best general index of the trend of rates.

The average receipts per passenger per mile, however, are now slightly higher than they were before 1887. In 1882 the average was 2½ cents and in 1887 it was 2.27 cents. In January, 1921, the average was 3.11 cents and for the year 1920 the average was 2.74 cents. Passenger revenues per mile reached their lowest point in 1909 when the average was 1.92 cents. In 1916 the average was 2.4 cents, in 1918 it was 2.41 cents and in 1919 it was 2.54 cents.

Commission and Court News

Interstate Commerce Commission

Conferences will be held at Yakima, Wash., and Boise, Idaho, in addition to those previously announced, on rates on fruits and vegetables; at Yakima on May 10, and at Boise on May 14. The Denver conference has been postponed to May 19.

The commission has further suspended until June 24, the operation of certain increased rates on glass fruit jars, etc., from Sand Springs, Sapulpa and other points in Oklahoma and Texas, to Memphis, Tenn., and points taking same rates.

The commission has further suspended until June 14, the operation of certain reduced class and commodity rates from New York, Philadelphia and other points to Houston and Galveston, Texas, via water and rail, or rail, water and rail lines.

The commission has suspended until August 29 the operation of certain schedules published in supplements to Louisville & Nashville tariffs which propose increased commodity rates on rough, sawed or dressed stone, carloads, from Bowling Green, Ky., to eastern points, Ohio River crossings, St. Louis, Mo., Memphis, Tenn., New Orleans, La., Birmingham, Ala., etc.

Suspension Procedure

The Commission has issued a public notice outlining the main points of its rules of practice concerning suspension of proposed rates under Section 15 of the interstate commerce act as amended. It says:

The statutory maximum period of suspension is 120 days beyond the time when the rate would otherwise go into effect. It is therefore important that in such proceedings there be no unnecessary delay.

Before filing changes in rates the carriers should have considered the action, the reasons underlying it and the effects of it so thoroughly as to be prepared in case the changes are protested to immediately present in full their defense. They should also, as requested in the commission's circular letter of February 9, 1915, send with each schedule containing increased rates, a statement of the changes and the reasons therefor. A similar statement should be submitted with each schedule containing reduced rates as to which there is reasonable ground to believe that protests may be filed.

Suspension of proposed rates should not be requested unless protestant is sure that he understands the effect of the rates and that his request rests on good grounds. The request should state clearly and concisely the reasons relied upon in support thereof. The one who requests suspension should at the same time send direct to the carrier or the tariff agent who issued the tariff advice that request for suspension has been filed, and of the reasons for that action. The request upon the commission should be accompanied by a statement that the carrier or agent, naming them, has been so advised. If the carrier or tariff agent makes answer to protestant's petition, a copy of such answer must be sent by the carrier direct to the protestant at the same time that it is forwarded to the commission.

If the protestant desires to be heard orally by the suspension board, the request for suspension should so state and be filed with the commission at least 15 days prior to the effective date of the tariff.

The commission must determine its action upon a request for suspension in the light of understanding of the situation. In order that opportunity may be had for such understanding it is important that the request shall be filed as far in advance of the effective date of the rate as is practicable and not less than 10 days before that effective date. See Rule XIX of the commission's rules of practice. It will be the policy of the commission to afford carriers an opportunity to answer or explain allegations or questions raised in a request for suspension, but it is essential that the carriers shall give immediate attention to such matters and forward at once such representations as they desire to have considered. If the request for suspension is not presented within the time above mentioned it may ordinarily be expected that it will not be favorably acted upon. If the carrier's neglect to promptly forward the data which they desire to have considered in answer to a request for suspension they may expect that it will be unavailing. It will be the purpose of the commission to avoid suspending proposed rates except where the date of that action affords opportunity to publish notice of such suspension before the effective date of the proposed rates.

Personnel of Commissions

Ira B. Mills, chairman of the Minnesota Railroad and Warehouse Commission, and a former president of the National Association of Railroad and Public Utility Commissioners, died at St. Paul on May 4 at the age of 70. Judge Mills had been in office about 28 years.

The Senate on May 3 confirmed the appointments of E. I. Lewis and J. B. Campbell as members of the Interstate Commerce Commission. These appointments fill the remaining vacancies on the commission and it now has 11 members for the first time since the law was passed a year ago, increasing the number from 9 to 11.

Johnston B. Campbell, of Spokane, Wash., who has been nominated a member of the Interstate Commerce Commission, as noted in the *Railway Age* of April 29, was born in



J. B. Campbell

Stillwater, Minn., and his first twenty-one years were spent on a farm. He was graduated from the University of Minnesota in 1890 and was engaged in the practice of law in Duluth, Minn., for the next eight years. In 1898 he moved to Moorhead, Minn., but he soon moved from there to the State of Washington and for a time was engaged in farming; but in 1903 he began the practice of law in Spokane. Here he was the prime mover in the establishment of the Spokane Merchants' Association,

and he has been the attorney and secretary of the association ever since. The management of the "Spokane rate case," in which for twenty or thirty years the merchants of that region have been contesting the long-and-short-haul provisions of the Interstate Commerce law, under which the freight rates from the east are higher to Spokane than to the Pacific Coast, has been carried on largely under his direction. Mr. Campbell has devoted most of his time to transportation matters since 1910, and during the period of government operation of the railroads he was a member of the Portland District Freight Traffic Committee.

State Commissions

The State Railroad Commission of California, on April 13, ordered a reduction of more than 25 per cent in freight rates on the Atchison, Topeka & Santa Fe, and the Southern California between Los Angeles and Palo Verde valley points.

A petition has been filed with the Illinois Public Utilities Commission by the village of Oak Park, Ill., asking that the Aurora, Elgin & Chicago and the Baltimore & Ohio Chicago Terminal be compelled to elevate their tracks through the town. The cost of this work has been estimated by the Commissioner of Public Works of Oak Park at \$1,600,000. The hearing was set for May 12.

The Michigan Public Utilities Commission on April 23 ordered all carriers in Michigan to reduce by May 10th freight rates for the transportation of sand, gravel and stone 25 per cent in the lower peninsula and 22 per cent in the upper peninsula. This order does not affect the rates on these materials where the sand is to be used in foundries or in the manufacture of glass, fertilizer, chemicals or cement, it being the purpose of the order to reduce rates on materials to be used in road construction.

The New York State Public Service Commission, second district, has denied the application of the Erie Railroad for permission to discontinue the services of an agent at a number of small stations in the western part of the state. It seems to the commission "that an impoverishment of the ordinary service of the company to the extent here proposed is a device pregnant with most grave and perhaps fatal results. It is difficult to see how any ultimate good can inure to the benefit of the investors in these properties by a deletion of the service to a point where it is unjust, unreasonable and inadequate."

The Public Utilities Commission of Utah has granted a certificate of convenience and of necessity for the operation of an automobile freight line between Salt Lake and Ogden, 37 miles, although there are two steam railroads and an electric line already serving this territory. The application of the proprietors of the automobile line has been pending since last August, strong protest having been made by the Oregon Short Line and the electric road. It appears that these automobiles have already done considerable business over this line and their application is endorsed by numerous business men in both cities. The commission requires tariffs to be filed and also a time table; and suggests that warehouses and other facilities will be needed. The commissioners expect that their order will give stability to a useful service now done outside of any regulatory law.

The move to abolish the railroad commission of the state of Wisconsin and substitute in its stead a utility commission of three members was reported unfavorably by the transportation committee in joint session with the Senate corporation committee at Madison, Wis., on April 27. This provision was incorporated in the Peterson utility bill and provided further that earnings of utilities in excess of 8 per cent on the investment should go into a sinking fund instead of being divided among stockholders. The committee agreed that the provision calling for the abolition of the present railroad commission in the Peterson utility bill should be removed from the bill and agreed to accept an amendment to be drawn by Louis E. Gettle, recent nominee as a member of the commission, altering the section which would govern the earnings of the utilities. In this form the bill will be recommended for passage.

Court News

Safety Appliance and Boiler Inspection Acts

The Minnesota Supreme Court holds that the presence of a piece of coal upon a step leading to a locomotive cab does not constitute a violation of the federal Safety Appliance Act; nor does the federal Boiler Inspection Act guarantee the employee against such obstruction. The court thinks both acts must be construed so as not to include cases where some foreign substance has found a temporary lodgment upon the appliances of the locomotive or tender, and which is not the result of the ordinary use of such instrumentalities, but came there accidentally from some unforeseen cause.—*Reeves v. C. St. P. M. & O. (Minn.)*, 179 N. W., 689

Contract to Give Notice of Injury Held Void

The Texas Commission of Appeals holds that under section 5 of the federal Employers' Liability Act, declaring void any contract or rule to exempt a common carrier from any liability created by the act, a contract by which an interstate railroad employee agrees to give notice of injury and claim for damages within 30 days, failing which his cause of action would be barred, is void. So far as the court could find the only prior case on this point is *Rock Island v. Pearce*, 118 Ark. 6 (1915) where a similar contract was held void under the act. The Supreme Court of the United States has had no opportunity to review that decision, and no federal court appears to have had such a contract before it for construction.—*Panhandle & Santa Fe v. Brooks (Tex.)* 222 S. W., 186.

Assumption of Risk of Dangerous Duty

A member of a train crew was, in the course of a well-known dangerous yard movement, stationed on the front of a caboose pushed by the engine, with a duty to signal the engineer in time for him to stop if a derail should be found set against further passage. It was so set, but either through the negligence of the trainman himself or of the engineer in not noticing or heeding his signaling, the latter did not stop in time, the caboose was derailed, and the trainman was crushed to death between it and cars on the adjoining track. In an action under the federal Employers' Liability Act the Pennsylvania Supreme Court, assuming for the purpose of decision that the negligence was that of the engineer and not of the trainman, held that the latter assumed the risk of injury or death as a result of the movement, so that no recovery could be had therefor under the act.—*Reed v. Director General of Railroads (Pa.)*, 110 Atl., 254.

Foreign Railway News

Training Plans on English Railway

The Great Western Railway of England has announced a training plan for salaried employees which involves a period of four years, during which time the employees who are selected to take the course will be taken from their regular duties and assigned for a brief period to work in each of several of the company's departments. In this manner the selected employees will be given an opportunity to observe the workings of as large a number as possible of the railway's various departments. It is contemplated that each selected employee will spend at least a year in the general offices of the company. Candidates for appointment to these courses must be recommended by the heads of their departments or by the division or district officers. No application is to be considered from any employee who does not hold a merit certificate in the company's examinations in either signaling or station accounts or who has attended a course of lectures and gained a first class certificate at one of the schools where educational facilities are provided by the company. The actual selection of the candidates and the observation of their progress in their studies will be in the hands of a committee made up of a number of general officers. The proposal does not carry any promise of preferment in promotions to those who are selected for this course.

England Escapes a Railway Strike

LONDON.

What threatened to be a general strike of all transport workers, including all classes of railway transportation employees, has been averted by what may be called a freak of fortune. The miners' union, which went out on a strike on April 1 on account of the drastic reductions in wages made necessary by the decontrol of the mines by the government, succeeded in gaining the support of the National Union of Railwaymen and the Transport Workers, who threatened a sympathetic strike to take effect on Friday, April 15. The chief argument for this co-operation by the railway union was that what the mine owners were trying to do to the miners the railway owners would try to do to the railwaymen when the railways were handed back to their owners on August 31, and that every support must be given the miners. From the time the strike announcement was made—April 9—until the date for which the strike was set, there were marked evidences of a lack of support in the ranks of the railway men. When the miners refused to consider what appeared to everyone, including the railwaymen, a fair proposal, which was suggested unofficially by the secretary of the miners' union, for reopening negotiations with the mine owners, the leaders of the railwaymen's union broke away and declared the strike off, no longer than five hours before the strike was to have taken effect. The miners are still holding out for a national wage board and the pooling of receipts for a uniform wage scale throughout the country.

Railway Operations in South Africa

The annual report of the general manager of the South African Railways and Harbors for the fiscal year ending March 21, 1920, shows a total route mileage of 9,541 for the South African Railways. In addition 1,285 miles of railway in the Southwest African Protectorate and 651 miles of privately operated lines are included under the administration. Of the 9,541 miles in the Union of South Africa, 154 miles are double tracked, 2 miles are three tracked and 12 miles are four track lines. None of the lines are of standard gage. Of 3 ft. 6 in. gage there are 8,981 miles and of 2 ft. gage 561 miles. No new lines were built during the year. The total capital investment at the end of the fiscal year was \$470,598,942 (£ to \$ at par) and the deficit after the payment of interest was \$2,721,318. The general manager complains in his report of unsatisfactory financial agreements existing between his and other government departments which he says cost his administration some \$3,645,000 per annum, or more than the deficit for the year.

The operating revenues of the railways totaled \$93,165,160, an increase of 25 per cent over the previous year. Operating expenses amounted to \$73,512,375, an increase of 29 per cent. Of the total revenues, 43 per cent were derived from merchandise and mineral traffic, 28 per cent from passenger traffic and 19 per cent from coal traffic. The annual wages bill increased \$30,982,500 over the same total for the fiscal year 1911-12. Freight train mileage for the year was 19,730,700; passenger train mileage was 6,247,389 and mixed train mileage was 5,330,069. Total train mileage increased 8 per cent over the previous year.

Japanese Railway Statistics

A statement covering the operating statistics of the Imperial Government Railways of Japan has just been released for the year ended March 31, 1919. This statement has been summarized by the Bureau of Railway Economics. The statistics represent approximately four-fifths of the total railway mileage of the country, the remaining one-fifth consisting of minor privately owned lines and light railways. The miles of single track operated in 1919 were 5,269 as against 5,206 in 1918, and the total miles of all track operated were 9,503 as against 9,313. Capitalization in 1919 amounted to \$636,836,513 as compared with \$593,171,996 in 1918.

The statistics show that the freight traffic on the Japanese government railways in 1919 increased by 9.4 per cent when compared with 1918, or 59,711,366 tons as compared with 54,603,406; the number of passengers carried increased by 17.5 per cent or 288,061,584 as compared with 245,234,480. The revenue derived from freight service amounted to \$54,707,599, while passenger earnings were \$59,769,956. Total earnings in 1918 were \$121,408,327, against \$91,487,284 in 1918. Operating expenses in 1919 were \$71,834,690, and in 1918 \$42,058,458. The increase of \$29,921,043 in revenues was thus offset by the increase of \$29,776,232 in expenses, the net operating revenue remaining nearly stationary. Interest charges amounted to \$21,097,112, additional works expenses \$6,019,889, and subsidies to private light railways \$747,750, leaving a net profit of \$23,632,908 in 1919 as compared with a profit of \$23,272,534 in 1918.

American Firm Secures Contract

for Construction in Bolivia

A contract has been signed between the Bolivian government and an American firm for the financing and construction of the railway from La Quiaca, on the Argentine border, to Atocha, Bolivia, a distance of 126 miles, the only link needed to give La Paz, Bolivia, an all-rail route to Buenos Aires, Argentina, according to Vice-Consul Nelson at La Paz. The company engages to negotiate a loan of \$7,000,000 in favor of the Bolivian government to cover the expense of construction and equipment of this railroad, and to complete the road by August 1, 1925. As the work progresses completed sections of 6 miles are to be turned over to the Bolivian government. Some work has already been done on the projected line, through previous contracts made with the Bolivian government by a French company, and in June, 1920, by an Argentine firm; however, both of these contracts were annulled for nonfulfillment. It is understood that 30 miles of the railway from La Quiaca are ready for the laying of the rails and that other parts of the La Quiaca-Tupiza section, 62 miles long, are also under construction. The Tupiza-Atocha section, 64 miles in length, has not yet been started. Total expenditures on the entire La Quiaca-Atocha line up to November 25, 1920, principally payments to previous contractors, have been approximately \$1,818,700 (bolivianos to dollars at par).

The construction of this line will mark the completion of the second trans-Andean railway in South America, the other being the railway connecting Valparaiso and Santiago, Chile, with Buenos Aires, Argentina. The latter line, however, is not serviceable for several weeks in the year on account of severe snowstorms and snowslides which occur occasionally on the route, whereas the La Quiaca-Atocha line will be serviceable all the year round. By means of this new railway the trip from New York to Buenos Aires via Arica or Melendo, Chile, can be made in 18 days, and by way of Antofagasta, Chile, in 19 days.

Miscellaneous

Equipment and Supplies

Car Deliveries in March

The number of freight cars delivered in March by the 27 car building companies reporting to the Railway Car Manufacturers' Association totaled 5,753 for domestic service and 700 for export. The passenger train cars delivered totaled 69 for domestic service. On March 31 the companies had on hand undelivered orders for 21,808 freight and 681 passenger cars for domestic service and 4,029 freight and 28 passenger cars for export. The detailed figures for the month follow:

NEW CARS DELIVERED			
	Domestic	Foreign	
Freight	5,753	700	
Passenger	69	0	
ON ORDER AND UNDELIVERED			
		Total	
Freight	21,808	4,029	25,837
Passenger	681	28	709
CAR REPAIRS			
Delivered—March			4,824
On order and undelivered March 31			14,348

Locomotives

The SAO PAULO & RIO GRANDE (Brazil) is inquiring for 10 Mikado type locomotives.

PEKIN-KALGAN.—The American Locomotive Company has been given an order for 42 locomotives of the Pacific, Mikado and Mallet types for the Pekin-Kalgan Railway, China. The total value of the contract is in the neighborhood of \$2,600,000. The Pekin-Kalgan is owned by the Chinese Government, and the payment for these locomotives is financed jointly by the American Locomotive Company and Mitsui & Co. The latter company is to pay to the locomotive company 50 per cent cash upon completion of the contract, and the remaining 50 per cent is to be paid in eight semi-annual payments. This order in value is one of the largest single orders placed by the Chinese government in the United States. Of the 42 engines there will probably be seven to ten Mallet type locomotives which will be the largest ever shipped out of the United States or in use in any other part of the world except the United States. Each locomotive and tender will weigh 640,000 lb. in working order.

Freight Cars

PERIN & MARSHALL, 1107 Broadway, New York, are inquiring for 60 all steel gondola cars, for export to India.

The SAO PAULO & RIO GRANDE (Brazil) is inquiring for 75 general freight, 25 open high side cars and 75 flat cars.

The PITTSBURGH & WEST VIRGINIAN is asking for prices on repairs to 500, 70-ton coal cars.

Passenger Cars

THE DELAWARE & HUDSON is inquiring for 12 milk cars.

THE SAO PAULO & RIO GRANDE (Brazil) reported the *Railway Age* of April 22, as inquiring through the car builders for some passenger train equipment, is asking for 6 first-class and 6 second-class coaches, also 8 baggage, 4 mail and 4 sleeping cars.

Machinery and Tools

The NEW YORK CENTRAL will receive bids, until 12 o'clock noon, May 16, for the manufacture, delivery and erection in complete working condition, of one 1,500 kw. direct current geared turbine generator, to be installed in the turbo-generator building, Grand Central Terminal, New York City, and the removal of the existing turbine generator located at the same place.

The CHICAGO, ROCK ISLAND & PACIFIC has ordered 8,000 tons of tie plates from The Railroad Supply Company, Chicago.

The SOUTHERN PACIFIC COMPANY will receive bids at 165 Broadway, New York, until 12 o'clock noon, May 20, for one year's requirements of calcium carbide, which will approximate a minimum of 1,451,000 lb. and a maximum of 1,919,000 lb.

THE LEHIGH & NEW ENGLAND will receive bids at Philadelphia, Pa., until 12 o'clock noon, May 16, for its requirements estimated at approximately 32,000 gross tons of No. 1 buckwheat anthracite coal to be delivered at Pen Argyl, Pa.; 15,000 gross tons of No. 1 buckwheat anthracite coal to be delivered at Lansford, Pa., and 150 gross tons chestnut coal to be delivered at Pen Argyl, Pa.

THE LONG ISLAND is asking for bids until 12 o'clock noon, May 12, for 340-360 wooden barrels of 150 deg. kerosene oil for headlights; 50-60 wooden barrels of long time burning oil for use in lamps controlled by the signal department; 20-30 wooden barrels 300 deg. of mineral seal oil; 175-200 steel barrels motor gasoline; 5 cars or about 35,000 gal. gas oil, for making Pintsch gas for cars; 25,000 gal. roadbed oil for laying the dust on tracks.

THE NORFOLK & WESTERN will receive bids at Roanoke, Va., until 12 o'clock noon, May 11, for 2 100-lb. crossings; 1 100-lb. manganese steel crossing; 4 switchboard panels; 2,000 socket terminals for 130-lb. rail bond; 2,000 7/16-in. steel expansion pins; 2 steel gates; 4 steel gate posts; electrical material; 5,000 No. 2 B. & S. gage copper rail bonds; 650 lb. flux rods; 6 clamps for holding bonds to rail, and 400 D bevel steel bars 3/8-in by 3 1/2-in by 20 ft.

Railway Construction

CENTRAL OF GEORGIA.—This company has awarded a contract to the Wright-Nave Company, Ashville, N. C., for the construction of 7 miles of branch line and about 1 mile of mine spurs. The branch line will run in a southeasterly direction from McCombs Station, Ala. The grading will average about 40,000 sq. yds. per mile. There will be no important structures on the new line and coal will be the principal commodity handled.

CHICAGO, GREAT WESTERN.—This company will close bids on May 11, for the construction of a new passenger station at Afton Junction, Iowa, to cost about \$8,000.

CHICAGO, ROCK ISLAND & PACIFIC.—This company closed bids for the construction of a 500-ton frame coaling station at Morris, Ill., on May 3.

CHICAGO UNION STATION.—This company will shortly accept bids for the completion of the filled portion of the Polk street viaduct, Chicago, at a cost of about \$12,000.

GRAND TRUNK.—This company is reconstructing its bridge over the Beauharnois canal near Cecile Junction, Que., at an expenditure of approximately \$70,000. The company is also adding a roadway and side walk to its international bridge at Black Rock, N. Y., involving the expenditure of \$40,500.

ILLINOIS CENTRAL.—This company will shortly accept bids for the construction of additions to its roundhouses at Waterloo, Iowa, and Freepport, Ill.

KENTUCKY AND TENNESSEE.—The Interstate Commerce Commission has issued a certificate authorizing the construction of a branch line in McCreary County, Kentucky, a distance of 9,230 feet, to reach a tract of coal land.

LOUISIANA & ARKANSAS.—This company is preparing plans for the construction of a machine shop and other buildings at Stamps, Ark., and will soon be ready to accept bids on the work.

PITTSBURGH & WEST VIRGINIA.—This company contemplates the construction of a branch line, 3 1/2 miles in length, running north from Virginia Station, W. Va. The grading on this line will be done under contract.

UNION PACIFIC.—This company will close bids on May 5, for the construction of a two-story, interlocking tower, with dimensions of 16 ft. by 20 ft., at Council Bluffs, Iowa, to cost approximately \$12,000.

Supply Trade News

Moore, Cameron & Hill, Limited, has removed its Montreal, Que., office from 284 Beaver Hall Hill to 205 Drummond building.

The Blackburn-Smith Corporation has removed its office from 105 West Fortieth street to the Terminal building, 103 Park avenue, New York City.

The Dutilh-Smith McMillan Company, Inc., and Lam, Glines & Co., Inc., have removed their offices from 50 Broad street to 40 West street, New York City.

The Ryan Car Company will move its Chicago office from the McCormick building, 332 South Michigan boulevard, to the Fisher building, 343 South Dearborn street, on May 1.

John J. Swan, for the past two years with the Prest-O-Lite Company at Indianapolis, Ind., has resigned to become associated with the Engineering Business Exchange, New York city.

J. M. Davis, formerly vice-president of the Baltimore & Ohio, has been elected president of Manning, Maxwell & Moore, Inc., 119 West Fortieth street, New York City, to succeed the late A. J. Babcock. Mr. Davis

was born on November 5, 1871, and began railway work in 1888, as a freight brakeman on the San Antonio & Aransas Pass. From September, 1891, to 1900, he served consecutively as stenographer to the superintendent of the Gulf, Colorado & Santa Fe, chief clerk to the superintendent of the Mexican Central, clerk in the general manager's office of the Great Northern, assistant superintendent and later superintendent of the Great Northern. In 1900, he went

to the Erie as superintendent at Scranton, Pa., subsequently serving as superintendent of the Union Steamboat Line of the Erie, at Buffalo, N. Y., and as superintendent of the Allegheny division of the Erie. He returned to the Great Northern in 1903, as superintendent, and in 1905 was promoted to assistant general superintendent of the Central district. In 1907 he went to the Oregon Short Line as assistant general superintendent, and was subsequently made acting general superintendent and later general superintendent. In 1910 he was appointed general superintendent of the Central district of the Southern Pacific, with headquarters at San Francisco, Cal. He entered the service of the Baltimore & Ohio on January 1, 1914, as assistant general manager at Cincinnati, Ohio, of the Baltimore & Ohio Southwestern-Cincinnati, Hamilton & Dayton, and later in the same year was promoted to general manager of these lines. In July, 1916, he was appointed vice-president in charge of operation and maintenance of the Baltimore & Ohio System, with headquarters at Baltimore, Md., and held that position until July 1, 1918, when, under federal control of the railroads, he was appointed manager of the New York properties of the Baltimore & Ohio, including the Staten Island lines. In September, 1919, he left the Baltimore & Ohio to become president of the Rock Hill Iron & Coal Company and associated corporations, including the East Broad Top Railroad & Coal Company, with office at New York.



J. M. Davis

The H. K. Ferguson Company, Cleveland, Ohio, has removed its Chicago office from the Rookery building to 1637 Monadnock Block. O. C. F. Randolph remains in charge of the Chicago territory.

The Ross Heater & Manufacturing Company, Inc., Buffalo, N. Y., has opened a branch office at 2 Rector street, New York City, and has discontinued its sales agency. The new office is in charge of C. M. Hardin, who was formerly located at the home office.

The Automatic Coupler & Trailer Equipment Company, 954 West Twenty-first street, Chicago, has been incorporated with a capital of \$100,000, by Norman T. Brenner, Meyer B. Mervis and Charles A. Holland, to manufacture railroad and other heavy mechanical equipment.

R. L. Shepard, until recently engaged in railroad sales promotion work for the Burroughs Adding Machine Company, Detroit, Mich., is now handling railroad sales for that company in Chicago. Mr. Shepard was formerly connected with the Union Pacific Railroad at Omaha.

Mark R. Briney, eastern manager of the Federal Signal Company, in charge of sales and installations in that district, has been appointed sales manager, with headquarters at 52 Vanderbilt avenue, New York City, effective May 1. Mr. Briney will have charge of all railway signaling sales and installations, both domestic and foreign, and his jurisdiction will extend over all branch offices, agencies and the commercial end of the business. J. J. Hubbard, formerly in charge of installations, has been appointed resident manager of the company, effective May 1. Mr. Hubbard will have charge of sales and installations in the eastern district, with offices as above.

Pittsburgh Base on Steel Products Opposed

The Federal Trade Commission on April 29 issued a formal complaint against the United States Steel Corporation and 11 subsidiary companies, upon application of the Western Association of Rolled Steel Consumers and other users of steel products, on the ground that the Pittsburgh basing point system of basing the prices of steel products except rails on the price at Pittsburgh plus the freight rate from that point to destination constitutes an unfair method of competition in violation of Section 5 of the organic act of the commission and Section 2 of the Clayton Act. The case was set for hearing on May 31 or as soon thereafter as it is reached on the docket. The complaint alleges that this price practice makes it impossible for purchasers of rolled steel to secure the product from any manufacturers at prices substantially different from those contained in the price schedules issued by the corporation.

Obituary

Ambrose Monell, for 15 years previous to 1917 president of the International Nickel Company, New York, and during the war a colonel in the aviation section of the A. E. F., died on May 2, at Beacon, N. Y., at the age of 47. Colonel Monell was born in New York City and was graduated from Columbia University with the class of 1896. After leaving Columbia, he went to the Carnegie Steel Company, Pittsburgh, as a metallurgical engineer, serving for six years in various capacities until he became assistant to the president. Later he became president of the International Nickel Company. Mr. Monell was a director of a number of companies, including the Haskell & Barker Car Company, the Air Reduction Company and the International Nickel Company.

Trade Publications

SPREADER PLOW.—The Bucyrus Company, South Milwaukee, Wis., has issued Bulletin SP-502 describing its Class 50 spreader plow. This eight-page booklet describes the machine and illustrates its appearance and the character of work performed. Information and a drawing are also given of a method of making a 31-ft. fill with the plow, without the use of trestle work.

Railway Financial News

ATCHISON, TOPEKA & SANTA FE.—Annual Report.—A review of this company's annual report appears on another page of this issue.

New Directors.—John W. Davis and W. C. Potter, both of New York, have been elected directors to succeed E. J. Engel of Chicago, and F. L. Julliard, of New York.

BANGOR & AROOSTOCK.—Annual Report.—The income account for the year ended December 31, 1920, compares with 1919 as follows:

	1920	1919
Rental from U. S. Railroad Administration entire year 1919, and January and February, 1920	\$231,789	\$1,555,775
March 1, 1920, to August 31, guaranty from U. S. Government as per contract ¹ due from the U. S. Government account net income being less than guaranty, difference	448,994	.....
Rail operations—revenues March 1 to December 31	\$5,786,756	.....
Less rail operations—expenses	5,030,406	34,594
	\$756,350	\$1,521,182
Compensation and net operating revenues	1,437,133	1,521,182
Other income	397,045	72,303
Gross income	\$1,834,179	\$1,593,484
Railway tax accruals	286,561	42,171
Interest on funded debt and other deductions	927,251	1,077,724
Total deductions	\$1,283,812	\$1,119,895
Net income	550,367	473,589
Dividends:		
Preferred 7 per cent	243,600	243,600
Common 4 per cent	154,400	154,400
	\$398,000	\$398,000
Balance of net income	\$152,367	\$75,589

¹Includes \$79,393 freight revenue from Maine Central Railroad covering period prior to January 1, 1918, in final adjustment in divisions as per contract of 1913. Does not include \$26,486 increased mail revenue applying to period prior to January 1, 1918, which has been credited to profit and loss during 1920 on instructions of the Interstate Commerce Commission.

The operating revenues and expenses in detail and the principal traffic statistics for 1920 compare with 1919 as follows:

	1920	1919
OPERATING REVENUES		
Freight	\$5,240,928	\$4,063,169
Passenger	1,117,246	953,917
Total operating revenues	\$6,675,481	\$5,287,300
OPERATING EXPENSES		
Maintenance of way and structures	\$1,445,082	\$1,177,240
Maintenance of equipment	1,585,035	1,506,244
Traffic expenses	46,782	45,872
Transportation expenses	2,649,211	2,040,865
General expenses	241,921	182,390
Total operating expenses	\$6,063,076	\$5,027,967
Net revenue from railway operations	\$612,404	\$259,333
Railway tax accruals	334,670	299,860
Railway operating income	\$277,645	Dr. \$42,451
PASSENGER TRAFFIC		
	1920	1919
Number of revenue passengers carried	684,644	619,471
Number of passenger miles hauled	27,345,129	25,079,846
Average miles carried—revenue passengers	39.94	40.49
Average revenue per passenger mile (cents)	\$0.4086	\$0.3804
FREIGHT TRAFFIC		
	1920	1919
Number of revenue tons carried	2,154,229	1,969,223
Number of tons carried one mile	242,823,083	235,876,903
Average miles hauled—revenue freight	113.23	119.78
Average revenue per ton-mile	\$0.2158	\$0.1723

Authorized to Issue Equipment Securities.—This company has been authorized by the Interstate Commerce Commission to issue conditional sale purchase notes to the amount of \$210,057 under the terms of a contract with the National Railway Service Corporation.

CANADIAN PACIFIC.—Lord Shaughnessy Proposes C. P. R. Operate Canadian National.—See article on this subject on another page.

CENTRAL VERMONT.—Annual Report.—The corporate income account after taking into consideration standard return for January and February and guaranty for guaranty period shows a net deficit for 1920 of \$425,042 as compared with a net income in 1919 of \$80,305.

The operating revenues and expenses in detail and the principal traffic statistics for 1920 compare with 1919 as follows:

	1920	1919
OPERATING REVENUES		
Freight	\$5,480,247	\$4,524,675
Passenger	1,461,812	1,197,307
Total operating revenues	\$7,726,522	\$6,288,387
OPERATING EXPENSES		
Maintenance of way and structures	\$1,443,076	\$1,270,494
Maintenance of equipment	2,198,424	1,535,408
Traffic	138,605	105,177
Transportation	5,103,882	3,739,450
General	286,039	282,499
Total operating expenses	\$9,193,474	\$6,907,961
Net from railway operations	Def. \$1,466,952	Def. \$619,574
Taxes	236,446	194,981
Net railway operating income	Def. \$1,967,156	Def. \$910,923
FREIGHT TRAFFIC		
Revenue train miles	1,030,974	906,216
Freight earnings	\$5,480,247	\$4,524,675
Earnings per freight train mile	\$5.32	\$4.99
Tons carried	4,870,160	4,072,076
Tons carried one mile	369,496,598	298,416,307
Earnings per ton mile	1.48 cents	1.52 cents
PASSENGER TRAFFIC		
	1920	1919
Revenue train miles	1,096,540	1,037,703
Passenger earnings	\$2,012,095	\$1,606,409
Earnings per passenger train mile	\$1.83	\$1.55
Passengers carried	1,470,347	1,368,709
Passengers carried one mile	45,294,652	39,541,851
Earnings per passenger per mile	3.23 cents	3.02 cents

CHICAGO & EASTERN ILLINOIS.—Confirmation of Sale Deferred.—Confirmation of the sale of this road, scheduled to take place in Chicago on May 3, before United States Judge Carpenter, met strong opposition from the Mechanics and Metals National Bank, through Isaac H. Mayer, its counsel in Chicago. The court refused the motion of Attorney George W. Murray on behalf of the reorganization managers to approve the reorganization plan in its entirety. The bank's claims as a creditor were expressly reserved for future consideration, and the matter was referred to Master in Chancery C. B. Morrison.

CHICAGO & WESTERN INDIANA.—Lessees Authorized to Guarantee Bonds.—The Interstate Commerce Commission has granted the applications of the Chicago & Eastern Illinois; Chicago, Indianapolis & Louisville; Wabash; Grand Trunk Western, and the Chicago & Erie, for authority to assume obligation or liability in respect of \$7,000,000 of Chicago & Western Indiana collateral trust bonds, by entering into a joint supplemental lease with that company under which each applicant agrees to pay \$5,000 monthly to the trustee under the collateral trust indenture for the purpose of satisfying certain sinking fund requirements thereof.

CHICAGO, BURLINGTON & QUINCY.—Northern Pacific-Great Northern Bonds Oversubscribed.—Representatives of the syndicate offering the Northern Pacific-Great Northern \$230,000,000 bonds, state that those who have subscribed up to \$100,000 will get the full amount of their subscriptions. Because of the oversubscription, which is reported to be between 10 per cent and 12 per cent, some of the largest subscribers will be scaled down in the allotments. Announcement of these allotments and of the division of subscriptions on the three issues, made available under the terms of the offering, will not be made, syndicate bankers said, probably until next Monday, when a complete history of the subscriptions, in tabulated form, will be made public.

CHICAGO, MILWAUKEE & ST. PAUL.—Loan Approved.—The Interstate Commerce Commission has approved a loan of \$10,000,000 to this company from the revolving fund to enable it to meet maturing indebtedness.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—Authorized to Acquire E. I. & T. H.—The Interstate Commerce Commission has issued a decision approving and authorizing the acquisition by this company of the control of the Evansville, Indianapolis & Terre Haute by purchase of its entire capital stock for \$1,000,000 as of January 1, 1921.

DELAWARE, LACKAWANNA & WESTERN.—Stockholders to Vote on Stock Dividends.—A special stockholders' meeting will be held July 21, to vote for the approval of plans relative to capitalization of \$45,000,000 of the road's surplus. If the stock increase

is approved as expected, directors will meet on July 28 and declare a stock dividend to holders of the company's \$42,220,550 outstanding stock.

The New York Times had an article last Friday, to the effect that there has been considerable dissatisfaction among the Lackawanna stockholders over the ruling of the I. C. C., which allowed the capitalization of only \$45,000,000 of the company's \$90,461,776 surplus. The Times' story said:

They hold, and they are approved in this by their officers and directors, that the stockholder has a greater equity in the surplus than have the stockholders in the surpluses of many other railroads. This, it is asserted, is due to the fact that the D. L. & W. has followed the plan of leasing in perpetuity about 70 per cent of its mileage, for which it pays a yearly rental of \$4,000,000. These properties have been developed out of earnings rather than as the result of bond issues, which is the usual railroad practice, and they yield the road in the neighborhood of \$2,000,000 a year. Much of the difference between this figure and the rental has grown into surplus. In the case of many other roads, they assert that the development of properties has been partly out of earnings and partly out of bond issues, while the roads have been acquired through the issuance of bonds. This has in many instances set up a heavy burden of interest charges, and it has been the policy of the Interstate Commerce Commission to require such roads to maintain surpluses in proportion with such charges. The Lackawanna holders feel that this is not necessary in the case of their company and that, therefore, they should have been allowed to capitalize their entire surplus.

The ruling of the Interstate Commerce Commission authorizing the Lackawanna stock dividend was given in the *Railway Age* of April 22, page 995.

The stockholders will also vote on the segregation of the company's coal properties. The company filed its acceptance of the Pennsylvania state constitution, which contains a provision prohibiting ownership and operation of coal properties by railroads.

DENVER & RIO GRANDE.—Annual Report.—The income account for 1920 compares with 1919 as follows:

	1920	1919
OPERATING REVENUES		
Freight	\$29,960,361	\$24,099,452
Passenger	7,481,518	6,922,474
Total operating revenues	\$40,590,345	\$33,016,257
OPERATING EXPENSES		
Maintenance of Way and Structures	\$6,252,620	\$4,856,556
Maintenance of Equipment	\$,342,746	7,923,546
Traffic	481,576	241,398
Transportation	14,664,166	11,295,477
General Expenses	1,034,204	928,666
Total operating expenses	\$32,552,648	\$25,753,232
Net operating revenue	\$8,037,698	\$7,263,024
Railway Tax Accruals	\$1,648,663	\$1,380,793
Uncollectible revenues	19,042	5,616
Total operating income	\$6,369,993	\$5,876,616
Standard return		\$8,319,377
Compensation, January and February	\$1,386,563	
Guaranty, estimated amount due	2,373,248	
Total non-operating income	\$5,461,714	\$9,436,844
Gross Income	\$11,831,707	\$15,313,460
Total deductions	\$10,820,771	\$17,800,906
Net Income	\$1,310,935	\$2,487,446

The annual report of the Denver & Rio Grande will be reviewed editorially in an early issue.

DULUTH & IRON RANGE.—Settlement with Railroad Administration.—This company has effected a final settlement with the Railroad Administration by which it receives \$4,866,000 in full settlement of its claim arising from the period of federal control. The company had claimed \$6,420,052.

DULUTH, MISSABE & NORTHERN.—Settlement with Railroad Administration.—This company has effected a final settlement with the Railroad Administration by which it receives \$8,525,000 in full settlement of its claim for the period of federal control. The company had claimed \$12,104,397.

EAST ST. LOUIS JUNCTION.—Asks Authority to Issue Notes.—This company has applied to the Interstate Commerce Commission for authority to issue \$85,000 of 7 per cent promissory notes for advances made by the St. Louis National Stock Yards Company to meet the 1920 payroll including back pay.

EVANSVILLE, INDIANAPOLIS & TERRE HAUTE.—Purchase by C. C. C. & St. L. Approved.—See Cleveland, Cincinnati, Chicago & St. Louis above.

Certificate Not Required for Acquisition of E. & I. Line.—The Interstate Commerce Commission has decided that the pro-

posed acquisition and operation by this company of a line heretofore owned and operated by the Evansville & Indianapolis does not require the issuance of a certificate of public convenience and necessity.

GRAND TRUNK.—Stockholders Meeting.—A special meeting of stockholders will be held in London on May 12, to consider a proposed amendment to the agreement entered into March 8, 1920, with the Canadian Government. The amendment extends the time for arbitration proceedings to determine the price to be paid by the government for Grand Trunk shares on condition that the present directors resign in favor of government representatives. This bill has passed the Canadian House of Commons and is awaiting action by the Senate. Acceptance of the new agreement will clear the way for immediate government control, after which the unpaid Grand Trunk interest due in April, will likely be paid. Interest due May 1, including that on obligations bearing provincial guarantees, has been paid.

KANSAS CITY TERMINAL.—Asks Authority to Issue Notes.—This company has applied to the Interstate Commerce Commission for authority to issue \$2,000,000 of ten year 6½ per cent notes secured by the pledge of \$3,125,000 of first mortgage 4 per cent bonds. The proceeds are to be used in part to retire an issue of \$2,500,000 of 4½ per cent notes maturing July 1. The new notes are to be sold through E. H. Rollins & Sons and the Continental & Commercial Trust Company of Chicago.

LEHIGH & HUDSON RIVER.—Annual Report.—The annual report for the year ended December 31, 1920, shows the following income account:

	1920	1919
Railway operating revenues, ten months	\$2,780,302	
Railway operating expenses, ten months	2,378,244	
Revenue from railway operation, ten months	\$402,058	
Less—		
Hire of equipment—Balance	\$168,054	
Joint facility rents	134,940	
	282,994	
Income from lease of road (U. S. R. R. Administration), two months	86,562	
Income from other sources	54,112	
Income, U. S. Government guaranty period	386,836	
	\$646,574	
Deductions—		
Taxes	\$106,731	
Interest on debt (due and accrued)	184,369	
	291,101	
Net income transferred to profit and loss	\$355,473	\$231,193
Dividends (6 per cent, 1920; 12 per cent, 1919)	103,170	206,340

The operating revenues and expenses in detail and the principal traffic statistics for the year ended December 31, 1920, compare with the preceding year as follows:

	1920	1919
OPERATING REVENUES		
Freight	\$2,984,251	\$2,545,342
Passenger	52,240	49,259
Total operating revenues, inc. other	\$3,146,209	\$2,687,526
OPERATING EXPENSES		
Maintenance of way and structures	\$394,109	\$333,186
Maintenance of equipment	607,442	503,321
Traffic expenses	23,711	20,953
Transportation expenses	1,651,475	1,125,756
General expenses	95,667	70,277
Total operating expenses	\$2,772,404	\$2,042,593
Net revenue from railway operation	\$373,805	\$644,933
PASSENGER TRAFFIC		
Number of passengers carried	140,984	133,652
Number of passengers carried one mile	1,705,329	1,705,222
Average receipts per passenger (cents)	11.7	12.8
Average receipts per passenger per mile (cents)	3.1	2.9
FREIGHT TRAFFIC		
Number of tons carried	3,927,434	5,322,354
Number of tons carried one mile	409,680,013	383,194,047
Average distance hauled per ton (miles)	69.2	71.9
Average receipts per ton per mile (mills)	7.3	6.6

LOUISVILLE & NASHVILLE.—Asks Loan from Revolving Fund.—This company has applied to the Interstate Commerce Commission for a loan of \$5,000,000 for 15 years, of which it is desired to apply \$4,000,000 on the purchase of freight equipment to the amount of \$12,324,258 and \$1,000,000 on additions and betterments on the Cumberland & Eastern Kentucky divisions, which will amount to \$4,204,139.

New Directors.—J. R. Kenly and Frederick R. Scott have been elected directors.

LEHIGH VALLEY.—*Extension Granted.*—The United States District Court has granted this company an extension of 60 days, until June 24, for filing its segregation plan.

MISSOURI, KANSAS & OKLAHOMA.—*Deferred Interest to be Paid.*—Notice has been received by the New York Stock Exchange that the interest on this company's guaranteed first mortgage 5 per cent, forty-year gold bonds, matured November 1, 1920, will be paid on presentation of coupons on and after April 30, 1921, and that payment of interest due May 1, 1921, will be deferred. Notice was also received that interest matured November 1, 1920, on the Dallas & Waco Railway Company's guaranteed first mortgage bonds due 1940, will be paid on April 30, 1921, and that May 1 interest will be deferred.

MUSKEGON RAILWAY & NAVIGATION COMPANY.—*Authorized to Issue Securities.*—This company has been authorized by the Interstate Commerce Commission to issue and sell \$304,900 of common capital stock and \$304,900 of first mortgage 6 per cent bonds, for the purpose of completing extensions to its road from Muskegon to Muskegon Heights, Mich.

PENNSYLVANIA.—*Asks Loan from Revolving Fund.*—This company has applied to the Interstate Commerce Commission for a loan of \$5,700,000 for 15 years to enable it to reimburse the treasury for the payment of obligations of subsidiary companies. The company offers as collateral security some stock of the Philadelphia, Baltimore & Washington. The Pennsylvania on May 27, 1920, applied to the commission for a loan of \$18,000,000. It received a loan of \$6,780,000 for expenditures on roadway and structures and it was proposed to apply \$11,000,000 on the purchase of new equipment, but the loan for new equipment was not pressed and the company now desires \$5,700,000 to meet maturing obligations. The Pennsylvania's application gives a statement of its accounts with the Railroad Administration, showing a total of \$214,787,420 due from the government as of December 31, 1920, and \$236,130,681 due to the government, including several amounts which may be funded. The company had received from the administration \$20,000,000 on account in 1920 and \$35,000,000 since the first of the year. The application also states that the company has received \$53,000,000 on account of its guaranty for the six months period of 1920 and that there is still due \$45,988,622.

Asks Authority to Guarantee Bonds.—This company has applied to the Interstate Commerce Commission for authority to guarantee the principal and interest of \$3,876,000 of refunding mortgage bonds of the Long Island.

READING COMPANY.—*Decision on Segregation Plan Withheld.*—After a hearing Monday on modification of the plan for dissolution of the Philadelphia & Reading Coal & Iron Company and other concerns from the Reading Railway interests, Judges Buffington, Davis and Thompson reversed decision in the United States District Court at Philadelphia. The court asked the Reading Company and the government to file a modified plan within ten days.

In beginning the discussion, William Clark Mason, of counsel for the Reading Company, said that since the last hearing in the case conferences between representatives of the government and representatives of the Reading Company had resulted in the elimination of two points which were to have been discussed. One, he said, was an agreement that the stockholders should not be required to pay 10 per cent to the bondholders for the release of the coal property from the lien of the general mortgage and the other was for keeping the stock intact and the Reading Company assigning its equity in the stock to a new corporation and issuing certificates of interest to the stockholders benefiting under the dissolution plan.

Allan McCarthy, counsel for the Prosser Committee, presented the side of the common stockholders. He spoke on the new proposed modification of the plan to place the stock of the coal company in the hands of a trustee for the Reading Company, subject to the jurisdiction of the court so that the property may be sold in time at its full market value.

The brief submitted on behalf of defendant Reading Company gives the following points:

1.—(a) The sale provided for in paragraph five of the Reading plan is such a disposition of the interest of the Reading Company in the stock of the Philadelphia & Reading Coal & Iron Company, as accomplishes the expressed purpose of the mandates of the Supreme Court of the United States requiring disposition by the Reading Company of such stock. (b)

such disposition does not confer on any one class of stockholders of the Reading Company any benefit to the prejudice of the legal rights of any other class of stockholders.

2.—The stock of the coal company need not be sold free from the lien of the general mortgage. A sale of certificates of interest therein would be a compliance with the provisions aforesaid of the mandate of the Supreme Court of the United States.

3.—In view of the expressed opposition of bondholders and stockholders it is believed the Reading Company should not offer a premium of 10 per cent to the general mortgage bondholders for the release of the coal company's property from the lien of the general mortgage and the requirement of the mandate of the Supreme Court of the United States may be fulfilled by proper injunctive provisions in the decree to be entered in this cause.

RUTLAND RAILROAD.—*New Director.*—E. J. Pearson, of New Haven, Conn., has been elected a director, succeeding George F. Baker, of New York.

ST. LOUIS SOUTHWESTERN.—*Authorized to Issue Promissory Notes.*—The Interstate Commerce Commission has authorized this company and the St. Louis Southwestern of Texas to issue joint promissory notes to the amount of \$384,990 in connection with the purchase of 10 locomotives from the Baldwin Locomotive Works.

TOLEDO, PEORIA & WESTERN.—*Annual Report.*—The operating revenues and expenses for the year ended December 31, 1920, compare with the preceding year as follows:

OPERATING REVENUES			
	1920	1919	
Freight	\$1,285,608	\$961,829	
Passenger	630,174	592,599	
Total operating revenues.....	\$2,090,667	\$1,645,768	
OPERATING EXPENSES			
	1920	1919	
Maintenance of way and structures.....	\$382,554	\$335,955	
Maintenance of equipment.....	676,494	517,549	
Traffic expenses	36,154	25,131	
Transportation expenses	1,249,355	857,896	
General expenses	97,024	65,621	
Total operating expenses.....	\$2,441,420	\$1,799,407	
Net revenue from railway operations.....	Def. \$350,753	Def. \$153,639	
Ratio of operating expenses to operating revenues	116.78%	109.54%	
Railway tax accruals.....	123,000	102,000	
Railway operating deficit.....	472,753	235,639	

The principal traffic statistics for 1920 compare with 1919 as follows:

FREIGHT TRAFFIC			
	1920	1919	
Number of tons carried.....	1,292,232	1,006,279	
Number of tons carried one mile.....	89,521,581	68,953,481	
Average distance hauled per ton (miles).....	69.28	68.52	
Average receipts per ton per mile (cents).....	1.44	1.40	
PASSENGER TRAFFIC			
	1920	1919	
Number of passengers carried.....	846,295	843,847	
Number of passengers carried one mile.....	20,982,556	20,367,659	
Average distance hauled per passenger (miles).....	24.79	24.14	
Average receipts per passenger per mile (cents).....	3.00	2.91	

Guaranty Certificates Issued

The Interstate Commerce Commission has issued certificates for partial payments on account of the railroad guaranty for six months of 1920, as follows:

Charleston & Western Carolina.....	\$260,000
Chicago, Terre Haute & Southeastern.....	26,000
Cincinnati, Indianapolis & Western.....	230,000
Hawkinsville & Florida Southern.....	10,000
Illinois Central.....	2,000,000
Missouri & North Arkansas.....	22,500
Norfolk & Western.....	2,000,000
Northern Alabama.....	80,000
Philadelphia & Reading.....	350,000
Sulphur Springs.....	45,000
Sulphur County.....	17,000
Texas Short Line.....	6,000
Western Maryland.....	400,000
Wrightsville & Tennille.....	75,000

Dividends Declared

Cleveland & Pittsburgh—Guaranteed, 1 1/2 per cent, quarterly; special guaranteed, 1 per cent, quarterly; both payable June 1 to holders of record May 10.

Delaware & Hudson—2 1/2 per cent, quarterly, payable June 20, to holders of record May 28.

Elmira & Williamsport—Common, 2.26; payable May 2 to holders of record April 20.

Illinois Central—1 1/4 per cent, quarterly, payable June 1 to holders of record May 28.

Norfolk & Western—Common, 1 1/4 per cent, quarterly, payable June 13 to holders of record May 31.

SALARIES OF RAILROAD OFFICERS would be limited to \$15,000 a year, unless a higher figure were approved by the Interstate Commerce Commission if congress should pass a bill introduced on April 25 by Representative Black of Texas.

Railway Officers

Financial, Legal and Accounting

Henry L. Stone, general counsel of the Louisville & Nashville, with headquarters at Louisville, Ky., whose retirement from active railroad service was announced in the *Railway Age* of April 8 (page 916), was born in Bath County, Ky., on January 17, 1842. He was educated at Bainbridge Academy and at the law school conducted by Messrs. Gordon and Coburn in Indianapolis, Ind. Mr. Stone was engaged in the private practice of law and as city attorney of Louisville, Ky., from the close of the Civil War until January, 1905. On the latter date he was appointed general counsel of the Louisville & Nashville, and has served in this position continuously since that time. In addition to his duties as general counsel of the Louisville & Nashville, Mr. Stone, on two occasions, has been chairman of boards of attorneys appointed to consider and make recommendations upon proposed acts of Congress, enlarging the powers of the Interstate Commerce Commission.



Col. H. L. Stone

Executive

W. S. Lee, vice-president of the Piedmont & Northern, has been elected president, effective April 26, succeeding Z. V. Taylor, deceased.

Edward S. Jouett, whose election as vice-president and general counsel of the Louisville & Nashville, with headquarters at Louisville, Ky., was announced in the *Railway Age* of April 29 (page 1055), was born at Winchester, Ky., on October 21, 1863. He was educated in the public schools of Winchester and at the University of Virginia, graduating from the law school of that institution in 1885. He became a member of the bar in Winchester and practised there and throughout Kentucky until September 1, 1912, when he entered railroad service as general attorney of the Louisville & Nashville, with headquarters at Louisville. He was appointed general solicitor in charge of the law department of the Louisville & Nashville during the period of federal control, and served in this position until the railroads were returned to private management, when he was appointed assistant general counsel of the Louisville & Nashville system. He was serving in this position at the time of his recent election as vice-president and general counsel.



E. S. Jouett

C. D. Mackay has been appointed assistant to the vice-president of the Southern, with headquarters at Washington, D. C., effective May 1, and will be charged with the duties hitherto entrusted to **George R. Loyall**, who has resigned as assistant vice-president to accept service elsewhere.

Charles T. O'Neal has been appointed receiver of the Fort Smith & Western, with headquarters at Fort Smith, Ark., effective April 15. Mr. O'Neal was born at Brandywine Springs, Del., and entered railroad service in 1890 as a clerk in the offices of the Philadelphia & Reading. In 1891 he entered the service of the Lehigh Valley, serving in various capacities until 1903, when he was appointed trainmaster on the Pennsylvania division. In 1905 he was transferred to the New Jersey and Lehigh division, and in 1906 was promoted to superintendent of the New York division. From 1908 to 1916, Mr. O'Neal served as superintendent of the Buffalo division and the Lehigh Valley Transportation Company. He was promoted to general superintendent in 1917, and served both in that capacity and as assistant vice-president and marine manager until 1919, when he was appointed manager of terminals of the various roads running to the Niagara frontier by the United States Railroad Administration. At the time of his appointment as receiver of the Fort Smith & Western, Mr. O'Neal was serving as assistant to the Director General of railroads, being assigned to the settlement of claims arising during federal control, with headquarters at Washington, D. C.

Operating

J. S. Jones has been appointed trainmaster of the Chicago, Rock Island & Pacific, with headquarters at El Reno, Okla., effective May 1, succeeding **C. F. Radans**, who has been assigned to other duties.

C. E. Lanham has been appointed superintendent of car service of the Gulf, Mobile & Northern, with headquarters at Mobile, Ala., effective May 1, succeeding **D. W. Davis**, assigned to other duties.

F. Wear, superintendent of the Butte division of the Great Northern with headquarters at Great Falls, Mont., will also act as superintendent of the Havre division, effective May 1, succeeding **J. L. Close**, who has been transferred to the Breckinridge division with headquarters at Breckinridge, Minn.

E. W. Hoffman, general superintendent of the Chicago terminal of the Baltimore & Ohio, has been transferred to the Northwest district with headquarters at Cleveland, O., succeeding **E. A. Peck**, who has been transferred to the Pennsylvania district, with headquarters at Pittsburgh, effective May 1.

J. F. Anderson, superintendent of the Kansas City Terminal division of the Chicago, Milwaukee & St. Paul, with headquarters at Kansas City, Mo., has been appointed assistant superintendent of the Kansas City division, with the same headquarters, the Kansas City Terminal division having been consolidated with the Kansas City division, and the position of superintendent abolished.

E. Thwaites has been appointed superintendent of the Cleveland division of the New York Central with headquarters at Cleveland, Ohio, succeeding **F. H. Wilson**, resigned to accept service with another company. **F. F. Riefel** has been appointed superintendent of the Toledo division with headquarters at Toledo, Ohio, succeeding **Mr. Thwaites**. **E. W. Brown** has been appointed superintendent of the Alliance division with headquarters at Alliance, Ohio, succeeding **A. E. Lloyd**, who has been appointed superintendent of the Michigan division with headquarters at Elkhart, Ind., succeeding **F. F. Riefel**.

A. E. Macdonald, superintendent of the Canadian National, with headquarters at Dauphin, Man., has been transferred to Saskatoon, Sask., succeeding **R. King**, assigned to other duties. **T. J. Brown**, superintendent, with headquarters at Calgary, Alta., has been transferred to Dauphin, Man., suc-

ceeding Mr. Macdonald. J. P. Johnson, assistant superintendent, with headquarters at Melford, Sask., has been transferred to Prince Albert, Sask. E. W. Cameron, assistant superintendent, with headquarters at Humboldt, Sask., has been given additional jurisdiction over the Humboldt sub-division, the Battleford sub-division and the Carlton sub-division. The appointments and changes were effective May 1.

D. S. Farley, whose promotion to assistant general manager of the Atchison, Topeka & Santa Fe, with headquarters at Topeka, Kan., was announced in the *Railway Age* of April 15



D. S. Farley

(page 964), was born at Albion, Mich., on June 24, 1870. He entered railway service on October 15, 1887, as a yard clerk for the Atchison, Topeka & Santa Fe at Denver, Colo., and his entire railroad career has been spent in the service of this company. In August, 1899, after serving as switchman and in various positions in the station service at Denver, he was made chief clerk at Pueblo, Colo., where he served until May, 1900. At that time he was transferred to Kansas City, Mo., where he served until August,

1907, when he was promoted to superintendent, with the same headquarters. He was transferred to Amarillo, Tex., on June 1, 1915. At the time of his recent promotion Mr. Farley was serving as superintendent with headquarters at Dodge City, Kan., where he had been transferred in June, 1920.

O. E. Coyne, whose appointment as superintendent of the Illinois division of the Missouri Pacific, with headquarters at Illmo, Mo., was announced in the *Railway Age* of April 1 (page 869), was born on November 2, 1876, at Broadwell, Ill., and entered railway service in May, 1892, as a telegraph operator for the Chicago & Alton. In 1899 he became a train dispatcher for the Grand Trunk, Western lines, remaining in the service of that road until 1902, when he went with the St. Louis, Iron Mountain & Southern, in a similar capacity. From 1905 to 1908 Mr. Coyne served as train dispatcher for the Atchison, Topeka & Santa Fe and in the latter year was appointed chief dispatcher for the Missouri Pacific. At the time of his recent promotion, Mr. Coyne was serving as trainmaster, to which position he had been promoted in 1913. He served with the American Expeditionary Forces during the war, being commissioned a captain in the Railway Transportation Corps. From March, 1919, to June, 1920, he had charge of the terminal switching at the port of St. Nazaire, France.

William K. Etter, whose promotion to assistant to the vice-president in charge of operation of the Atchison, Topeka & Santa Fe was announced in the *Railway Age* of April 15 (page 961), was born at Shippensburg, Pa., on January 16, 1874. He was educated at McPherson College and entered railway service in June, 1891, as a rodman for the Atchison, Topeka & Santa Fe. During the next two years Mr. Etter served successively as stenographer, clerk, timekeeper and chief clerk to the superintendent at various points on the Santa Fe. In February, 1901, he was made chief clerk to the superintendent, with headquarters at Needles, Cal., and a few months later was appointed chief clerk to the general superintendent at La Junta, Colo. In September, 1902, he was transferred to Topeka, Kan., where he served until August, 1905, when he was promoted to trainmaster, with the same headquarters. In January, 1906, Mr. Etter was promoted to superintendent of the Rio Grande division, with headquarters at San Marcial, N. M. He was transferred to

the Oklahoma division, with headquarters at Arkansas City, Kan., in October, 1907. Mr. Etter was promoted to general superintendent, with headquarters at Newton, Kan., in September, 1916. At the time of his recent promotion, he was serving as assistant general manager, with headquarters at Topeka, Kan., to which position he had been promoted in November, 1918.

Traffic

W. J. Cartwright has been appointed commercial agent of the Southern with headquarters at Chattanooga, Tenn., succeeding R. D. Miller, transferred, effective May 1.

E. G. Heilbronner has been appointed general freight and passenger agent of the Pittsburgh, Lisbon & Western, with headquarters at Lisbon, Ohio.

D. B. Hevron has been appointed district freight agent of the Southern, with headquarters at Evansville, Ind., succeeding J. T. Mudd, who has resigned.

H. F. Kern, general agent of the Southern Pacific with headquarters at Kansas City, Mo., has been transferred to a similar position at Cincinnati, O. L. B. Banks succeeds Mr. Kern at Kansas City.

H. P. Thrall, mail traffic manager and service inspector of the Southern Pacific, with headquarters at San Francisco, Cal., has been appointed mail and express traffic master, with the same headquarters, effective April 23.

J. P. Tocher has been appointed division freight agent of the Southern with headquarters at Louisville, Ky. J. N. Templeton has been appointed to a similar position at Lexington, Ky. The following have been appointed commercial agents: W. T. Keating, at Indianapolis, Ind.; R. D. Miller, at Chattanooga, Tenn.; and G. B. Miller, at Anniston, Ala. These appointments were effective April 15.

W. Humphreys, whose promotion to general western freight agent of the Southern, with headquarters at Chicago, was announced in the *Railway Age* of April 15 (page 963), was born at Louisville, Ky., on January 6, 1876. He entered railway service in August, 1898, in the traffic department of the Southern, and has served in various positions in that department at Cincinnati, Ohio, Mobile, Miss., Evansville, Ind., and New York City. At the time of his recent promotion, Mr. Humphreys was serving as division freight agent with headquarters at Louisville, Ky.

Fred S. Reigel, whose promotion to general freight agent of the Southern, with headquarters at Cincinnati, Ohio, was announced in the *Railway Age* of April 15 (page 963), was born at Louisville, Ky., on April 21, 1879, and entered railway service in August, 1899, as a messenger in the local freight offices of the Southern at Louisville. In March, 1905, he was made rate clerk in the assistant freight traffic manager's office at Louisville, and the following year was promoted to chief clerk to the assistant general freight agent, with the same headquarters. In December, 1911, he was made assistant chief clerk to the assistant freight traffic manager, and in June of the following year was promoted to chief clerk in the same office. In July, 1916, in addition to his other duties, Mr. Reigel was made acting assistant general freight agent at Louisville, and in June, 1917, he was promoted to assistant general freight agent, with headquarters at Cincinnati, Ohio. He was serving in this position at the time of his recent promotion.

Mechanical

E. C. Huffman, superintendent of the Great Northern with headquarters at Breckinridge, Minn., has been appointed master mechanic of the Sioux City division with headquarters at Sioux City, Ia., effective May 1, succeeding F. J. Fero, deceased.

T. E. Paradise, assistant superintendent of motive power of the Chicago, Burlington & Quincy, with headquarters at Lincoln, Neb., has been appointed master mechanic with headquarters at Hannibal, Mo., succeeding H. Modaff who

has been transferred to Ottumwa, Ia. The position of assistant superintendent of motive power at Lincoln, has been abolished. Mr. Modaff succeeds H. D. Turner who has been appointed road foreman of engines with headquarters at Burlington, Ia. These changes are effective May 1.

Engineering, Maintenance of Way and Signaling

D. C. Fenstermaker, district engineer of the Chicago, Milwaukee & St. Paul, with headquarters at Chicago, has been granted a leave of absence effective April 16, to become associated with Peterson Brothers, contractors, Omaha, Neb., who will construct a new branch line in Cuba for the United Fruit Company.

William Hood, chief engineer of the Southern Pacific, with headquarters at San Francisco, Cal., has retired from active railroad service, effective May 3, after 54 years of service. G. W. Boschke, assistant chief engineer, succeeds Mr. Hood. A sketch of Mr. Boschke's career appeared in the *Railway Age* of February 11, 1921 (page 394).

William Morrison, assistant signal engineer of the electric division of the New York Central, with headquarters at New York City, has been appointed assistant engineer, with the same headquarters, effective April 16, and the position of assistant signal engineer has been abolished. Effective this date J. Stolz, supervisor of signals of the electric division, was appointed assistant supervisor of signals, with the same headquarters.

C. D. Cronk, assistant signal engineer of the New York Central, with headquarters at Buffalo, N. Y., has been appointed chief signal inspector, with headquarters at Cleveland, Ohio, and the office of assistant signal engineer has been abolished. E. A. Black, chief signal inspector, with headquarters at Cleveland, Ohio, has been appointed supervisor of the Franklin signal district, succeeding L. L. Whitcomb, who has been appointed signal supervisor on the Cleveland signal district, succeeding J. C. Seaman, who has been appointed signal inspector of the Cleveland signal district.

Purchasing and Stores

H. C. Pearce, director of purchases and stores of the Chesapeake & Ohio with headquarters at Richmond, Va., will serve the Hocking Valley in a similar capacity, effective April 21.

Special

J. A. Rittenhouse, superintendent of the Pullman Company, with headquarters at Philadelphia, Pa., has been transferred to Detroit, Mich., with jurisdiction over the Detroit, Buffalo and Cleveland districts, effective May 1. W. A. Hartley, assistant to the assistant general manager, with headquarters at Philadelphia, Pa., has been given jurisdiction over car movements and other matters local to the Philadelphia district. J. T. Ramsom, assistant general manager, with headquarters at Washington, D. C., has been given jurisdiction over all matters general in character, affecting the Philadelphia district.

Obituary

Frank H. Davis, vice-president of the Chesapeake & Ohio with office at New York, died at his home in Elizabeth, N. J., on May 2. Mr. Davis was also vice-president of the Hocking Valley and vice-president and treasurer of the Minneapolis & St. Louis.

C. W. Pifer, office engineer, Department of Way and Structures, United States Railroad Administration, with headquarters at Chicago, died at his home on April 21. Mr. Pifer was born at Lafayette, Ind., October 21, 1863, and graduated from Purdue University in 1889. He entered railway service in 1892, with the Pennsylvania. In 1896 he became engineer

in charge of special inspections for the Cleveland, Cincinnati, Chicago & St. Louis. Three years later he became assistant engineer of the Illinois Central. In 1914 he was appointed senior civil engineer, Interstate Commerce Commission, and in April, 1920, he was appointed office engineer for the Railroad Administration.

Joseph W. Moore, assistant engineer, valuation department of the Illinois Central and Yazoo & Mississippi Valley, died at the Illinois Central Hospital on April 13, following a protracted illness. Mr. Moore was born at Louisville, Ky., March 20, 1874. He attended the University of Kentucky where he took a special three-year course in engineering. He first entered railway service in August, 1898, in the engineering department of the Louisville & Nashville, with which road he served as rodman, instrumentman, assistant engineer and assistant roadmaster. In 1907 he served for one year as track engineer of the A. & B. Construction Company on the Atlanta, Birmingham & Atlantic and from June, 1908, to November, 1909, was roadmaster of the latter road. He was assistant engineer in the valuation department of the Central of Georgia from March to June, 1910, when he went to the Southern Pacific, Texas and Louisiana lines as roadmaster at Morgan City, La. Mr. Moore became roadmaster of the International & Great Northern at Navasota, Texas, in December, 1914, and in September, 1916, he was appointed pilot engineer in the valuation department of the Illinois Central. In August, 1919, he was appointed assistant engineer in the valuation department of the Illinois Central, which position he held at the time of his death. Mr. Moore served through the second training camp at Plattsburg in the Summer of 1916, and soon after the entrance of the United States into the war he entered the training camp at Camp Grant and was commissioned captain and assigned to command Company "B", 35th Engineers. He served until August, 1919, and following his discharge from service was commissioned Major in the Engineers Reserve Corps.

Elmer A. Howard, vice-president of the Chicago, Burlington & Quincy, died at his home in Chicago, on May 4, after a long illness. Mr. Howard was born at Fairfield, Iowa, on July

18, 1858. He was educated in the public schools and attended the University of Iowa for one year. At the age of 18 he entered the employ of the Burlington as telegrapher and station agent at Fairfield, Iowa, and remained in that position for eight years. In 1885, he entered the Indian service under the Cleveland administration. He resigned as Indian agent in 1887, to go into the banking business at Fairfield, Iowa, and in 1900 was appointed national bank examiner for the state of Iowa. In 1903 he returned to the service of the Burlington,

and for seven years served as real estate and industrial commissioner. In November, 1915, he was elected vice-president in charge of the land and industrial departments, which position he held at the time of his death.



E. A. Howard

THE BUREAU OF STANDARDS, Washington, which had been investigating the causes of failure of chilled iron and rolled steel car wheels, using special apparatus for duplicating service conditions and for measuring the temperatures and stresses developed in the wheels, held, last week, several conferences with representatives of the Association of Manufacturers of Chilled Car Wheels for the purpose of preparing a paper on the stresses developed in wheels of this type through the heating of the rim. A representative of the association spent the week at the Bureau going over the data which has already been secured.

EDITORIAL

Railway Age

EDITORIAL

The Table of Contents Will Be Found on Page 5 of the Advertising Section

While Jett Lauck's "Estimated Possible Savings" have been so discredited that further comment would serve to clothe it with an unwarranted significance, it is well to bear in mind that this document had its inception in a knowledge that the public has taken on a new attitude with respect to the railroads.

Don't Overlook Any Bets

Under the Transportation Act the officers of the roads are charged with responsibility for the efficient management of the properties. No matter how successful they may be in this endeavor, both as to earnings and service, their's will always be the burden of proof that every effort is being made to promote efficiency. In other words, it will be strictly up to all the roads to take advantage of any development as to methods and materials that show a real economy. If some roads prove successful in obtaining excellent results in this direction through the use of treated timber and tie plates, water softeners, mechanical freight handling equipment, mechanical stokers, superheaters, locomotive cranes, etc., and (if we may dare to hope so), bonus and piece work systems, the officers of other roads will be compelled to take more than an academic interest in such improved methods. On them is immediately imposed the problems, can it be applied on our road? If so, how? If not, why? These are not merely questions of accountability to the directors and stockholders, but represent a responsibility to the public in general and the shippers in particular.

The Railway Accounting Officers' Association at its annual meeting at Atlantic City, N. J., beginning June 8, will complete one of the most successful years in the history of that active and increasingly influential organization. The docket this year is about twice as large as that of last year, and among the proposals to be presented by the various committees are a number of steps of unusual importance. The Railway Accounting Officers' Association is composed of men of high calibre. It is unusually well officered; the members think a great deal of their organization and are willing to work hard for its success and for the welfare of their profession. The association became affiliated with the Association of Railway Executives a little over a year ago. This affiliation has given the accounting officers' organization something of a new standing and prestige. Combined with this, the accounting officers have been greatly assisted during the past year by the elimination of the restrictions which hampered them during the period of federal control. It is these factors which the association has been able to take advantage of and which have assisted it in making for itself a record year. It is interesting to note one or two of the important features of the year's work. One is the progress made as to standard forms. Those originated for station accounting and practices are especially noteworthy, but, in general, it may be said that the number of new standard forms originated, not counting revisions, this year exceeds the number originated in nearly all the previous years of the association's history combined. An even more important step in the work during the past year is the proposal to make R. A. O. A. interline

accounting recommendations mandatory. Important steps along this line will be brought up at the June meeting and it is the expectation that eventually all the interline accounting recommendations will be made mandatory. It is fitting that this important step towards further greater uniformity in railway accounting should be a part of the work of a year which has been so successful.

Practically all railroads in the United States and Canada were requested to furnish information on ashpits to a committee of the American Railway Engineering Association last year. Answers to the questionnaires sent out failed to develop a great deal of the information desired but one thing was forcibly illustrated; namely, the many different types of ashpits and the wide diversity of opinion regarding their respective merits. It is said that almost every type of ashpit in common use was recommended by some roads and criticized by others. Regarding water ashpits, the disadvantages are said to include relatively high first cost, high cost of maintenance and operation, difficulty with wet ashes in winter and possible danger to workmen. In view of these objections, why are water ashpits the most popular type for modern terminals turning sixty and more locomotives in 24 hours? The advantages of water ashpits include the elimination of hot gasses and warped cinder cars, high emergency storage capacity, reduction of manual labor to a minimum and ability to handle large amounts of ashes rapidly. A relatively high first cost of ashpit and crane must be conceded but the interest on this investment is saved many times over where large amounts of ashes are involved. The cost of maintenance is almost solely a question of proper design, and operating costs, exclusive of interest and depreciation, are small. The difficulty of handling wet ashes in severe winter weather is very real but should not be charged against water ashpits solely since all ashes must be sprinkled or cooled before being loaded into cinder cars. Regarding danger, it is significant to note that not one of the railroads referred to in the committee's report mentioned danger as a disadvantage of water ashpits. Evidently this objection also is overcome by proper design.

The Pros and Cons of Water Ashpits

Education and Efficiency

An employee with but a slight knowledge of the fundamental principles underlying his work and of its importance to the organization as a whole cannot manifest the interest which is necessary to make him the most efficient worker. In order to overcome this handicap and to obtain the greatest possible co-operation, railroads as well as other organizations are coming to realize more and more the benefits to be derived from a systematic plan of education. An excellent example of the work being accomplished along this line is the system employed by the telegraph department of the Chicago, Rock Island & Pacific. The superintendent and assistant superintendent of telegraph organized the wire chiefs,

operators and repeater attendants of the system into a society for the purpose of the improvement of the members in the practical technical details of the telegraph and telephone work. The society is the outgrowth of a course of instruction which has been carried on by G. D. Hood, superintendent of telegraph, for the past year and a half with a view of bringing to the men of his department a better knowledge of the telegraph and telephone. Officers were elected, a constitution and by-laws adopted and committees appointed, and the organization is now well under way. The Committee of Direction consists of three members elected annually, one of whom shall be chairman-secretary. Thus, not only have the men had an opportunity to learn of the fundamental principles underlying their work and of the latest developments in the telegraph field, but because of this increased knowledge their interest has been aroused and they take a greater pride in their department and its efficient operation than was possible before. Similar methods may be found of value for use by other department heads who are considering plans for increasing efficiency.

At the National Foreign Trade Convention in Cleveland last week great emphasis was laid on the importance of a thriving

The Foreign Trade Convention

foreign trade in maintaining healthy economic conditions in this country. Indeed, one speaker went so far as to blame the present depression principally on the stagnation in our foreign markets. Whether or not the volume of our foreign business is the chief factor in determining prosperity or depression in this country, there can be no doubt but that it is at least a contributing factor of no small importance. It is to the interest of everyone, therefore, who is seeking a revival in business, to assist in bolstering up our foreign commerce and to do everything possible to insure its future stability. The various Edge law banks which have been organized to extend long term credits to foreign purchasers will doubtless be of great assistance in enabling American manufacturers to increase their sales abroad. Possibly in the development of these institutions lies the solution of our present difficulties in reviving our foreign business. However, the root of the problem lies deeper: in order to put our export trade on a sound footing, we must either accept a great quantity of imports or we must plan to make large permanent investments abroad. Credits advanced under the Edge law plan are satisfactory as a temporary arrangement, but to secure the future stability of foreign trade, which is necessary if it is to be a desirable part of our economic structure, American investors must be induced to become regular purchasers of the securities of legitimate foreign enterprises. One of the most important fields for such investments, especially in relatively undeveloped countries where the opportunities for building up trade are consequently the greatest, is in foreign railways. Permanent investments of this character have the added advantage of securing a preference for American goods to fill the needs of the concerns in which the investments are made. In view, probably, of the severe decrease in our foreign trade in late months scant attention was given at the convention to this and other fundamental phases of the problem. Interest was diverted instead to popular remedies which promise a speedy, although probably not a permanent, solution for the present situation. Neither was any particular attention paid to the phases of the problem affecting the railroads or the railway supply manufacturers beyond, possibly, the suggestion that no return to normal conditions could be complete without a reduction in freight charges. The plan of the convention, however, was doubtless well considered beforehand by those in charge and it must be admitted that the phases of foreign trade chosen for discussion were handled in a thorough and painstaking manner.

Two advanced steps have been taken by the Mechanical Division of the American Railway Association in dealing with the problem of improving general freight car conditions. Interchange rules 114 and 120, the former dealing with the rebuilding of cars destroyed on foreign lines and the latter with the repair of cars on foreign lines requiring extensive repairs, now permit the repairing line to apply such betterments as metal draft arms, steel draft members, truss draft gears, etc., where formerly the rules required that the original plan of construction be strictly followed. The adoption of a special letter ballot in December, 1920, authorized the application of ends on box cars as specified for new cars when cars with steel underframe or steel center sills with a sectional area of sills of not less than 24 sq. in., required repairs to the ends consisting of new posts and braces. The nature of these two steps, however, is negative rather than positive. The provisions of these rules are not mandatory and their value lies largely in the fact that the door has been opened so that obsolete equipment coming within their provisions may be improved if the repairing line is inclined to do so and does not meet too much opposition from the car owner. Weak as these rules are likely to prove, so far as actual results are concerned, however, they undoubtedly mark the maximum advance which the sentiment of the representative membership of the Mechanical Division would permit, and they are strong evidence of the difficulty of improving equipment conditions when the general interests of the railroads as a whole meet the opposition of the immediate interests of the individual roads. This suggests the need for placing the interchange rules on a basis which will bring into harmony these two opposing interests. One of the most logical means of accomplishing this end is the establishment of prices for labor and material chargeable for repairs under the interchange rules, on a basis which will include a clear profit above the costs and the overhead. Such a policy not only will create an incentive for the repairing line to do all of the work which should be done on each foreign car repaired, but will make it distinctly to the advantage of the car owner either to retire or completely rehabilitate most of the equipment coming under these rules.

Where the Money Went

THE SENATE COMMITTEE on Interstate Commerce began this week an investigation of the railroad situation. While the railways are suffering from a heavy decline in traffic there is, so far as we know, no dissent from the proposition that their troubles are mainly due to the fact that their operating expenses have been, and still are, too high. Therefore, the Senate committee's investigation probably will resolve itself chiefly into an inquiry as to why the operating expenses have been, and still are, so high.

Upon this point, wide differences of opinion have been expressed. Railway executives contend that expenses of all kinds have been too high, but that their difficulties are chiefly due to an excessive payroll. The labor leaders claim that the payroll is not excessive, but that the operating expenses are excessive almost entirely because the railways have been "wasting" money in the purchase of fuel and materials.

There is no question that the money has been, and is, going too fast. Where has it been going? Statistics of the Interstate Commerce Commission throw light upon this subject.

In 1916 the payroll, of which 96.4 per cent consisted of the wages of the employees, consumed 60.5 cents out of every dollar of operating expense incurred. In 1920 the employees got 97.5 per cent of the payroll, and out of every dollar of operating expense incurred 63.4 cents was chargeable to the

payroll. These figures show that during this period the payroll increased relatively more than other operating expenses.

The largest expenditure made by the railways, except that for labor, is that which they make for materials used in maintenance of their equipment (locomotives and cars) and of their tracks and other permanent structures. They buy material used in the maintenance of equipment and in the maintenance of way and structures from numerous manufacturing concerns. The labor leaders claim that they have paid excessive prices to these concerns because, as is alleged, the railways and the manufacturing concerns are under the same financial control.

Is it a fact, then, that the cost of the materials used in maintenance has increased more than the cost of the labor used in maintenance? In the three years ending with 1917 the railways paid to labor 47.32 cents out of every dollar expended for maintenance of equipment, while in 1920 they paid labor 57.49 cents out of every dollar they spent for maintenance of equipment. In the three years ending with 1917 the railways paid for materials 29.08 cents out of every dollar expended in the maintenance of equipment, while in 1920 they paid for materials only 26.57 cents out of every dollar expended for maintenance of equipment. These figures show conclusively that the increase in the cost of maintaining equipment was due in much larger measure to increase in the cost of labor than to increase in the cost of materials.

In the three years ending with 1917 the railways paid to labor 55.64 cents out of every dollar they expended for maintenance of way and structures, while in 1920 they paid to labor 60.55 cents out of every dollar that they spent in maintenance of way. How about the cost of materials? In the three years ending with 1917 they paid for materials 35.63 cents out of every dollar expended for maintenance of way, while in 1920 they paid for materials only 30.22 cents out of every dollar they spent for maintenance of way.

These figures leave no room whatever for question as to where the greatest relative increase in railway expenses occurred. It was in the payroll.

Probably the greatest increase in expenses should have been in the payroll. Those, however, who got the benefit of the fact that the increase in the payroll was greater than other increases in expenses hardly seem to be in a good position to denounce the other increases as excessive and due to mismanagement.

Within recent months not only wages in other industries and the cost of living, but also the prices that the railways have to pay for materials have declined. The decline in the prices of materials has been accompanied by reductions in the wages of the workmen employed by the concerns which make these materials. Can anybody logically contend that the prices of the materials that the railways buy should be reduced, with resulting reductions in the wages of the men employed by those who make them, and at the same time contend that railway wages should be maintained at much the highest level to which they ever were advanced?

Development of Port of New York

THE STATES of New York and New Jersey have, after about four years of effort, succeeded in the establishment of a centralized port authority. The effect of this will be widespread not only because of the bearing which the port of New York has upon the nation, but also because of the fact that it establishes a precedent upon which the solution of similar matters of mutual interest to other states can be based. The port of New York has long stood out as the greatest of all American ports but it has likewise stood out as one of the most expensive when viewed from the angle of unit transportation costs. Split geographically by the Hudson river and its lower reaches into two major parts and then again divided and subdivided by numerous municipal-

ities on the New Jersey side, its development has been influenced by almost as many different plans and policies as there were municipalities. This was clearly recognized by the joint harbor commission appointed in 1917 to make a study of the situation as it existed and to recommend a plan for the development of the port. In its report as presented a short time ago and given in abstract on page 269 of the January 28 issue of the *Railway Age* it distinctly pointed out the need of a single authority created under a compact that would be more than a mere pledge or agreement since it must of necessity, to be of any real worth or value in building up the port, be of a nature that would define and bound a district within which the two states would actually cooperate, as well as create an organization or agency with sufficient powers to bring about the needed results.

Yet, in spite of the very obvious need for such a joint board with clearly defined powers, petty jealousies, partisan politics and what not, all revolving about the loss of jurisdiction over parts of the harbor by individuals and by municipalities, made their usual appearance. The signing of the port treaty between the states of New York and New Jersey on April 30 marks the realization of the two states that if progress is to be made in and at the port of New York, all local jealousies and other similar detriments must be eliminated or be made inconsequential. This has been done and the port of New York as it stands now is under the jurisdiction of a single port authority or joint board. Each of the states has relinquished its rights over its own particular shore lines, thus conferring upon the new board the power to control or to designate the building and developing of piers, warehouses, rail and water connections and any other facilities thought necessary.

Thus the first or legal part of the plan of the joint commission has been carried out to a successful conclusion. The physical plan comes up next before the two legislatures. Involving as it does some radical departures from orthodox port methods, its adoption will undoubtedly be strongly fought. Honest and sincere endeavor will vie with personal ambitions and jealousies in bringing about various changes in the physical plan as proposed, for there are features contained in the plan open to considerable criticism. The necessity for action is so great that it is sincerely to be hoped that these conflicting interests will be able quickly to get together on a workable basis.

Wabash

THE CAREER OF THE WABASH since it was reorganized and taken out of the hands of receivers on November 1, 1915, has been characterized by progressively increasing efficiency of operation. This improvement in operation was reflected in net earnings in 1916 and 1917, but during federal control increased costs of fuel, higher wage scales and other factors typical of the federal control period resulted in decreased net and in 1920, in an operating deficit. The standard return for the Wabash was set at \$5,826,810, although the corporation protested that the charges made during and after the receivership entitled the company to a compensation of \$8,681,000. In 1918 the first year of government control, the net railway operating income earned for the Railroad Administration was \$3,715,518; in 1919, \$831,152, and in 1920 there was a net railway operating deficit for the entire year of \$3,759,790. So far in 1921 the road has been doing better than it did in the corresponding months of 1920. The road had a net operating deficit for January, 1921, amounting to \$145,113. In February, the balance was on the other side and there was a net operating income of \$105,597, making for the two months a deficit of \$38,516, as compared with a deficit more than ten times that figure, or \$385,442, in the first two months of 1920.

The Wabash operates 2,473 miles of line, of which it

owns 2,034, leases 9 and operates 430 under trackage rights. These lines are shown on the map. It should be observed that more than half the mileage over which the road has trackage rights constitutes that part of the system which gives it its entrance into Buffalo, N. Y. The lines of the Wabash extend to the neighborhood of Detroit. From there east the road operates over the Grand Trunk to Black Rock, N. Y., 228 miles, and thence on the Lackawanna to Buffalo, 15 miles. Considering the territory traversed by the Wabash, it is natural that its traffic should be highly diversified. In 1920 the figures were as follows: Products of agriculture, 17 per cent; products of animals, 5 per cent; products of mines, 39 per cent; products of forests, 6 per cent, and manufactures and miscellaneous, 28 per cent. The road gets a comparatively long haul on this traffic and in 1920 the average haul was 271 miles.

The Wabash in 1920 did more business than it did in 1919, but not as much as in 1918 or 1917. It differed from the larger number of roads whose annual reports have already been reviewed in these columns in that 1920 was not a record-breaking year from the standpoint of business done. The freight revenue in 1920 was \$43,324,700, as compared with \$35,255,548 in 1919. The total tonnage of revenue freight carried was 16,845,541, as compared with 14,686,194 in 1919. The 1917 figure was 18,156,259, that being the greatest in the company's history. The revenue ton-mileage in 1920 was 4,566,144,218; in 1919 it was 4,027,016,200, but in 1917, 4,785,374,795.

The road has increased its operating efficiency rather markedly in recent years. One of the factors that stands out in greatest relief in this connection is that of the progressive

siderably above the average for the eastern district and, in fact, for the country as a whole.

The story of the increase in revenues in 1920 over 1919, the even greater increase in operating expenses and the corresponding decrease in net was the same on the Wabash as on nearly every other railroad. The increase in operating revenues in 1920 over 1919 was 22.8 per cent; in expenses, the increase was 32 per cent. The decrease in net has already been commented on. The operating ratio in 1920 was 98.13 per cent and in 1919, 91.28 per cent. The increase in operating expenses as between the two years amounted to \$14,272,366. The report shows that increases in pay through the Labor Board's award last July amounted approximately to \$4,700,000 and that increased prices of fuel, materials and supplies made up about \$1,900,000. The Wabash paid for fuel coal in 1920 \$3.52 a ton; in 1919, \$2.74. In 1916 the average cost per ton was \$1.60.

The Wabash in 1920 effected considerable improvement in its equipment and roadway. It received from the Railroad Administration 2,800 double sheathed box cars, and 1,000 hopper cars. It also authorized the rebuilding of 600 box, 200 flat and 500 coal cars and the conversion of 250 box cars to automobile cars. The acquisition of 20 light Mikado locomotives has already been noted. During the year there were laid 21,178 tons of new 90-lb. rail, as compared with 5,337 tons in 1919; there were put in main track 797,576 ties and 165 miles of track were rebalasted. These figures represent as a whole considerably more work done than the average for several years.

The corporate income account for 1920 shows that without the standard return and guaranty the road would have had a



The Wabash

increase in revenue train loading. The average revenue train load in 1920 was 638 tons. In 1919 it was 627 tons, the progressive increase over previous years being shown by comparison with the figures for those years, which are as follows: 1916, 517 tons; 1917, 568 tons; 1918, 606 tons. This increase in train loading has been largely due to new power of larger capacity and to the modernizing of existing locomotives. The average tractive effort per locomotive at the end of 1916 was 30,317 lb.; at the end of 1919 this average had become 32,597 lb., and at the end of 1920 it was 33,134 lb. The increase in 1920 was due to the acquisition of 20 light Mikado locomotives allocated to the road by the United States Railroad Administration. Another figure that is of interest in showing the efficiency of operation is the average revenue load per loaded car. In 1920 this was 23.4; in 1919, 22.56. In 1920 the Wabash secured a mileage per car per day of 27 as against 26.2 in 1919. The ton-miles daily per car in 1920 were 526. This compared with 469 in 1919 and was con-

net deficit for the year of \$7,369,827. The standard return for the first two months of the year amounted to \$971,135. The amount accrued in accordance with the guaranty provisions of the Transportation Act covering the six months of the guaranty period was \$8,063,775. The balance for the year was \$1,983,943, as compared with \$1,747,228 in 1919, \$632,705 in 1918, or \$4,172,045 in 1917.

The following gives the figures for operation in 1920 as compared with those for 1919:

	1920	1919
Mileage operated.....	2,473	2,476
Freight revenue.....	\$43,324,700	\$35,255,548
Passenger revenue.....	11,218,051	10,143,356
Total operating revenue.....	59,982,282	48,847,086
Maintenance of way expenses.....	10,541,360	8,086,850
Maintenance of equipment.....	14,735,861	9,358,676
Traffic expenses.....	1,169,383	657,109
Transportation expenses.....	30,023,953	24,610,615
Total operating expenses.....	\$8,859,395	\$4,587,030
Net from railway operations.....	1,122,887	4,260,056
Tax accruals.....	1,574,473	1,445,726
Total operating income.....	Def. 454,490	2,805,154

The corporate income account was shown in the Railway Financial News column of the *Railway Age* of April 29, page 1054.

Lehigh Valley

ANTHRACITE COAL furnishes in the neighborhood of 42 per cent of the total freight tonnage of the Lehigh Valley. The road ranks second among the anthracite carriers as to the amount of anthracite tonnage originated, but it is first as far as concerns the tonnage of domestic sizes. Because of the recent decision of the Supreme Court ordering the segregation of its coal properties, the Lehigh Valley has been more or less in the public eye of late and it will probably be in the public eye more rather than less in the near future when the segregation plan is announced. In addition to its being one of the anthracite coal carriers, the Lehigh Valley is also characterized by the excellent service it renders to shippers of coal and other freight.

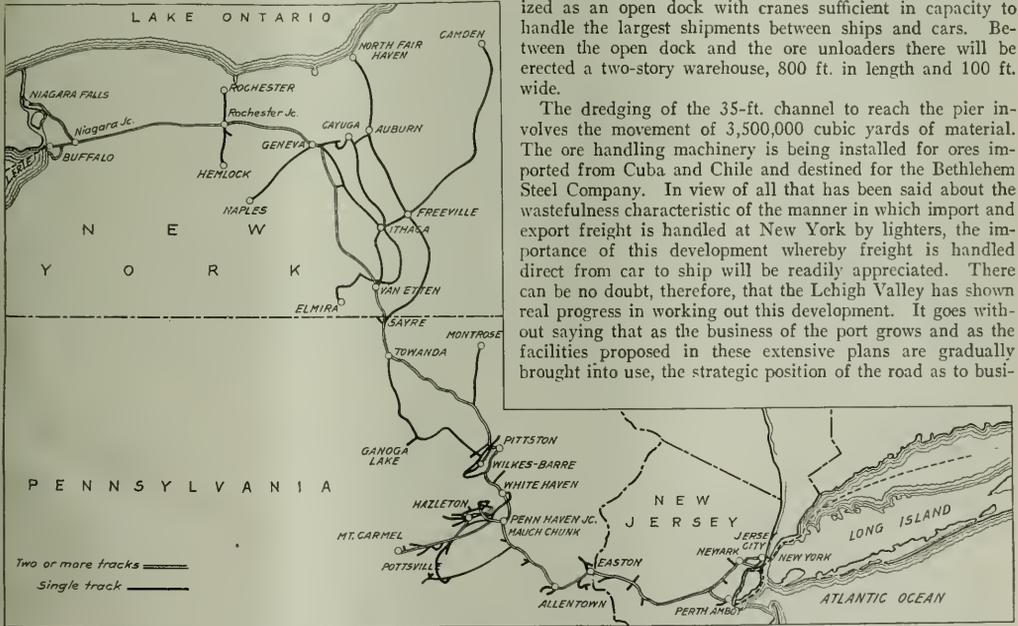
Probably the most striking thing about the Lehigh Valley, however, is the improvement program that road has been carrying out over a term of years to give it a greater capacity

York harbor and to keeping its rolling stock in first-class condition."

No one who has read of the improvements or additions which the Lehigh Valley has been making to its terminal facilities in New York harbor can fail to have been impressed by the great amount of work which the road has already carried out at that port. Still less can he fail to be impressed by the plans contemplated for the future. Particular reference, as far as speaking of the future is concerned, is made to the development now partly under way at what is known as the Claremont terminal. When this terminal is completed, it will be without much doubt the most extensive and best equipped facility of its kind in New York harbor. It is situated on the New Jersey side of New York Bay, between the Lehigh Valley's present terminals at Black Tom and Constable Hook. The plans call for a rail and water terminal with three piers each approximately 7,000 ft. long with slips 450 ft. wide and with sufficient depth of water to accommodate vessels drawing up to 35 ft.

Work is now proceeding on the first pier. For the present this is to be 3,596 ft. long, offering berthing space for five large ocean going ships. At the outer end ore unloading machinery capable of handling 2,500 tons of ore an hour from vessels to cars will be installed. The shore end will be utilized as an open dock with cranes sufficient in capacity to handle the largest shipments between ships and cars. Between the open dock and the ore unloaders there will be erected a two-story warehouse, 800 ft. in length and 100 ft. wide.

The dredging of the 35-ft. channel to reach the pier involves the movement of 3,500,000 cubic yards of material. The ore handling machinery is being installed for ores imported from Cuba and Chile and destined for the Bethlehem Steel Company. In view of all that has been said about the wastefulness characteristic of the manner in which import and export freight is handled at New York by lighters, the importance of this development whereby freight is handled direct from car to ship will be readily appreciated. There can be no doubt, therefore, that the Lehigh Valley has shown real progress in working out this development. It goes without saying that as the business of the port grows and as the facilities proposed in these extensive plans are gradually brought into use, the strategic position of the road as to busi-



The Lehigh Valley

and to enable it to be a more efficient carrier in general. The improvement program has included, more particularly, substantial progress as to its equipment and increases in the terminal facilities at various strategic points on the system.

President E. E. Loomis, in the 1920 annual report, refers to the program in these words: "Probably the greatest problem confronting the railroads will be to provide adequate facilities to handle the business of the country, which, it is fair to assume, will increase in the next ten years in the same proportion as in the past decade. This your company has constantly in mind, and at this time is giving special attention to enlarging its terminal facilities at Buffalo and in New

York and through the port of New York will be greatly enhanced.

President Loomis in the statement quoted above, referred also to the maintenance of equipment. This matter was a somewhat striking feature of the Lehigh Valley's operations during 1920 and for that reason merits more than passing attention. The Lehigh Valley has for many years been carrying out a program of securing larger power and of modernizing locomotives already in service. When the property was returned to private control on March 1, 1920, it was found, as was commonly the case on most roads, that the equipment had not been properly maintained. This was true particularly of cars which had been off line and which were returned

in poor repair. The Lehigh Valley promptly took steps to remedy this situation and to this time it has not reduced its expenditures for maintenance of equipment despite the present high costs or the sharp falling off in business. The expenditures for maintenance of equipment in 1920, it will be noted, were nearly double those for maintenance of way. In the first two months of 1921 expenditures for maintenance of equipment were nearly \$1,000,000 in excess of those for the same period of 1920, although expenses of other kinds were considerably less in this period in 1921 than in 1920. It was not unusual for a road to spend more for maintenance of equipment in January and February, 1921, than in the same two months of 1920, but it was unusual for a road to spend as much more in proportion as the Lehigh Valley has done.

The Lehigh Valley did more business in 1920 than it did in 1919, but not as much as in some of the years immediately preceding. The total tons of revenue freight carried in 1920 were 32,103,897 as compared with 30,934,972 in 1919, or 37,250,739 in 1918. The ton-mileage of revenue and non-revenue freight in these years compared as follows: 1920, 6,558,302,627; 1919, 5,968,348,276 and 1918, 7,136,881,128. The average haul of revenue freight in 1920 was 197 miles; the average revenue per ton per mile 0.971 cents. The Lehigh Valley in the years up to 1918 made some rather remarkable increases in its average train load. The average revenue tons per train in 1916 were 654; in 1917 this figure was raised to 751 tons, an increase of 15 per cent in a

quite different result from the figures of operation; it showed a net income of \$13,511,917 as compared with \$4,977,213 in 1919 or \$6,592,834 in 1918. The 1920 net income includes, of course, the standard return for January and February, and the guaranty for the guaranty period. It also includes an item of \$15,532,351 dividend income. This item was \$14,343,674 greater than in 1919, the difference being due to the fact that in 1920 the Lehigh Valley received extraordinary dividends from its coal properties, Coxe Brothers & Co. and the Lehigh Valley Coal Company, paid out of earnings in former years. Dividends paid by the Lehigh Valley during the year amounted to \$4,245,749, the payment on the common stock being 7 per cent. The interest charges for the year totaled \$4,580,839 on funded debt and \$393,362 on unfunded debt. Rent for leased roads, however, amounted to \$2,195,092. The profit and loss surplus at the close of the year was \$36,326,576, having increased from \$25,965,934 at the close of 1919. An interesting feature of the Lehigh Valley's financial standing is that although the road has \$2,400,000 of equipment trust certificates outstanding none of these certificates are in the hands of the public.

President Loomis in his report has some pertinent remarks concerning the present railroad situation that are so well put as to deserve quoting. He said, "There has been a recent tendency to find a connection between the present business depression and the increased transportation charges. A study of the situation, however, indicates rather that business conditions merely are reflecting the general disorganization and unsettlement following the war and, while some rate reductions may be possible as the result of decreased operating costs, no general reduction in transportation charges should be made if the railroads are to furnish the facilities and high standard of service the commerce of the country demands.

"We feel that the Transportation Act has not had a fair trial up to this time, principally because of the decline in volume of traffic, which, toward the close of the year, accompanied the general business depression. Before any legislative changes are considered, it is to be hoped that the present law will be given further opportunity to demonstrate its value."

The operating results for 1920 as compared with those of 1919 are as follows:

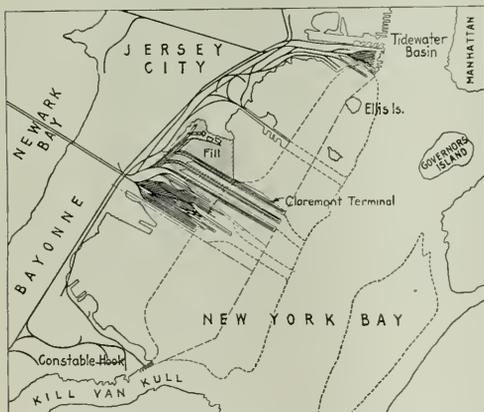
	1920	1919
Mileage operated	1,448	1,448
Anthracite coal freight revenue	\$23,727,484	\$20,740,261
Bituminous coal freight revenue	2,630,066	2,335,477
Merchandise freight revenue	35,011,415	28,531,805
Total operating revenue	75,229,584	65,542,502
Maintenance of way expenses	11,952,836	9,824,647
Maintenance of equipment	23,656,316	18,152,710
Traffic expenses	984,338	481,733
Transportation expenses	41,486,497	28,870,526
Total operating expenses	80,593,975	60,309,198
Net from railway operations revenue	Def. \$4,374,390	\$5,233,304
Taxes	2,367,895	1,822,987
Operating income	Def. \$7,649,345	3,408,253

The corporate income account is as follows:

	1920	1919
Operating income, 10 months	Def. \$4,263,487	
Standard return, 1919		11,316,196
Other income, including standard return for January and February, guaranty, dividend income, etc.*	26,453,346	
Total income	22,189,859	13,164,434
Deductions from gross income	8,677,942	8,187,221
Net income	\$13,511,917	4,977,213
Dividends (7 per cent, 1920, 7 1/2 per cent, 1919)	4,245,749	4,699,512

*Dividend income in 1920, \$15,532,351; in 1919, \$1,188,678.

SENATOR TOWNSEND has submitted to the Senate concurrent resolutions adopted by the Michigan legislature petitioning Congress to repeal the Esch-Cummins act and also urging the amendment of the act so as to restore to the states the control of the capital securities of railroad corporations created under the sovereignty of the states or of railroads operating wholly within the territorial limits of a state.

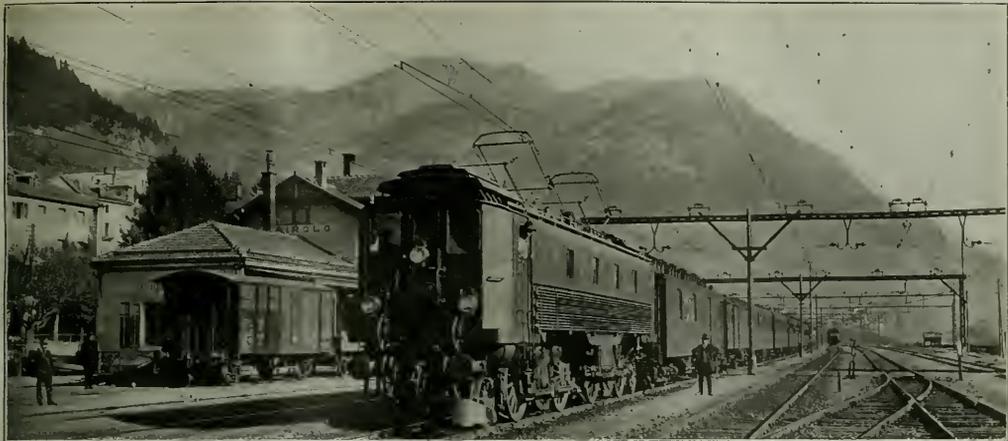


Relation of the Claremont Terminal to Other Terminals on New York Bay

single year. In 1918 it became 892 tons, a still further increase in a single year of no less than 19 per cent. This increase, however, has not been kept up since that time presumably because of the smaller amount of business carried. The revenue train load in 1919 was 878 tons; in 1920, 864 tons. The average load per loaded car in 1920 was 32.21 tons as compared with 30.62 tons in 1919. In 1920 the car miles per day were 21.9.

The operations of the Lehigh Valley in 1920 resulted in an operating deficit of \$7,649,345 as compared with operating income in 1919 amounting to \$3,408,253. This is the familiar story of an increase in gross, a still greater increase in expenses and a decrease in net. The operating revenues in 1920 amounted to \$72,229,584, an increase of \$9,687,082 over 1919; the operating expenses to \$80,503,974, an increase of \$20,194,776 over 1919. The operating ratio in 1920 was 107 and in 1919, 92.

The corporate income account for the year, however, shows



Electric Passenger Train at Airolo

Electrification of St. Gotthard Line, Switzerland

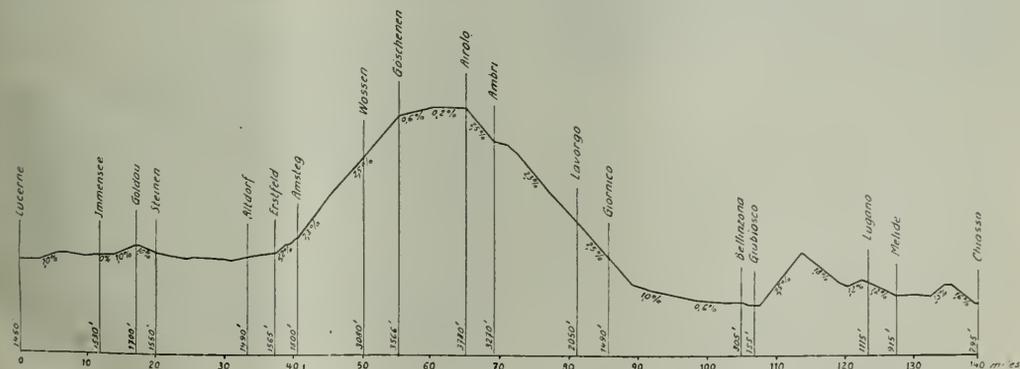
Road Has 60 Trains a Day—Average Grade of 2.5 Per Cent for Thirty Miles—Coal Is at a Premium

By Hans W. Schuler
Electrical Engineer

THE SWISS FEDERAL RAILROADS decided to electrify the St. Gotthard Line from Erstfeld to Bellinzona, a distance of 101 miles, in August, 1913. The St. Gotthard Line extends from Lucerne to Chiasso on the Italian border, a distance of 180 miles. That part of the line which is electrified represents a mountain railroad of the first order,

able were used in electrifying because of the heavy traffic, the severe climatic conditions and the importance of the line as a main connection between Germany and Italy.

The electrified section is all double track and has the heaviest and longest grades of any of the standard gage railroads of Switzerland. The northern part, from Erstfeld



Profile of the St. Gotthard Railroad. The Section from Erstfeld to Bellinzona Has Been Electrified

with its heavy grades, long tunnels and with the great differences in altitudes that are to be overcome.

In 1912 the amount of traffic handled from Erstfeld to Bellinzona was about 405,000,000 ton-miles. Every day 20 through passenger trains, 8 local passenger trains, 22 freight trains and from 10 to 20 special trains were run over this line. The best material and methods of construction obtain-

to Goeschenen, at the northern portal of the St. Gotthard tunnel, has an average grade of 2.6 per cent for 18.7 miles, and the southern part from Biasca to Airolo, at the south portal of the St. Gotthard tunnel, has an average grade of 2.5 per cent for 28 miles.

The original plan for electric power called for two power stations equipped with single phase generators, one situated

near Amsteg in the Reuss Valley on the north side of the Alps, and the other near Ambri-Piotta on the south side. In 1914 the work of building these power stations was started and it was planned to get them finished and ready for service in 1918. The world war checked this program. Because of the enormous difficulties created by the war, it was necessary to neglect some of the construction work of the Amsteg power station and concentrate the work of building on the Ritom power station at Ambri-Piotta. This station began

Because of the difficulties involved in getting materials such as iron, copper and insulators from other countries the construction of the contact line was delayed. Other obstacles encountered were the necessary reinforcement of the numerous bridges, due to the fact that the electric locomotives were heavier than the steam locomotives displaced, and to the necessity for rebuilding the stations at Goeschenen, Airolo and Bellinzona, which had reached their capacity in 1913. In spite of these delays the contact line through the St. Gotthard tunnel was ready for service in May, 1920, when the Ritom power station began to supply current. In July the construction of the contact line from Erstfeld to Goeschenen was completed and in November the contact line from Airolo to Biasca was ready for service. The great amount of rebuilding work now going on in the station of Bellinzona will make it impossible to start electric operation from Biasca to Bellinzona before early summer this year.

The Power Stations

The power station at Ritom is a hydro-electric plant with a head of 2,620 ft. Lake Ritom, situated about 2,950 ft. above the village of Ambri-Piotta, at an altitude of 6,000 ft., is used as a reservoir, and the water is held in the lake by a small dam at the outlet of the lake. The useful volume

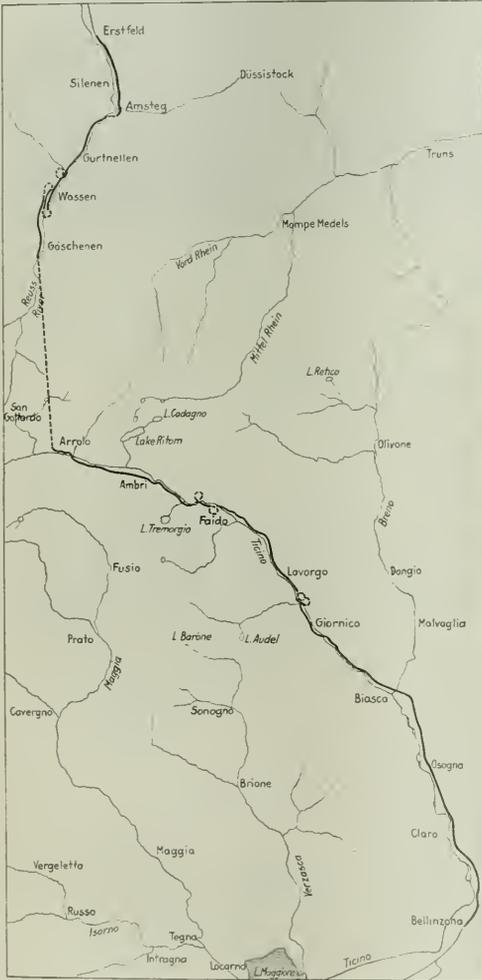


The Ritom Power Station. Pressure Pipe Lines from Lake Ritom Are Brought Down Through Cleared Space in the Timber Shown in the Rear

of the lake is 918,000,000 cu. ft. and the average outflow is 35.3 cu. ft. per second. This flow and head maintain a continuous output of 8,500 hp. at the shaft of the turbine. The reservoir capacity of this plant makes it admirably suited for co-operation with the plant at Amsteg, which has a varying output caused by the widely fluctuating flow of the Reuss River, on which it is located.

The Ritom power station is now built for an output of 48,000 hp. and its capacity will later be enlarged to 72,000 hp. At present there are three 9,000 kva. generators in service, each direct connected to a 12,000 hp. Pelton turbine, while a fourth set is being mounted. The generators develop single-phase, 15,000-volt power at a frequency of 16 2/3 cycles. The current is delivered directly to the contact line at the power stations and also to 11,000 kva. transformers which step the voltage up to 60,000 volts to transmission lines which take it to the various sub-stations. At present it is necessary to mix electric traction with steam traction between Biasca and Bellinzona, and until it is possible to discontinue this practice, the tension on the contact line will be maintained at 7,500 volts.

The Amsteg power station uses the fall of the Reuss river. A pressure tunnel, 4 1/2 miles long, conveys the water to a



Map of the Electrified Section of the St. Gotthard Railroad

to deliver current to the contact line in the spring of 1920. The reason for this procedure was that when Italy entered the war the traffic on the St. Gotthard Line diminished considerably; it was evident then, that this traffic regress would continue for some time. The Ritom power station should be able to furnish all of the power required to run trains until about 1922, and it seemed advisable not to hasten the construction work of the Amsteg power station, but to wait a year or two for better conditions for construction work.

water chamber 920 ft. above the power house. The average minimum output during the three winter months is 12,000 hp. at the shaft of the turbines. Water wheels aggregating a total of 60,000 hp. will be installed at first and later increased to 90,000 hp. The Amsteg power station should be ready for service early in 1922, and as soon as it is put in operation the Ritom station will be practically idle in the summer, thus allowing a large volume of water to accumulate in Lake Ritom, while Amsteg, due to the immense flow of the water in the Reuss river during the summer months, will

there is only one two-conductor transmission line consisting of two cables of 135 sq. mm. copper cross-section between Ritom and Goeschenen and two lines consisting of four cables of 120 sq. mm. cross-section each between Ritom and Giornico. A second line between Ritom and Goeschenen and two lines between Amsteg and Goeschenen are being installed. Each of the cables used in these lines has a cross-section of 135 sq. mm.

The 30,000-volt cables are placed on the right of way in concrete channels. Junction boxes are placed in the concrete channels at intervals of about 1,600 ft. for the purpose of making splices in the cable. In the St. Gotthard tunnel the cables are laid in reinforced concrete channels that are attached to the side wall of the tunnel at a height of 4 ft. 11 in. above the top of the rail. The channel supports are placed at intervals of 10 ft. 9 in. The insulation of the cables consists of specially impregnated Manila paper, which is covered by a lead sheath 3 mm. thick, which in turn is enclosed in a jute wrapper.

From the Giornico sub-station to the south and from Amsteg to the north the transmission lines are aerial. The line to the sub-station of Giubiasco is now ready for service and the line further south to the sub-station of Melide will be completed by the end of this year. For the greater part



The Amsteg Power Station Under Construction. Photograph Was Taken in November, 1920

be able to generate all the power that is needed to run all trains over the St. Gotthard line. During the three winter months the Amsteg station will have its output limited to 12,000 hp. and Ritom will be able to satisfy the balance of the power demand by drawing on the water accumulated in the lake during the summer months.

Transmission Lines

From the power stations the power is transmitted over 60,000-volt transmission lines to the sub-stations. Between



Catenary Construction on Tangent Track

the Ritom power station and the sub-stations of Goeschenen and Giornico these transmission lines are built as underground cables. As the middle point of the transformer high tension winding is grounded, the tension between each conductor and ground is only 30,000 volts. The cables are insulated to stand 30,000 volts in normal service. Before they are laid they are tested with 90,000 volts. At present



Catenary Construction on Curve. Supporting Bridge in Foreground. Second Bridge Is a Pull-Off

of the distance these lines parallel the track at a distance of 66 ft. and consist of 4 copper strands of 100 sq. mm. cross-section. The average distance between poles is 262 ft. A ground wire consisting of a 1/2 in. galvanized steel strand is strung over the top of the poles. The transmission lines from Amsteg to the north will be built during the coming summer and fall and should be ready for service early in 1922. It will connect the Amsteg power station with the sub-station at Steinen.

Sub-Stations

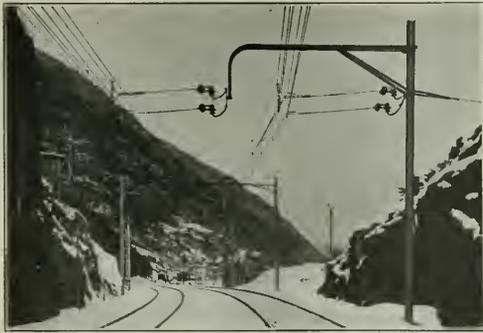
There are five sub-stations in all. The sub-stations of Goeschenen and Giornico are already in operation, the sub-station of Giubiasco is about completed and the sub-stations at Melide and Steinen will be put in service at the end of this year. In the sub-stations the single phase current from the power stations is transformed from 60,000 to 15,000 volts and delivered to the contact line. The sub-stations of Goeschenen, Giornico and Giubiasco are built for the installation of three transformers of 5,000 kva., continuous rating, but only two will be installed until the traffic demands

a third. The sub-station at Steinen will be equipped with three and later on with four transformers of 5,000 kva. capacity.

The Contact Line

The contact line is built as a catenary. Over the main line track it consists of a No. 0000 hard drawn copper contact wire, a $\frac{1}{2}$ -inch 19-strand galvanized iron auxiliary messenger and a $\frac{1}{2}$ -inch 7-strand galvanized iron messenger wire. The contact wire is suspended from the auxiliary messenger at intervals of 23 ft. and the auxiliary messenger is supported from the messenger by hangers placed at intervals of 92 ft. The bridges which support the messenger are spaced 184 ft. apart. At these bridges the contact wire and auxiliary messenger strand are held in their position, relative to track, by a special pull-off construction. On curves with radii less than 2,950 ft. the contact wire, the auxiliary messenger and the messenger are pulled off in the middle of the span. The span of 184 ft. was chosen because it was found the most advantageous one with respect to the many curves and because of the small width of the pantograph shoe made necessary by the form of the tunnel. On adjoining lines, where curves are less frequent, the length of span will be 197 ft.

The maximum tension of the contact wire at the lowest



Catenary on a Curve Showing Another Type of Pull-Off Construction (See Preceding Illustration)

temperature reached in winter is 883 lb. At the highest temperature in summer, this tension goes down as far as 530 lb. With the greater number of catenary systems used in Europe, a constant trolley wire tension is obtained by tension weights used to suspend the contact wire at various points of the line. No tension weights are employed in the construction of the catenary on the St. Gotthard Railroad and much care has been taken to obtain a perfectly level contact wire, as the pressure of the pantograph shoe is kept at only $5\frac{1}{2}$ lb.

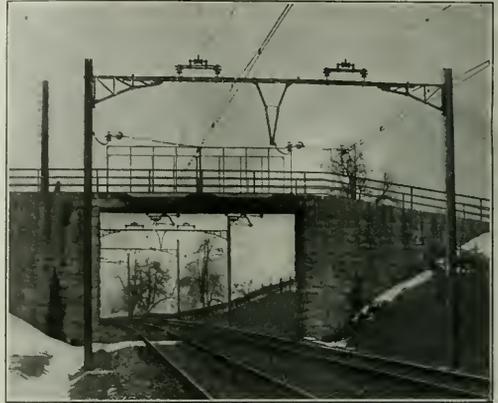
In the tunnels the auxiliary messenger is replaced by a copper wire that is mounted close to the main contact wire. The messenger is replaced by a copperclad steel wire that has a copper cross-section of 28 sq. mm. and a steel cross-section of 28.5 sq. mm. The messenger is supported by special frames, which are about 82 ft. apart.

The height of the contact wire above the top of the rail at the highest temperature is 18 ft. on the open line, 19 ft. at highway crossings and 20 ft. in stations. The total difference in height, on account of temperature change, is 1.5 ft. In tunnels and under low bridges the height above the top of rail is 16 ft. at all temperatures.

The contact line is insulated with a double insulation that consists of two pin-type and one spool-type insulator at all points where the messenger strand is supported. At pull-off points the insulation consists of one pin and one spool-type

insulator. On account of the limited space in tunnels it was impossible to install double insulation. As a substitute a pin-type insulator of especially heavy design is used. All of the insulators used have a cylindrical section which makes it possible to use them with a sturdy type of insulator support or armature.

The yard tracks are equipped with a contact line which



Special Contact-Wire Support and Protective Devices Are Used on Highway Bridges

consists of the contact wire 70 sq. mm. cross-section, of a $\frac{3}{8}$ in. 19-strand galvanized iron auxiliary messenger and a $\frac{3}{8}$ in. 7-strand galvanized iron messenger.

The pole lines on the open line between Erstfeld and Bellinzona are made of H-beams, 8 in. wide. Between Bellinzona and Chiasso and between Erstfeld and Lucerne structural steel poles are used which have the same mechanical



Sectionalizing Insulators and Circuit Breakers on Pole in Yard Catenary Construction

strength. The yokes between the poles are made of two "T's" or of four angles. Structural steel poles are used in the stations with rigid steel cross-spans. All insulator supports and all bolts and small parts for the contact line are heavily galvanized.

Section insulators and switches are so located that all the tracks in a station can be disconnected from each other and so that all of the main line tracks between any two stations

can also be disconnected from the rest of the system. There are no feeders along double track lines, but feeders are provided on single track lines for continuity of the circuit while repair work is being done on the contact line.

The different sections of the contact line are connected by oil circuit breakers. Four of these circuit breakers are located



Sectionalizing Switches Used to Disconnect the Catenary Over the Station Tracks from the Main Line Catenary

at either end of every station. When all of the lines are in service, the contact line transmits the current through the stations to points farther away from the feeding point. Each station is provided with a special jumper line that goes around the station and maintains continuity of the circuit when the lines in the station are disconnected.

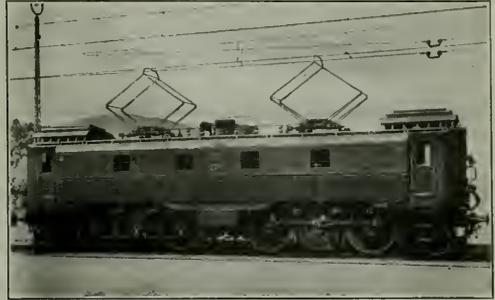
Telegraph and Telephone Lines

All of the telegraph and telephone lines in Switzerland not owned by the railroads are owned by the government and it is common practice to run both government and rail-

and telephone lines in a cable laid in a concrete channel in the right of way and the state removed its lines as far away from the railroad as the rather narrow valley would admit. Along this line both the railroad and the state have discontinued the use of a grounded return, and as the lines are either in a cable or from 1,640 ft. to 2,600 ft. from the contact line and frequently transposed, there is no trouble from inductive interference and no danger of actual contact. In some localities the induced voltage in the railroad telegraph and telephone lines runs as high as 240 volts at peak loads, but as the lines are not grounded this does not interfere with normal service.

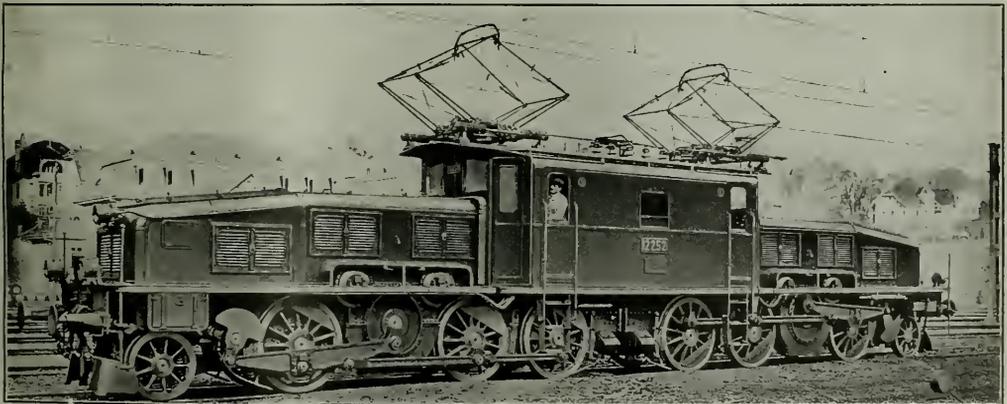
Locomotives

When a decision was reached to electrify the St. Gotthard line, it was planned to obtain trial locomotives as soon as



Electric Passenger Locomotive

possible and to test them out on the Loetschberg Railroad for the purpose of finding out which type was the best suited for the St. Gotthard line. The war also delayed the delivery of electric locomotives for the test, and for this reason the locomotives for the St. Gotthard line had to be ordered before the trial locomotives had been delivered and tested.



Electric Freight Locomotive

road telegraph and telephone lines along the railroad right of way. As many of these lines use a grounded return, it is not possible to have them on the right of way of an electrified road because of the noise caused by inductive interference and the danger of actual physical contact with the overhead system of the electrified railroad.

On the St. Gotthard line the railroad placed its telegraph

At the present time there are about 30 locomotives in service, 15 of which are freight and 15 passenger locomotives. The data for the two types are given in Table 1.

The coal situation, often referred to as the coal misery, reached its climax in 1918 and taught Switzerland to consider steam railroad electrification as a vital as well as an economic problem. With the high prices being paid for coal,

many roads could probably show considerable saving if electrified, but more than this it was desirable to maintain the continuity of traffic and not be dependent upon the good will

TABLE 1

	Passenger locomotive	Freight locomotive
Type	2-4-2	3-6-2
Continuous rating (hp.)	1650	1825
One hour rating (hp.)	1800	2250
Drawbar pull (continuous)	20,000 lb.	26,000 lb.
Drawbar pull (one hour)	23,000 lb.	37,500 lb.
Speed	47 miles per hr.	40 miles per hr.
Length over all	54 ft.	63 1/2 ft.
Diameter of driving wheels	60.2 in.	53.2 in.
Gear ratio	1:3.5	1:4.03
Weight of mechanical parts	59.3 tons	72.0 tons
Weight of electrical parts	47.3 tons	56.0 tons
Total weight	106.6 tons	128.0 tons
Weight on drivers	76.8 tons	103.9 tons
Electric parts made by	Brown, Boverly & Co.	Maschinenfabrik Oerlikon
Mechanical parts made by	Locomotivfabrik Winterthur	Lokomotivfabrik Winterthur

of foreign countries for coal. These were the primary reasons for deciding on a program for the electrification of all of the lines of the Swiss Federal railroads, and a decision has been reached not to wait for the completion of the electrification

TABLE 2

Lines	Length of line	Year operation was started	Kind of power used
Brig-Iselle (Simplon tunnel)	13.7 miles (single track)	1905	Three phase 3000 volts freq. 16 2/3
Brig-Sitten	35 miles (partly double track)	1919	As above
Thun-Bern	20 miles (double track)	1919	Single phase 15,000 volts freq. 15
Erstfeld-Biasca	56 miles (double track)	1920	As above but freq. 16 2/3
LINES BEING ELECTRIFIED		Time work will be finished	Kind of power used
Biasca-Bellinzona	12.5 miles (double track)	Apr., 1921	Single phase 15,000 volts freq. 16 2/3
Bellinzona-Chiasso	34 miles (double track)	End, 1921	As above
Erstfeld-Lucerne	37.3 miles (partly double track)	Apr., 1922	As above
Goldau-Zug	12 miles (single track)	Apr., 1922	As above
Lucerne-Zug-Zuerich	28.3 miles (partly double track)	End, 1922	As above
Sitten-Lausanne	60 miles (double track)	Aug., 1923	As above

work on the line from Erstfeld to Bellinzona but to go on at once with the electrification of adjoining lines. Table 2 lists the Swiss Federal roads now electrically operated and those on which the work of electrification is in progress.

Senator Elkins Urges Public to Buy Coal Now

“HOW TO BREAK the ‘buyers’ strike,’ if such it may be called, affecting the coal industry is one of the grave and immediate problems confronting the government in its executive and legislative branches,” said Senator Davis Elkins, of West Virginia, in a statement to the press.

“Sudden restoration of a market, and an attempt to crowd the hauling of the bulk of the nation’s coal in the fall and winter months, will place upon the railroads a burden which they are admittedly unable to adequately discharge. That will simply mean a repetition of the so-called ‘coal famine’ of last year, which was *per se* a car famine.

“It is proposed in bills before Congress to induce the public to lay in its fuel supply in ample season by authorizing and directing a reduction of seasonal freight rates on coal. That idea put into practice might prove effective. If it should, it is hardly likely to meet the present critical situation with the desired promptness. That help would be likely to come rather late.

“Under existing freight rates and scales of miners’ wages, the prices for soft coal are as low now as they are likely to be. They are less than those established by the late fuel administration, which allowed, according to Dr. Garfield, an average profit of 46 cents the ton.

“Since then, during 1920, the miners secured an increase in two installments of 47 per cent, which increase was written into the present wage scale under government supervision, and which scale has until April, 1922, to run.

“It is therefore useless to hope for a reduction in wages as an aid to lower soft coal prices this year. Wages and freight rates are the main supports of the present market prices.

“Since 1914 the soft-coal industry has had to sustain six successive increases in wages. These increases have added, it is estimated, \$1.70 to the cost of each ton. On a yearly production of 550,000,000 tons, this would represent an increase of \$935,000,000 in wages alone over what it cost to produce soft coal before the war.

“Freight rates have approximately doubled since 1914. Where the average freight rate was about \$1.50 a ton in pre-war days, the average rate now, so far, is about \$3 a ton. For long distances from the mines the freight rates run much higher than \$3 a ton.

“The increase of \$1.50, applied to a yearly production of 550,000,000 tons, represents an advance in the cost of soft coal to the consumers and the country over on account of freight rate charges, of \$825,000,000.

“Taken together, advances in wage scales and in freight rates since 1914, it is estimated, have added \$1,750,000,000 to the yearly coal bill of the nation.

“The conclusions to be drawn from the foregoing are that (1) the wage scale stands until April, 1922, a scale written under government supervision, if, indeed, not by government direction; (2) that any reduction in freight rates on coal is likely, if it comes and when it comes, to be too late to correct the present situation before the damage has been done; and (3) that the grave concern felt by the officials of the government over coaling the country for next fall and winter is abundantly justified.

“The public’s interest and concern in this matter are second to no other. What the public needs is to clearly understand that by holding off it is assuming too great a risk on its own account; is unwittingly contributing to the vexations and burdens of the railroads, already weighted down with vexations and troubles; is keeping many thousands of miners idle, and causing distress to the dependents of these men, and doing that which it does not at heart want to do—helping to retard the rebirth of prosperity, confidence and optimism in our industrial and economic life.”



Photo by Keystone
The Trans-Siberian Station at the Russia-Manchuria Border

Carriers Answer Lauck's Charges Before Board

Railroad Representatives Close Testimony in Wage Case With Reply to Employees' Exhibits

DECLARING the voluminous exhibits submitted to the Railroad Labor Board by W. Jett Lauck to be irrelevant, fallacious and having no foundation in fact, representatives of eastern and western carriers on May 7 completed presentation of the railroads' plea for wage reductions. The last two days of hearings in the case were given almost wholly to an attack upon material prepared by Mr. Lauck as a "consulting economist" for the labor organizations. The attack was made by J. G. Walber, speaking on behalf of the eastern roads; F. W. Sargent, general solicitor of the Chicago & North Western, speaking for the North Western and for the western roads; R. M. Shaw, general counsel of the Chicago Great Western, speaking for six presidents of western roads, and E. H. Senneff, general counsel of the Pennsylvania.

The statement read by Mr. Shaw on behalf of the western roads was signed by Charles H. Markham, president, Illinois Central; Hale Holden, president, Chicago, Burlington & Quincy; H. E. Byram, president, Chicago, Milwaukee & St. Paul; W. H. Finley, president, Chicago & North Western; J. E. Gorman, president, Chicago, Rock Island & Pacific; S. M. Felton, president, Chicago Great Western, and W. B. Storey, president, Atchison, Topeka & Santa Fe, and said in part:

For some weeks Mr. Lauck has been presenting to the Labor Board and giving to the press statements charging that large amounts of money are being wasted in the financial and operating management of the railroads. These statements have no relationship to any question before the Board, or which it has authority to determine. The Board itself has expressly stated that the Interstate Commerce Commission is the only federal body having authority over the general management of the railroads, and that the Board has authority only to fix reasonable wages and working conditions.

The sole purpose of these statements is to divert public attention from matters actually pending before the Board. They are bald propaganda intended to discredit private management and promote the Plumb plan. We respectfully protest against the Board continuing to allow hearings before it to be made a means of spreading this propaganda.

Since these statements have been permitted to be presented to the Board, we call your attention to the fact that in addition to being irrelevant, they are gross misrepresentations of the management of the railroads and that their tendency and purpose is to mislead the public regarding the actual facts as to both railway management and railway regulation. We shall briefly point out a few of these misrepresentations to illustrate the true character of all of them.

1. It is charged that in various ways the capitalization of the railroads has been made excessive and that in this way a burden has been imposed upon the public. We deny that the capitalization of the railroads as a whole is excessive. Even if it were, this would have no effect on passenger and freight rates, since the Transportation Act and the Interstate Commerce Commission, in carrying it out, have specifically based the rates upon a valuation made by the Commission itself.

2. It is charged that the railroads and concerns from which they buy fuel, materials, supplies and equipment are under the same financial control, and that, in consequence, the railroads pay excessive prices to these other concerns. Every railway buys fuel, materials, supplies and equipment from literally hundreds of different coal, iron and steel, lumber and equipment companies all over the country, and the charge that the railroads and all these concerns are under the same financial control is absurdly untrue. Even if they were under the same financial control it would not prove that the railroads pay excessive prices, and indisputable facts regarding almost innumerable transactions of the purchasing departments of the railroads could be presented to show that they do not, and have not, paid higher prices than other purchasers of the same things. Absolutely the only evidence purporting to support this charge is that the railroads paid high prices last year for having a very small part of their locomotives and cars repaired

in outside plants. Any fair comparison of the prices paid for these outside repairs, and what it would have cost to have made them in railway shops, will prove that the prices paid to outside plants were not excessive. Furthermore, the only reason why the railroads had these repairs made in outside plants was that their own shops were unequal to the demands upon them at the time.

3. It is charged that the railroads have wasted immense sums by not "modernizing" their locomotives. Figures given by Mr. Lauck himself show, however, that improved devices have been installed with remarkable rapidity on locomotives within the last ten years, considering the difficulties the railroads have had in raising capital for improvements. Mr. Lauck's inconsistency is shown when he charges the railroads have not sufficiently improved their locomotives, says at the same time that they have greatly increased their average tractive power, and then criticizes them because they have not fully utilized this increased tractive power. The best measure of the increase in the service obtained from locomotives is the average trainload. The average trainload of the western railroads in 1915 was 393 tons, while in 1920 it was 643 tons, an increase of 61 per cent. No better evidence could be cited than these figures of the increase in the efficiency with which locomotives have been used, and in general operating efficiency.

4. Mr. Lauck criticizes the railroads for many other alleged wastes which, even if proven to exist, could be remedied only by making great improvements in the physical properties. These improvements could be made only by the investment of large amounts of new capital. This new capital could be obtained only if the railroads were enabled to make enough net operating income to pay a return upon it. The railroads are trying to increase their net operating income by the only means immediately available—that is, by reducing their excessive operating expenses—and in this effort almost the only opposition they are receiving is from the labor leaders that Mr. Lauck represents. Within recent months the prices of everything the railroads buy except labor have been reduced.

5. Among the items of alleged "waste" Mr. Lauck mentions loss and damage. In 1917, the last year before government control, payments for loss and damage to freight were only \$35,000,000. In 1919, after two years of government control, this had increased to \$106,804,000, or 205 per cent. Mr. Lauck defends unified government control, but fails to point out that such a large saving in this item is possible because it was so increased under government control. He also fails to mention that since the railroads were returned to private operation the American Railway Association has been carrying on a campaign to reduce loss and damage 50 per cent, which already is beginning to meet with great success.

6. It is claimed that while the managements have been inefficient, the "productive" efficiency of the employees as measured by the amount of traffic handled per employee has increased. This claim is in direct contradiction of the facts. In 1916 the number of ton-miles of freight handled per employee was 243,218 and in 1917 250,997. The latter was the highest figure ever reached. In 1918 the average ton-miles per employee was only 241,541 and in 1919 only 208,026. In 1920 it had increased to 221,921. It declined under government control and increased under private operation in 1920, but even in 1920 was much less than that in 1916 or 1917.

When the railroads were still handling a large business, their operating expenses were running about \$6,200,000,000 a year, of which about \$4,000,000,000 was going to labor. Mr. Lauck has estimated that the railway managements have been "wasting" \$2,500,000,000 a year, while B. M. Jewell, head of the Railway Employees' Department of the American Federation of Labor, has completely outdone Mr. Lauck by estimating that in various ways there could be made economies amounting to over \$3,376,000,000 a year. At the same time, both Mr. Lauck and Mr. Jewell contend, first, that the railroads have not been justified in laying off employees, and, secondly, that there is no justification for any reductions in wages. The necessary effect of these contentions is that there is no justification for any reduction in the payroll. When they claim that from \$2,500,000,000 to \$3,500,000,000 a year could be saved by better management, and at the same time contend that there should be no reductions in the payroll, the inconsistencies and baselessness of their propaganda becomes apparent.

The railway managers are trying to reduce operating expenses through changes in rules and working conditions and reductions in wages which they believe will be just to the public, the railroads and the employees in view of the changes in conditions which

recently have occurred. They are also making the utmost efforts to effect every other economy that is practicable under present conditions. They realize that if they could raise sufficient new capital to make needed improvements in the properties they could effect very large economies by reducing the amount of labor, fuel and materials used. Until, however, they are allowed to earn enough net return to enable them to raise the new capital for these improvements, the large economies that could be effected through these improvements must remain in abeyance.

In the hearings on the railroad situation soon to be held before a Senate committee in Washington the subject of railroad management will be fully investigated, but we have felt that since charges of mismanagement having no relation to any matter pending before your honorable Board continue to be made day after day in statements before your Board, we could not, in justice to the properties we represent, refrain any longer from calling attention to the irrelevancy, inconsistency and baselessness of these charges and the purposes for which they obviously are being made.

J. G. Walber Analyzes Lauck Exhibits

Mr. Walber's analysis dealt largely with the alleged "economies" which Mr. Lauck has maintained should be placed in effect before reductions are made in the payroll.

With respect to alleged possible economies amounting to \$2,026,355,000, through the use of various mechanical appliances and in general the revamping of all facilities and equipment, Mr. Walber said:

Notwithstanding the railroads have been using such devices, treated ties, etc., upon which so much stress is laid, the operating results and the ratio of operating expenses to gross earnings do not reflect economies capable of being measured to any extent as claimed, nor does the experience of the railroads justify estimates of economies of the magnitude represented.

Since these total economies (\$2,026,355,000 as stated by Mr. Lauck) amount to more than one-third of the total operating expenses, it is reasonable to assume that economies would be effected in expenses for labor and material in the same proportion that these items of operating expenses now bear to the total operating expenses. At the present time expenses for labor approximate 60 per cent of the total operating expenses. It is, therefore, reasonable to assume that 60 per cent of the savings claimed would have to be savings in labor, which would mean the reduction of 668,000 employees based on the number in service in 1920.

Referring to one of Mr. Lauck's statements headed "Immediate Savings" amounting to \$272,500,000 covering economy devices for locomotives, he stated:

Granting that expenditures for such devices were justified, it must be manifest that it would be wholly impracticable within any brief period of time which would justify the statement that they would be "immediately available" and the management of any railroad that followed this suggested practice could not survive the test of the Transportation Act as to honest, efficient and economical operation.

With reference to an alleged saving of \$50,000,000 a year through freight handling at terminals, Mr. Walber said:

This allegation is purely hypothetical and based on someone's estimate of a total possible saving of \$350,000,000 at all points in the United States on railroads and steamships. The railroads have been alive to this for years and are constantly studying the situation, adopting, where found practicable and economical, such mechanical devices and other means as will reduce the cost of operation.

Referring to alleged savings on shop cost accounting, he said:

There is nothing in this statement which indicates that such a saving is possible; it is merely an assertion that if 1 per cent can be saved it will amount to so much money. The roads have pointed out that while time studies are a prime essential in any proper system of shop accounting, nevertheless during Federal control the railroads were met with threatened strikes or actual strikes because they used such methods after piece work had been abolished and were then instructed by the United States Railroad Administration to discontinue such accounting methods.

With respect to other accounting economies alleged to justify a saving of \$50,000,000, Mr. Walber said:

A casual consideration of the factors entering into this cost will demonstrate how little reliance can be placed thereon, and in addition we merely call attention to the fact that as one saving

they point out the desirability of introducing systems which require largely increased accounting and statistics and in another exhibit show how accounting and statistics should be curtailed.

Referring to the roads' alleged failure to utilize modern labor saving devices for office work, Mr. Walber said:

In this instance, as in practically all the other allegations, they are purely visionary and evidently prepared without any knowledge whatever of the actual conditions.

It is also noted that an alleged saving of \$40,000,000 per year would be accomplished by the elimination of labor turnovers. This estimate is the personal estimate of an individual and, from the way it is used, it is assumed that turnovers can be eliminated. The fallacy of such an assumption is apparent.

In connection with the alleged possible annual saving of \$100,000,000 for tie renewals, Mr. Walber stated in part:

It is estimated that to install a plant capable of treating 1,000,000 ties per annum would require approximately \$500,000. Any railroad which would undertake this installation would have to provide this capital and assume the interest, depreciation, maintenance of the plant and cost of treating ties over a period corresponding with the life of the untreated ties before any benefits would accrue. Again, it should be understood in treating ties it is only done to protect them against decay, and for this reason only certain kinds of wood are treated.

In reply to charges of financial mismanagement of the railroads, Mr. Senneff said in part:

Railroad capitalization has no effect whatever on railroad wages or rates. If any of the transactions to which reference is made have proved unjustifiable in the past they have received public condemnation and the bad results have been borne by the investors and not by the employees or the public using the railroads. Wages have been determined and will hereafter be determined irrespective of any railroad's capitalization.

Therefore, as neither railroad valuation rates nor wages have been gaged by stock or bond issue of any single railroad company nor of all the railroads, as no individual company is assured any return upon the value of its property as found by the Commission, the attempt to introduce these irrelevant matters growing out of transactions in the past years conduces only to confusion and beclouds the whole issue respecting just and reasonable wages.

It was also pointed out that the right of the railroads to apply surplus earnings to betterments and subsequently capitalize them is a method of financing that has been universally approved in this country and has been largely responsible for the efficient transportation system that the country enjoys; that it has stood the test of Public Service Commission, the Interstate Commerce Commission and the Supreme Court of the United States; that there is no possible danger in the future of overcapitalizing in this method of financing; and that the valuation work undertaken by the Interstate Commerce Commission even now proves conclusively that the value of the assets of the road far exceeds capitalization.

The respondents criticized many of the railroads because they have sold their stock for par value instead of market value. Again we insist that this specious argument really has no place in this hearing. Sufficient to say, however, that the principle of attempting to issue new stock in any amount at existing market is unsound. The effect of a new issue on the market is generally an immediate depreciation in price and the governments of the world and municipalities cannot escape this law of supply and demand. What has been said respecting the sale of stock applies generally to the sale of bonds. Bonds are sold to best advantage after careful consideration of all factors after ascertaining what the public is willing to pay.

A great deal is said in respondents' exhibits about interlocking directorates of the railroads and corporations with which they have business transactions. Respondents are attempting to create the impression that because of these interlocking directorates some great wrong is being done to the public and to the railroads themselves, which claim cannot be supported.

In fact, it has not been shown that such transactions have resulted in any injury to the public or to the railroads. However that may be, the contention is completely answered by the fact that such transactions are now governed by the provisions of the so-called Clayton Act, so that once paraphrasing Mr. Lauck, this is "water over the dam," and may be dismissed at this time without any further discussion as wholly irrelevant and immaterial in so far as this hearing is concerned.

F. W. Sargent Continues

Bombardment of Lauck Exhibits

Mr. Sargent followed with another broadside at Mr. Lauck's case, stating at the outset:

We have accepted it as fundamental for the purpose of this case that Decision No. 2 fixed just and reasonable rates of pay. That Congress directed this Board to adjust wages when disputes arose from time to time, having in mind, first, wages in other industries, and, second, cost of living, and thereafter the other five elements named in Section 307.

Mr. Lauck asks the Board to abandon the specific directions given to it by Congress in Section 307 of the Transportation Act. He in effect asks the Board to first create an artificial condition by the establishment of some standard of living which may meet the Board's conception of what the standard for every class ought to be, and, second, compel the transportation industry to pay wages that will support such a standard regardless of the productivity of the employee and regardless of the ability of the industry to maintain the standard thus set up. Realizing that the scale of wages is now so high that common carriers cannot continue to meet it, Mr. Lauck then proceeds to justify his theory upon two general propositions. First, he says that the railway employees did not receive all they were entitled to during Federal control and that, therefore, the corporations should now be compelled to continue the present scale in order to reimburse railway employees for their failure to receive their advances. In the second place, he claims that the railway companies prior to Federal control had been guilty of financial mismanagement, that they had in a large measure, through such mismanagement, destroyed their credit, had failed to make proper and essential improvements which would produce enormous economies, and on this account have placed themselves in a position where they are unable to continue the present scale of wages and at the same time take care of their other operating expenses, taxes and fixed charges. That in view of this prior financial mismanagement the roads should not now ask the employees to bear any portion of the present depressed conditions, but should continue to pay wages which the traffic will not bear and which are bound to result in bankruptcy for most of the properties.

If this Board is to set up a standard of living for railway employees and fix wages to support such a standard, regardless of the effect upon the ability of the employer to meet the same, then it will of necessity impose a greater burden upon all other classes of industry and all other classes of labor than is warranted or contemplated by any theory thus far announced in the Transportation Act. When you suddenly call upon the transportation systems of the country to pay a level of wages that traffic will not bear, then you ask all other industries responsible for the payment of freight and passenger rates to support a transportation expense that of necessity forces a reduction of wages in other industries or a suspension of business, with the consequent loss of employment for employees in other industries.

It is not an answer to say that the income of railway companies may be fixed by law through the establishment of rates, for there is no law that will support the payment of rates higher than the traffic will bear, and if the present scale of wages is to be continued then it can be readily seen by the most casual observer that one of two things must happen. Either the volume of traffic must increase even beyond that of any business ever heretofore conducted by the carriers in the country or there must be still a further increase in freight and passenger rates.

If this Board is to set up a standard which meets its own judgment as to the so-called living wage for the family of five, as urged by Mr. Lauck, and if this is to be the basis of wage adjustments rather than the items mentioned in the Act of Congress, it follows, as a matter of course, that the Board should fix a different standard for different sizes of families and for individuals. The statisticians have taken the family of five because it is said to be the average family, but the average family has more than one producer. We are, therefore, asked to pay a wage to the breadwinner in the family or ten or to the unmarried man or woman with no family, based upon the so-called living wage for the family of five. The very statement of the proposition illustrates how impracticable it is to apply the theory. You fix, for instance, the so-called living wage for the family of five as the basis to guide your deliberations, and that compensation would be wholly unnecessary for thousands of employees in the railway service, such as young clerks, unmarried men and women, including the large number of employees in extra gangs for section labor, etc.

I am not prepared to admit that, in view of the changed conditions, the wages we are contending for would not afford living wages to the various employees falling within the respective classes under consideration. I maintain that if the decision of this Board was just at the time it became effective, May 1, 1920, then it follows that a reduction in the various scales of compensation

must be granted at this time in view of the overwhelming evidence regarding changed conditions with reference to the scale of wages in outside industries and with reference to the cost of living.

The railway companies are dependent upon competitive industrial and economic conditions for the successful operation of their properties. They may not make up deficiencies and pay the obligations of the federal government through the processes of taxation, as the government was and is prepared to do from time to time. We cannot draw upon the public treasury to make good the shortages in operation costs. It is quite impossible for me to conceive upon what theory it is now claimed that wages should be maintained at an abnormal level by railway companies and on a basis which traffic will not bear for the purpose of paying an obligation which it is claimed the government owed to its employees and which the government would have to meet, if at all, through the process of taxation.

The logic of Mr. Lauck leads to the absurdity of saying that we must now pay wages which the traffic will not bear and thus continue to impair railroad credit in an effort to re-establish railroad credit for the purpose of making the alleged deferred improvements which will enable other operating economies that will in turn make it possible to pay his scale of compensation.

Mr. Sargent then analyzed the various "economies" suggested by Mr. Lauck and concluded his remarks on this subject by saying:

All these estimates are based upon theories mostly by experts who have never had upon their shoulders the responsibility of the payroll and the financing of great industrial undertakings. Mr. Lauck is dealing in theories characteristic of one who indulges only in statistics and is not charged with the responsibility of management which must secure practical results.

Later, in taking up the charges of financial mismanagement, Mr. Sargent showed that in so far as the Northwestern was concerned, Mr. Lauck's charges were not based on facts and were wholly misleading and unsound.

Mr. Walber followed with another attack upon the "living wage" theory capitalizing the impracticability of applying such a theory to the transportation industry.

Employees Complete Testimony

Against Wage Reductions

The Board's sessions on May 4 and 5 and half of the session on May 6 were given to representatives of the employees for the completion of their testimony. On May 4, Mr. Lauck continued the presentation of his exhibits, filing many volumes of opinions and statistics in an attempt to prove his contention that the establishment of a "living wage" was the problem before the Board, that neither the cost of living nor the wages paid in outside industry have declined and that the present depression is temporary. In addition he attacked the data presented in this case by the railroads as inaccurate and misleading.

G. W. Easty, vice-grand president of the Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station Employees, and E. F. Grable, grand vice-president of the United Brotherhood of Maintenance of Way Employees and Railroad Shop Laborers, also presented short statements on behalf of their organizations.

On May 5, B. M. Jewell, president of the Railway Employees' Department of the American Federation of Labor, speaking on behalf of the Federated Shop Crafts, reiterated with some embellishments the contents of Mr. Lauck's 51 exhibits. L. E. Sheppard, speaking on behalf of the train service employees, urged the Board to ignore the necessity of the railroads for immediate relief and make its award only after careful deliberation. W. S. Stone, head of the Brotherhood of Locomotive Engineers, spoke on behalf of a "living wage" based on American standards and not on the standard of living maintained by the Mexican or other foreign laborers on American railroads. The cost of living should not be a factor in the determination of wage scales, he contended.

W. S. Carter, president of the Brotherhood of Locomotive Firemen and Enginemen, and Captain J. J. Scully, on behalf of the Master Mates and Pilots of America, also testified.

On May 6, W. G. Lee, president of the Brotherhood of

Railroad Trainmen, Mr. Sheppard, S. E. Heberling, president of the Switchmen's Union of North America, and Mr. Carter testified against wage reductions for the members of their organizations, using arguments similar to those already outlined. Mr. Carter spoke at length against the alleged "open shop" movement and painted a dismal picture if such a movement were to be successful. He also attacked the accuracy of the statistics compiled by the United States Department of Labor, stating that because of lack of funds the department is unable to compile complete and accurate data.

American Short Line Hearing

Bird M. Robinson, president of the American Short Line Railroad Association, appeared before the Board on May 10 in behalf of certain short line railroads cited to appear before the Board in dockets 331 and 332 and styled the calling before the Board of the short lines listed in the above dockets as unusual and in his opinion so far outside of the authority conferred upon the Labor Board by the Transportation Act of 1920, that he felt it not only due the short line railroads represented by the association of which he was president but likewise a duty he owed the Board to present his personal views in regard to the case. He stated that the scope of his presentation would be to call attention of the Board to the questionable right of consideration of complaints that are without any justification in fact, or in any event, without such foundation in fact as gives the Board the right to hear and decide them.

In this connection he called attention to the notices sent to carriers located in varied and distant sections of the country to appear before the Board which do not advise or inform such carriers as to what particular organization of employees is making complaint or what particular craft or class of employees are members of organizations in whose behalf application is filed. Moreover, he went on to say, they do not show what person or officer filed the application in the several cases or any other fact which would enable the carrier to come prepared to answer the complaint, that there seems to be no rule of the Board which required such *prima facie* showing of fact as will give protection to the carrier against such proceedings.

In rounding out the position of the Association, he said that the Association had objected and still objected to the joinder of separate and independent carriers in the hearing and decision of complaints. Continuing, he said, that beginning with the eighteenth of October, 1920, the Association appeared in hearing in docket No. 26 and then and there showed to the Board that the requirements of Section 301 of the Transportation Act, 1920, had been disregarded in every case and that the Association therefore contended and still contends that in the case of each and every carrier represented by it, there was not such a dispute as could be submitted to the Board for hearing and decision. That in that presentation, he said what he now repeated, that the alleged disputes were not genuine but were in truth and fact part of the plan of the leaders of organized labor to nationalize all labor engaged in transportation service in the United States and place the employees in direct control of general officers, thus compelling the carriers to deal directly with them rather than with the employees engaged in their service.

"The law," Mr. Robinson said, "clearly contemplates that carriers shall not only have the right to deal directly with their employees, but this right is a mandate of Section 301 and it was never intended that the Board should become a National Board of Adjustment such as the leaders of organized labor seem to think it should be.

Mr. Robinson stated that the Association expected to show to the Board that in substantially all of the cases involved in docket No. 331 and 332 wherein the Association appeared for the individual carriers, there is in fact no foundation for the applications which were filed and the action of the Board cannot possibly serve any good purpose, whereas it naturally

has the effect of bringing about discontent and in some cases dispute which would not otherwise have occurred.

In concluding his statement, Mr. Robinson said: "From my place as president of the American Short Line Association, I have opportunity to know and do know the opinions of the managements of these numerous small properties. The opinion I get, without exception, is that the management would have no trouble in effecting a proper adjustment with their employees if it were not for the interference of officials or labor organizations. The interpretation which this Board seems to give to the Transportation Act is such that every carrier will be compelled to have a closed shop or else refuse in any case to employ any person who happens to be a member of a labor organization. It is obvious that Congress did not intend to bring about such a situation. The labor provisions of the Transportation Act, both in letter and in spirit, are intended as a method of conciliation and settlement as between the parties directly interested. It did not intend to create a labor autocracy such as will be, if the carrier is denied the right to initiate its own scale of wages without agreement of some employee or employees who may be members of labor organizations."

On May 11 B. M. Jewell filed exhibits with the Board, closing the wage hearings which began January 10. The American Short Line hearing was continued on May 11 when E. P. Curtis, vice-president of the Order of Railway Conductors, appeared in rebuttal to Bird M. Robinson's presentation. The hearing on the Greer letter was postponed until May 12.

Freight Car Loading Increases

WASHINGTON, D. C.

THE NUMBER OF CARS loaded with revenue freight continued to increase during the week ended April 30, according to the weekly report of the Car Service Division of the American Railway Association. The total was 721,997, as compared with 800,960 for the corresponding week of 1920 and 752,362 for the corresponding week of 1919. This is a gain of 17,000 in a week. Increases were shown in the loading as compared with the previous week in all classes of commodities, also increases as compared with the corresponding week of the year before in grain and grain products and merchandise and miscellaneous freight.

The freight car surplus also showed a further reduction during the week of April 30, to 482,352. The number of surplus coal cars shows a reduction of 6,000, to 229,443 but the surplus box cars shows a slight increase, to 178,037.



Clemenceau Arriving in Paris After His Trip to Egypt



Photo by International

Consolidation Locomotives for the Western Maryland

Weight and Tractive Effort Establish New Records for This
Type Tender of 15,000 Gallons Capacity

THE DESIGN OF LOCOMOTIVES adapted to special operating conditions has led to the development of some notable examples of the standard types of freight and passenger power. A striking illustration of the high tractive effort that can be secured with a restricted wheel-base is found in the Consolidation locomotives recently built for the Western Maryland by the Baldwin Locomotive Works. These engines have a rated tractive effort of 68,200 lb., the weight on drivers being 268,200 lb. or 67,050 lb. per pair of drivers. In these particulars they exceed any engines of either the Consolidation or Mikado types heretofore constructed by the builder.

During the past ten years the Consolidation has been largely displaced by the Mikado and in view of the selection of the former type by the Western Maryland, a brief discussion of the advantages and disadvantages of each may be of interest.

The Consolidation type locomotive was introduced in this country in 1866, the first engine of this type having cylinders of 20 in. diameter and 24 in. stroke, and a total weight of 90,000 lb. The Consolidation wheel arrangement is well adapted for general freight service and following its introduction was widely adopted, being for many years the prevailing type of freight power. About twelve years ago the Mikado began to displace the Consolidation and comparatively few of the latter type have been built for heavy freight service in recent years.

The principal advantage of the Mikado lies in the fact that the longer wheel-base, with a trailing truck, permits the use of a longer boiler barrel and a deeper firebox, thus improving the capacity and efficiency of the boiler. The Consolidation, however, can be designed to give equally high tractive effort at low speeds where the boiler capacity is not the limiting factor. The absence of the trailing truck eliminates certain maintenance costs and the non-symmetrical wheel-base is easier on the track.

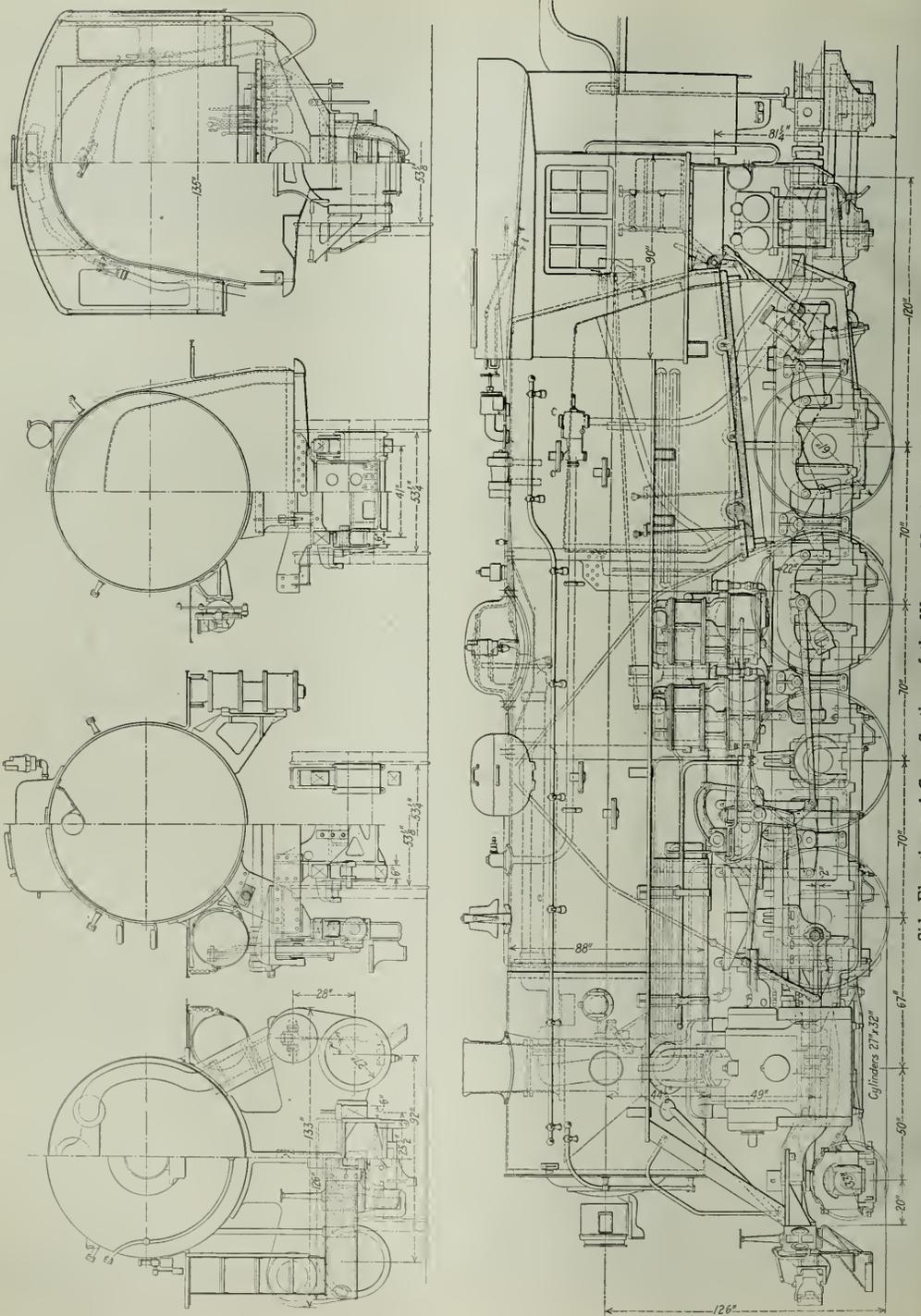
The improved utilization of fuel and higher speed capacity have generally been considered to outweigh the disadvantages of the Mikado. However, Consolidations are still used to a considerable extent for heavy drag service where slow speeds will suffice. With driving wheels of the size that are suitable for work of this kind, it is possible in a Consolidation engine to obtain a reasonably good boiler design. The firebox throat can be made of sufficient depth to install a brick arch without raising the boiler to an excessive height. Such a locomotive, with a high percentage of total weight on driving wheels, is well fitted for heavy, slow speed service.

The Consolidation engines which the Baldwin Locomotive Works are now building for the Western Maryland are a remarkable example of locomotives for such work. These engines are designed to operate on 90 lb. rails, to traverse curves of 22 deg. and grades of $3\frac{1}{2}$ per cent. The total weight is 294,900 lb. The ratio of adhesion is 3.93, indicating that the weight on drivers is utilized for tractive purposes to the fullest possible extent. As compared with a design of heavy Consolidation built for the Western Maryland in 1910 and using saturated steam, these new locomotives show an increase in total weight of 31 per cent, and in tractive effort of 40 per cent.

The boiler is of the straight top type with horizontal roof sheet and sloping throat and back head. The diameter of the first course of the barrel is 88 in. The throat has a depth of 19 $\frac{13}{16}$ in., measured from the under side of the barrel to the bottom of the mud ring. The firebox is supported at the front and back on vertical plates. The front end of the crown is supported on three rows of expansion stays, and about 550 flexible staybolts are applied in the breaking zones in the sides, throat and back. The distance between the two sheets is 15 ft. 3 in. Fifty superheater tubes of $5\frac{1}{2}$ in. diameter and 240 water tubes of $2\frac{1}{4}$ in. diameter are used. The ratio of length to internal diameter in the water tubes is 91.5, this low value indicating that the capacity of the boiler has been made high at some sacrifice of fuel economy. The safety valves are placed just forward of the firebox and, as the clearance is limited, they are tapped directly into the boiler shell instead of being mounted on an auxiliary dome.

The firebox equipment includes a brick arch, power operated fire door and grate shakers and a Standard stoker. The drop plates are at the back of the grate. The ash pan has two hoppers with swing bottoms, both of which are controlled by one handle. Flushing pipes are applied for washing ashes from the slopes of the pan.

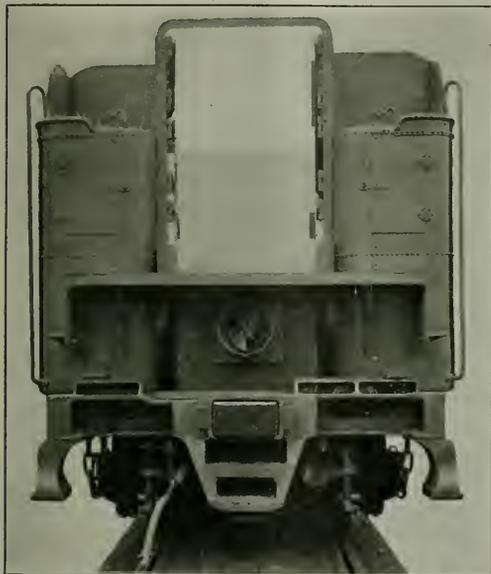
The frames are 6 in. wide, spaced 41 in. between centers, each frame being cast in one piece with a single front rail to which the cylinders are bolted. The transverse bracing calls for special attention. A most substantial steel casting, placed just back of the cylinders, extends the full length of the leading driving pedestals and serves as a fulcrum for the driving brake shaft. The guide yoke crossie is also of cast steel and it is extended back sufficiently far to brace the second driving pedestals. This crossie also serves as a support for the driving brake cylinders, one of which, because of lack of room, is placed in a horizontal, and the other in a vertical position. The two brake shaft arms are placed



Side Elevation and Cross-Sections of the Western Maryland Consolidation

at right angles to each other, the horizontal cylinder being connected to the vertical arm by means of pull rods, while the vertical cylinder is directly connected to the horizontal arm. The frame braces further include a steel casting at the main driving pedestals and a casting, placed between the main and rear pedestals, which is bolted to both the top and bottom frame rails and serves as a support for the forward end of the firebox.

The cylinders are fitted with gun iron bushings, and the steam distribution is controlled by 14 in. piston valves. Walschaert valve motion is used and the gears are controlled by the Pittsburgh power reverse mechanism. The equipment



Front View of the High-Capacity Tender

includes automatically operated drifting valves designed by the railway company. The links are carried on longitudinal supports of cast steel, which are bolted in front to the guide bearers, and at the rear to a cross-tie placed between the second and third pairs of drivers. The reverse shaft is located immediately in front of the links and the lifting arms extend in a backward direction, each radius rod being suspended at its rear end. The valve motion is so designed that the link blocks are down when running ahead. Other machinery details include cast steel piston heads of dished section with cast iron bull rings and packing rings. The guides and crossheads are of the Laird type. The main rod stubs are of the open end type which permits renewing the brasses without removing the eccentric cranks.

The driving boxes are of cast steel and are fitted with bronze hub faces and brass lined pedestal faces. Cast iron shoes and wedges are used, the latter being of the self-adjusting type. The driving axles and engine truck axle are of heat treated steel, and flanged tires are used on all the wheels. Flange oilers are applied to the front and back drivers.

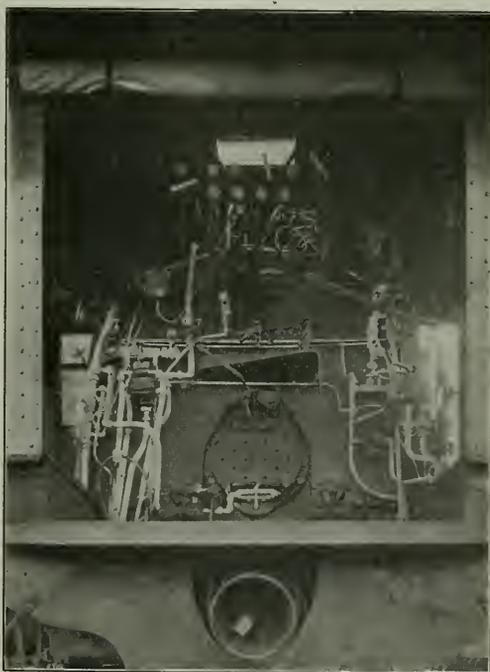
The truck is of the Economy constant resistance type and is equalized with the first and second pairs of driving wheels. Dolphin beams are placed over the boxes on the third and fourth pairs of drivers and are connected on each side of the locomotive with three inverted leaf springs which are

placed below the upper frame rail. Limited clearance space under the firebox did not permit placing the springs over the boxes of the two rear pairs of wheels.

The cab is unusually roomy and comfortable with all fittings placed within convenient reach of the crew. The injectors and steam turret are placed outside the cab and have extension handles identified by small aluminum plates with raised letters. The equipment includes a breather pipe for providing fresh air while passing through tunnels. This arrangement consists of a 1/2 in. pipe placed across the boiler back head and having five 1/4 in. globe valves equally spaced, each fitted with 3 ft. of 1/2 in. hose. The air supply is drawn from the brake system.

An interesting detail is the arrangement of the hand rail columns, which are in the form of clamps, so that the hand rail can be readily taken down without removing the columns. The headlight dynamo is placed on the right hand side of the boiler, ahead of the cab, and the wiring is run through the hand rail. The pilots are adjustable as to height above the rail and are of short design so that two locomotives can be coupled pilot to pilot without interference.

The tenders of these locomotives are of special interest,



Breather Pipes for Use in Tunnels Are a Novel Feature of the Cab Equipment

having the unusual capacity of 15,000 gal. of water and 16 tons of coal. The tanks are comparatively long and low in order to keep the center of gravity as low as possible. The extreme length of the tank is 36 ft. 6 in. and the width 10 ft. 5 1/2 in., while the depth is 6 ft. 6 in. with a collar 32 in. high on each side of the fuel space. The sides and rear of the fuel space are sloped so that the coal will gravitate into the stoker trough even when only a small amount is on the tender. The stoker trough is constructed so that it may be removed as a complete unit even when the tender has a full load of coal. An unusually complete arrangement of

Director General Hines estimated that the loss to the government in operation during the period of federal control would be \$900,478,756.56. Because of claims which have arisen that were not considered by Mr. Hines and the underestimate made in the allowance for maintenance, fire losses, additions and betterments made solely for war purposes, and other accounts, it is the estimate of the present director general that the operating loss to the administration will be about \$1,200,000,000, or \$300,000,000 in excess of the estimate made by former Director General Hines.

"It must be borne in mind," the report says, "that this estimate is based on making settlement upon the administration's construction of the upkeep section of the standard contract. Should the Supreme Court ultimately approve the carriers' contention in regard to maintenance, as set out in said upkeep section, the liability of the Railroad Administration would be very largely increased." The report adds that the Railroad Administration records fail to support claims for overmaintenance sufficient in amount to offset the amounts claimed, and that "it is quite evident that some allowance must be made on account of undermaintenance." The differences of construction of the act between the carriers and the administration, it is said, will amount to several hundred million dollars.

The report also gives a short summary of the nature and character of claims of third persons against the Railroad Administration apart from the claims of the carriers. There are now pending before the Interstate Commerce Commission over two thousand formal complaints for reparation against the director general on account of rates put into effect during federal control. These complaints involve unknown amounts but in some cases a tremendous tonnage movement is involved. In addition to calling on the individual carriers to defend these claims the administration has provided a special department for this purpose in the division of Law. A large number of claims for personal injury, loss and damage, overcharge, labor, fire losses, and taxes were also left over as a result of federal operation and these claims are liabilities of the director general. As a result of a ruling of the supreme court of Minnesota some five thousand cases have been instituted against the Railroad Administration for damages resulting from a devastating fire in the forest regions of Minnesota in October, 1918, which caused a money loss of from \$25,000,000 to \$40,000,000. So far quite a number of judgments have been rendered against the Railroad Administration in lower courts on account of these claims on the ground that railroads started some of the fires.

It also appears that the Railroad Administration has assets aggregating \$430,930,138.08, composed of negotiable obligations of the various carriers. These consist of equipment trust obligations and notes and bonds taken by the Railroad Administration during the period of federal control.

Also the Railroad Administration has to its credit in available cash \$228,977,311. It is suggested that if, instead of making a direct appropriation for the use of the Railroad Administration, the Secretary of the Treasury could be authorized, upon a proper showing of necessity, to take over at their face value, from time to time, such amounts of the obligations of the railroads held by the Railroad Administration as may be required to complete the liquidation, the liabilities of the Railroad Administration could be adjusted without a direct appropriation in its favor. As subsequent settlements are made additional obligations of debtor roads will be taken and held by the Railroad Administration, such indebtedness being for purposes provided for and in accordance with the transportation act. If the Railroad Administration could cash a sufficient amount of these securities, it has in all probability assets considerably more than sufficient to pay all of its obligations. If an arrangement of this kind is not feasible, an additional appropriation of \$200,000,000

will be required to continue the Railroad Administration liquidation up to the end of the fiscal year 1922.

The controlling reason why more settlements have not been made is stated to have been the delay of the carriers in filing their final claims. Practically no such claims were filed during the calendar year 1920.

In concluding the report, the director general gives the following summary of the situation:

"I have no desire to exaggerate the importance or the complexities of making this final adjustment of the 26 months of federal control and operation of the transportation systems of the country. It is undoubtedly the greatest adjustment between one tenant and over five hundred landlords that has ever occurred. A brief repetition of familiar figures emphasizes this.

"The railroads constituted an immense industrial plant, comprising in round numbers 250,000 miles of main line, with all of the innumerable structures which go to make up and operate railroads—shops, yards, roundhouses, machine shops, store houses, bridges and the like; 2,500,000 freight cars, in all stages of repair; 66,000 locomotives; 55,000 passenger cars; some \$600,000,000 of materials and supplies scattered over the many lines of road, with no inventory taken at the time; 555 separate companies, with nearly 2,000,000 employees; the gross earnings of the properties for the year ending December 31, 1917, over \$4,000,000,000, with net earnings for the same period of nearly \$1,000,000,000, and the entire value of the property estimated at from \$15,000,000,000 to \$20,000,000,000. This property was operated under the abnormal conditions of a world war. The demand for labor and materials in all industrial enterprises was greatly in excess of the supply. In the effort to combine this stupendous aggregate of independent lines into a single and co-ordinating concern much of the operating property of the individual carriers was inextricably intermingled. The adjustment and straightening out of this wonderful adventure on the part of the government presents for solution novel, complex, and important questions wholly without precedent.

"The government took this great plant over night. It was taken at a time when serious and almost unprecedented winter weather greatly embarrassed and increased the expense of operation, and at a time when congestion of traffic, largely brought about by unusual exigencies in the business incident to the war, and priority orders of war material intended for export, had in effect practically broken down the ordinary efficiency of railroad transportation, especially those eastern lines connecting with Atlantic ports.

"The property was in all stages of obsolescence. It was taken under a proclamation issued by the President, who, in a statement of even date with the proclamation, declared that he would recommend to Congress the passage of a law providing 'that the railway properties will be maintained during the period of federal control in substantially as good repair and as complete equipment as when taken over by the government.'

"The Congress, following this recommendation, in the federal control act provided that the standard contract should contain such provisions 'as may be requisite in order that the property of each carrier may be returned to it in substantially as good repair and in substantially as complete equipment as it was in the beginning of federal control.'

"Most of the roads entered into standard contracts, the terms of which attempt to provide rules by which the questions of upkeep shall be determined. It is differences of opinion as to the construction of these rules from which arises most of the controversies between the Railroad Administration and the carriers in carrying out final settlements.

"In conclusion, I want to suggest and emphasize that in reaching final settlements the disputes to be adjusted between the carriers and the Administration are not mere matters of

accounting, to be settled by the application of fixed and definite rules that may be followed by accountants and statisticians, but every settlement presents serious practical questions, many of them new and novel, that can only be fairly determined by men on both sides who have had actual and extensive railroad experience in the field."

Results of Extended Tests With Titanium Treated Rails

THE TITANIUM ALLOY MANUFACTURING COMPANY, Niagara Falls, N. Y., has just made public the results of an extended series of investigations inaugurated in 1913 to determine the effects of the use of titanium in rail steel. Earlier results of these investigations were published in a series of eight bulletins, the last of which was issued in 1915 while data from the more extended tests since that date are incorporated in Bulletin No. 9 which has just been issued. The later investigations were undertaken to determine (1) the exact structural and physical differences between titanium-treated and untreated rails and the causes for difference in service; (2) a simple practical method for ascertaining the efficiency of the titanium treatment so that improperly treated heats might be identified and separated from those free from excessive segregation; (3) the service which several thousand tons of titanium-treated rails rendered in four to six life years in track as compared with rails rolled under similar conditions but without this treatment.

During 1913 and 1914 samples of A-rails (the top rails of the ingots) from 111 different heats of standard and 101 heats of titanium-treated open-hearth steel, made for various railroads at mills of six different steel companies, were forwarded to the laboratories of the Titanium Alloy Manufacturing Company for analysis. Early in 1915 the Pennsylvania Railroad adopted its 100-lb. P. S. section rail which included a limitation as to segregation. In an earlier report it was stated that the application of this segregation specification to each of the A-rail samples from the 212 heats above referred to indicated that the A-rails from only 37 per cent of the heats of standard open-hearth steel passed the Pennsylvania requirements, whereas these rails from 93 per cent of the titanium-treated heats passed the specification.

While this improvement in the total segregation was very interesting it was thought that there must be some discernible difference between the titanium-treated steels, which showed negative or moderate segregation of carbon in the A-rails and those few which showed excessive segregation. In an effort to determine if any such difference existed, samples of each of the titanium-treated steels were analyzed for titanium by two methods; one in which the total titanium present was determined, while in the other only that part of the titanium insoluble in hydrochloric acid. This latter method, it is believed, gives the amount of titanium remaining in the finished steel in excess of that usefully consumed in deoxidation. When the determinations for insoluble titanium were made on these titanium-treated samples numerous samples of untreated steels were also analyzed in the same way and in no case was over .002 per cent of insoluble titanium found in any untreated steel; whereas in the titanium-treated steels the amount of insoluble titanium varied from as low as .002 per cent to .03 per cent, while the average content of insoluble titanium in the treated steels was approximately .01 per cent or 10 per cent of the total titanium (0.10 per cent) added to the ladle in the form of ferro carbon-titanium.

Further experiments were conducted to substantiate the recommendation of the manufacturer that where recarburizer in the form of liquid spiegel was added it should be done in the furnace before tapping and the titanium added alone in the ladle, since where a large amount of liquid spiegel, with

its accompanying acid slag, is poured into a ladle of steel, the metal is so agitated and the slag so intimately mixed with it that an immediate addition of titanium is apt to be lost by expending itself in deoxidizing the slag. As a result no benefits are derived from the use of titanium, such as are normally obtained when the spiegel is added in the furnace and its reactions completed before tapping, or when no spiegel is used but only comparatively small and much cleaner additions of ferromanganese and ferrosilicon precede the ferro carbon-titanium in the ladle.

The determination, in steel, of titanium insoluble in hydrochloric acid is a very simple method and can be made very quickly and accurately. This determination will ordinarily make further analytical work unnecessary because so high a percentage of titanium-treated rail steel will meet the required specification for segregation.

It has been suggested that, in order to conform to regular mill practice, all rails that pass the usual physical requirements be accepted by the purchaser. Samples for titanium determination could be taken by inspectors for the purchaser and sent to its laboratories or those of any agency it might employ. Results of the analytical work would be available before deliveries of rail were made and the A-rails from any heats that showed more than the allowable segregation could be placed where track service was not severe. Arrangements might be made with the rail mills that such rails would be classed as seconds or specials.

It is claimed by the manufacturers that the adoption of this simplified method should (1) eliminate the majority of rail failures; (2) assure the purchasers of rails of the more uniform steel throughout all the ingots of a heat; (3) provide a larger yield of acceptable rails by eliminating serious segregation in the upper portion of the ingot and (4) offer the possibility of raising the carbon content of the steel slightly as the segregation can be controlled effectively by this method. This would result in better wearing steel.

In substantiation of its claim that these results have been obtained in practice attention is called to the comparative test of 14,310 tons of standard 90-lb. A.R.A. type A open-hearth rails rolled at four different mills and 6,000 tons of titanium-treated open-hearth rails of the same weight and section laid in tracks of the Chicago & Alton in 1913. These tonnages were laid so that the service for all rails was approximately the same. In this investigation of nearly eight years the total failures of standard open-hearth rails has been 116 and of titanium-treated rails 16, or 114.56 and 37.72 per 100 track miles respectively.

Similarly, analyses of the rail failure statistics of the American Railway Engineering Association for 1918 show average failures per year in service per 100 miles of track to be 13.7 for standard open-hearth rails as compared with 6.8 for titanium-treated open-hearth rails, while similar figures contained in the report for 1919 show 14.6 and 4.9 failures respectively.

Attention is also called to a report of the A.R.E.A. Rail Committee in May, 1917, which included inspection results on approximately 195,000 tons of 100-lb. P. S. section open-hearth rails made for the Pennsylvania railroad under its 1915 special segregation specification in which the average discard from the top of the ingot was 26.2 per cent and the average rejections 9.0 per cent, giving a total average discard and rejection of 35.2 per cent. In comparison, inspection records on the manufacture of 13,000 tons of titanium-treated open-hearth rails rolled in 1913, 1914 and 1919, showed an average discard from the top of the ingot of 9.0 per cent and a rejection of 3.8 per cent. Applying the Pennsylvania segregation specification to this tonnage, the total discard and rejection would have been 15.67 per cent, or less than one-half that which actually occurred with the Pennsylvania railroad rails.

Prosperity Dependent Upon Revived Foreign Trade

Decline in Exports Cited by Foreign Trade Convention as Cause of Depression—Remedies Proposed

THE NECESSITY of a revival in foreign trade before normal business conditions can be restored in this country was emphasized in the final declaration of the Eighth National Foreign Trade Convention which was held at Cleveland from May 4 to 7. The declaration further asserted that no readjustment to meet the new conditions in business could be complete without "reduction in the costs of railroad transportation both for domestic and export shipment." In opening the convention, J. A. Farrell, president of the United States Steel Corporation and chairman of the National Foreign Trade Council, characterized the difficulties of financing our exports as the chief problem to be solved in the restoration of normal foreign trade. He pointed out that "no nation can long carry on with success an unbalanced foreign trade, whether the disproportion be on the side of imports or exports." He said further that the original cause of the present business depression was "the almost complete stoppage of foreign trade."

The convention this year presented a marked contrast to the one held a year ago at San Francisco. The discussion at that time centered on ways and means to take care of the then enormous volume of our export trade and how to maintain our position in the markets which had been built up. At Cleveland some 1,500 delegates were in attendance. At San Francisco a year ago the attendance was in the neighborhood of 2,300. Last year when the problem involved taking care of the trade already acquired the chief activity of the convention was the discussion of the peculiarities of the various foreign markets and of means whereby our various industries could meet the demands placed on them by heavy foreign orders. This year the discussion was centered on the solution of the financial difficulties which are hindering the sales of American goods abroad.

Various Subjects Considered

The convention was conducted as usual by general sessions and group sessions. The general sessions were devoted to matters of general policy and the group sessions to the problems of various specialized fields under the general subject. The general sessions were as follows: I The Financial Situation; II The Need for Long Term Credits in Our Foreign Trade; III Foreign Trade Policies; IV The Merchant Marine, and V National Program for Foreign Trade.

The various subjects assigned to group sessions were: I Commercial Education for Foreign Trade; II Foreign Credits; III Problems of the Export Manager; IV The Motion Picture in Foreign Trade; V Special Export Problems of the Manufacturer; VI Foreign Trade Advertising; VII Inter-American Trade Relations; VIII Interest of Agriculture in Foreign Trade; IX Banking Service to Foreign Trade; X The Service of the Export Commission House, and XI Trade Relations with the Far East.

In addition to the regular sessions there were a number of experts in various fields of foreign trade from government departments and elsewhere who acted as "trade advisers" to representatives of the various industries who sought their counsel regarding the problems of their particular businesses.

Contrary to the precedent set last year the foreign trade situation as it affects the railroads received no special attention at either the general or the group sessions.

The chairman of the convention was A. C. Brown, president of the Brown Hoisting Machinery Company and president of the Cleveland Chamber of Commerce. Mr. Brown was elected by a unanimous vote of the convention

following the opening of the first general session by J. A. Farrell, chairman of the National Foreign Trade Council.

The Financial Situation

The financial situation with relation to our foreign trade was discussed in some of its broader aspects by W. P. G. Harding, governor of the Federal Reserve Board, and F. I. Kent of the Bankers' Trust Company, New York. Governor Harding devoted his address to the means of "thawing our frozen credits." He advocated all possible stimulation of business as the most effective means of liquidating these credits. Governor Harding took an optimistic view of the general business situation and stated that the time had come for "renewed courage and confidence," that there was "no point in forcing liquidation further," that "we have passed the worst of our troubles" and that "the problems ahead of us all are solvable." Governor Harding was followed by Mr. Kent, who urged greater honesty in our business relations and the hearty support of investors in purchasing the securities offered by Edge law corporations as solutions for the serious obstacles with which our foreign trade is faced.

The Need for Long Term Credits

The present difficulties of lumber exporters in meeting foreign competition due to the adverse exchange situation and to the inability to finance the extension of long term credits were discussed by J. J. Donovan, vice-president of the Bloedel-Donovan Lumber Mills, Bellingham, Wash. The importance of long term credits to the manufacturer of specialties was discussed by F. H. Taylor, president of the S. S. White Dental Manufacturing Company, Philadelphia. The same question was treated from the point of view of the manufacturer by G. R. Meyercord, president of the Illinois Manufacturers' Association, and from that of the exporter of agricultural products by J. H. Barnes of the Barnes-Ames Company, New York.

The lack of interest on the part of investors in subscribing to the stock of the various Edge law corporations, particularly the Foreign Trade Financing Corporation, was said by W. C. Redfield, president of the American Manufacturers' Export Association and formerly secretary of commerce, to be holding up millions of dollars' worth of foreign business which would open up many mills and factories and give employment to thousands. Mr. Redfield said in part:

"I know personally of orders from other countries of over \$20,000,000 available to the United States at the present time which can be closed just as soon as the corporation operates. These orders, I know, are for firms in Chicago, New York, Boston, St. Louis, Philadelphia, Cleveland and several southern cities, and, I am informed, it is true also of Spokane, Seattle and San Francisco.

"It is not a question of whether this corporation ought to be formed and put into operation, but one of whether we shall go up or down in the foreign export trade. We have the ability to compete with foreign competitors, but we have reached the end of our financial power with the tools we have, and unless new tools to enable us to extend long-time credits to our foreign trade are created speedily we have reached the end of our useful activities in export trade. Our British competitors can get credits extended for four, six or eight years. We cannot.

"We have no alternative but to shrink at home unless we go after the export trade. This corporation is not being organized to thaw frozen credits, to relieve the banks or to

be representative of any group or clique or part of America, but for America as a whole."

Senator Edge's Address

At the annual banquet held on May 7, Senator W. E. Edge addressed the convention on the general subject of American foreign trade. He advocated practical legislation to assist in curing the "economic ills" of the country but warned that "industry cannot be inspired or prosperity be promoted merely by legislation." The establishment of confidence at home and the extension of credit to foreign buyers, he said, were the practical methods of stimulating business in this country. Senator Edge emphasized the importance of the "deplorable situation of the railroads" as a factor in "the prevailing uncertainty" in business. He also characterized our merchant marine as a "monumental failure" and declared that the government would "do well to save 35 per cent of the billions of dollars invested, much of it in absolutely worthless and valueless craft that cannot be even given away." The senator summarized his address, in part, as follows:

"I contend that all these ills—depression in business, depression in production, lack of business for railroads and the merchant marine and consequent unemployment—will be corrected only if we attack the root of the evil; and the only solution to these and other related problems is the securing of a market. The buying power both at home and abroad exists; if abroad, it is aided by an extension of credits we can well afford to extend, and the foreign buyers have the security to protect us; and at home by the return of confidence which can only be brought about by a realization that men can develop, can make a reasonable profit on their enterprise and, most important, retain it. We cannot expect to rejuvenate foreign or domestic enterprise as long as the government continues a policy of requiring as high as 70 per cent of the profits to be paid to the government; the tax system must be revised so that the burden will be more equably distributed and in the long run the rich will pay the bill just the same, because they will be encouraged to do big things and thus employ labor, increase production and radiate that happiness and contentment necessary to insure general prosperity. Even the workman can afford to pay a nominal tax if he is employed; it would pay him more to pay such a nominal tax than to have no income with which to pay anything.

"The thought in my mind that I hope I have made clear is that these various troubles of the railroad situation, the merchant marine situation, the farmers' troubles, or whatever the case may be, will be corrected only by the two accomplishments—confidence at home and credit abroad."

The "Final Declaration"

At the last general session of the convention a "final declaration" of opinions and recommendations was adopted. This statement called attention to the decline of our export trade from \$928,000,000 in June, 1920, to \$384,000,000 in March, 1921, and pointed to the inability of foreign buyers to pay for goods which they are greatly in need of as the cause for the decline. An increase in imports of goods "not detrimental to existing industry" and the "creation of adequate facilities for the purpose of drawing upon surplus American investment funds in order that the long term credits so badly needed by the disorganized countries of Europe may be furnished" were urged as solutions to our present difficulties. The declaration follows in part:

The world is suffering today from unbalanced exchanges. Notwithstanding the position of the United States as a creditor nation, the present unstable financial condition of a large part of the world, especially of Europe, is the fundamental cause for our own business depression. A return to normal conditions in our own country depends in large part upon an improvement of our foreign trade. The present

retrogression is clearly evidenced by the maximum of the country's export trade \$928,000,000 in June, 1920, decreasing in October to \$751,000,000 and in March, 1921, to \$384,000,000.

Foreign nations whose imports exceed their exports have been compelled to curtail purchases because of inability to pay by exports. The result of this would be eventual restoration of more normal exchange, but the requirements of international commerce and domestic prosperity in each country demand immediate relief from present stagnation.

The United States must continue to increase its imports of raw material and merchandise not detrimental to existing industry in order to receive pay for the exports necessary to stable employment of labor in agriculture and industry; and to permit of the liquidation of the obligations of the debtor nations. Continued liquidation in gold of foreign obligations to us will tend to renew inflation and arrest the beneficial readjustment of values on the basis required by present conditions throughout the world.

It is generally agreed that the solution depends upon our ability to create adequate facilities for the purpose of drawing upon surplus American investment funds in order that the long term credits so badly needed by the disorganized countries of Europe may be furnished. Most of the countries of Europe are unable to pay us now and for some time to come in gold or merchandise, and unless they are enabled to obtain credits to purchase the raw materials which they need, their business and ours will continue to stagnate.

We urge the immediate creation of financial institutions under the Edge law, whose machinery will facilitate extension of long term credits to promote free exchange of exports and imports. We commend efforts to acquaint our investing public with the necessity of purchasing debentures issued by such institutions against approved foreign securities for this purpose, so that eventually every community will serve its own vital interest in furthering our foreign commerce as a necessary component of domestic prosperity.

The reduction of loans and accumulation of banking reserves now permit, and the lower prices of many commodities justify, the extension of credits sufficient to accelerate recovery in certain lines. This should gradually thaw frozen credits and end stagnation. It will further provide increasing export and import cargoes for our now partially idle merchant marine and contribute to restoration of economic equilibrium in countries suffering from war debts and inflated currencies and to a proper distribution of commerce in neutral markets.

It is manifest that while many products of our soil have been reduced in value to pre-war levels, a number of manufactured products remain too high in cost of production to compete in neutral markets with foreign goods. It is essential that the substantial reduction in cost of living, which has already occurred in food products and other basic commodities, shall be followed by economies in cost of production until a stable balance of values of all commodities and productive effort is established. No readjustment, however, can be complete without reduction of costs of railroad transportation both for domestic and export shipment. Continuance of our present cost of finished merchandise would maintain unreasonable expense of living and put our products in a non-competitive position in markets of depleted purchasing power.

To insure such equality of treatment, the American tariff, whatever its underlying principle, should provide for additional duties on imports from nations discriminating, by tariffs or administrative practices, against the trade of the United States.

The foreign service of the United States should be reorganized and established under a unified supervision which will promote its efficiency, both in diplomatic representation and in the collection and dissemination of commercial information. This reorganization should provide for a permanent career through the establishment of a national training academy for the foreign service, which will attract competent and ambitious young men into a life work of constructive effort in their country's service.

The convention urges upon Congress the vital importance of prompt action upon measures affecting our foreign trade now pending before it. Chief among those calling for immediate enactment are the increases of appropriation that will provide for much needed expansion and improvement in the Bureau of Foreign and Domestic Commerce and in the Bureau of Standards in the Department of Commerce.

THE ILLINOIS CENTRAL recently organized a committee of officers and employees to act as a General Fuel Conservation Committee. J. F. Porterfield, general superintendent of transportation, has been appointed chairman of the committee.

Railroad Hearings Before Senate Committee

Railroads Not Asking New Legislation—Wages Must Be Reduced in Order to Reduce Rates

WASHINGTON, D. C.

HEARINGS before the Senate committee on interstate commerce, pursuant to the Senate resolution directing an inquiry into the general railroad situation, were begun on Tuesday, May 10.

In opening the hearing, Chairman Cummins read into the record statistics showing that while operating revenues have increased since 1913, there has been a greater increase in operating expenses so that for the year which ended on March 1, 1921, the net operating income was only \$2,578,922 compared with \$787,610,435 in 1913. In the latter year, the ratio of operating expenses to operating revenues was 69 per cent while in 1917 it was 70 per cent, in 1918, 73 per cent, and for the year which ended on March 1 last, 94 per cent.

"The railroads received during the year, up to March 1, 1921, as I have stated, \$6,175,962,718 as operating revenues," he said. "I think it can be said without very much doubt that that is a larger revenue than the railroads will ever receive again for the same volume of business. The operating expenses, together with taxes and the adjustment of equipment rents and joint facility rents, consumed all of that sum except \$2,578,923. So we have before us the problem, I think, of trying to ascertain whether the \$6,000,000,000 and more received as operating revenues were wisely and economically and efficiently expended. If we can not increase the revenues, and I think we have reached our limit in that respect for the same volume of business, it is apparent that expenses must be reduced in some way or other if the railroads of the country are to be successful in their operations."

"That situation had led me to ask the railway executives to appear, in the first instance, and give the committee the benefit of their knowledge and their observation with regard especially to the enormous expenses of 1920, so that we might find out, possibly, some way to assist in the operation of these railroads that would enable them to continue in operation, for it is perfectly obvious that if this condition is to be a permanent one a very grave situation confronts the people of the United States. I have therefore asked Mr. Thom, who represents the railway executives, to present the showing which the railroad companies desire to make with regard to this very vital matter."

Because of this situation, he said, he had asked the railroad executives to appear for the purpose of furnishing the committee information which might enable it to assist in meeting the situation, adding that it is "obvious that if this situation is to be permanent a very grave situation faces the people of this country."

Julius Kruttschnitt, chairman of the Southern Pacific, began the presentation of the railroad case, first reading into the record a preliminary statement by Thomas De Witt Cuyler, chairman of the Association of Railway Executives, which outlines the attitude of the executives toward the investigation, and following this with an extensive statement outlining the history of the causes that have brought the railroads to their present condition. Mr. Cuyler said in part:

The Association of Railway Executives welcomes the inquiry undertaken by the Senate.

In a general way, the following will indicate the spirit which will pervade the testimony to be offered by the railroads:

The transportation service of this country is passing through a crisis. It is not a crisis peculiar to the railroads of the United States. It is a situation of world-wide incidence arising from perfectly understandable causes, most of them having their origin in the world war.

Feeling, as we do, that the world has definitely turned the corner of its most acute depression, so we feel that the railroad situation has likewise passed through its darkest hour and has now definitely turned for the better.

The last Congress in passing the Transportation Act, placed upon the statute books the most constructive measure dealing with our transportation situation which had been enacted into law in the past fifteen years.

Difficulties Not Due to Transportation Act

The Transportation Act has not broken down; the present difficulties of the railroads are not due to the Transportation Act, and the Transportation Act provides effective machinery for remedying, in so far as it may be done by national legislation, the difficulties in which the railroads now find themselves.

The managements of the railroads do not approach Congress or the American people asking for any amendments in existing national legislation. They desire to make perfectly clear their present situation, and the measures they are taking and propose to take to work their way out of existing difficulties.

The railroad managers regret that the operation of inexorable economic laws makes it necessary that railroad wages should be reduced. But the railroad managers have no fight with their employees, and the supreme aim of every railroad management in America to-day is to establish its relationship with its employees on a basis of friendliness and co-operation which will result in work at satisfactory wages for the largest possible number of men and in an efficient and economical service to the public.

The Interstate Commerce Commission has a clear understanding of the real nature of the American transportation problem and has evinced its desire in co-operation with the public and with the railroad managements, to work out the difficult problems of regulation in a manner which will insure adequate facilities and complete protection to public interest.

The public also is manifesting a disposition actively to cooperate with railroad managers.

Railroad managements are fully aware of the feeling in many quarters that certain railroad rates are excessive, and the unremitting effort of the railroad managements of this country is to provide service of such economy and efficiency that it can be rendered at a rate which will promote the movement of the largest possible amount of traffic.

Facilities More Important Than Rates

The responsibility of railroad management is of course not alone to give low rates, but to provide adequate facilities. In times of prosperity the adequacy of facilities is of more consequence than the rate itself. So that if the railroad managers assent to a schedule of rates in time of depression which make it impossible for them to provide adequate facilities against a period of prosperity, they would be recreant to a duty they cannot escape.

The public and the Congress may rest assured that the railroad managers are straining every nerve so to reduce their expenses that they may be able at the earliest moment to adjust rates to changed economic conditions, and certainly to the end that no individual rate shall be so high as to interfere with the normal movement of a commodity.

The railroads have just emerged from a year of extraordinary expenditures, expenditures so large that even with greatly increased freight revenue they were unable to earn an appreciable sum upon the actual investment in American railroad property.

All Expenses to Be Accounted For

The railroad executives will explain to the Senate committee the reasons for these expenses. The railroads will show specifically that the greater part of the increased expenses of 1920 are due to causes over which the railroads had no control. The railroads will also show, I believe, that they are rapidly surmounting their difficulties and from now on will realize a progressively improving situation.

The eyes of the railroads are turned to the future, and the railroad managers are confident that as a result of the hearings before the Senate committee there will be a far better understanding on the part of the public of the whole railroad situation.

Mr. Kruttschnitt's statement was in part as follows:

In order to understand the problem which the committee has before it, and properly to apportion the responsibility for the

result, it must be appreciated that, except as either is affected by bad management, the railway operating revenues and more than 64 per cent of the railway operating expenses, being the labor costs, and in 1920, in addition, a very substantial part of the cost of materials and supplies which were purchased by the Railroad Administration during federal control, but used by the railroads at the prices paid, or contracted by the government to be paid, are fixed by the government—in other words, that the government prescribes the charges from which the operating revenues of the carriers come, and likewise fixes the wages which constitute more than 64 per cent of the operating expenses, and that the price of the necessary materials and supplies which the carriers must have are fixed either by the government as above stated or by economic forces beyond the power of the carriers to control. The narrow limits within which the powers of management may be exercised are thus manifest, and, of course, where there is a limit to power there is a corresponding limit to responsibility. At the same time, even within the limits of these restrictions, there is room for the play and for the effect of good or bad management, and the character of the management, whether good or bad, efficient or inefficient, is a legitimate and proper subject of inquiry. Care must be taken, however, to appraise justly the several causes contributing to the result and to apportion to each cause its due share of importance.

Expenses Largely Controlled by Government

Out of every dollar of operating expenses 30 cents were paid out for materials and supplies. The government operated the roads for two months of 1920 and accordingly agreed to the prices of materials and supplies for these months, as well as incurred all of the other operating expenses for these months. The government also purchased or contracted for a large quantity of materials and supplies which were passed over to the carriers on the return of the properties, and these materials and supplies, as used, were charged into the operating expenses for 1920 at prices fixed for the carriers by the government in making the purchases. It is conservatively estimated that one-half of the materials and supplies used in the year 1920 were thus necessarily charged into the operating expenses for that year at prices fixed for the carriers by the government.

Accordingly, 15 cents out of every dollar of operating expenses for 1920 were paid out for materials and supplies at prices thus fixed for the carriers by the government.

All operating expenses (other than for labor and material and supplies) for the first two months of 1920 amounted to about 3.5 cents out of every dollar of operating expenses for the year. These were incurred by the government and not by the carriers.

This means that the 64 cents out of every dollar of operating expenses were paid for labor at prices fixed by the government; that 15 cents out of every dollar of operating expenses was paid for materials and supplies, at prices fixed by the government, and that 3.5 cents, out of every dollar of operating expenses for the year 1920, was paid for other expenses incurred by the government in the first two months of 1920, or a total of 82.5 cents out of every dollar of operating expenses for the year 1920 was paid out at prices directly fixed by the government itself.

The remaining materials and supplies used during the year 1920 were purchased by the carriers at prices fixed by general market conditions and beyond their power to control, and which cost 15 cents out of every dollar of expense. In other words, prices fixed by the government or by market conditions cover 97.5 cents out of every dollar of operating expenses.

The especially narrow limits within which the efficiency of management might have become effective to control operating expenses for 1920, including transportation expenses, are thus apparent.

It follows that efforts to control expenses during that year were of necessity almost wholly confined to obtaining better results from labor and economical use and consumption of materials.

The difficulty of this task, in the midst of extensive unrest and disorganization of labor and of disturbed economic conditions generally, cannot be easily exaggerated.

Turning to an analysis of the railway operating expenses, there can be no proper dissent from the statement that by far the largest contributing cause to the abnormal amount of these expenses is the cost of labor.

The cost of labor to the carriers may be divided into two classes, the direct and the indirect cost. The direct cost of labor is the compensation paid by the carriers to their employees; the indirect is that part of the cost of materials and supplies which is caused by the labor service in creating them.

The history of the direct labor cost is interesting and in this inquiry is of substantial importance.

The labor bill of the carriers in 1916, which was before the Adamson Law took effect, stood at \$1,468,576,394. The increases since 1916, excluding switching and terminal companies, have thus been as follows:

1917.....	\$270,905,748
1918.....	874,331,209
1919.....	229,315,081
1920.....	855,087,919

or an aggregate increase since 1916 of \$2,229,639,957.

And the increase since 1917, the last year of private management prior to federal control, was \$1,958,734,209.

The figures given are actual. The increase made in 1920, however, was in force only a part of that year.

The labor costs, including switching and terminal companies for 1920, were \$3,742,486,936; for 1919 they were \$2,868,672,284, an increase in 1920 over 1919 of \$873,814,652.

If the increased scale had been in force during the whole year of 1920, the wage bill for 1920 would have been approximately \$3,980,000,000. This means that the labor costs to the carriers of Class I were actually greater in 1920 than in 1917 by more than 115 per cent, and that, if the increased scale had been in effect during the entire year 1920, the increase would have been about 128 per cent.

It must be noted that during the same period the gross revenues of the carriers increased less than 54 per cent.

It will also be noted that since the government took charge of the labor costs by the Adamson law in 1916 the labor costs have been increased by government action by \$2,229,639,957, the total for 1920 being \$3,698,216,351, and that before the government took charge the entire labor costs amounted to \$1,468,576,394.

The properties of these carriers had been taken possession of by the government for a vital and very sacred public purpose. There was a great and relentless agitation for increases in wages during the whole period of federal control, which included more than ten months of the period of actual war. The Railroad Administration deemed it best to yield to this agitation and granted the enormous increases which have been noted as made during that period. Manifestly the burden of these increased costs could not end with federal control but must be passed on to the owners with the return to them of their properties. Nor did the record end with the advances actually made during the period of government possession. For many months prior to the end of federal control still larger demands for increases in wages had been pending and these unadjusted demands were also passed along to the owners with the return of their properties. These were subsequently adjusted by the Labor Board. Thus the inevitable and the recognized effect of what the Railroad Administration did and of what it began and left incomplete was to burden and encumber these properties and their future management after the resumption of private operation with the necessity to meet and provide for an increase of cost for labor amounting to \$1,958,734,209 annually (the difference between the entire labor cost of 1920, excluding switching and terminal companies, \$3,698,216,351, and the labor cost of 1917, namely, \$1,739,482,142), which is greater by more than two hundred and nineteen millions of dollars than the entire annual labor cost at the time the government took possession, namely \$1,739,482,142.

It is a just cause of complaint against the director general that he neglected and refused to recognize and satisfy the moral obligation he was under to make, in the revenues of these properties, an increase corresponding with the enormous and destructive burden of expense which he had placed upon them and left the carriers to assume the burden before the public of seeking an increase of rates to meet the increase of expense which he had placed on them. It was easy to impose this increased burden upon the carriers. It would have been a most ungracious task to transfer it to the public. So this task was left to the carriers, and they were confronted at the threshold of resuming their relations with the public with the necessity to assume the responsibility of asking a large increase of rates. In equity this obligation was not theirs—it was the obligation of those who had created the necessity.

Freight Rates Not Responsible for Depression

Freight rates are not responsible for the business depression, Mr. Kruttschnitt said. Widespread propaganda is being carried on to arouse public sentiment against existing freight rates. The fact is that even since the rates have been advanced the cost of transporting commodities is far less than the toll taken by the commission merchant and the retailer. Consequently people are misled and conclude that high rates have stopped the movement of a large amount of freight and that the railways would make more money if they would reduce the rates and thereby revive the traffic.

There is the strongest reason to believe that the very great reduction in traffic has been due almost entirely to general business conditions, world-wide in their effect and that would have come if there had been no advance in freight rates.

Prices of commodities reached their maximum in the first

half of 1920 and thereafter fell with great rapidity in France, the United States and the United Kingdom.

The fall in the United States began in May and was rapidly on its way downward in September when the advanced rates took effect. Nevertheless, traffic did not drop for at least four months.

In the last four months of 1920, the net ton miles of revenue freight were 143,349,678,000, an increase of 7 per cent over the preceding year.

It was a general deflation and fall in prices from the heights to which they had been driven by war conditions that has caused a stagnation of business throughout the world.

That it is not caused by the cost of transportation, is convincingly shown by the fact that stoppage of buying has caused an over-supply of ships. Ocean tonnage rates have been recently at the lowest point in their history. Notwithstanding these low rates ocean traffic shows great stagnation as rail traffic and millions of tons of shipping here and abroad are rusting in idleness.

Many commodities would not move even if the freight charges on them were abolished entirely because producers can find no market.

That the decline in business is not due to prohibitive freight rates is shown by the following examples:

In January of this year the total tonnage of lines west of El Paso and Ogden operated by the Southern Pacific fell off 41 per cent. The combined intrastate freight tonnage in Arizona and Nevada declined 50 per cent although no increase in the intrastate freight rates in those states has been authorized or made effective. This decrease embraced grain, hay and livestock as well as ores and other commodities.

Of a Texas cotton crop of over four million bales, 40 per cent remains unmarketed. The average amount of increase in the inland freight rates to Galveston was 24½ cents per 100 pounds. On the other hand the ocean rate from Galveston to Liverpool has declined from \$1.98 per 100 pounds in August, 1920, to 45 cents in March so that the average cost of shipments from producing point to Liverpool has been reduced about \$1.28½ per 100 pounds. Obviously the freight rate is not responsible. Cotton shippers attribute it to absence of demand both foreign and domestic.

Of the total crop of 99,000 bales of cotton in the Imperial Valley of California, about 54,000 bales remain unshipped, notwithstanding that a rate is now obtainable through the Panama canal as low as the rail rate available last season before the August advance, and also notwithstanding that ocean rates to Yokohama have been reduced \$1.10 per 100 pounds and to Liverpool as above stated while the rail rates to Pacific rates were increased only 14 cents and to Galveston only 40 cents.

During September, October and November, 1920, 45 per cent less rice, 54 per cent less canned salmon and 77 per cent less dried fruit were exported than during the same months of the previous year, although the reduction in ocean rates was substantially more than the increase in inland rail rates.

A removal of all the recent increase of the rate on lemons would not help the California lemon grower. He has a rate by sea through the Panama canal of less than half (42 per cent) of the rail rate yet his lemons are not marketed.

More lemons were shipped from California in the four months, November, December, January and February (after the increase in freight rates), than were shipped in the corresponding months one year ago.

The real trouble is that the government has taxed the lemon grower heavily to create a glut of ocean tonnage which has lowered ocean rates to unheard of limits and Sicilian lemons are sold at \$1.25 a box in Eastern markets where the Californian must sell his fruit. The ocean highway is free and the Sicilian knows it. If Congress wants to help the Californian, it knows how it can easily do so but it cannot be done by interminable discussion and investigation of rail rates.

On the basis of 54 heads of lettuce to the crate, the cost per head to the California grower is 6.7 cents. From personal experience at retail markets consumers have to pay from 20 to 25 cents a head for California lettuce and quite as much as for lettuce grown in the neighborhood on which there is no freight charge.

The facts about the freight rates on cantaloupes have been grossly misrepresented. From the report of the United States Department of Agriculture, Bureau of Markets, we find that the average sale price for the 1920 season in New York was \$4.82 a crate. The present freight rates plus refrigeration are \$1.84½ to New York and \$1.49 to Chicago. This leaves a profit to the operator on cantaloupes sold in New York of \$1.62½ per crate. The freight rates have been grossly misrepresented and the statement is made that sale at

\$3.50 yields a little over 30 cents profit. The average price of the cantaloupe laid down in New York in 1920 was not quite 11 cents. They were retailed at about 25 cents.

The percentage of freight charges to the average value of commodities shipped in the early part of 1921 is only two-tenths of 1 per cent greater than it was in 1914.

Remedies for Existing Conditions

The trouble with our railroads has been intensified by the results of 26 months of an experiment in government ownership and operation. The word "ownership" is used advisedly as the federal railroad administration treated the railroads as if they were absolutely owned by the government and turned them back to their owners helplessly bound in improvident agreements in the making of which their owners had no voice.

The first requisite for the prosperity of any property is the right to conduct its own affairs. Without this efficient operation is impossible. It is not a question of revenues and reasonable return as much as one of life and death to every industry in the land. Poor service no matter how low the rate is expensive and increases the cost of everything.

Some remedies easily applied and productive of great economies are:

1. Stop the use for common carrier purposes of highways built with public moneys without adequate tolls and proper regulations.

2. Make inland waterways built or improved at public expense carry themselves as to interest on cost and maintenance by regulating the common carrier traffic on them and by imposing adequate tolls.

3. Keep the United States government out of the business of operating steamships and stop the lavish expenditure of public money to provide coast to coast ocean transportation in competition with transcontinental railroads.

4. Tolls for use of the Panama canal should be sufficient to pay interest on its cost, operating expenses and maintenance.

5. Do not deprive transcontinental carriers of coast to coast traffic by inflexibly enforcing a strict long and short haul clause.

You call us here to tell you what ails the railroads. We have been telling regulatory bodies for years that railroads were subject to the same inflexible economic laws to which all other industries are subject.

The government having strangled the railroads into something like bankruptcy at last removed its hands and permitted a sudden increase in rates that should have been gradual and started at least 12 years ago. The difficulties with the railroads is excessive operating expenses and an abnormal amount of these expenses is the cost of labor.

These, then, are the directions in which we need and ask your help. You may well ask what the railroads propose to do to help themselves.

The railroad executives have exerted, are exerting, and will continue to exert every effort to increase efficiency of operation, as they realize since the passage of the transportation act to a degree greater than they ever did before their allegiance to the public as well to their shareholders.

Many absurd, impractical and totally indefensible estimates of possible savings to result from the adoption of numerous improvements have been made in the heat of discussion of pending issues with organized labor. These economies are to be made by the universal use of practices and devices of different degrees of merit, some of which have long been used by all roads and all of which are used by some roads. All the suggestions cost money and a great deal of money, and the proposal of organized labor is that the additional capital be invested, not for the benefit of those who provide it, nor for the benefit of the public to reduce rates, but generally and principally to permanently support wages on the inflated war level.

Some of the directions in which the joint and several efforts of the public, the carriers and their employees can help the situation are:

The public can help, among other ways:

1. By continuing the splendid co-operation that it has accorded the railroad since their return to their owners, in using equipment and other facilities intensively.

2. By modifying laws that limit the length of freight trains and compel the employment of unnecessary men.

3. By terminating Government made agreements that put a premium on inefficiency.

The carriers can help:

1. By increasing capacity of existing lines by reducing curves and grades.

2. By conserving fuel through educating enginemen and the use of improved devices.

3. By replacing obsolete locomotives, shops, and tools by

modern ones—matters of supreme importance on account of great increase in wages.

4. By eliminating every ounce of useless dead weight in locomotives and cars, remembering that it costs just as much to haul a ton of useless wood and iron as it does to haul a ton of dry goods.

5. By reducing delays at terminals and in transit through the provision of more second tracks, passing sidings, and terminals.

6. By extended use of power devices for handling freight, and other labor-saving devices.

7. By promoting common use of tracks and terminals wherever practicable.

The employees can help:

1. By increasing and ever increasing production in all departments of railroad service.

2. By loyal, earnest effort to reduce operating expenses to prewar costs, or better, in recognition of the generous increases in wages granted by public regulating bodies.

3. By conserving fuel and saving life, limb, and property through greater care and stricter observance of rules and regulations. Payments for loss and damage to freight increased from \$35,000,000 in 1917 to over \$104,000,000 in 1919, or \$40,000,000 more than they should have done after allowing for 8 per cent fall in traffic volume and 100 per cent increase in value of commodities.

Finally, managers and employees jointly can render incalculable service to their corporations and to the public by cultivating friendly, harmonious, and co-operative relations that were dangerously weakened during governmental control, and above all, by establishing a thorough realization of the obligation of public service, to which we all owe absolute fealty.

We do not wish to be understood as criticizing or disapproving the motives of public policy that determined the construction of the Panama Canal, highways, inland waterways, and ships. We recognize the first as a measure of national defense the last as indispensable to winning the war, whose cost, even if many times what it has been, would have been wisely incurred. The others are necessary for the development of our country and contribute largely to the pleasure and convenience of every one of us. But what we do criticize and protest most earnestly is the unrestricted use for common carrier purposes of these works, built with public money, to destroy the business of public service corporations built with private moneys dedicated to public use; and most of all do we protest against the entry by the United States Government, backed by the United States Treasury, into destructive competition with its own citizens.

Continuing his testimony on May 11, Mr. Kruttschnitt said in explaining the stagnation in railroad building:

In 1920, \$62,264,000 went as a return to those who paid for the properties while 60 times as much (or \$3,742,000,000) went to those who are employed on the railroads. This answers the question "why don't we build more railroads?"

The fall in rate of railroad construction began in 1905 and, with a negligible check in 1916, has continued ever since, so that the new mileage constructed in 1920 was less than the average in the five years from 1840 to 1845. New construction in 1920 was only one-eighth of 1 per cent of the existing mileage, and at this rate it will require eight years to increase it by 1 per cent.

Mr. Kruttschnitt pointed out that for the railroads of the whole country, increased expenses in 1920 over 1919 were as follows:

Actual expenses for 1920.....	\$6,163,138,341
Actual expenses for 1919.....	4,667,774,131
Increase for 1920 over 1919.....	\$1,495,364,210

DETAILED AS FOLLOWS:

Increased cost of—	
Labor	\$884,148,739
Locomotive fuel	196,429,760
Cross ties	28,113,000
Insurance	20,160,000
Loss and damage.....	18,917,000
Stationery and printing.....	12,264,000
Depreciation	20,135,000
Track material	10,764,000
Water and lubricants.....	8,318,000
General supplies	29,741,000
Transportation expenses other than labor and items explained above	51,488,000
Valuation expense	1,887,000
Corporation and printing.....	15,837,326
Other increases in taxes, rents and uncollectible revenues.....	52,771,359
Cost of R. R. Administration.....	7,168,000
Maintenance of way, materials and equipment not accounted for above and deferred federal maintenance.....	121,420,000
Total increase in expenses above explained.....	\$1,499,566,184
Actual or net increase in expenses.....	1,495,364,000

Mr. Kruttschnitt was to return for questioning by the committee on May 12.

Container Car Expedites Mail Service

NEW RECORDS for speed in the handling and transportation of mail in quantities were established in a recent test of the container car system of the New York Central in the government mail service. The saving of time due to the elimination of handling enabled a mail train from New York to make connections at Chicago which had not been made heretofore and in some instances 12 to 14 hours were saved by placing the pouches on earlier fast trains.



Loading Containers with Mail Sacks at the Post Office

This demonstration opens a new field of usefulness for the container system of transportation which has already been successfully applied to express and l.c.l. freight.

For the test in mail service the express type of container car was used. The nine portable containers were filled with mail at the postal stations, seven being filled at the Grand Central Terminal and the remaining two at the New York general post office. They were then transported by motor truck and loaded onto the car at the Thirty-third street



Unloading the Containers at Twelfth Street Yard, Chicago

yards of the New York Central. Loading the mail into the containers consumed an average of 15 min. The trucks were transferred from the Grand Central Terminal to the yards in an average of 15 min., and from the general post office to the yards in an average of 5 min. each. The containers were loaded from the trucks to the car in an average of 3 min. each, or 27 min. for the nine.

The mail matter carried on the car weighed 34,650 lb. and was made up of 894 sacks, 336 parcels of parcel post matter and 11 registered pouches of valuable mail, a total of 1,241

separate packages. The total weight of mail carried was considerably above the average weight hauled in the present standard mail car which usually carries about 30,000 lb. A single container carried 150 sacks weighing 5,090 lb. and the container car can readily carry a total of 50,000 lb. or more.

Upon arrival at Chicago at 8 a. m., Saturday, May 7, the car was immediately switched to the crane at the Twelfth street yards and was set for unloading at 8:10 a. m. The nine containers were all unloaded and placed on trucks in 21 min., the average time for unloading being 2.3 min. each. The last container left Twelfth street at 8:31 a. m. Delivery at various destinations in the city were made as follows:

Container No.	Destination	Time delivered	Connecting trains due to leave
*105	Dearborn street station.	8:21 a. m.	A. T. & S. F. 9:25 a. m.
107	Main post office.	8:26 a. m.	.....
102	Northwestern depot.	8:34 a. m.	C. & N. W. 9:00 a. m.
103	South end Union depot.	8:31 a. m.	C. B. & O. 9:30 a. m.
110	South end Union depot.	8:38 a. m.	C. B. & O. 9:30 a. m.
106	North end Union depot.	8:45 a. m.	C. M. & St. F. 9:45 a. m.
101	North end Union depot.	8:45 a. m.	C. M. & St. F. 9:45 a. m.
108	Parcel post branch, Main post office, Eleventh and State streets.	8:39 a. m.	.....
111	Parcel post branch, Main post office, Eleventh and State streets.	8:54 a. m.	.....

*Delayed 12 minutes at track crossings.

If mail had been available, the car could have been reloaded within two hours after its arrival. The containers were locked and released by the post office department one hour before the departing time of train No. 2, 1 p. m. An average of 15 min. was consumed in bringing them from the La Salle street station to the loading point and the containers were loaded from the trucks to the car in an average of 2 min. each. On the return trip the containers carried 37,220 lb. of mail matter in 1,248 separate packages, including 69 pouches of registered mail.

The test was authorized by Postmaster-General Hays and a committee of officials of the post office department were aboard the train that carried the container car. Representatives of the New York Central also were present and supervised the test trip.

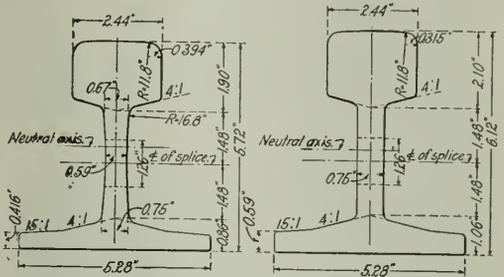
The advantages of the container car method of handling mail may be summarized as follows: It eliminates the possibility of theft or loss of valuable mail while in transit due to the fact that the container cannot be opened until it is removed from the car by the use of a crane. The container will also prevent a repetition of the numerous recent thefts of mail from trucks carrying it from post offices to railroad stations. The system reduces to a minimum the damage to parcel post or other mail in transit. It effects a saving in the cost of handling, both in labor and in trucking, and a material saving in the use of equipment. The possibility of quick transfer at important points and the maintenance of close train connections is an important advantage. The container makes it possible to restore the practice of maintaining ten or more separations in loading cars which cannot be done with solid car loading as now practiced.

New Standard Rail Sections for French Roads

AFTEK AN EXTENDED investigation six of the principal railroads in France have adopted four new standard rail sections. This subject is of particular interest to American railway engineers owing to the fact that the investigation included the study of some American rail sections, but these were abandoned in favor of new sections which conform very closely to the general outline of sections previously used in France. The four sections adopted are shown in the illustrations and include a 26-kg. section for narrow-gage tracks, a 36-kg. section for light traffic, stand-

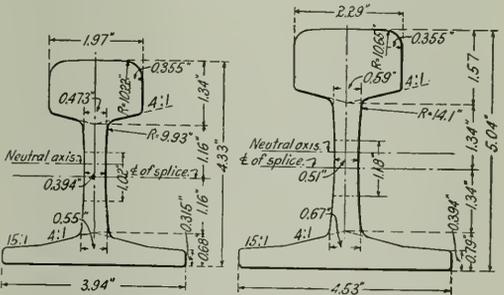
ard-gage lines, a 46-kg. section for light traffic, standard-gage lines and a 55-kg. section for use in tunnels where the action of moisture and smoke results in rapid loss of metal.

It is to be noted that these sections retain the double bevel



46-kg. (92.8 lb.) Rail, 55-kg. (110.9 lb.) Rail for Tunnels

on the top surface of the base in conformity with prevailing French practice. Three of the rail sections have curved faces on the webs and the base widths are appreciably less than the height. Consideration of a great many types of rail splices



26-kg. (52.3 lb.) Rail, 36-kg. (72.6 lb.) Rail

finally resulted in a decision to continue the use of fish plates like those in general use in France, although the thickness has been increased appreciably over that of the types previously used.

American Railway Development Association

THE American Railway Development Association, formerly the Railway Development Association, held its thirteenth annual meeting at Hotel Pennsylvania, New York City, on Wednesday, Thursday and Friday of this week. The opening session began on Wednesday forenoon, the 11th, with President H. O. Hartzell (B. & O.) in the chair and Secretary J. B. Lamson (C. B. & Q.) acting as secretary of the meeting.

The first address was by Charles H. Herty, editor of the Journal of Industrial and Engineering Chemistry, New York city, who gave a rapid sketch of ways in which railroads could develop traffic in their respective territories by spreading knowledge of how natural resources can be made more valuable in ways that the chemist can explain to them. Railroads have developed vast territories by the aid of the geologist; but the day of the geologist is largely past. The chemist has not been duly appreciated. Not a railroad in America

has made a thorough chemical survey of its territory, though a few companies have done a little at it.

The railroad chemist, to cover the field adequately, should be a man of strong character, imagination and initiative. He should be close to the president, not merely an information bureau; not content to wait for people to come to him, nor to be merely an analyzer of water, oils, steel and paint. Men of this kind are scarce, and a good salary will be necessary.

In the discussion following this address mention was made of the former annual chemical exhibition held in New York city. Mr. Herty hopes to revive this. A member said that the Technology Club, New York city, could furnish a list of chemists open to engagement.

A Shipper's Views

B. J. Case, of Sodus, N. Y., speaking on the transportation of perishables from a fruit grower's standpoint, told of experiences in that business in central New York. Shipments of peaches have been increased in volume in that region in 15 years several hundred per cent but the risks of the business due to uncertain seasons and fluctuations in crops are considerable, and the hearty co-operation of the railroads is of vital importance. For example, the distribution of fruit cars last year, when New York growers felt aggrieved at what they deemed undue favoritism toward other regions, left a shortage at a critical time; and a thousand carloads of peaches were left in the orchards unharvested. Consumers could have been found for those peaches if the fruit could have been shipped at the right time.

How to Secure Desirable Settlers for Vacant Lands

E. F. Benson, manager of the department of immigration and industry of the Northern Pacific, in a paper on this subject, presented a strong plea for the establishment of community development associations; only by intelligent co-operation can satisfactory progress be made. To get a man to buy a farm is not enough. The individual with \$2,000 can perhaps take a farm, but the necessary stability, enterprise and intelligence can be had only by co-operative effort.

Of American farms, only 62 per cent are operated by their owners. If that percentage cannot be increased the country is in danger. We see in the downfall of the Roman empire a deadly parallel to tendencies now working in this country. We have warnings on all sides today. The trouble in Russia is due to the ungratified ambition of the masses to own land. A similar ambition among the peons of Mexico accounts for the last ten years of trouble in that country. Denmark, by state action, has made itself a prosperous country of small farms. Even Ireland has in the last ten years been greatly improved by the Irish land bill.

The California experiment was started by Dr. Leeds, who, in 1914, brought to that state the lessons of experience in Australia. The state appropriated \$260,000 in 1917 and a million in 1919. Secretary F. K. Lane, in his recommendations for lands for soldiers, took this experiment as his guide.

The Wisconsin plan is the better one, in Mr. Benson's opinion. Legislatures are only very slowly convinced of the wisdom of appropriating public money, but the Wisconsin Colonization Company (headquarters at Eau Claire) advances the necessary money and thus far has paid good dividends; and has satisfied its patrons. The State Immigration Department cooperates with it. The president of the company will give all desired information. The company does not build houses for patrons, but lends them half the necessary money. It aids them in getting good and tasteful modern houses at a low price. The speaker could see no reason why schemes of this kind could not be worked as well in Maine or California as in Wisconsin.

In the discussion on this paper Mrs. Fullerton (Long Island) described the work of her road in promoting the

prosperity of small farms. County home bureaus are doing good work of this kind all over New York state. C. L. Smith (O. W. R. R. & N. Co.) related some of his experiences. He devotes much attention to home building. A colonization enterprise in Northern Minnesota was mentioned.

Reforestation of Cut-Over Lands

W. S. Ayres (New Orleans Great Northern) read a comprehensive and instructive paper on the timber problem in the great level country of the south, where 155 million acres have been denuded. Millions of acres are being reforested but much more needs to be done. At Bogalusa, La., this summer there is to be a forestry school, continuing six weeks.

In the discussion it was stated that the Canadian Pacific sends out a train with forestry lecturers every summer, three weeks being spent in the work. The use of trees as wind breaks or snow fences was mentioned, but results are not always satisfactory. The Canadian Pacific is trying hemp as a snow fence. It is an annual and grows ten feet high.

The rest of the proceedings of the meeting will be reported in a later issue.

A New Brownhoist Locomotive Crane

DURING THE PAST few years, many roads have found it economical to handle their coal, ashes and other materials by a locomotive crane. This has been necessary because rapid handling is often essential and because the crane is so much more economical than hand labor. Up to the present time, however, most of these cranes were



The Crane in Use in Material Yard

large capacity machines and too big to be economical for many small jobs. The saving effected by cranes on these larger operations has created a demand for a smaller type which can be used economically where there is not so much material to be handled.

With the idea of filling the need for a smaller capacity crane for this work, a new Brownhoist No. 2 locomotive crane has been developed. This machine can be changed in a few minutes' time to handle either a grab bucket, bottom block or lifting magnet. The new crane will do the same work as the larger types within its capacity. It is built to handle a one-yard bucket, hook loads of 5 tons, or a 36-in. magnet.

In order to meet the different working conditions, these new cranes are made to operate by steam, electricity or gasoline engine. They are built for use on railroad trucks, traction wheels or creeper trucks. This new crane has just been added to the other types of locomotive cranes built by the Brown Hoisting Machinery Company, Cleveland, Ohio.

General News Department

The American Association of Dining Car Superintendents will hold a special meeting at Chicago in connection with the National Hotel and Restaurant Week, commencing July 12.

Thirty-nine brakemen have already been dismissed, or transferred to other work, on the Pittsburgh division of the Pennsylvania Railroad, on account of the repeal of the full-crew law of Pennsylvania. These men were on through passenger trains.

The Southern Pacific, with its oil burning locomotives, runs passenger trains from New Orleans to El Paso, 1,194 miles, with only two changes. The runs are from New Orleans to Houston, 362 miles; Houston to Del Rio, 380 miles and Del Rio to El Paso 452 miles.

The hearing before an examiner of the Interstate Commerce Commission regarding the expenditures of the Pennsylvania Railroad for locomotive repairs made by the Baldwin Locomotive Works was resumed at Washington on May 9. J. T. Wallis, chief of motive power, was the principal witness.

The Great Northern has abolished its Havre division, effective May 5. The lines of this division from Havre, Montana, to Cut Bank have been added to the jurisdiction of the Montana division and the lines from Pacific Junction to Gibson, Great Falls to Shelby and Virden to Sweet Grass have been added to that of the Butte division.

The Railroad Commission of California has authorized the Sugar Pine Railway to discontinue service as a common carrier, since neither present nor prospective revenues are sufficient to justify further operation. The Sugar Pine Railway operates a standard gage line in Tuolumne County, Cal., from Ralph to Lion's Dam, a distance of 16 miles.

Train accidents investigated by the Bureau of Safety of the Interstate Commerce Commission in the last three months of 1920—October, November and December—numbered 34, and the summary of the reports of these investigations—No. 6—has just been issued. The list includes 13 rear collisions, six butting collisions, four miscellaneous collisions and seven derailments.

Four employees of the Columbus & Greenville were killed and several others injured as a result of the wrecking of a double-header freight train 15 miles west of Columbus, Miss., on April 30. The accident was caused by the tender of the second engine leaving the track as the train was backing down grade into Columbus, causing both engines to leave the track and overturn.

The Interstate Commerce Commission has announced a hearing on the protest filed by the Kansas City Southern to the supplemental tentative valuation recently issued by the commission at Kansas City, Mo., on May 25, before Examiner Hartman. A hearing on the protest of the San Pedro, Los Angeles & Salt Lake will be held before Examiner Hartman at Los Angeles on June 6.

Electrical Hazards and Safeguards Against Them, is to be the subject for discussion at the meeting of the American Society of Safety Engineers, at 29 West 39th street, New York, on Friday evening, May 27. H. S. Balliet, assistant terminal manager, Grand Central Station, will describe the safety equipment of that terminal, and there will be illustrated papers by C. O. Van Dannenberg, W. W. Samuels and L. E. Smith.

An exhibit of transverse and longitudinal fissures in rails is being displayed in the offices of Robert W. Hunt & Co., Chicago, as a means of acquainting railway men with the true character of these serious causes of rail failures. Of

particular interest are samples of rails containing fissures that have not yet resulted in complete failure and disclosing how very little evidence there is to indicate the presence of these dangerous flaws.

The Freight Claim Division, of the American Railway Association, will hold its thirtieth annual session at the Hotel Sherman at Chicago, on May 17, 18 and 19. Coronado Beach, Cal., had been selected as the place of meeting, and later Denver was substituted; but the present railroad situation made necessary a further consideration and Chicago was selected. The report of the committee on cause and prevention will occupy the attention of the members on the 18th.

The Signal Appliance Association, F. W. Edmunds, secretary, announces that in connection with the signal engineers' convention at Hotel Drake, Chicago, June 6-8, there will be a general luncheon each day, Monday, Tuesday and Wednesday, and a dinner on Tuesday evening; luncheon tickets to be on sale Monday morning and dinner tickets on Tuesday morning. Mr. Edmunds announces tentative plans for securing special cars from New York for Chicago on Saturday afternoon, June 4. Another circular will be issued later, and reservations from New York may be made through H. S. Balliet, secretary of the Signal Section, Grand Central Terminal, New York City. Mr. Edmunds suggests that members reserve rooms at the Drake Hotel without delay; rates for single rooms, \$5 to \$7 per day; double rooms, \$6 to \$14.

Misuse of monthly commutation tickets on the Long Island Railroad causes that company an estimated annual loss of \$100,000, and General Passenger Agent P. H. Woodward, in a second circular suggesting that possibly it may be necessary to require the holders of such tickets to paste on them their photographs, says that the stations where the worst offenders live are Far Rockaway, Arverne, Rockaway Beach, Rockville Center, Freeport and Bay Shore. It is further suggested that if citizens would co-operate with the railroads in securing a law imposing penalties for dishonest use of tickets, there would be no necessity of resorting to drastic measures to protect the revenue of the company. A law punishing unauthorized persons for selling, bartering or transferring tickets, now in force in Pennsylvania, accomplishes the desired results, says Mr. Woodward.

Acquisition by the government of all the railroad freight cars in the country at a fair depreciated value, has been proposed to President Harding by S. H. Barker, financial editor of the Philadelphia North American. Mr. Barker proposes that the government issue in payment 15-year serial car trust certificates which he says the railroads can sell readily if they bear a reasonable rate of interest, and thereby can raise additional funds needed for improvements. He has estimated that in this way the railroads could be provided with about \$3,000,000,000 at a cost of around 5½ per cent. Apparently no estimate was made of the amount of such certificates which would have to be given to the holders of the outstanding equipment obligations before the cars could be turned over to the government. The President offered to submit the plan to Senator Cummins if it were placed in written form.

Hearings before W. A. Colston, director of the department of finance of the Interstate Commerce Commission, on the proposal of the New York Central to acquire control of the Chicago Junction and the Chicago River & Indiana, were resumed at Chicago on May 3, when George B. Hanauer, vice-president and general manager of the Indiana Harbor Belt Line, took the stand. Mr. Hanauer maintained, under cross examination by Luthur M. Walter, that the change of the control of the property would be for the good of all con-

cerned and defended his position further under cross examination by representatives of various other interests, including Irving Herriott, attorney for some of the shippers who are opposed to the change and Walter L. Fisher, attorney for the Railway Terminal Commission of the City Council of Chicago. Mr. Fisher tried without success to get an admission that the plan would endanger the unification of all terminals at Chicago, as outlined by the Railway Terminals Commission of the City Council. Hearings during the first part of the week, commencing May 8, were concerned with the valuation of the property and will be continued throughout the week.

February Operating Statistics

The net ton miles of revenue and non-revenue freight handled by 170 Class I railroads for the month of February, according to the Interstate Commerce Commission's monthly bulletin, was 24,915,000,000 as compared with 32,958,000,000 in February, 1920. The average car miles per car day was 21.3 as compared with 22.3 in 1920, but the net tons per loaded car showed a slight increase, 28.4 as compared with 28.3. The average train load was 618 tons as compared with 675. The coal consumption in road service was only 5,792,000 net tons as compared with 7,505,000 in 1920. The percentage of serviceable cars was 9.8 as compared with 6.5 in 1920 and there were 7,463 unserviceable locomotives as compared with 7,730 in 1920.

Meeting of Railroad Division A.S.M.E.

A meeting of the Railroad Division of the American Society of Mechanical Engineers will be held on Thursday, May 26, at 10:00 a. m., in the Congress Hotel, Chicago, in connection with the spring meeting of the society. Three professional papers will be presented and discussed as follows: The Design of Large Locomotives, by M. H. Haig, mechanical engineer of the Atchison, Topeka & Santa Fe; The Needs for the 2-10-2 and Other Heavy Freight Locomotives for Road Service, by A. F. Stuebing, mechanical department editor of the *Railway Age*, and the Necessity for Improvement in the Design and Operation of Present-Day Locomotives, by H. W. Snyder, mechanical engineer of the Lima Locomotive Works. Following the discussions of these papers a business meeting of the division will be held.

Store Door Delivery

According to an announcement by the Federal Highway Council, Washington, D. C., store door delivery of freight is to be established in Baltimore, Md., plans for the enterprise having been agreed upon at a conference between merchants of the city and representatives of the Pennsylvania, the Baltimore & Ohio and the Western Maryland Railroad. A local committee, of which A. E. Beck is chairman, has been appointed to work out the details. General store delivery was in operation at Baltimore, and also at Washington, for several years but was finally abolished because of an order by the Interstate Commerce Commission, made after hearing various complaints, in which the conduct of the railroads in this delivery business was unlawful and discriminatory because of the use only in these two cities and not in other places.

Protests Against Valuations

Protests against the supplemental tentative valuations served by the Interstate Commerce Commission on March 31 have been filed with the commission by the Kansas City Southern, the Atlanta, Birmingham & Atlantic and the Winston-Salem Southbound. The Kansas City Southern declares that it had introduced evidence that its property was worth \$80,000,000 and the commission has given no analysis of the methods by which it found the property to be worth a smaller sum. It is stated that the commission has ignored the earning power of a carrier, which is the most important, if not the controlling factor, and it has apparently ignored the stock and bond value, which for the five-year period preceding the valuation was approximately \$62,000,000, or \$13,000,000 greater than the final value found by the commission. The protest

also enumerates various items which it asserts the commission has not taken into consideration.

The Winston-Salem Southbound protest objects to the finding of a final value less than its original cost.

A Canadian View

Hon. F. B. Carvell, chairman of the Board of Railway Commissioners for Canada, in a recent speech at Calgary, Alberta, responded to the calls for a general reduction in freight rates by saying that three essential preliminaries would be: a rearrangement of the working conditions of railroad employees; a reduction in service and a reduction in the price of coal.

"A healthy situation for the railways is just as necessary to the west as sunshine and rain. Without railways the west would still be the home of the Indian and the buffalo."

Mr. Carvell briefly reviewed conditions. It took, he said, \$22,000,000 for the Canadian railways to pay the retroactive part of the Chicago award. The payroll for the Canadian National prior to the McAdoo award was \$43,265,000. It was estimated the payroll for the present year would be \$81,347,000. The Canadian Pacific payroll prior to the award was \$56,190,000. The estimate for this year was \$100,000,000. He would like to see the day, he said, when Canadian business men, Canadian railwaymen and railway officials could gather round a table and settle their own differences, instead of adopting awards made in the United States.

Revenues and Expenses for March

A preliminary compilation of the returns to the Interstate Commerce Commission by 198 Class I roads for March show a net operating income of \$13,894,000 as compared with \$15,100,000 for March last year. The total operating revenues were \$458,000,000 as compared with \$459,000,000 last year. The operating expenses were \$399,000,000 as compared with \$419,000,000 last year, a reduction of 4.8 per cent. The preliminary report is as follows:

	1921	1920	Per cent of increase 1921 over 1920
Total Operating Revenues:			
Eastern District	\$205,864,936	\$204,085,540	0.9
Southern District	75,187,344	77,105,600	d 2.5
Western District	177,309,246	178,076,094	d 0.4
United States	458,361,526	459,267,234	d 0.2
Total Operating Expenses:			
Eastern District	183,721,741	197,523,582	d 7.0
Southern District	65,846,562	65,998,267	d 0.2
Western District	149,861,144	155,843,322	d 3.8
United States	399,429,447	419,365,171	d 4.8
Net Railway Operating Income:			
Eastern District	10,547,118	Def. 2,642,991	499.1
Southern District	5,268,444	8,526,446	d 38.2
Western District	15,078,503	9,217,282	63.6
United States	30,894,065	15,100,737	104.6

Business Men Endorse Secretary Hoover's Plan for Reorganization of Department

Plans for reorganization of the Department of Commerce and increasing its scope so as to make it more helpful to the business of the country were discussed at a conference at Washington on April 29, between Secretary Hoover and a large number of business men representing the most important industries of the country, whom he had invited for that purpose. The men attending the conference later drew up a letter addressed to the Secretary as embodying their views, which endorsed the opinion which he had previously expressed that the department should embrace all the non-regulatory bureaus of the government relating directly to industry (as distinguished from agriculture), to trade and to transportation. The letter said that the Department of Commerce had never developed to the scope implied in the act of Congress which created it. It was suggested that the whole statistical activities of the government relating to production, stocks, consumption and distribution, and movement of the basic commodities, excluding agriculture, should be concentrated in the department and the opinion was expressed that the basic industries would voluntarily aid the department in the collection of vital statistics.

REVENUES AND EXPENSES OF RAILWAYS

MONTHS OF MARCH AND THREE MONTHS OF CALENDAR YEAR 1921

Table with columns: Name of road, Average mileage operated, Operating revenues (Total, Freight, Passenger, Inc. mail), Maintenance of way and structures, Traffic, Transportation, General, Total, Operating ratio, Net from operation, Operating (or loss), Net (or decr.) with rentals, Increase (or decr.) in net operating revenue. Rows include Alabama & Vicksburg, Vicksburg, Shreveport & Pac., Ann Arbor, Atchison, Topeka & Santa Fe., Gulf, Colorado & Santa Fe., Panhandle & Santa Fe., Atlanta & West Point., Western of Alabama., Atlanta, Birmingham & Atlantic., Atlantic Coast Line., Charleston & Western Carolina., Baltimore & Ohio., Baltimore & Ohio Chic. Term., Staten Island Rapid Transit., Fargo & Crookston., Belt Ry. Co. of Chicago., Bessemer & Lake Erie., Bingham & Garfield., Boston & Maine., Brooklyn Eastern District Term., Buffalo, Rochester & Pittsburgh., Canadian Pacific Lines in Maine., Carolina, Clinchfield & Ohio., Central of Georgia., Central of New Jersey., Central Vermont., Chesapeake & Ohio., Chicago & Alton., Chicago & Eastern Illinois., Chicago & North Western., Chicago, Burlington & Quincy., Chicago Great Western., Chicago Junction., Chicago, Milwaukee & St. Paul.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF MARCH AND THREE MONTHS OF CALENDAR YEAR 1921—Continued

Table with columns: Name of road, Average mileage during period, Freight, Passenger, Total, Operating revenues, Maintenance of way and structures, Equip., Traffic, Trans-Operating expenses, General, Total, Operating ratio, Net from way operation, Operating income (or loss), Net after returns, Increase (or decrease) last year.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF MARCH AND THREE MONTHS OF CALENDAR YEAR 1921—(CONTINUED)

Table with columns: Name of road, Average mileage operated during period, Freight, Passenger, Total Operating revenues, Maintenance of way and structures, Equipment, Traffic, Trans- portation, General, Total, Operating ratio, Net from railway operation, Operating income (or loss), Net after rentals, Increase (or decrease) comp. with last year.

REVENUES AND EXPENSES OF RAILWAYS

MONTHS OF MARCH AND THREE MONTHS OF CALENDAR YEAR 1921—CONTINUED

Table with columns: Name of road, Average mileage during period, Operating revenues (Total, Passenger, Freight, Mail, Express, Freight collect, Freight and mail, Freight and mail collect, Freight and mail collect), Maintenance of way and equipment (Total, Way, Equip-ment), Traffic (Total, Trans-portion), General, Operating (Operating, Net from railway operation, Operating (loss or gain), Net rentals, Increase comp. with last year).

(c) War taxes included in March, 1921, \$1,535,151, and in period January to March inclusive, \$1,525,125

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF MARCH AND THREE MONTHS OF CALENDAR YEAR 1921—CONTINUED

Table with columns: Name of road, Average mileage operated during period, Freight, Passenger, Operating revenues, Total operating revenues, Maintenance of way and structures, Traffic, Trans- portation, General, Total, Operating ratio, Net from railway operation, Operating income (or loss), Net after other items, Increase (or decrease) last year.

time is necessary on the part of any of the railroads. The regulations of the commission and of the Bureau of Explosives will be revised in accordance with regular practice to conform with the new law and new regulations will be prepared to apply to steamships.

Railway Business Association

President A. B. Johnson has announced the new members of the executive committee, elected or appointed at or since the March meeting, and the full list of members, as issued by Secretary Frank W. Noxon, is as follows:

President, Alba B. Johnson, Philadelphia.

Honorary Vice-president, Geo. A. Post, New York.

Vice-presidents: W. W. Salmon, Rochester, N. Y.; W. W. Willits, Chicago; Knox Taylor, High Bridge, N. J.; W. H. Woodin, New York; S. G. Allen, New York; Stephen C. Mason, Pittsburgh; Charles J. Symington, New York.

Executive Members: V. C. Armstrong, New York; J. C. Bradley, Buffalo; S. P. Bush, Columbus, O.; Robert F. Carr, Chicago; J. S. Coffin, New York; S. M. Curwen, Philadelphia; G. F. Downs, Buffalo; Andrew Fletcher, New York; Howard A. Gray, Chicago; Irving T. Hartz, Chicago; A. L. Humphrey, Pittsburgh; E. J. Kearney, Milwaukee; R. P. Lamont, Chicago; Frank J. Lanahan, Pittsburgh; E. B. Leigh, Chicago; Herbert I. Lord, Detroit; Burton W. Mudge, Chicago; A. H. Mulliken, Chicago; W. G. Pearce, New York; J. G. Platt, Boston; F. A. Poor, Chicago; William E. Sharp, Chicago; S. L. Smith, Cleveland; Alexander Turner, New York; E. H. Walker, New York; H. H. Westinghouse, New York; W. E. Clow, Chicago.

Secretary, Frank W. Noxon, Liberty building, Philadelphia, Pa.

To avoid too great a difference in the resident contingents and to promote attendance at the New York and Chicago meetings, the number of eastern members has been increased so as to make New York and Chicago equal as regards representation.

L. F. Loree Answers Lauck's Charges

At the annual meeting of the stockholders of the Delaware & Hudson, L. F. Loree, president of the company, answered charges made by W. Jett Lauck, economist for the unions affiliated with the American Federation of Labor, as follows: Mr. W. Jett Lauck, consulting economist, charged before the United States Railroad Labor Board in his attack on the honesty of railroad finances, that the Delaware & Hudson company has since 1911 issued securities in the par amount of \$34,951,000; that these securities were sold for \$33,889,609. These amounts are correct except that he understates the amount received by \$30,116. They cover four transactions for the raising of new funds to be used for Additions and Betterments, and for refunding maturing securities. But Mr. Lauck then goes on to charge that the difference is in fact water and that the public is wrongfully required to pay a return thereon. As a matter of fact, all four issues were submitted to the Public Service Commission, and, after examination, were approved by them and sold at prices approved by them. The discount, which was really \$1,031,275, was charged against the profit and loss account, as required by the Public Service Commission and by the Interstate Commerce Commission and was not added to the cost of your property devoted to public use.

"Such statements are characteristic of Mr. Lauck. He has that type of mind where, being disappointed in the results of a mathematical calculation, he calmly turns the 6's upside down, uses them as 9's and maintains the new result is the correct one, since he has, he insists, used the same figures. We came to know Mr. Lauck last spring when he testified before the Anthracite Wage Arbitration Board and where he was thoroughly discredited. Such a man, of course, cannot long continue to deceive the country, nor by his false statements do your company any lasting harm. No organization in these times would appear to be complete without a research bureau, and a 'consulting economist,' and the results are sometimes weird. Shareholders should not be disturbed by their outgivings."

Traffic News

The Senate committee on interoceanic canals on May 9 began a hearing on bills which propose to exempt American coastwise vessels from the payment of tolls for the use of the Panama Canal.

The Chicago & North Western and the Union Pacific will restore the Denver Special, the overnight train between Chicago and Denver, on May 29. This train will leave Chicago at 6:05 p. m. daily, arriving in Denver at 8:59 p. m. the next day.

The Railroad Administration has issued a circular advising the carriers that were under federal control that claims by shippers for overcharges not filed with the Interstate Commerce Commission by March 1 may be filed direct with the appropriate carrier up to September 1. The previous order that all claims be filed by March 1 aroused a storm of protest among shippers.

According to a statement sent to the press on May 10 by the "Producers and Shippers of Perishable and High Tonnage Commodities on Pacific Coast," eastern agents of the California fruit growers in New York, Pittsburgh, Baltimore and Chicago have wired the home offices they will be unable to handle the California products this year because of "the exorbitant prices caused by high freight rates" from the coast and because the competition of Eastern fruit and vegetables "makes it impossible to market the California products."

An indication that business conditions throughout the country are getting better is found in the fact that the volume of distribution by jobbers and retailers showed a distinct gain in March over February, says Archer Wall Douglas, chairman of the committee on statistics and standards of the Chamber of Commerce of the United States. The whole tone of Mr. Douglas' report is optimistic. He points out many signs as indicative of an improvement in the situation, and as tending to foreshadow a return to more settled and stable conditions. However, he says: "Excessively high railroad rates are one of the serious handicaps of the situation, while they likewise fail in their original purpose of providing adequate revenue for the roads. They are prohibitory in their effects. In some cases, especially those of early fruits and vegetables from the far south to northern and western markets, the cost of transportation is from four to five times the price received by the producer."

Coal Production

The production of soft coal continued to recover during the week ended April 30, though at a diminishing rate, according to the weekly bulletin of the Geological Survey. The total output was estimated at 6,921,000 net tons, an increase as compared with the week preceding of 101,000 tons, or 1½ per cent. In spite of the recovery, the rate of output is at the lowest level touched at any time since April, 1914, except for the period of the great strike of 1919. Moreover, as consumption and exports combined are undoubtedly in excess of 6,900,000 tons a week, the draft upon consumers' stocks of coal, which amounted to perhaps 8,000,000 tons during the first quarter of the year, still continued.

Advance figures on stocks of railroad fuel were published last week in the Geological Survey's preliminary report on consumers' stocks. Additional returns since received by courtesy of the American Railway Association confirm the preliminary results and a report for 319 railroads shows that from January 1 to April 1, these roads reduced their stocks by nearly 92,000 tons, barely 1 per cent, and the stock remaining on April 1 was sufficient for three weeks and three days' operation at the rate of consumption prevailing in the first quarter of the year. The bulletin says it, therefore, appears that while railroad fuel coal purchases have seemed to the coal operator disappointingly small, the actual acceptances by the carriers have been sufficient to meet their current requirements, in view of their present reduced rate of consumption.

Commission and Court News

Interstate Commerce Commission

The commission has suspended from June 1 until August 18, the operation of certain schedules which provide increased Class B rates from Ohio river crossings to certain South-eastern points.

The commission has further suspended until June 17 the operation of a supplement issued by the American Railway Express Company which provides increased minimum weights on kale, lettuce and spinach.

The commission has suspended from May 11 to September 8, the operation of certain schedules which provide for changes in the carload rates on pig iron from certain points in Alabama, Georgia, Tennessee and Virginia to various points in Louisiana, Oklahoma and Texas.

The commission has further suspended until June 22 the operation of certain schedules which provide for the cancellation of the existing proportional commodity rates on iron poles, pipe and pipe connections between Mississippi river crossings and points in Iowa.

The Interstate Commerce Commission has issued a decision applying its findings in the Montana intrastate rate case, in which it ordered the rates raised by the percentages applied to interstate rates to the charges of the Butte, Anaconda & Pacific, as to which a separate hearing was held.

The Interstate Commerce Commission has rendered its decision in the North Dakota intrastate fare case finding that the rates within the state maintained by state authority are unduly preferential against interstate commerce and ordering the discrimination removed by the application of the percentages of increase authorized by the commission in ex Parte 74.

The commission has suspended, from May 9 until September 6, proposed minimum shipment requirement of 6,120 quarts to apply on milk and cream in less carloads in special baggage cars (no icing), or in open iced milk or refrigerator cars from points on the Central Vermont. At present no minimum shipment requirement is published to apply on this kind of traffic either locally or jointly from points on the Central Vermont.

The commission has suspended from May 10 to September 7, the operation of certain schedules contained in tariffs of the Illinois Traction System which provide for cancellation of existing switching rate of 14 cents per net ton on brick, in carloads, from Danville to Bronson, Ill., when destined to points on and via the Chicago & Eastern Illinois, and establishment in lieu thereof of a proportional commodity rate of 56½ cents per net ton.

The commission has suspended from May 10, until September 7, the operation of certain schedules published in a supplement to St. Louis-San Francisco tariff, which provide for the cancellation of the existing through rate of 42 cents per 100 pounds on plaster from Southard, Okla., to Brooklyn and New York, N. Y. (Gulf Line Piers), applicable via Galveston, Texas, and the Morgan or Mallory Steamship Lines, leaving combination rate of 90½ cents per 100 pounds applicable instead.

The commission has further suspended until July 1, the operation of certain schedules published in a Baltimore & Ohio tariff, which provide a switching charge of 55 cents per 2,000 pounds for switching coal, coal boulets or briquettes and coke, carloads, from points of connection with the Chesapeake Western to private sidings on the Valley, also to connections with the Southern, the operation of which was suspended until June 1, by an order previously entered in the same proceeding.

The commission has suspended until September 3 the operation of all schedules published by the Southern which propose to restrict interchange with other lines at Atlanta, and providing that traffic will be interchanged with connecting lines only at certain points indicated. The proposed designated point of interchange between the Southern and the Louisville & Nashville is Decatur street, and industries more than three miles distant from this point would be assessed a switching charge of 1½ cents per 100 lb., whereas the present charge on coal, for instance, is \$2.50 per car.

State Commissions

The Railroad Commission of the State of California, on April 26, ordered the railroads in the Los Angeles, Cal., Plaza district, to construct a union passenger terminal in that city and to eliminate grade crossings at Macy, Aliso and Seventh streets. The case has been pending since 1917. The order requires the Southern Pacific, the Atchison, Topeka & Santa Fe, the Los Angeles & Salt Lake and the Pacific Electric systems to join in the station construction and also indicates what grade separation is to be made by each, excepting the Pacific Electric which will be treated in a subsequent order. The order also directs that the new terminal is to be built in a district bounded by Commercial, North Main and Redondo streets, Alhambra avenue and the Los Angeles river. The cost of construction is to be borne by the four roads, and no attempt is made at this time by the commission to divide this cost.

Personnel of Commissions

E. I. Lewis, who, with J. B. Campbell, on April 27 was appointed by President Harding to the Interstate Commerce Commission and was confirmed by the Senate on May 3, arrived in Washington the first of this week and immediately entered upon his new duties. He comes to the commission from the chairmanship of the Public Service Commission of Indiana. While the bulk of his work there was in the field of public utilities, including electric interurbans, he had attracted attention by carrying through the long-fought-out Indiana-Illinois freight rate controversy. His record was such that he had the support of Senators New and Watson, Postmaster-General Hays, Governor Warren T. McCray, former Governor James P. Goodrich and other leaders in the state. Mr. Lewis is 48 years old. His education, as far as schools were concerned, was limited to two six-months' terms in a one-room country school. At 11 years of age he became a printer's apprentice. He advanced to a journeyman printer and foreman of a daily newspaper, and was a member of the Typographical Union. At 22 he became a newspaper reporter and worked through the various steps of that profession up to that of correspondent. His particular bent seemed to be that of investigation and constructive suggestion. He was sent to New Zealand, Australia, South Africa, Japan, China, Manchuria, Siberia, Korea, Russia, India, and to Europe on several occasions on investigations. In this connection his attention was particularly centered on governmental machinery and policies and, necessarily, on the important part that railroads play in economic and political affairs of government.

Four years ago, when he was selected by Governor James P. Goodrich of Indiana primarily for the purpose of extricating both the Indiana commission and the public utilities and common carriers from politics, he found a docket with 634 open or undecided cases—practically a year's work. This was soon reduced to a point where the commission was abreast with current affairs, and when last week he turned the executive office of the commission over to John W. McCordle, his successor as chairman, there were but 58 live unheard cases pending, or less than the normal current monthly finding. Mr. Lewis, when on the Indiana commission, is understood to have held that the creation of commissions was the result, very largely, of delays occasioned by handling matters through formal tribunals, and that the whole salvation of at least utility regulation lies in dealing with the present and the future rather than with the past.

Foreign Railway News

Italian Assistance for Roumanian Railways

LONDON.

It is reported that a representative of the Italian Railway Administration recently arrived at Bucharest for the purpose of studying the question of reorganizing the Roumanian railways and the participation of Italian capital and the employment of Italian workmen in such enterprise. A conference between the representative and the Roumanian Ministry of Communications has taken place regarding the possibility of an agreement being made in this connection.

Disabled Italian Soldiers Occupy Railway Premises

LONDON.

The soldiers disabled in the war have occupied the premises of the Italian Railway Administration requesting that they should be put in the places of women engaged during the war as stenographers, and so forth. They were removed from the premises by the police, but about 5,000 with but one leg or one eye, attacked the police patrol on duty at the gate of the premises and occupied the offices again. The general manager of the Railway Administration has agreed to replace 5,000 girls engaged during the war with 5,000 disabled soldiers.

European Bids on Track Materials for Chile

Bids on steel rails, rail joints, spikes, bolts, switches and crossings of a total value of about \$1,800,000 which were received and opened at Santiago, Chile, on March 17, by the state railways included bids from German, French and Belgian manufacturers, in addition to American, according to advices from Commercial Attaché McQueen. The bids received from the Germans were considerably lower than the others but their failure to comply strictly with the specifications, including terms of payment, may prevent their receiving the award, and it is considered probable that all bids may be rejected pending possible reduction in prices.

Financial Position of the English Railways

The railways of Great Britain are still under government control and are operating under guaranties. Consequently, it is not difficult to understand that the annual reports for 1920, most of which have been made public, show little change in net earnings over 1919. The annual report of one of the companies, the London & North Western, shows this relative uniformity. Some of the principal figures of this report follow:

	1920	1919
Receipts in respect of railway working under Government control.....	\$195,905,871	\$152,484,877
Expenditures.....	165,630,982	122,868,158
Net receipts.....	30,274,889	29,616,719
Other net receipts—miscellaneous, rents, etc.....	3,080,744	3,468,644
Total net income.....	33,355,633	33,085,363
Brought forward from previous year.....	1,316,039	1,284,712
Total.....	\$34,671,672	\$34,370,075
Less—Interest, rentals and other fixed charges.....	8,194,388	7,957,633
Balance after payment of fixed charges.....	\$26,477,284	\$26,412,442

Note: Pounds to dollars at par.

The report does not separate operating income from returns received under government contracts and consequently no measure of its actual earning power is given. The company was enabled to pay 7½ per cent on its ordinary stock in 1920. In spite of this comparatively high dividend rate, the company's stock has been selling in the market at around 70. This low figure may be taken as the market's discount on what it thinks the position of the company will be when government control ceases next fall. During the period of government control the expenses of the carriers have increased tremendously. The chairman of the company, in addressing the annual stockholders' meeting said, in part:

"Our wages bill in 1913 was \$29,160,000 and in 1920 it had reached the enormous figure of \$97,200,000. The various grades (of employees) have been standardized; that is to say, all men doing the same kind of work receive practically the same rates of pay, whether they are employed at the busiest center or at the smallest and most remote stations. . . ."

Relative to the government's proposal to group all the railways into a few large systems, the chairman said, in part:

"There can be no question that, with the present high wages and reduced hours, no possible economies can be effected by any system of grouping the railways or by any other means that we can see will without a further considerable increase in rates and fares, restore the pre-war net revenue earning capacity of the railways, and it must be remembered that increases of rates and fares cannot be carried too far without defeating their object by destroying the traffic. . . ."

March Car Exports

Ten passenger cars, valued at \$237,730, were exported in March, twice as many as in February. The February totals showed a sharp decline over January in freight car exports and the March totals evidence an even sharper slump in this business. The March shipments totaled 707, valued at \$1,327,959, or a little more than half the February exports. The detailed figures by countries, as compiled by the Bureau of Foreign and Domestic Commerce, follow:

Countries	Passenger		Freight and other		Parts of cars Dollars
	Number	Dollars	Number	Dollars	
France.....	13,011
Malta, Gozo & Cyprus Is.....	175
Norway.....	5,143
Russia in Europe.....	10	237,740	.....	.....	98,296
England.....	20,280
Canada.....	19	28,310	39,632
Costa Rica.....	1,436
Guatemala.....	5,143
Honduras.....	98,296
Panama.....	2,902
Salvador.....	32,790
Mexico.....	45	129,012	31,719
Newfoundland and Labrador.....	1,622
Jamaica.....	4,013
Trinidad and Tobago.....	2,199
Cuba.....	306	565,850	173,091
Dominican Republic.....	56	55,620	41,132
Argentina.....	332,947
Brazil.....	39	214,958	63,086
Chile.....	56,443
Colombia.....	12	19,979	384
Ecuador.....	2,007
British Guiana.....
Peru.....	3	9,324	52,848
Uruguay.....	28,098
Venezuela.....	10	5,683	.....
China.....	89,826
British India.....	19,141
Hongkong.....	3,900
Japan.....	102,300
Australia.....	32,800
Philippine Islands.....	200	42,750	52,055
British West Africa.....
British South Africa.....	23,477
Portuguese Africa.....	17	59,961	.....
Egypt.....	1,202
Total.....	10	237,740	707	1,327,959	1,327,959

Foreign Capital Influences Chinese Railway Purchases

The invitation by Chinese bankers on behalf of the Ministry of Communications for bids on rolling stock to be supplied to the government railways (*Railway Age*, April 22, page 1005) is said by Trade Commissioner Frank Rhea, Peking, to constitute for all practical purposes an invitation for bids by the Ministry itself. Inasmuch, therefore, as certain of the government railways have been financed to a considerable extent by foreign concerns under contracts restricting the powers of the Ministry in many ways, some of these foreign interests are maintaining that on certain railways the equipment to be purchased must, under terms of their agreements, be purchased from manufacturers of their own respective countries. For instance, a British company, which has assisted in financing the Tientsin-Pukow, the Shanghai-Nanking and the Shanghai-Hangchow-Ningpo lines, is claiming that its contract provides that it shall have the option for the purchase of equipment and supplies for these lines and, furthermore, that under the agreement British concerns must be given preference in placing orders for materials.

Train Reductions in England

LONDON.

On account of the continuation of the coal strike and the severe shortage of coal, the English railways have put into effect a reduced schedule which amounts to about 50 per cent reduction in train mileage. The greatest reduction is made in the long distance runs where the train mileage is the greatest. In addition the number of cars per train has been decreased. Some sleeping cars and luncheon cars have been removed from service and a very determined effort is being made to reduce fuel consumption.

At the present time negotiations between the miners and the mine owners are not in progress. The miners persist in their demands for the national wage board and the national pool for wages, the latter being a demand which neither the mine owners nor the government will consider. Industry throughout Great Britain has been seriously penalized through the lack of coal and unemployment is constantly increasing. The railway union which threatened to refuse to handle the coal has agreed to handle coal only for delivery to public utilities and for household consumption.

Stagnation of Transportation in Austria

Although the railway situation in Austria is very serious and many years may be required to restore conditions to normal, every effort is being put to improve conditions, according to Colonel W. B. Causey, American Technical Adviser to Austria, and measurable progress is being made. One of the greatest needs of Austria and of all central Europe at the present, says Colonel Causey, is locomotives. The Austrian locomotive shops are filled with bad order engines and they have orders from neighboring states far in advance of their capacity. These shops are laboring under a great handicap in the lack of raw material and coal and to add to their labor difficulties their employees are greatly undernourished. The accompanying photograph



An Austrian Munitions Factory Converted to a Locomotive Shop

shows the progress being made by one concern. During the war this plant manufactured munitions but after the armistice it was converted to a locomotive shop. The capacity of this plant is 50 locomotives but it is being extended to take care of 80 locomotives at one time. At present every available stall in the shop is filled and 2,000 men are employed.

Austrian iron mines, blast furnaces and rolling mills have been idle for practically two years because of the inability to secure coke and coal. All the coke producing territory as well as the other coal mines are either in Czechoslovakia, one of the new states carved out of the old empire, or in Upper Silesia (Germany). Present Austria produces only lignite and that of a poor calorific value, and only about 15 per cent of the fuel needs of the country.

The settlement of the Austrian question is in the hands of the Reparations Commission in Paris which has been working for many months over the allocation of coal and coke; credits to pay for food, coal and other raw materials; and the rehabilitation of the financial system—so far without visible results.

Equipment and Supplies

Locomotives

THE SANTO RAILWAY, Shantung province, China, has ordered 6 Consolidation type locomotives, from the Baldwin Locomotive Works.

THE INTERNATIONAL & GREAT NORTHERN reported in the *Railway Age* of January 7, as inquiring for four Mikado and four switching locomotives, has ordered eight locomotives from the Baldwin Locomotive Works.

THE SHANTUNG RAILWAY has ordered 3 Pacific type locomotives from the American Locomotive Company. These locomotives will have 20 by 26 in. cylinders and a total weight in working order of 175,000 lbs. They will be equipped with superheaters.

Freight Cars

THE CHICAGO GREAT WESTERN is inquiring for prices on the repair of 400 box cars.

THE TIENTSIN-PUKOW (China) is asking for prices through New York export houses, on 100 all-steel box cars of 40-tons capacity.

THE WOO HANG (China) is asking for prices through New York export houses, on 40 composite gondola cars, of 40-tons capacity.

THE PEKIN KALGAN (China) is asking for prices through New York export houses on 450 gondola cars and 500 box cars of 40-tons capacity, 30 box cars of 30-tons capacity and 20 cattle cars.

THE PEKING-SUIYUAN (China) is asking for prices through New York export houses, on 450 all steel box cars and 100 all steel gondola cars, of 40-tons capacity.

Iron and Steel

THE DOMINION GOVERNMENT has ordered from the Algoma Steel Corporation, 50,000 tons of rails for the Canadian National Railways.

THE ST. LOUIS SOUTHWESTERN has ordered 270 tons of steel from the Virginia Bridge & Iron Company, for a bridge over the Trinity river in Texas.

THE BALTIMORE & OHIO has ordered from the Bethlehem Steel Bridge Corporation, 850 tons of fabricated steel, for a bridge at Foxburg, Pa.

THE MAINE CENTRAL reported in the *Railway Age* of April 1, as inquiring for 400 tons of fabricated steel, for a bridge at Norridgewock, Maine, has ordered this steel from the Bethlehem Steel Bridge Corporation.

Machinery and Tools

THE NEW YORK CENTRAL is inquiring for one 48-in., 500-ton, double-end wheel press.

Miscellaneous

THE MISSOURI PACIFIC is inquiring for 500,000 high carbon steel tie plates.

THE AMERICAN ASSOCIATION of Dining Car Superintendents will hold a special meeting at Chicago in connection with the National Hotel and Restaurant Week, commencing July 12.

Supply Trade News

R. S. Cowan has succeeded A. W. Hillis as railroad representative of the Western Electric Company at Detroit, Mich.

The Nathan Manufacturing Company has removed its general offices from 512 Fifth avenue to 21 East Fortieth street, New York City.

Raymond R. Bilter, formerly secretary of the Trumbull Waste Manufacturing Company, Philadelphia, Pa., is now associated with the Railway Supply & Manufacturing Company, Cincinnati, Ohio.

Arthur G. Johnson, for fourteen years with the Vapor Car Heating Company, Inc., Chicago, and recently with the International Steel Corporation, New York, is now representing the Armspear Manufacturing Company, 447 West Fifty-third street, New York City.

The report that the Ryan Car Company was to move its Chicago offices from the McCormick building, 332 South Michigan avenue, published in this column in the issue of May 6, was incorrect. The company's offices are as formerly in the McCormick building.

D. B. Steinman, formerly special assistant to Gustav Lindenthal, consulting engineer and later professor in charge of civil and mechanical engineering, at the College of the City of New York, has opened an office as consulting engineer at 25 Church street, New York.

Richard Gregory, controller of the Western Electric Company, New York, has been made also a member of its board of directors and S. Wallace Murkland, assistant controller since 1918, has been appointed general contract sales manager; both with headquarters at New York.

Frederick Hayes Wilkins, European general manager of the International Western Electric Company, New York, has been elected a vice-president with headquarters at London, England. This company is the exporting subsidiary of the Western Electric Company, New York.

Sidney G. Johnson, who recently opened an office at 30 Church street, New York City, has been appointed sales representative of the Signal Accessories Corporation, Utica, N. Y. He also represents the Hazard Manufacturing Company, Wilkes-Barre, Pa., as noted in the *Railway Age* of April 29.

The Electric Service Supplies Company, Philadelphia, Pa., will act as exclusive selling agent for the Peerless Equipment Company, Hanover, Pa., manufacturers of Peerless armature repair machinery, and Segur coil winding tools. Heretofore Peerless armature tools were manufactured by the Manley Manufacturing Company, York, Pa., and Segur coil winding tools by the Electrical Manufacturers Equipment Company, Chicago.

E. C. Sattley, associated for 20 years with the Page Steel & Wire Company at Pittsburgh and Monessen, serving a large part of the time as general manager, has joined R. J. Jones, formerly manager, and Oliver G. Boyd, formerly secretary, of the Tube & Pipe Supply Company, in forming a new corporation under the name of the Iron & Steel Products Company, with offices at 230 Fifth avenue, Pittsburgh, Pa. The new organization will continue the business heretofore conducted by the Tube & Pipe Supply Company. E. C. Sattley is president, R. J. Jones, vice-president, and Oliver G. Boyd, secretary and treasurer of the new company.

Wilber Eckels has been appointed western sales manager, with headquarters in the People's Gas building, Chicago, for the Standard Coupler Company, New York. Mr. Eckels graduated from Pennsylvania State College with the degree of mechanical engineer and has been with the Standard Coupler

Company since 1912, with the exception of one year when he served as lieutenant in the 35th Engineers, A. E. F., in France and England. E. G. Goodwin has been appointed chief engineer of the same company with headquarters at New York, vice R. D. Gallagher, Jr., resigned. Mr. Goodwin received his technical education in the Virginia Polytechnic Institute and has been connected with the Norfolk & Western in its engineering department for eleven years.

Homer J. Forsythe, manager of the construction division of the engineering department of E. I. Du Pont de Nemours & Co., Inc., Wilmington, Del., has been transferred to the position of assistant general manager of the Hyatt Roller Bearing Company, Newark, N. J., a subsidiary of the General Motors Corporation. Mr. Forsythe has a wide experience in machine shop work, having been with the engineering department of the Du Pont Company since August, 1906, when he began work at the Wilmington office as estimator. Later he held executive positions at the Brandywine shops, Wilmington, and during the war he was made manager of the combined Wilmington shops which were engaged in the construction of material for the war plants. Since the war, Mr. Forsythe served as manager of the construction division of the engineering department.

South African Railway Electrification

LONDON.

The Office of the High Commissioner for the Union of South Africa, Trafalgar Square, London, W. C. 2, England, has announced that the time limit for which all tenders regarding the electrification of the Capetown-Simonstown and Durban-Maritzburg Lines, has been extended to noon, July 5, 1921.

Obituary

Charles Hosmer Morse, chairman of the board of directors of Fairbanks, Morse & Company, Chicago, died on May 5, at his home in Winter Park, Fla. He was born in St. Johnsbury, Vt., on September

23, 1833, and received his education at St. Johnsbury Academy. Mr. Morse began his business career in 1850, as a clerk in the office of E. & T. Fairbanks & Co., scale manufacturers. In 1862, he became a member of the firm of Fairbanks, Greenleaf & Co., Chicago, successors to E. & T. Fairbanks & Co., and on January 1, 1872, when the firm of Fairbanks, Morse & Co. was established, he became president of that company. He retired as president on May 19, 1915, to become chair-



C. H. Morse

man of the board of directors of the same company, at which time he was succeeded as president by his son, C. H. Morse, Jr.

Trade Publications

ADVANTAGES OF SUPERHEATED STEAM.—What Every Executive Should Know About Superheated Steam is the subject of Bulletin No. T-7 recently issued by the Superheater Company, New York. The bulletin discusses superheaters for stationary power plants and is designed to appeal to the executives and, therefore, has been made non-technical. After a brief explanation of superheated steam and the methods of producing it, the economies effected by its use are discussed, the concluding section dealing with the application of superheat to existing power plants.

Railway Construction

CHESAPEAKE & OHIO.—This company has entered into an agreement with the county authorities of Logan county, W. Va., for the construction of a bridge across the Guyandot river. The county authorities of Logan county are to construct the substructure and the company is to build the superstructure and the approaches.

CHICAGO & NORTH WESTERN.—This company has awarded a contract to Witherspoon and Englar, Chicago, for rebuilding the company's grain elevator on the Calumet river, Chicago, which was destroyed recently by an explosion.

CHICAGO UNION STATION.—This company is accepting bids for the construction of a viaduct on Van Buren street, between Canal street and the Chicago river, Chicago.

ILLINOIS CENTRAL.—This company will shortly accept bids for the construction of a new turntable at Dubuque, Iowa, and the extension of roundhouse facilities at Dubuque and at Paducah, Ky.

ILLINOIS CENTRAL.—This company is accepting bids for the construction of the substructure for its bridge over the tracks of the Chicago, Milwaukee & St. Paul at Genoa, Illinois, to cost approximately \$30,000.

LOUISVILLE & NASHVILLE.—This company has awarded contracts to the Roberts & Schaefer Company, Chicago, for the installation of two electrically operated cinder plant equipments at Hazard and Loyall, Ky.

NEW YORK, NEW HAVEN & HARTFORD.—This company has awarded a contract to D. O'Connell's Sons, Holyoke, Mass., for regrading a portion of its freight yards and removing and relaying several tracks and cranes at Springfield, Mass., and other work incidental with the construction of the Springfield-West Springfield bridge, now being built under the jurisdiction of Hampden county, Mass.

SOUTHERN PACIFIC, TEXAS LINES.—This company has awarded contracts to the W. C. Hedrick Company, Dallas, Tex., for the construction of a three-story storehouse with dimensions of 60 ft. by 208 ft., of reinforced concrete, hollow tile and brick construction, to cost approximately \$100,000, and a coach paint shop of steel construction with dimensions of 173 ft. by 274 ft., to cost approximately \$120,000.

TEXAS & PACIFIC.—This company has acquired real estate west of the city of Fort Worth, Tex., which will be the site of future yard and terminal improvements.

TEXAS & PACIFIC.—This company contemplates undertaking the construction of a new passenger station at Cottonport, Louisiana.

TEXAS & PACIFIC.—This company, which was noted in the *Railway Age* of April 15 (page 958), as accepting bids for the construction of a bridge over Bayou-Plaquemine, La., has awarded a contract for the structural steel and machinery for this work, to the Phoenix Bridge Company.

UNION PACIFIC.—This company is accepting bids for the work of lining its Sherman tunnel, near Hermosa, Wyo., with concrete.

UNION PACIFIC.—This company has awarded a contract to the Utah Construction Company, Ogden, Utah, for the grading and the construction of bridges along a forty-two mile line from Haig, Neb., west into Wyoming.

VALDE & NORTHERN.—The Interstate Commerce Commission after having denied the application of this company for a certificate authorizing construction work by this company has held a re-hearing and issued a report finding that construction work was begun in good faith prior to the effective date of the law requiring certificates by the commission and that, therefore, no certificate of public convenience and necessity is, under the circumstances, required.

Railway Financial News

CANADIAN PACIFIC.—Annual Meeting.—Stockholders at the annual meeting in Montreal, May 4, passed a resolution approving the issuance of bonds, debentures or other securities collateral to consolidated debenture stock which the company is or may hereafter be empowered to issue. Retiring directors were re-elected. President E. W. Beatty, in a statement to the meeting referred to recent financing of the company as follows:

Your directors have recently accepted a proposal for the acquisition by London, England, interests of a substantial amount of four per cent consolidated debenture stock which was very favorable. This is the first application for the acquisition of debenture stock from England since the outbreak of hostilities in 1914, and, in the opinion of your directors, is an incident of the utmost significance as indicating the resumption of interest in your principal capital security in Great Britain. It may conceivably be the first step towards the re-establishment of a market in England for the banking securities of the company which cannot but have an important influence on its future financing.

CHICAGO, BURLINGTON & QUINCY.—New Directors.—Arthur C. James, of New York, and Charles Donnelly, president of the Northern Pacific, have been elected directors to succeed J. E. Reynolds and C. W. Bunn, respectively.

CHICAGO, ROCK ISLAND & PACIFIC.—Asks Authority for Equipment Warrants.—This company has applied to the Interstate Commerce Commission for authority to issue six lease warrants for \$158,885.54 each, with interest at 7 per cent, payable to the Pullman Company as part payment under the lease plan for 30 steel coaches and five steel chair cars costing \$1,128,840.

LEHIGH & NEW ENGLAND.—Annual Report.—The income statement for the year ended December 31, 1920, as compared with the year 1919 is as follows:

	1920	1919
Compensation, January and February.....	\$187,484	.....
Compensation for guaranty period.....	567,463	.....
Compensation for year.....	.....	\$1,135,761
Operating results September 1 to December 31, 1920:		
Total railway operating revenues.....	\$1,897,103	.....
Total railway operating expenses.....	1,401,595	.....
Net from railway operations.....	\$495,508	.....
Railway tax accruals.....	102,937	.....
Railway operating income.....	\$392,571	.....
Net hire of equipment—credit balance.....	108,888	.....
Net joint facility rents—debit balance.....	18,255	.....
Net railway operating income.....	\$483,204	.....
Gross income.....	\$1,255,424	\$1,163,334
Total deductions from gross income.....	408,673	498,813
Net income.....	\$846,750	\$664,521
Balance transferred to profit and loss.....	843,698	661,511

The operating revenues and expenses in detail and the principal traffic statistics for 1920 compare with 1919 as follows:

	Operating Revenues	
	1920	1919
Anthracite coal freight.....	\$2,659,033	\$2,078,961
Bituminous coal freight.....	479,701	432,909
Merchandise freight.....	1,478,193	1,249,934
Passenger.....	23,572	20,649
Total operating revenues (inc. other)....	\$4,820,406	\$3,981,318
	Operating Expenses	
	1920	1919
Maintenance of way and structures.....	\$789,497	\$573,850
Maintenance of equipment.....	1,048,207	863,067
Traffic.....	70,381	81,772
Transportation.....	1,836,042	1,372,666
General.....	179,466	116,353
Total operating expenses.....	\$3,921,144	\$2,956,117
Net revenue from railway operations.....	\$899,262	\$1,025,201
Tax accruals.....	\$227,775	\$179,671
Total railway operating income.....	\$671,487	\$845,531
Net railway operating income.....	\$903,699	\$833,975
Freight Traffic		
Total revenue tonnage.....	6,881,496	6,749,758
Average ton-miles—revenue freight per train mile.....	560.12	581.25
Average revenue per ton-mile of freight (cents).....	1.80	1.49

LITTLE ROCK & ARGENTA.—Purchase by Missouri Pacific.—See Missouri Pacific.

LEHIGH VALLEY.—Annual Report.—A review of this company's annual report for 1920 appears on another page of this issue.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—*Authorized to Acquire Road.*—This company has been authorized by the Interstate Commerce Commission to acquire the property of the Wisconsin & Northern by purchase and to issue its 5 per cent consolidated gold bonds to the amount of \$2,671,000 in part payment.

MISSOURI PACIFIC.—*Annual Report.*—The corporate income statement for the year ended December 31, 1920, compares with the previous year as follows:

	1920	1919	Increase or Decrease
Railway operating revenues.....	\$98,194,271	\$98,194,271	
Railway operating expenses.....	94,909,599	94,909,599	
Net revenue railway operations.....	\$3,284,672	\$3,284,672	
Railway taxes and uncollectible railway revenue.....	\$3,820,709	\$235,000	\$3,585,709
Total operating income.....	Def. \$536,036	Def. \$235,000	-\$301,036
Non-operating income.....	1,935,132	1,549,050	386,081
Compensation accrued under federal control (on basis of standard return).....	1,872,101	14,206,814	-12,334,713
Government guaranty under Transportation Act of 1920.....	15,638,829	.....	15,638,829
Gross income.....	\$18,910,026	\$15,520,864	\$3,389,161
Deductions from gross income.....	15,876,950	11,280,025	4,596,925
Balance, net income transferred to profit and loss.....	\$3,033,075	\$4,240,839	-\$1,207,764

The annual report of the Missouri Pacific will be reviewed editorially in an early issue.

NEW YORK, CHICAGO & ST. LOUIS.—The corporate income account for the year ended December 31, 1920, is as follows:

	1920	1919	
Railway operating revenues.....	\$23,953,824	\$23,478,763	
Railway operating expenses.....	19,112,850	18,397,611	
Net revenue from railway operations.....	\$4,840,974	\$5,081,152	
Railway tax accruals.....	\$1,020,000	\$626,294	
Railway operating income.....	\$3,816,117	\$4,454,272	
Total non-operating income.....	\$691,357	\$260,484	
Gross income.....	\$4,507,474	\$4,713,756	
Total deductions from gross income.....	\$2,258,623	\$2,345,241	
Net income.....	\$2,248,851	.....

*Includes both corporate and federal items.

The annual report of the New York, Chicago & St. Louis will be reviewed editorially in an early issue.

NEW YORK, CHICAGO & ST. LOUIS.—*Authorized to Pledge Bonds.*—This company has been authorized by the Interstate Commerce Commission to pledge and repledge from time to time all or part of \$1,036,000 of second and improvement mortgage bonds now held in its treasury as collateral security for short term notes.

NORFOLK SOUTHERN.—*Annual report.*—The income statement for the year ended December 31, 1920, compares with 1919 as follows:

	1920	1919	
Operating revenues.....	\$6,610,402	\$6,117	
Operating expenses.....	6,959,365	\$61,177	
Net railway operating income.....	Def. \$348,963	Def. \$61,177	
Railway tax accruals.....	219,416	30,139	
Railway operating income.....	Def. \$569,079	Def. \$91,388	
Rents from lease of road (including standard return).....	\$211,145	\$1,366,751	
Miscellaneous income (including rental and operating deficit paid by government on account of operations during guaranty period).....	1,312,515	42,551	
Total non-operating income (including other).....	\$1,684,258	\$1,714,499	
Gross income.....	\$1,115,178	\$1,623,111	
Total deductions from gross income.....	\$1,168,739	\$1,310,125	
Net income.....	Def. \$53,561	\$312,986	

The annual report of the Norfolk Southern will be reviewed editorially in an early issue.

PERE MARQUETTE.—*Annual Report.*—The corporate income account for the year ended December 31, 1920, is as follows:

	1920	1919
Operating revenues.....	\$35,022,787	.....
Operating expenses.....	30,350,542	.....

Net operating revenue.....	\$4,672,245	.....
Non-operating income.....	1,761,120	.....
Gross income (includes standard return, full year, 1919, two months, 1920).....	\$6,433,365	\$3,744,772
Taxes.....	768,407	91,417
Hire of equipment—Debit.....	1,297,174	.....
Rentals.....	730,410	26,049
Total charges excluding interest.....	\$2,801,100	\$121,254
Balance before deduction of interest.....	3,632,265	3,623,478
Total interest accruals.....	\$2,238,292	\$1,726,547
Surplus.....	\$1,393,973	\$1,896,931

The annual report of the Pere Marquette will be reviewed editorially in an early issue.

PITTSBURGH & WEST VIRGINIA.—*Annual report.*—The income account for the year ended December 31, 1920, is as follows:

	1920	1919	
Railway operating revenues.....	\$2,254,048	.....
Railway operating expenses.....	2,273,966	.....
Net revenue from railway operations.....	Dr. \$19,918	.....
Railway tax accruals.....	169,322	.....
Total operating income.....	Dr. \$190,367	.....
Gross income.....	\$470,755	.....
Total deductions from gross income.....	\$37,076	\$67,581	
Net income.....	\$433,679	\$522,355	

Note—Due to uncertainty as to the amount finally to be allowed, no estimate has been set up in the year's income figures to represent the return or rental due from the United States Railroad Administration for federal operation during January and February, 1920, or from the Interstate Commerce Commission for the six months' guaranty period ended September 1, 1920.

SPRINGFIELD TERMINAL.—*Asks Authority to Issue Stock.*—This company has applied to the Interstate Commerce Commission for authority to increase its capital stock from \$75,000 to \$150,000.

WABASH.—*Annual Report.*—A review of this company's annual report for 1920 appears on another page of this issue.

WEST SIDE BELT.—*Annual report.*—The income account for the year ended December 31, 1920, is as follows:

	1920	1919	
Railway operating revenues.....	\$771,913	.....
Railway operating expenses.....	690,901	.....
Net revenue from railway operations.....	\$81,012	.....
Railway tax accruals.....	9,502	.....
Total operating income.....	\$71,345	.....
Gross income.....	\$445,467	.....
Total deductions from gross income.....	\$128,132	\$152,136	
Net income.....	\$317,335	Dr. \$137,807	

Note—Due to uncertainty as to the amount finally to be allowed, no estimate has been set up in the year's income figures to represent the return or rental due from the United States Railroad Administration for federal operation during January and February, 1920, or from the Interstate Commerce Commission for the six months' guaranty period ended September 1, 1920.

WISCONSIN & NORTHERN.—*Purchase by M., St. P. & S. M.*—See Minneapolis, St. Paul & Sault Ste. Marie above.

Guaranty Certificates Issued

The Interstate Commerce Commission has issued certificates for partial payments to the railroads on account of their six months' guaranty, as follows:

American Railway Express Company.....	\$1,500,000
Buffalo, Rochester & Pittsburgh.....	97,500
Carolina & Northwestern.....	50,000
Chicago, Burlington & Quincy.....	650,000
Chicago, Terre Haute & Southeastern.....	23,000
Cleveland, Cincinnati, Chicago & St. Louis.....	470,000
Peering Southwestern.....	9,500
Kansas, Oklahoma & Gulf.....	90,000
Louisville, Henderson & St. Louis.....	175,000
Martin & Rye Valley.....	8,800
Meridian & Memphis.....	4,000
Mississippi Central.....	245,000
Montpelier & Wells River.....	64,500
New Orleans Great Northern.....	105,500
Paris & Mt. Pleasant.....	20,000
Savannah & Statesboro.....	1,000
St. Paul Bridge & Terminal.....	7,000
Texas & Pacific.....	125,000
Vermont Valley.....	45,000
Virginia Southern.....	2,000

Dividends Declared

BESSEMER & LAKE ERIE.—Preferred, 3 per cent, semi-annually, payable June 1 to holders of record May 15.
 CANADIAN PACIFIC.—Common, 2½ per cent, quarterly, payable June 30 to holders of record June 1.
 PITTSBURGH, BESSEMER & LAKE ERIE.—Three per cent, semi-annually, payable June 1 to holders of record May 14.

ANNUAL REPORT

The Delaware and Hudson Company—Ninety-First Annual Report

New York, N. Y., April 1, 1921.

To the Stockholders of The Delaware and Hudson Company:

The following presents the income account of your company for the year 1920, arranged in accordance with the rules promulgated by the Interstate Commerce Commission, with comparative results for the year 1919:

	1920	1919	Increase or Decrease
Railway operating revenues.....	\$45,354,298.72	\$34,749,709.00	\$10,604,589.72
Railway operating expenses.....	42,126,330.91	31,886,711.03	10,239,619.16
Net railway operating revenues.....	\$3,227,968.53	\$2,862,997.97	364,970.56
Operating income credits:			
Rent from locomotives.....	\$100,727.06	\$108,424.04	—7,696.98
Rent from passenger train cars.....	79,106.12	16,364.66	62,741.46
Rent from work equipment.....	21,489.56	10,759.33	10,730.23
Joint facility rent income.....	136,502.10	132,130.79	4,371.31
Total credits.....	\$337,824.84	\$267,678.82	70,146.02
Gross railway operating income.....	\$3,565,793.37	\$3,130,676.79	435,116.58
Operating income debits:			
Railway tax accruals.....	\$1,186,053.92	\$1,075,802.70	110,251.22
Uncollectible railway revenue.....			
Hire of freight cars—debit balance.....	939.26	8,622.03	—7,722.77
Rent for locomotives.....	79,555.60	Cr. 18,160.12	97,715.72
Rent for passenger train cars.....	18,447.13	6,595.15	11,851.98
Rent for work equipment.....	32,593.63	15,513.01	17,080.62
Joint facility rents.....	1,578.44	994.97	583.47
	428,058.56	376,914.87	51,143.69
Total debits.....	\$1,747,226.54	\$1,466,322.61	280,903.93
U. S. Govt. compensation guarantee.....	\$5,621,163.60	\$5,445,404.46	175,859.14
Net railway operating income.....	\$7,439,730.43	\$7,109,758.64	329,971.79
Non-operating income:			
Income from lease of road.....	\$88,933.13	\$86,763.87	2,169.26
Miscellaneous rent income.....	\$85,197.78	\$88,799.68	26,398.10
Miscellaneous non-operating physical property.....	23,467.84	96,398.09	—72,930.25
Dividend income.....	1,038,041.03	934,267.98	103,773.05
Income from funded securities.....	214,969.20	234,251.46	—19,282.26
Income from unfunded securities and accounts.....	143,876.71	429,666.64	—285,189.93
Income from sinking and other reserve funds.....	81,374.32	107,245.01	—25,870.69
Miscellaneous income.....	1,315,427.01	1,474,068.27	—158,641.26
Total non-operating income.....	\$2,991,287.02	\$3,420,861.00	—429,573.98
Gross income.....	\$10,431,017.45	\$10,530,619.64	—99,602.19
Deductions from gross income:			
Rent for leased roads.....	\$1,944,157.01	\$1,964,123.97	—19,966.96
Miscellaneous rents.....	1,821.25	3,268.00	—1,446.75
Interest on funded debt.....	3,228,948.12	2,919,237.04	309,711.08
Interest on unfunded debt.....	303,585.05	412,906.70	—109,321.65
Miscellaneous income charges.....	19,343.15	626,079.45	—606,736.30
Total deductions.....	\$5,497,854.58	\$5,925,615.16	—427,760.58
Net income—The Delaware and Hudson Company carried to general profit and loss.....	\$4,933,162.87	\$4,605,004.48	328,158.39
Percentage to capital stock.....	11.61	10.83	.78

FINANCIAL.

The Delaware and Hudson Company, on December 31, 1920, was capitalized \$2,503,000, there having been no change during the year. The total funded debt on December 31, 1920, was \$68,056,000, a net increase of \$2,953,000. The three-years, five per cent, secured notes aggregating \$9,000,000, issued during 1917, as stated in the annual report for that year, matured on August 1, 1920, and were paid on that date. In order to provide for said three-years notes and for other corporate purposes, the company disposed of 10,000,000 of its ten-years, seven per cent, secured floating rate notes, due 1920, to mature on June 1, 1920, interest payable semi-annually, on June 1 and December 1. During the year, first-lien equipment bonds aggregating \$1,959,000 were purchased through the sinking fund established in connection with their issue. In payment for the 1,500 freight cars allocated to the first and refunding mortgage making the total, just prior to the end of Federal control, there were issued during the year, \$3,912,000 in the aggregate of equipment notes, bearing date as of January 15, 1920, carrying interest at the rate of six per cent per year, payable semi-annually, on June 1 and December 1. In addition, there was an equal amount which will mature on January 15 of each year, to and including the year 1935.

The sum of \$395,040, being one per cent of the par value of the first and refunding mortgage gold bonds outstanding on June 1, 1920, was paid during the year to the trustee under the first and refunding mortgage making the total paid to December 31, 1920, \$3,636,230. Of the amount paid during the year, \$337,690.83 was expended upon additions and betterments to the mortgaged property in accordance with the mortgage agreement.

There was accumulated in the Coal Department sinking fund during the year, in accordance with the ordinance passed on May 9, 1899, and amended

on May 10, 1920, \$353,777.34, which has been applied to reimburse the treasury for coal lands purchased and unmined coal in Pennsylvania.

The usual payment of \$650,000, required under the terms of the First Lien Equipment Trust indenture, was made, making the total paid to date, \$8,450,000. This has been increased by accumulations or interest on balances and investments.

During the year there was received from the United States, in partial payment of compensation for the taking over of the company's property in December, 1917, and its subsequent operation as an arm of the Government, business on February 29, 1920, by the United States, the sum of \$1,285,000, which, with the amounts paid on account of the years 1918 and 1919, aggregating \$14,099,100, makes a total of \$15,384,100. There was also received from the United States, on account of the guarantee of net earnings provided for by the Transportation Act of 1920, the guarantee period extending through August 31, 1920, the sum of \$2,195,000. The balance on both accounts with the United States, subject to adjustments which may be necessary on account of additions to the property during Federal control, and other matters not yet agreed upon, and the establishment of the maintenance charges during the guarantee period, will be provided for in the final settlement with the Government.

COAL DEPARTMENT.

The anthracite produced by your system corporations during the year 1920, including the product of washeries, aggregated 8,039,182 long tons, a decrease of 116,313 tons, or 1.41 per cent below 1919. The year's output was 11.38 per cent of the total output of Pennsylvania, of which Pennsylvania was 71,023,257 long tons, or 1.5 per cent more than in 1919. Production was reduced during the year by high water in some of the mines, resulting from seepage on account of the sudden melting of the heavy snowfall of the winter of 1919-1920, and of the refusal of the Secretary of Labor to grant the benefit of the so-called "vacations" which were taken on account of reluctance to accept the wages award made in August, 1920, by the Anthracite Coal Commission. This Commission, which consisted of one representative of the public, one representative of the employees and one representative of the operators, was appointed in March 31, 1920, and on June 3, 1920, after prolonged negotiations between the employees and the operators had failed to produce an agreement. These negotiations were referred to in the annual report for last year, in which it was stated that the agreement between the employees had expired on March 31, 1920, and that efforts to negotiate a new arrangement were in progress, under a stipulation that any change in wages should be retroactive to April 1 of that year. After these negotiations had proceeded between the parties directly in interest for about two months without an agreement being reached, the Secretary of Labor intervened and after conferences in Washington, at which the Department of Labor was represented, suggested a compromise which was accepted by the operators but rejected by the employees. The appointment of the Commission by the President followed this rejection. Hearings were held at Scranton on July 20, 1920, and an award was made on August 30, which became the agreement of September 2, retroactive to April 1, 1920. This agreement continues the award of the Anthracite Coal Strike Commission, made in 1903, including the provision that there shall be no discrimination against members of any organization or organization, or any interference by any employee or organization with those who are not members. It provides for increases in wages rates which are estimated by the Department of Labor of the United States to amount to 17.4 per cent of the rates previously in force, and 13.8 per cent of the rates in force prior to the European war. It also reduced the standard day to eight hours in the case of the few classes of employees who had continued to have a longer work day. For the first time since the advent of the United Mine Workers of America into the anthracite fields, an agreement has been made to which that organization, through its district organizations numbers 1, 7 and 9, appears as a party to a contract with the anthracite operators. Despite this concession, and the agreement prior to the submission to arbitration to accept the award of the Commission, both union officers and certain of the employees expressed considerable dissatisfaction with the result that demands for re-opening the arbitration were accompanied by refusals to work which were not at all disguised, although they were called "vacations." President Wilson refused to intervene further until work was fully resumed but upon such resumption he requested the negotiating committees to resume the purpose of adjusting inequalities the existence of which might mutually be agreed upon. The negotiating committees have resumed discussion of certain alleged inequalities. The questions which can properly arise before these committees do not include any relating to the standard rates established by the award, as of course it is recognized that an arbitration award thus made must be given effect in accordance with its terms and for the full period it was intended to cover.

During the latter part of 1920, work was commenced on a new breaker located in Scranton, to have a capacity of 9,000 tons per day, to be built of steel and to have a minimum amount of inflammable material, thus reducing the fire risk to the lowest practicable limit. This breaker, replacing the Marvine breaker, which was constructed of wood, has been completed and is now in operation.

RAILROAD DEPARTMENT.

The United States continued in possession, through the month of February, 1920, of your system and that of 13 other system corporations in the United States, together with your boat lines operating on Lake Champlain and Lake George, and these properties continued to be operated through the United States Railroad Administration until surrendered to your officers on March 1, 1920, the period during which the properties were returned out of your possession and control was from noon on December 28, 1917, to and including midnight of February 29, 1920. All operations during the months of January and February, 1920, like those of the previous months of Federal control, were on the account of the limited resources which were responsible for all expenses of operation, including maintenance and for all taxes except war taxes, and for compensation in the nature of rent for your temporary expropriation at the rate of \$7,042,144.21 per year, in accordance with the contract with the Director-General of Railroads, acting for the United States, in 1917. The President, when he returned to you control in 1919. In addition, you will be entitled to compensation in respect of certain additions to the properties provided for your account during the period of Federal control.

Notwithstanding the pledges contained in President Wilson's proclamation of December 27, 1917, and the Act of Congress of March 21, 1918, and the contractual obligation deliberately assumed on December 9, 1919, your properties were not adequately maintained while they were in the possession of the United States nor were they returned to you in control in condition as good or as fully equipped as that in which they were taken. The extent of this undermaintenance may be illustrated by the items representing renewals of rails and ties. The average number of new rails used for replacements, during the test period, was 8,223 gross tons, during Federal

control it was 7,607 gross tons; the yearly average of renewals of ties during the test period was 339,872, during Federal control it was 270,100. Moreover, the ties used for replacement during Federal control were inferior in quality.

Under date of May 29, 1919, Mr. Walker D. Ilnes, as Director General of the United States Railroad Administration, issued a general letter to all Regional Directors, dealing with maintenance expenses, which while treating the subject from the point of view of economy, appears to have been construed by the recipients as a demand for reductions in these expenses almost irrespective of the expedients necessary. By telegram dated two days earlier Mr. Ilnes had advised the Directors that "for the month of June, 1919, the maintenance of way ratio of each road ought not to exceed its average yearly ratio of the test period." The foregoing was followed by a circular of instructions to the same officers, issued by Mr. W. T. Tyler, Director of Operations, and dated June 2, 1919, in which the Regional Directors were advised in part as follows:

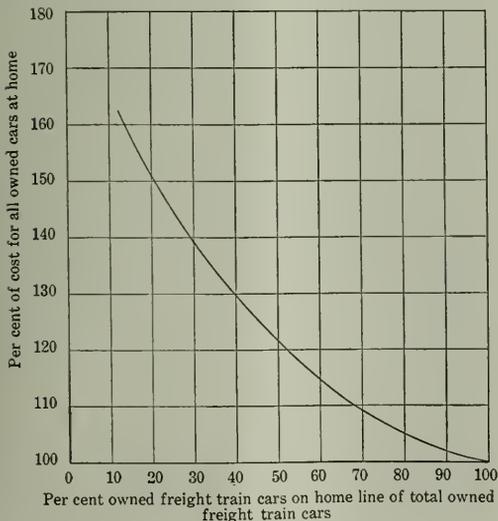
"There is no obligation on the Government to replace upon the properties the same quantities of material and labor placed upon them during the test period."

This circular of instructions repeated the order to make the ratio of the test period the maximum limit of June expenditures and its whole tenor was towards a sharp curtailment in actual maintenance. It included the following:

"There is grave danger that the 1918 and 1919 Maintenance of Way expenditures may substantially exceed the obligations unless immediate action is taken to control such expenditures. The Director General's telegram of May 27th, requiring adherence to the test period maintenance ratio, was intended to act as an immediate and effective curb for the month of June and until a broader policy could be formulated and promulgated for the remaining six months of the year. The tendency to overmaintain appears to be general. The obligation of the Federal Managers and General Managers to the Government is to see to it that if this tendency has play on their properties it must be corrected effectively and at once, so that the Government will not be called upon to pay for maintenance in excess of the obligations."

To fully appreciate the foregoing, it is necessary to note that June is a month in which weather conditions are generally favorable to maintenance work and in which the necessity for making up for the substantial cessation of such work during the months of severe weather ought to result in expenditures very much in excess of the yearly ratio. Moreover, by making the ratio of such expenses to operating revenues during the test period the limit, the Director General resorted to a standard established under radically different conditions. The freight and passenger rates of June, 1919, were not nearly as much above those of the test period as were wages and prices of the materials required for replacements. Hence the adoption of the ratios to revenues of the test period inevitably led to the application of substantially less labor and materials. Careful examination of subsequent instructions, to the end of Federal control, does not indicate the substitution of any more liberal policy. Under the control of such instructions it is apparent that adequate maintenance was impossible.

The dispersal and scattering of freight-car equipment throughout the United States, regardless of ownership and special adaptability to the requirements of the owning line, was a characteristic incident of Federal control. Like other ventures of the Railroad Administration, it diminished efficiency and increased expenses. A study based upon information covering the test period, received from eighty railroads owning eighty-two per cent of the freight train car equipment of the country, has determined the relation between the cost of repairs to freight cars and the per cent of owned cars on home line. This relation appears in the diagram below, which shows that as the proportion of owned cars away from home increases, the cost of repairs increases. This conclusion accords with experience, because it is known that the immediate application of general repairs, when needed, produces a lower total cost of maintenance over a period of time than the application of temporary repairs plus the cost of deferred general repairs.



Curve showing change in cost of freight train car repairs to change in percentage of owned cars on home line.

It was noted in the annual report for last year, that your Board of Managers had accepted the conditions prescribed by the Transportation Act of 1920 in order to become entitled to the guarantee by the United States for the period from March 1, to August 31, 1920, inclusive, of net earnings

equal to one-half of the annual "standard return" of the Federal control period computed in accordance with the Act of March 21, 1918. On February 3, 1921, claim was filed with the Interstate Commerce Commission in accordance with the order of October 18, 1920, for a balance due from the United States account of the guarantee amounting to \$3,266,465.67. The amount claimed represents the difference between the actual net income for the six months of the guarantee period, and one-half of the annual standard return, as finally established by the Interstate Commerce Commission, and finally together with the adjustments for maintenance which should be charged against this period, and increases in the rate of standard return by reason of additional facilities provided at your expense during Federal control. The amount of \$3,266,465.67 represents, in part, the net operating results of the guarantee period, and the time claim was made and will be subject to variation to the extent that actual results differ from these estimates.

During the period of Federal control, and the ensuing six months of the guarantee period, ending August 31, 1920, your account was not affected by the operating results obtained and these results were directly of importance only to the extent that they suggest the conditions under which the property was returned and operations for your account commenced. The following data relating to operating results combine the figures of the two months of Federal control, the six months of the guarantee period, and the four months of operation for your account which together constitute the calendar year 1920.

The railway operating revenues amounted, in 1920, to \$45,354,299, which was \$1,864,589, or 4.22 per cent more than in 1919, and \$19,880,083, or 78.04 per cent more than the average annual revenues for the period from July 1, 1914, to June 30, 1917, known as the "test period," which, by the Act of March 21, 1918, was made the basis of the "standard return" during Federal control. Operating expenses amounted to \$42,122,430, an increase of \$10,239,619, or 32.11 per cent over 1919, and \$24,557,635, or 139.78 per cent over the annual average of the test period. Operating income, before deduction of taxes, was therefore \$3,227,969, an increase of \$3,164,971, or 32.11 per cent more than in 1919, but \$4,677,550, or 59.17 per cent below the average of the test period. Freight receipts were \$9,680,200, or 32.83 per cent more than in 1919 and \$18,047,835, or 85.47 per cent more than the average of the test period. Freight movement during the year was equivalent to the movement of 4,265,734,874 tons one mile which is to be compared with 2,531,432,622 tons one mile in 1919, and 3,229,732,728 the annual average of the test period, the increase compared with 1919 being 20.79 per cent and as compared with the test period 32.08 per cent. Average receipts per ton mile amounted to 9.18 mills in 1920, 9.10 in 1919, and 9.12 in the test period, the average for 1920 being an increase of 9.94 per cent over 1919 and 40.37 per cent over the test period.

There were no extraordinary changes in the relative volume of the different classes of freight traffic as compared with 1919, the general increase for the year being attributable to the increase in the volume of traffic diverted to other routes under orders of the officers of the Railroad Administration, while the railways were under Federal control.

Passenger movement aggregated 130,971,551 passenger miles, which is to be compared with 132,884,477 in 1919 and an annual average of the test period of 130,984,189 passenger miles, a decrease from 1919 of 1.44 per cent. Mileage of passenger trains increased 4.98 per cent over 1919, but decreased 17.55 per cent as compared with the average of the test period. Passenger car increase was 7.78 per cent over 1919, but a decrease of 14.11 per cent below the average of the test period. Average receipts per passenger mile traveled were 2.88 cents in 1920, 2.45 cents in 1919, and 2.23 cents during the test period. Receipts per passenger train mile were \$1,5836 in 1920, \$1,4355 in 1919, and \$1,0106 during the test period, showing an increase over 1919 of 10.29 per cent and over the test period of 56.70 per cent. Per passenger car mile, the receipts of 1920 increased 7.41 per cent over 1919 and 50.48 per cent over the test period.

Mail revenue during 1920, amounted to \$367,350, an increase of \$27,699, or 163.05 per cent over 1919, and \$229,298, or 166.10 per cent over the average for the test period.

Miscellaneous revenue of 1920 showed a decrease of 43.75 per cent below 1919, principally on account of credits this account during 1919, the latter having been removed from statement during that year, a large tonnage of anthracite which had been stored during 1918.

Although the foregoing shows considerable increases in revenues, the operating income of the year, as already noted, shows but a slight increase over 1919, and as compared with the average of the test period, this decrease amounting to 59.17 per cent. This result was occasioned by the excessive increase in operating expenses resulting from advances in wages, the changes in the conditions of employment as compared with the pre-war period, and the continued high cost of materials and supplies. The Railroad Labor Board of the United States, created by the Transportation Act of 1920, granted increases by an order issued on July 20, 1920, and retroactive to May 1, of that year, which required an increase in your monthly payrolls of approximately twenty-one per cent, as compared with 1919, the maintenance of the existing rate of structure of 1920 increased \$937,405, or 22.43 per cent and the increase over the average of the test period was \$3,062,983, or 149.27 per cent. Expenses for maintenance of equipment increased \$2,756,918, or 27.62 per cent over 1919 and \$7,823,111, or 59.47 per cent over the average of the test period. Transportation expenses increased \$6,062,908, or 38.85 per cent over 1919, and \$12,445,128, or 134.91 per cent over the test period. Traffic expenses show an increase of \$149,418, or 63.04 per cent over 1919, principally on account of the railway industry's establishment of the development of business which were abolished during Federal control.

Increases in rates of wages and changes in the terms and conditions of employment made during Federal control and, subsequent to its termination, by the Railroad Labor Board, greatly increased the operating expenses which the railways have currently to meet. Rules which might not be seriously objectionable under special and local conditions may be wholly unworkable when given general application and it is now evident that rigid standardization of wages and working conditions has become an enormous burden upon the railway industry and the country. For the purpose of equal treatment of unequals. The wide area of the United States, their diverse resources, industries and economic standards and methods, have imposed varying conditions upon the performance of railway services with widely different demands upon the employees and an equally wide range in the reasonable requirements of labor itself. To ignore these differences in fixing the relations between employees and railway employers must be as unsatisfactory in its results as it would be to build all railways to the same standards of grades, curves, and capacity, regardless of the differences in traffic requirements and in local topography. Yet such disregard of essential differences is embodied in the so-called standardization of wages and terms of employment which is an evil legacy from the period of Federal control.

The Railroad Administration made no effort to adjust the charges for railway service to the heavily increased expenses which it assumed by successive concessions to importunities for higher wages and reductions in the labor exchanged for wages. Unwillingness to accept responsibility for

these increased expenses to the extent of putting in force rate-schedules adequate to meet them resulted in the operation of the railroads at a heavy loss to the United States and an accumulating deficit in the income account of the Railroad Administration which was forced upon the taxpayers. Whether those who pay taxes accept such burden with less profanity, with less effective protest, is a problem which the Railroad Administration, with less effective protest, is a problem which the Railroad Administration or some higher authority must be assumed to have resolved to its own satisfaction.

The Transportation Act of 1920, provided for the adjustments in rates on the part of the Railroad Administration had refused to make. Before this adjustment could be made, the Railroad Labor Board made the further increases previously referred to, with the result of augmenting the amount of additional revenue necessary to be produced. Application was promptly made to the Interstate Commerce Commission which determined that the rate schedule ought to produce a return of six per cent upon the aggregate value of railway property as determined for each of the four years in which the country was divided into four groups, the group in which your railway is located was designated the "Eastern Rate Group" and includes the whole region between the Canadian frontier, the Atlantic ocean, the Great Lakes and Mississippi river and (roughly) the Ohio and James rivers.

General authority for increases in freight and passenger rates was accorded, and the new rates to go into effect upon August 26, 1920. In estimating the changes necessary to produce the required revenue the Interstate Commerce Commission assumed (1) the continuance of substantially the same existing volume of traffic, (2) the continuance of substantially the same ratio as interstate rates. Neither assumption was justified by the facts. Traffic has diminished to an aggregate far below that considered in the estimates and the opposition to certain States to the adjustments indicated proved inconvenient and costly and has, in several instances, resulted in litigation carried to the Supreme Court of the United States.

Railways in the territory served by your lines were granted a twenty per cent increase in passenger fares. All interstate rates were once per cent increase in accordance with this authority. But in New York, once per cent increase in fares for travel within the State of New York was delayed by the opposition of the Public Service Commission for the Second District of New York. A supplementary application to the Interstate Commerce Commission resulted in a twenty per cent increase in fares for travel within the State of New York, but the adjustment was again delayed by an injunction obtained by the Public Service Commission. An order vacating this injunction was obtained on December 18, 1920, and, except as to the value of the same, has been changed by the Interstate Commerce Commission on December 20, 1920. The broad question of the authority of the Interstate Commerce Commission to authorize adjustments in rates for services rendered by interstate carriers but wholly within the limits of single States has been pending in the Supreme Court in several cases, the first of which your company is a party. In one of these suits the Public Service Commission of New York is the plaintiff and the Interstate Commerce Commission a defendant.

Coincident with the increases in passenger fares, a surcharge of fifty per cent of the charge for accommodations in parlor and sleeping cars, per cent of the proceeds of which accrue to the railway carriers, became generally effective.

The increase in mail revenue, above noted, resulted from an order of the Interstate Commerce Commission, issued pursuant to the Act of Congress of June 15, 1919, authorizing the Interstate Commerce Commission for transportation of mails for its determination. The new rates were retroactive to November 1, 1916, the payments in adjustment of compensation for services during Federal control accruing to the Railroad Administration.

The increase in freight rates necessary to produce the return approved by the Interstate Commerce Commission to the railroads in the Eastern Rate Group was computed at forty per cent, if applied uniformly to all freight movement and on the assumption of the continuance of the same volume of traffic. It is to be noted that in making the estimates, an increase of forty per cent was granted as to traffic originating and ending within the region, but as to traffic to or from other regions the permitted advance was only thirty-three and one-third per cent. In the case of express shipments, a minimum class scale or in the minimum charge for shipment were authorized.

The Interstate Commerce Commission also authorized increases in rates applicable to milk traffic, switching, storage and demurrage and new schedules affecting these services were put in force on August 26, 1920.

The results of the changes above summarized have been disappointing. Not only was there failure, on the part of the Commission, to authorize the full increases indicated as necessary by the estimates on which it relied, but experience has shown that however thoroughly those estimates were warranted when made, they were too hopeful as to the continuance of business activity and consequent heavy traffic. Moreover, the estimates assumed the continuance of the revenues then arising from express business and these revenues were almost immediately reduced in the sum of \$2,000,000 per year by the operation of the new rate schedules and by the contracts. The difference between the revenue of the carriers of this group from inter-territorial freight, advanced thirty-three and one-third per cent, and that which would have been realized at a forty per cent advance, is about \$20,000,000 per year. It is to be noted that the carriers in this group are now earning not less than \$175,000,000 per year less than six per cent upon the total of their investments in property devoted to public use. A substantial portion of this deficit will probably never be recovered and the carriers will not obtain the full benefit of reductions in the cost of fuel and other supplies.

INDUSTRIAL DEPARTMENT.

One hundred and fifteen new industries were located on the tracks of your company during 1920, as compared with one hundred and eleven in 1919. Sixty-three extensions to old industries and twenty industrial sidetracks were constructed; the corresponding numbers of 1919 were ten and seven. Representatives of the Industrial Department of the Interstate Commerce Commission have continued to co-operate with the various activities of the Farm Bureau Association and with the Department of Farms and Markets of the State of New York.

FEDERAL VALUATION.

The Director of Valuation of the Interstate Commerce Commission furnished your officers, during 1920, with preliminary statements showing proposed reports to the Commission concerning value of your lands in rights of way and elsewhere and also of your structures pertaining to your railway. This was in accordance with the practice of the Bureau of Valuation of affording opportunity to check for errors and omissions and to submit objections to proposed conclusions before formal serving of the reports by the State of New York. The reports of the Bureau have been carefully reviewed in your Valuation Department, and criticisms have been submitted showing in detail claims for corrections of errors

and increases in unit prices above those proposed by the Bureau of Valuation. The report on land values showed a total value of lands used for common carrier purposes of \$7,115,901, and the engineering report estimated the cost of reproduction new, of all structures used for common carrier purposes, as \$97,653,962. The cost of reproduction and depreciation of the structures, with the cost of depreciation, indicated an average estimated depreciation of 24.50 per cent. The criticisms submitted show that these estimates of value are substantially below those which should be allowed. It should be understood that the inventory upon which the estimates were made was for the year 1916, but that the unit prices applied were those of June 30, 1914, as estimated by the Bureau of Valuation. The figures stated do not, therefore, include any property added after June 30, 1916, nor do they take into account the large increase in the value of materials and labor since that date. On these accounts the figures stated, even when corrected in accordance with the criticisms which have been submitted, will not at all indicate the present value of your physical property. The total assigned as the value of lands is fundamentally erroneous for the reason that it is based solely on the value of the structures and of adjacent lands, averages obtained therefrom having been applied to the area of your lands, and includes no allowances for costs of acquisition, damages and other items that invariably increase the cost of railway rights of way. Objections have also been made to the estimate of twenty-four per cent depreciation below new condition. It is considered that this estimate has been obtained by methods and arbitrary assumptions which necessarily lead to gross over-estimation and indicate a condition entirely contrary to the facts. Objections to this result are also made on the account of the cost of valuation, to the end of 1920, amounted to \$502,464.52, of which \$365,930.92 was charged to your operating expenses to December 31, 1920, and \$136,533.60 to the operating expenses of the Railroad Administration during the period of Federal control.

ALLIED TROLLEY LINES

An increase to seven cents in the rate of fare charged by this company authorized by the Public Service Commission, which took effect on January 29, 1920, was recorded in the annual report for last year. At the time this rate became effective, the forty-cent fare for labor expenses was adjusted to forty-five cents per hour, the standard rate then being paid to conductors and motormen. This forty-five cents rate represented an increase of fifty per cent over wages in force in the year 1918. A rate of sixty cents per hour for motormen was established and conducted early during 1920, and on July 1, 1920, it became necessary for the United Traction Company to establish the same rate, the alternative being a strike, and it was necessary to make proportionate advances for conductors. The new rates obtained, with the result that the increased wages could not be met out of revenues unless a further increase in fares could be obtained and this involved application to the Public Service Commission. The new basis of wages was therefore put in force under a temporary agreement which provided for the continuance of the increased wages after November 1, 1920, in case prior to that date, relief in the form of increased fares could not be obtained. Prompt application was made to the Public Service Commission, which was asked to authorize a standard rate of fare of ten cents per passenger. This application followed the customary course with successive hearings and by legislation. A preliminary ruling favorable to the company on all questions of franchise restrictions except as to the relatively unimportant claim made by the City of Rensselaer, was rendered by the Commission. Final decision was not rendered until January 21, 1921. In this decision, the Commission, after a hearing, held that the Commission held that it was without power to grant the relief sought as to some of the principal lines in the City of Troy. Considering itself without power to afford substantial relief except as to the City of Albany, the Commission granted the increase of fare from five cents to six cents to eight cents but required the sale of four tickets for thirty cents. At that same time, the company was directed to carry passengers within the City of Rensselaer for five cents, between any point in Rensselaer and the plaza in Albany for six cents, and in the cities of Troy, Waterlief, Cohoes, Green Island, Waterford and Colonie, a six cents fare was prescribed. It is estimated that these changes in fares amount to a reduction in annual revenue, as compared with the standard seven cents fare, of \$86,000. The opinion of the Commission plainly expressed the view that operating expenses would soon substantially reduced through return to a lower basis of wages and some decline in the prices of materials and supplies. The following is quoted from the opinion:

"The wages in effect immediately prior to July 1st were about 75 per cent of the present scale. What the company will be obliged to pay in the future is not yet told. We assume that the officials of the company are awaiting the action of the Commission in this proceeding before renewing negotiations.

"It thus appears that wages have increased enormously during the war reconstruction period. We do not believe the Commission can assume that the present scale is to continue. We assume that the company is unwilling to continue it under the present rates of fare, and the existing agreement seems to assume that unless the fares are increased the present scale will not continue. The rate increases granted by the Commission in 1918 and 1919 have been returned to the company by the increased wage scales. In substance, therefore, the Commission in the last two rate orders as well as in the order about to be made has been and is dealing not with return on the company's investment but with wages of the employees.

"It is a matter of general knowledge, of which the Commission may properly take notice, that the costs of both labor and materials which have so sharply advanced within a brief period have begun to decline. The apex seems clearly to have been passed. In view of this condition and of the fact that the present wage agreement is for a limited period, we do not feel justified in fixing rates upon the assumption that the present wage scale of the company will continue any considerable time. It may be that wages will not decline as rapidly as they have advanced, but it seems clear that they will not remain at the present point when the general cost list is receding.

"Under the circumstances, we think we must assume, in arriving at an estimate of expenses for the coming year, that the trend of wages and other expenses will be downward."

The authority having control of the company's revenues having thus formally given notice that it would not accede in an adjustment of rates sufficient to meet the costs of operation at the rates of wages in

force, an adjustment of wages more favorable to the company and that might be expected to have the approval of the Commission, became imperative. On January 2, 1921, the day after the opinion was rendered, employees were notified that the provision to terminate the wages agreement would be exercised and that the company would return to the wages prevailing on June 30, 1920, the change to take effect at midnight on January 28, 1921, when the Commission had fixed as the effective date of the changes in rates required by its order. The employees refused to accept this readjustment and a strike ensued. After some days, during which the property remained idle, an order was resumed by the Public Service Commission, requiring the company to resume operations and efforts to do so with the aid of new employees were promptly commenced and have been continued; disorderly and violent resistance to these efforts occurred and for a time the operation of cars was irregular, traffic inconsiderable and the expenses high. A restraining order prohibiting the interference with the efforts of the company to render public service was entered in the Supreme Court on March 23, 1921. The violations of public order have diminished and seem tending to disappear and operations and traffic are gradually moving towards the normal.

A statute adopted at the present session of the Legislature, extending the Public Service Commission law, extends the authority to approve changes in rates with the effect of removing such limitations as were held to exist in Troy and Rensselaer. Under this statute these companies should be able to obtain reasonable rates of fare.

The operating revenues of the Hudson Valley Railway amounted to \$1,099,072, operating expenses to \$986,998, taxes to \$55,025 and net operating income to \$57,409. These data show increases in operating revenues or 13.14 per cent, in operating expenses of 20.97 per cent, in taxes of 6.78 per cent and an increase in net operating income of 43.11 per cent. Under authority obtained from the Public Service Commission on account of the insufficiency of the revenues at the former rate, the standard zone rate of this property was increased on June 29, 1920, to seven cents. The wages of the employees of this company were necessarily increased on July 1, 1920, to the basis of sixty cents for conductors and motormen, previously adopted in neighboring cities, and put in force on the same date by the United Traction Company. In making this change the company reserved the same right to discontinue the higher basis which was reserved by the United Traction Company. During September, application was made to the Public Service Commission to permit an increase in the zone rate to ten cents, except as to local service in Fort Edward, Hudson Falls, Glens Falls and Saratoga. After hearings by the Commission, the application was supported on briefs and oral argument during November, but no decision has been rendered.

The operating revenues of the Plattsburgh Traction Company amounted to \$33,122, a decrease of 12.29 per cent; operating expenses to \$29,625, an increase of 12.43 per cent; net operating income to \$14, a decrease of 82.46 per cent. The wages paid by this company have been lower by reason of local conditions, than those paid in the Capitol District, but on June 15, 1920, it was necessary to make an increase of five cents per hour to motormen and conductors, making the standard rate for such employees thirty cents per hour, with corresponding increases to other employees. Corresponding adjustments in fares became necessary and an advance to seven cents for service outside the city limits was obtained without opposition. It was also necessary to increase to seven cents, the rate within the city of Plattsburgh and the application for this change resulted in a hearing before the Public Service Commission. A favorable decision was rendered on October 14, and the increased rate of fare was permitted to become effective on October 21, 1920.

The operating revenues of the Troy and England Railway amounted to \$39,442, an increase of 8.27 per cent; operating expenses to \$44,397, an increase of 24.72 per cent, and there was an operating deficit of \$6,825 which compares to the deficit of \$710 in the previous year. The operations of this company are so closely related to those of the United Traction Company that it was necessary to extend to the employees the conditional advance in wages which was accorded to those of the latter on July 1, 1920. Even without this increase, the operating expenses would have required additional revenue. Application for an increase in the zone rate to eight cents and for corresponding increases in round trip fares and providing for more adequate rates for chartered cars, was made to the Public Service Commission by a tariff filed on November 20, 1920. This tariff was suspended on the application of the town of North Green, through which the property runs, and after hearing, decision was rendered permitting the advance rates to go into effect on January 29, 1921. The employees of this company are members of the organization which includes the former employees of United Traction Company and the strike on that company included the Troy and New England.

LITIGATION

Substantially all the railroads west of the Hudson river, including your company, have been made defendants in a proceeding instituted by the New York, New Haven and Hartford, Central New England Railway, Central Vermont Railway, Rutland Railroad, Boston and Maine Railroad, Maine Central Railroad and Bangor and Arundel Railroad before the Interstate Commerce Commission, claiming increased divisions on freight traffic interchanged at the various New England gateways. Numerous hearings have been held, resulting in a bulky record, and oral arguments before the Commission have been held on April 7, 1921. While the Transportation Act of 1920 empowers the Commission to establish divisions of rates, your counsel consider that the present proceeding is not within its jurisdiction. The New England railroads appear to support one complaint upon grounds which could not be the basis of the basis of an order in respect of divisions. Moreover, it is considered that the existing divisions are, and long have been, rather unduly favorable to the New England lines.

GENERAL REMARKS.

The business of the United States is encountering a serious period of depression. Taxation remains at the war level, and its burden is increasing. The conditions of the country are such that war activities disappear. Complete financing of the war in the form of a heavy floating governmental debt, continues to interfere with normal financial operations. Prices in general seem to be tending toward more normal levels, but wages are tending in the same direction but more sluggishly in spite of extensive unemployment. These factors point to adjustments that must precede any return to satisfactory conditions. Basic conditions are essentially sound. In a large degree the people of the country have been the owners of their own industries and have invested largely in foreign securities and on the international balance sheet, the Nation has become a creditor where but lately it was a debtor. If men exercising legislative and other authority will build soundly upon these foundations, general prosperity should soon be realized.

By order of the Board of Managers,
L. F. LORE, President.

[Adv.]

Railway Officers

Executive

H. S. Ray, assistant general passenger agent of the Chicago, Rock Island & Pacific, with headquarters at Des Moines, Iowa, has been promoted to assistant to the president, with headquarters at Chicago, effective May 1, with jurisdiction over the newly created department of public and labor relations.

W. A. Webb, vice president and general manager of the St. Louis Southwestern with headquarters at Tyler, Texas, has resigned, effective May 10. This position has been abolished and its duties have been taken over by **F. W. Green**, vice president in charge of operation with headquarters at St. Louis, Mo., and Tyler, Tex.

Financial, Legal and Accounting

E. B. Conrad, auditor of freight accounts of the Oregon Short Line, with headquarters at Salt Lake City, Utah, has been appointed freight auditor of the Chicago, Milwaukee & St. Paul, with headquarters at Chicago, effective May 1.

F. H. Harvey, general auditor of the Pittsburgh & West Virginia and the West Side Belt, has been elected secretary in addition to his other duties, succeeding **H. C. Moore**, secretary and treasurer. Mr. Moore will continue as treasurer of the company.

H. T. Newcomb, whose appointment as general solicitor of the Delaware & Hudson was announced in the *Railway Age* of March 18 (page 741), was born at Owosso, Michigan. He graduated from Columbian (now George Washington) University in 1891 with the degree of bachelor of law and received his master's degree the following year. From 1906 to 1916 Mr. Newcomb was senior member of the law firm of Newcomb, Churchill and Frey at Washington, D. C. From 1916 until the time of his recent appointment Mr. Newcomb was engaged in the general practice of law in New York. A great portion of his work has been in connection with railway litigation. He is the author of "Railway Economics," "The Postal Deficit," "Force and Effect of the Orders of the Interstate Commerce Commission," "Constitutionality of the Delegations of the Interstate Commerce Law" and other works on similar subjects.

Operating

J. E. Hood has been appointed general manager of the Uintah with headquarters at Mack, Colo., succeeding **M. W. Cooley**, effective April 8.

O. F. Ohlson has been appointed trainmaster of the Northern Pacific, with headquarters at East Grand Forks, Minn., effective April 15, succeeding **F. W. Lyons**.

C. H. Bland has been appointed trainmaster of the Louisiana Railway & Navigation Company, with headquarters at Shreveport, La. **W. E. Salyards** has been appointed chief dispatcher with the same headquarters.

E. G. Goforth, assistant general manager of the International & Great Northern, with headquarters at Palestine, Tex., has been promoted to general manager, succeeding **A. G. Whittington**, who has resigned.

F. S. Rosseter, assistant superintendent of the Toronto Terminals of the Canadian Pacific, with headquarters at West Toronto, Ont., has been transferred to a similar position, with headquarters at Chapeau, Ont., succeeding **V. T. Boughton**, resigned.

F. S. Deveny, trainmaster of the Baltimore & Ohio Chicago Terminal with headquarters at Chicago, has been promoted

to superintendent with the same headquarters. **R. A. Barlow**, assistant trainmaster, has succeeded Mr. Deveny as trainmaster. The position of general superintendent of this company has been abolished. These changes were effective May 1.

H. H. Hooper, superintendent of transportation of the St. Louis-Southwestern with headquarters at Tyler, Texas, has resigned, effective May 10. The position which he occupied has been abolished and its duties have been taken over by **W. Mosby**, transportation assistant with headquarters at St. Louis. Mr. Mosby's headquarters have been changed to Tyler, Texas. The Illmo and Pine Bluff divisions have been consolidated and **W. E. McGraw**, superintendent of the Illmo division, has been appointed superintendent of the two divisions. **K. C. Marshall**, superintendent of the Pine Bluff division has resigned and his office has been abolished. **E. Richards**, superintendent of telegraph and safety with headquarters at Tyler, has been appointed acting superintendent of the Tyler division, succeeding **D. C. Dobbins**, resigned.

Traffic

P. L. Shepherd, general freight and passenger agent of the Gulf & Ship Island, with headquarters at Gulpport, Miss., has resigned.

W. D. Cook has been appointed general freight agent of the Gulf & Ship Island, with headquarters at Gulpport, Miss., effective May 10, succeeding **P. L. Shepherd**, resigned.

F. W. Elder, commercial agent of the Gulf Coast Lines, with headquarters at Houston, Tex., has been transferred to San Francisco, Cal., succeeding **E. J. Naylor**, who has resigned, effective May 1.

W. B. Gheen, division freight agent of the Atlantic City Railroad and the New York division of the Philadelphia & Reading, has been transferred in a similar capacity to the Philadelphia division. **G. A. Buck**, agent at Pottsville, Pa., has succeeded Mr. Gheen as division freight agent of the New York division and the Atlantic City.

Engineering, Maintenance of Way and Signaling

William Hood, chief engineer of the Southern Pacific, whose retirement from active railroad service, effective May 3, was announced in the *Railway Age* of May 6 (page 1100), was born on February 4, 1846, and was educated in the scientific department of Dartmouth College. He entered railway service in May, 1867, as a rodman on the Central Pacific, being engaged in the construction of that line through the Sierra Nevada mountains at the time of the building of the first transcontinental line. He was appointed assistant engineer on January 1, 1868, and served in that position until June 1, 1872, when he became assistant engineer of the Southern Pacific. Three years later he was promoted to chief assistant engineer, a position which he held until June, 1883, when he accepted an appointment as chief assistant engineer of the Central Pacific. He was promoted to chief engineer of that road on October 10, 1883, but in August, 1885, he returned to the Southern Pacific as chief engineer of the Pacific System. On June 1, 1900, he was promoted to chief engineer of the Southern Pacific. Mr. Hood retired on the 54th anniversary of his first connection with the Southern Pacific company,



Wm. Hood

R. W. Barnes, assistant engineer of the Southern Pacific, with headquarters at Portland, Ore., has been appointed assistant engineer of the Southern Pacific, Texas Lines, with headquarters at Houston, Tex. **H. L. Archbold** succeeds Mr. Barnes.

W. S. Hanley has been appointed chief engineer of the St. Louis-Southwestern with headquarters at Tyler, Texas, succeeding **A. A. Mathews** resigned. **C. C. Pettigrew**, division engineer with headquarters at Illmo, Mo., has been appointed division engineer of the Illmo and Pine Bluff divisions, which have been combined, with headquarters at Pine Bluff, Ark. **W. N. Raleigh**, division engineer with headquarters at Pine Bluff, has resigned and his position has been discontinued. These changes were effective May 10.

Mechanical

W. P. Kershner, who has been appointed superintendent of motive power of the International & Great Northern, with headquarters at Palestine, Texas, was born at West Leesport, Pa., August 16, 1885. He graduated from high school at Reading, Pa., in 1901 and began his railroad career as a night caller for the Philadelphia & Reading. Shortly thereafter he became a machinist apprentice and later a machinist for the Reading and resigned to attend the University of Pennsylvania, from which he graduated in 1908. He then entered the employ of the Louisville & Nashville at South Louisville, Ky., as a layer-out on new engines. Later he served the Chicago & North Western in the office of the mechanical engineer. He left that position to go with the Northern Pacific at Livingston, Montana, and shortly afterward resigned to enter the service of the Chicago, Milwaukee & St. Paul at Lombard, Montana. Later he became general foreman for the Oregon Short Line, at Montello, Idaho. He next became a hydraulic engineer for the Bishop Creek Mining Company at Laws, Cal., but soon afterward entered railroad service again—this time as a drop pit foreman for the Southern Pacific. Subsequently he was in the employ of the Texas & Pacific, the International & Great Northern and the Missouri, Kansas & Texas. During the war Mr. Kershner served as second lieutenant, captain and major in the engineers and saw 17 months' service overseas. After his discharge from the service he went to the Texas & Pacific as general mechanical inspector and was later promoted to shop superintendent. A few months later he left this position to become master mechanic of the International & Great Northern at Palestine, Texas, which position he held at the time of his recent appointment.

Obituary

B. H. Bennett, general agent of the Chicago & North Western, with headquarters at Toronto, Ont., died on May 7.

Henry Boutet, for 31 years chief interchange inspector for all the railroads entering Cincinnati, O., and organizer of the Chief Interchange Car Inspectors' and Car Foremen's Association, of which Society he was president for seven years, died at his home at Ludlow, Ky., on April 25, at the age of 69.

John W. Mulligan, real estate and tax agent of the Chicago, Rock Island & Pacific, whose death was announced in the *Railway Age* of April 29 (page 1056), was born at Fort Charles, Bainbridge, County Downs, Ireland, on June 21, 1874. He was educated in the United States, and after serving the Pullman Company, entered the employ of the Chemical National Bank, while pursuing legal studies at the same time. He entered railroad service on August 1, 1902, as a stenographer in the real estate and tax department of the Chicago, Rock Island & Pacific, and has served that company continuously since then. From 1902 until November 1, 1907, he served successively as stenographer, chief clerk and right of way agent, and on the latter date was promoted to assistant real estate and tax agent, with headquarters at Chicago. He was promoted to real estate and tax agent of the Rock Island system on January 1, 1920, and was serving in that position at the time of his death.

EDITORIAL

Railway Age

EDITORIAL

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One of the most extravagant conditions which any industry can face is a high labor turnover. While this is particularly true in those classes of employment where a high degree of skill and experience are required, its effect is also evident in the less skilled and so-called unskilled industries. The constant changing of men has been the greatest handicap which has been imposed upon maintenance of way work, particularly track work, as many as 20 men frequently being hired in a single season to keep one man at work. Conditions such as those which existed during the war, when our entire industrial life was thrown into a turmoil, cannot be avoided. However, the exceptionally high turnover in maintenance of way work has existed for so long, irrespective of conditions in outside industries, that many officers regard it as inherent to the work and a condition which must be reckoned with rather than eliminated. That it can be largely reduced is open to demonstration. Other industries employing similar classes of men have stabilized their forces and greatly increased the production per man. If they can do it, the railways can do as much. The present offers an opportunity for the study of this problem and the inauguration of plans for the elimination of those defects in our present system which are contributing to this constant changing of forces. There is now a surplus of labor. Men who desire permanent employment are available. Therefore, the railways have an opportunity to secure and develop forces which can be made permanent. To do this they must learn what conditions are tending towards short tenure of service, and remove them. This may require some radical changes in the railways' methods of work but the great saving which can be effected by reducing this turnover to that prevailing in other industries can be realized when it is considered that the maintenance of way department payroll is now in excess of three-quarters of a billion dollars annually.

What Is Your Labor Turnover?

One of the disputed points in concrete practice relates to the effect of water on the life of a structure. Waterproofing is generally applied to keep water out of basements, pits, tunnels or other subterranean or subaqueous constructions subject to hydrostatic pressure, as well as to railway decks which serve also as the roof over occupied spaces or passageways. But in most of these cases, the prime reason for keeping out the water is because it interferes with the occupancy of the structure, while the question of the deterioration of the concrete is secondary. A rather wide difference of opinion exists as to the necessity for waterproofing in cases where the only object is the protection afforded to the structure itself. On eastern roads having a larger proportion of permanent structures and where the tendency has been more largely toward heavy massive design, the use of waterproofing as a protection to the concrete is quite general while in the west the practice is more varied. While it is generally conceded that steel imbedded in a concrete of reasonable density is not corroded by the circulation of water through the pores in the surrounding material, the possibilities of electrolytic action or the

Should Concrete Be Waterproof?

presence of corrosive gases introduces a specific hazard in some cases. Another uncertainty is introduced through the possibility of injury by frost action, especially at construction or expansion joints. It is not the purpose here to suggest what the correct practice should be, but when two parallel roads follow practices that are entirely different in this regard, it should be clear that one or both of them is following precedents rather than conclusions founded on thorough study. If the facts are not now available for a scientific conclusion, it is high time that such investigations be made.

"Commerce Reports" is the name of a daily publication issued by the Bureau of Foreign and Domestic Commerce at Washington. The purpose of this publication supposedly is the dissemination of information of interest and value to those who are seeking to further America's foreign commerce.

More Red Tape

Probably the most important of any of the information published in this journal is the announcements of projects which are being undertaken in foreign countries which may afford opportunities for the sale of American goods. It might naturally be supposed that the Bureau would be glad to have information of this character copied by business papers and given general circulation. Such, however, is apparently not the case. In "Commerce Reports" of May 11 it is reported that a certain railway in Brazil is contemplating the construction of a bridge to cost \$1,000,000 and that the name of the railroad can be obtained on request by reference to a certain file number. The New York office of the Bureau, however, would not give the name of the road to the *Railway Age* without a promise in writing that the information would not be printed. In other words, the fact that a project is to be undertaken which will afford an important opportunity for American builders who are seeking foreign contracts is to be kept from all except those who have the patience and the time to read "Commerce Reports" every day. Herbert Hoover, the new Secretary of Commerce, has apparently been endeavoring to rid his department of useless red tape and put it on a basis of co-operation with business and the business press. The *Railway Age* is heartily in accord with such a movement and believes that Mr. Hoover can do American business a real service by instructing his subordinates in the Bureau of Foreign and Domestic Commerce that their business is the dissemination of information and not its concealment.

Promoting the Prosperity of Farmers

The American Railway Development Association, whose annual meeting is reported in another column, is unique among railroad associations, in that its purposes and activities are wholly outside the railroad field; and they extend in all directions. The members work to develop, not railroads, but everything else; everything which will stimulate railroad traffic, provided a suitable opening can be found. This meeting was devoted mainly to farming, and the discussions ranged from seed potatoes to the construction of tasteful cottages. Among

the wealth of practical ideas, those presented by E. F. Benson, of the Northern Pacific, were perhaps the most interesting in their novelty and bigness. His paper was very briefly reported last week. As everyone knows, the fundamental farm problem in America is to make intelligent and energetic people contented to live on farms; and Mr. Benson set forth with great force the essential elements required in dealing with it. Nothing less than hearty co-operation will turn the trick. The Community development association makes available to the individual the benefits of co-operative effort in scientific farming, comfortable home-making, education of children and all the principal elements of a contented life. Such associations should be fostered by the railroads from the plainest motives of self-interest. An association should be voluntary and mutual; but remarkable results have been accomplished in two states, California and Wisconsin, by what may be termed outside initiative. In California by legislative action, and in Wisconsin by a corporation, frankly organized for profit, the settlement of farms has been promoted on a large scale to the great satisfaction of all concerned. As Mr. Benson said, this may be called paternalism or cold business, or whatever you please; but the results challenge criticism. Every railroad officer interested in colonization, or in promoting the prosperity of farmers, will do well to get copies of the paper.

"Productive Efficiency" of Facilities and Employees

THE LABOR UNION LEADERS are telling the Railroad Labor Board and the public, and will soon be telling the Senate Committee on Interstate Commerce, that the financial troubles of the railroads are due to wasteful management and not to the inefficiency and high wages of labor. Therefore, they contend, all the needed economies in operation can and should be secured by increased efficiency of management without reductions of the payroll.

These contentions are a challenge to a direct comparison between the efficiency of management and the efficiency of labor. The operation of the railroads is carried on under the direction of their directors and officers. Their operations are conducted partly by means of human agencies, namely, the employees, who furnish their labor, and partly by means of physical instrumentalities, namely, the tracks, locomotives, cars and other parts of the plant, which are provided by the invested capital of the owners. The only thing produced by the railroads is transportation. Their most important product is freight transportation, their earnings from the transportation of freight being over 70 per cent of their total earnings. All improvements in plant and methods having as their ultimate object the increase of efficiency and economy of operation are designed and intended to secure this object by increasing the amount of traffic handled per each physical unit and per employee. Since the payroll now constitutes about two-thirds of all operating expenses, it is especially essential to the maintenance and increase of the economy of operation that the amount of traffic handled per employee shall continuously increase. It happens, however, that while the track, the locomotive, the car, being inanimate things, can offer no resistance to the efforts of the officers to increase their productive efficiency, the employees, being human beings, can, by securing unreasonable rules and working conditions and by other means, largely defeat the efforts of the managers to increase their productive efficiency.

Having in mind these facts, some interesting and significant comparisons may be made between the changes which have taken place within recent years in the average amount of traffic handled per unit of physical plant and per employee. The accompanying table gives the number of tons carried

one mile (1) per mile of line, (2) per freight locomotive, (3) per freight car, and (4) per employee in the years 1913, 1917 and 1920.

	TONS CARRIED ONE MILE			
	Per mile of line	Per freight locomotive	Per freight car	Per employee
1913	1,335,416	8,650,446	148,474	187,877
1917	1,698,825	11,282,617	173,552	250,997
1920	1,747,948	11,682,068	190,951	221,921

Each of these years was a year of maximum traffic—that is, one in which the amount of traffic handled was larger than in any previous year. It will be seen that in 1917 as compared with 1913, and in 1920 as compared with both 1917 and 1913, there was a large increase in the amount of freight traffic handled per each mile of line, each freight locomotive and each freight car. It will also be seen that between 1913 and 1917 there was a large increase in the amount of freight traffic handled per employee. While, however, between 1917 and 1920 the amount of freight handled with each unit of the physical facilities increased, the amount of freight handled per employee showed a sharp decline.

The railroads were under private management in 1917 and again in 1920. Was this decline in the amount of freight handled per employee in 1920 due to shortcomings of private management? On the contrary, it is easy to demonstrate that it was due to the aftermath of government operation. In 1917, under private operation, as the table shows, the number of tons carried one mile per employee was 250,997. This figure was the result of a steady increase in the output per employee which had been going on over a long period of years, and was the maximum figure ever reached. In 1918, under government operation, the tons carried one mile per employee declined to 241,541. This decrease in output per employee was entirely due to a large increase in the number of employees, since the total amount of freight handled by the railroads in 1918 was slightly larger than in 1917. In 1919, the second year of government operation, while the total amount of freight traffic carried by the railroads declined over 10 per cent, the number of employees actually increased over 70,000. The result was that the number of tons carried one mile per employee declined further to 208,026. While, therefore, the amount of freight handled per employee in 1920, under private management, was less than in 1917, under private management, it was greater than in 1919, under government operation.

The facts are, then, that the tracks, locomotives and cars of the railroads, the methods of using which are almost entirely under the control of the officers, have steadily increased their output per unit. It is also a fact that the railway managements in 1920 secured a greater output from practically every other physical facility than ever was secured before. On the other hand, the average output of the employees abruptly declined under government control, and is still much less than it was in 1917.

The labor leaders say that the "productive efficiency" of the employees, measured in passenger miles and ton-miles, is greater than before the war. The figures show this is true, the output per employee being greater in 1920 than in 1913. When, however, the labor leaders appear before the Senate Committee the members of that committee may well inquire why in 1920 the productive efficiency of every physical facility of the railroads was greater than ever before, while the productive efficiency of the employees in the years 1918, 1919 and 1920 was less than in 1917, or even in 1916.

The physical facilities of the railroads have been provided by the owners. The owners are now getting practically no return upon their investment in these facilities, although the productive efficiency of the facilities in 1920 was greater than ever before. Since the productive efficiency of the facilities has shown a steady increase, while the productive efficiency of the employees has shown a decrease, the members of the

Senate Committee may well ask the labor leaders why those who have provided the facilities should continue to be denied as much return upon their capital as they received in 1916 and 1917, while the employees should, as the labor leaders contend, continue to be paid wages twice as high as they received in those years.

Forged Testimony Before the Labor Board

THE *Railway Age* has never opposed, or even criticised, the organization of labor. It believes labor has as much right to organize as capital. It has, however, criticised many things that labor organizations, and especially labor leaders, have said and done. Among other things it has criticised leaders of certain railway labor organizations for causing intolerable delays in the proceedings before the Railroad Labor Board by introducing testimony having no bearing whatever upon any question before the board, and having the obvious purposes of delaying action by the board and unjustly discrediting private management in the eyes of railway employees and the public.

While much of the testimony presented by the labor leaders to the board has been irrelevant, the facts regarding the introduction by them in the national agreements hearings of a letter purporting to have been written by I. W. Geer, general manager of the Southwestern Region of the Pennsylvania system, are disgraceful. The letter was introduced on March 22 by B. M. Jewell, president of the Railway Employees' Department of the American Federation of Labor, and Frank P. Walsh, counsel for the labor unions represented by Mr. Jewell, during the cross examination of General W. W. Atterbury, vice president of the Pennsylvania system. It purported to carry instructions from Mr. Geer to all supervisory officers to ascertain the position of employees on proposed reduction of wages, "resorting to defamation of all labor organizations if necessary." The letter was immediately challenged by officials of the Pennsylvania as fraudulent. In a hearing before the Labor Board last week Mr. Geer and other officers and employees of the Pennsylvania proved that it was a complete forgery—that no such letter had ever been written by Mr. Geer, or received by any of those to whom it purported to have been addressed.

The counsel for the labor unions was obliged to admit that the letter was "unauthentic." A lawyer who introduces testimony which is fraudulent either has knowledge or is ignorant of its fraudulency when he introduces it. Whatever may have been Mr. Walsh's knowledge or lack of knowledge of the character of the letter when he introduced it, it is significant that when the Labor Board by formal resolution asked that he "make known how and from whom this letter, evidently fictitious and fraudulent, came," he refused to do so. "As representing the labor organizations," he said, "I do not intend to pillorize the person from whom this information came to us."

In other words, instead of repudiating or exposing the person or persons who committed the forgery, the labor leaders and their counsel protected him or them.

The course of the labor leaders and their counsel in introducing a letter bearing upon its face plain indications of a fraudulent character, and then, after its true nature as a forgery had been established, refusing to disclose the identity of the forger or forgers, requires no comment from us. Every reader may safely be left to make his own comments and draw his own conclusions. A very large majority of the members of the railway labor organizations are truthful and honorable men and good citizens. It is unfortunate they are represented in important positions by men who will do what

their representatives before the Labor Board did in this instance.

In this connection it is neither inappropriate nor unjust to point out that while this particular piece of "testimony" was a forgery designed not only unjustly to injure the railways, but to ruin the career of a railway officer, a large part of the other testimony which has been introduced by the labor leaders before the Labor Board is hardly more defensible. Practically all the testimony they have introduced regarding the alleged financial crookedness of the railway managements, the alleged crooked relations between railway officers and railway supply companies and the alleged deliberate wastefulness of railway managements is almost as baseless, dishonest and misleading as the forged letter attributed to Mr. Geer. In the long run the labor unions and the railway employees are injured, and not benefited, by being represented in the way they have been before the Labor Board in the national agreements case.

A Railroad a Composite Structure

A RAILROAD is an aggregation of facilities for the production of transportation. Among its important units are cars and locomotives and the tracks and structures over which they are moved. As in any well-organized machine, these facilities must be co-ordinated into a harmonious unit if the best results are to be obtained. No constituent part can be developed without regard for the others, but it must be designed to be combined with others to form a composite agency. Obviously, the owners of the railways will be served best when these agencies are so co-ordinated as to produce transportation at the minimum cost.

So much for the ideal. Since the earliest days of railroading there has existed a controversy between the engineering and the mechanical departments regarding the load-carrying capacity and the clearances which it is necessary to provide in bridges, these structures forming the limit on the size and weight of the locomotives which can be operated. It is recognized by both that the reductions in the cost of operation of American railways have been due primarily to increased train loads, which in turn have been made possible by larger and heavier locomotives. Since the mechanical department can install these locomotives only as the engineering department provides the tracks, bridges and other structures over and through which these must operate, the engineering department exercises a restriction on the activities of the designer of locomotives. The pressure which the mechanical department has continually placed upon the engineering department is illustrated in the article by M. H. Haig, mechanical engineer of the Atchison, Topeka & Santa Fe, which was published in the *Railway Age* of May 6, page 1073, in which he stated that if a locomotive is to give practically 100 per cent service "its design must not be restricted by personal opinion or by physical limitations of the road * * * The only governing factors should be the size of the train and the traffic of the territory." Taken literally, this would imply that the question of the cost of providing the facilities necessary to enable these locomotives to operate is not a consideration.

It is here that the viewpoints of the engineering and mechanical department officers differ. It is natural that the mechanical officer thinks primarily in terms of the efficiency of the locomotive. It is equally natural that the engineering officer thinks first in terms of the cost of the structure he builds. There is no argument regarding the safe load for any bridge or the safe clearance for a structure; these are matters capable of demonstration. The problem with which a railway management is confronted in harmonizing these conflicting viewpoints is that of determining at what point

the additional cost of providing the facilities necessary for the operation of larger locomotives exceeds the economies derived from this heavier power. The problem is not that of larger locomotives, or of stronger bridges. It is one of economics to determine that point at which fixed charges more than offset possible economies. Both engineering and mechanical officers can contribute to the solution of this problem by combining to study it as a broad problem of the railroad, rather than that of their individual departments.

Delaware & Hudson

THE DELAWARE & HUDSON is one of the few roads of the country which seems to have made marked progress in regaining the operating efficiency and earning power which characterized it prior to the advent of federal control. The road in 1920 did the largest business in its history. After taking into consideration the amounts necessary to make up the standard return for January and February and the guaranty for the guaranty period, the company had a net of \$4,933,163, equal to 11.61 per cent on the capital stock, as compared with a net in 1919 of \$4,605,004, equal to 10.83 per cent on the capital stock. The Delaware & Hudson is confronted with the national agreements and the high wage scales in like degree with any other railroad. If conditions in 1920 had been back to normal, the road would have had a remarkable year.

President L. F. Loree's annual reports of the Delaware & Hudson are noted for their completeness of detail and for the information they give concerning the actual operations of the road. The 1920 annual report is no exception. It is characterized by comparisons of the operations in 1920, not only with 1919 but with the annual averages for the test period from July 1, 1914, to June 30, 1917, which comparisons assist greatly in making proper analysis of the 1920 results. The figures show the usual trend in the form of increases in gross, proportionately greater increases in expenses and the corresponding decreases in net. On the other hand, they point out in marked fashion the improvements in operating efficiency towards which the Delaware & Hudson was working prior to the time the railroads were taken over.

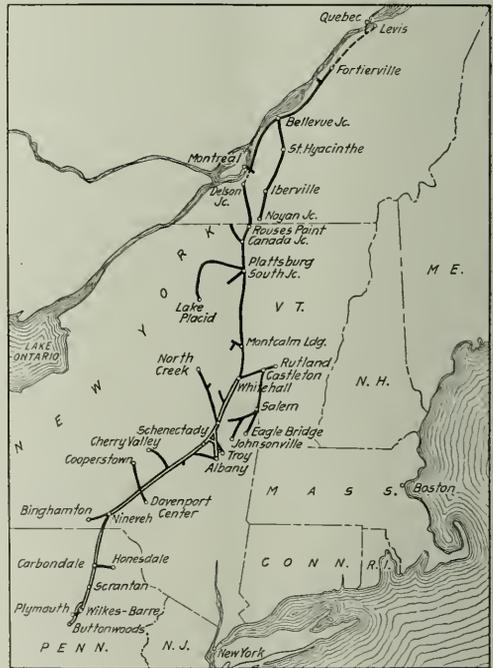
The comparisons between 1920 and the annual average for the test period show among other things these interesting details: The railway operating revenues in 1920 were 78.04 per cent greater than the average annual operating revenues for the test period; the operating expenses, however, were 139.78 per cent greater and the operating income before the deduction of taxes 59.17 per cent less. The revenue ton-miles handled in 1920 were 32.08 per cent over the test period average, the revenue per ton-mile, 40.37 per cent.

The excessive increase in operating expenses resulting from advances in wages, the changes in the conditions of employment as compared with the pre-war period and the continued high costs of materials and supplies are shown in increases for 1920 over the test period averages as follows: Maintenance of way and structures, 149.27 per cent; maintenance of equipment, 159.47 per cent; transportation, 134.91 per cent. The relationship of the increases in gross and decreases in net is presumably fairly typical of what may have taken place on any railroad. It is doubtful, however, if many railroads can point to increases in operating efficiency such as are shown in an increase in the trainload in 1920, as compared with the average for the test period, of 195 tons whereby the average revenue trainload in 1920 was 842 tons; or of an increase of six tons in the revenue load per loaded car making that figure in 1920, 34 tons.

The Delaware & Hudson for many years prior to 1918 was working out a plan of development calculated to increase the efficiency of operation of the property to a measurable extent.

This program was especially well co-ordinated. It included the purchase of heavier power, the building of proper terminals and shops to care for this power, improvements in the line over which the heavier trains were to run, the building of longer sidings to take care of the longer trains and the construction of various new yards necessitated by the other improvements in operation. These things naturally relate one to the other, but that seems to be a feature of railway operation which the Delaware & Hudson happens to have realized rather better than many of the other roads of the country. The improvement program is still under way, although some parts of it were held up temporarily during the latter part of federal control. The results that have been obtained are probably best shown by the increase in trainload already referred to.

The Delaware & Hudson operates 909 miles of line, of



The Delaware & Hudson

which 358 miles is double track. Its principal revenue is derived from anthracite coal; in fact, the road was built originally to carry to market the coal mined by the coal company which built it. The tonnage of anthracite handled in 1920 amounted to 12,388,943 tons of a total tonnage of 28,965,242. Hard and soft coal combined bring in about 47 per cent of the total revenues, including those from passenger traffic. The anthracite coal tonnage is secured from a compact area in the Susquehanna and Lackawanna valleys of Pennsylvania between Plymouth and Carbondale, a distance of about 38 miles. The fact that the mines are so close together is utilized as an assistance to efficient operation in a rather interesting way. Empty cars are assembled at Carbondale, are taken by road engines to the various breakers and the loaded cars are returned to the yard for classification and road movement. The prevailing movement of the coal is from Carbondale over the line to Albany and Mechanicville,

and this section of the road is the portion of greatest traffic density.

In addition to the hard coal moved, there is considerable bituminous coal and merchandise interchanged with the Pennsylvania and Jersey Central at Wilkes-Barre, with the Erie and Lackawanna at Binghamton and with the Lehigh Valley at Owego. This combined tonnage is moved to Oneonta in through trains either from Binghamton or from the Pennsylvania division via Ninevah, all of which points will be found on the map. At Oneonta the traffic is classified and moved northward to Albany, to Mechanicville, or through Saratoga for Canada. The improvements which were carried out were intended to facilitate the operation outlined. The movement southbound is principally empties, so that it does not present such complicated problems.

The changes that were made were outlined in full detail in the annual report of the property for 1918. Suffice it to say that among the most important changes was the enlargement of the yard at Carbondale completed in 1917; this enlarged the capacity of the yard to 3,139 cars, an increase in car capacity of 50 per cent. Other important changes were included in the way of larger motive power and reduction of grades. Between Ninevah and Oneonta as early as 1911 the grades were reduced to 0.3 per cent, making it possible to move full trains from Carbondale to Oneonta without breaking up the load and for one locomotive to haul from the summit north of Carbondale to the end of the division any train which can be taken to the summit by a single locomotive with a Mallet pusher. The maximum grade between Oneonta and Delanson, where the lines to Schenectady and Albany converge, is now 0.8 per cent. It is proposed to reduce this to 0.5 per cent. The work is partly completed; considerable was done on it in 1920 in the way of putting in a new third track between Schenevus and Richmondville Junction. With the maximum of 0.5 per cent it will be possible to haul trains of maximum tonnage from Oneonta to Schenectady with the use of a pusher locomotive between Schoharie Junction and Esperance only.

These various improvements were co-ordinated with a program for larger locomotives, new engine terminals, longer sidings, etc., all planned with the view to increasing freight train efficiency. It is unfortunate that more space is not available to go into the matter in greater detail, for it is these things, combined with favorable traffic conditions, which have enabled the Delaware & Hudson to continue in the van of progress as an efficient and prosperous carrier.

Mr. Loree in his report has considerable to say concerning federal control and the results of it. It is impossible to reproduce the full effect of what he says without using his own words. Speaking of the failure of the Railroad Administration to maintain the property up to its proper standard, he says:

Notwithstanding the pledges contained in President Wilson's proclamation of December 27, 1917, and the act of Congress of March 21, 1918, and the contractual obligation deliberately assumed on December 9, 1919, your properties were not adequately maintained while they were in the possession of the United States, nor were they returned to your control in condition as good, or as fully equipped, as that in which they were taken. The extent of this undermaintenance may be illustrated by items representing renewals of rails and ties. The average number of new rails used for replacements, during the test period, was 8,223 gross tons; during federal control it was 7,607 gross tons; the yearly average of renewals of ties during the test period was 339,872; during federal control it was 270,100. Moreover, the ties used for replacement during the federal control were inferior in quality.

Again, in speaking of the policies of the Railroad Administration as to wages and rates, he makes these pertinent remarks:

Increases in rates of wages and changes in the terms and conditions of employment made during federal control and subsequent to its termination, by the Railroad Labor Board, greatly

increased the operating expenses which the railways have currently to meet. Rules which might not be seriously objectionable under special and local conditions may be wholly unworkable when given general application and it is now evident that rigid standardization of wages and working conditions has become an enormous burden upon the railway industry. Nothing is more unequal than the equal treatment of unequals. The wide area of the United States, their diverse resources, industries and economic standards and methods, have imposed varying conditions upon the performance of railway services with widely different demands upon labor and an equally wide range in the reasonable requirements of labor itself. To ignore these differences in fixing the relations between employees and railway employers must be as unsatisfactory in its results as it would be to build all railways to the same standards of grades curvature and capacity regardless of differences in the traffic requirements and in local topography. Yet such disregard of essential differences is embedded in the so-called standardization of wages and terms of employment which is an evil legacy from the period of federal control.

The Railroad Administration made no effort to adjust the changes or railway service to the heavily increased expenses which it assumed by successive concessions to importunities for higher wages and reductions in the labor exchanged for wages. Unwillingness to accept responsibility for these increased expenses to the extent of putting in force rate schedules adequate to meet them resulted in the operation of the railroads at a heavy loss to the United States, and an accumulating deficit in the income account of the Railroad Administration which was forced upon the taxpayers. Whether those who pay taxes accept such burden with less protest, or with less effective protest, is a problem which the Railroad Administration or some higher authority must be assumed to have resolved to its own satisfaction.

The Delaware & Hudson in 1920 carried 27,260,813 tons of freight, an increase of 3,616,135 tons over 1919 and of 4,498,258 tons over the annual average for the test period. The average haul was 156 miles and the revenue ton-mileage 4,265,734,874. The number of tons carried one mile per mile of road, or the traffic density, was 4,692,261, which is a high average. The revenue per ton-mile was 0.918 cents and the total freight revenue \$39,163,644, an increase of \$9,680,199 over 1919 and of \$18,047,835 over the test period average. The freight revenues constituted 86 per cent of the total revenues. As noted above, the revenue trainload was 842 tons and the average revenue load per loaded car was 33.83 tons. The miles per car per day averaged 27.9 as compared with 26.7 in 1919. The ton-miles daily per car reached the high level of 662, a figure which was exceeded by but few roads during 1920.

The operating results for 1919 and 1920 follow:

	1920	1919
Mileage operated	910	910
Total operating revenues (including passenger) ..	\$45,354,299	\$34,749,709
Maintenance of way expenses	5,114,909	4,177,864
Maintenance of equipment	12,736,975	9,980,056
Traffic expenses	386,448	237,030
Transportation expenses	21,669,668	15,606,760
Total operating expenses	42,126,330	31,886,711
Net from railway operations	3,227,969	2,862,998
Taxes	1,186,054	1,075,803
Net railway operating income	7,439,730	7,109,759

The corporate income account is as follows:

	1920	1919
Gross income	\$10,431,017	\$10,530,620
Total deductions	5,497,354	5,925,615
Net income	4,933,163	4,605,004

New Books

Proceedings of the Thirtieth Annual Convention of the American Railway Bridge & Building Association. Edited by the secretary. 248 pages, illustrated. 6 in. by 9 in. Bound in cloth and paper. Published by the association, C. A. Lichty, secretary, C. & N. W. Railway, Chicago.

This volume contains the proceedings of the annual convention which was held in Atlanta, Ga., October 26-28, 1920. It includes the reports of eight committees and two individual papers. The proceedings of this association are characterized by their highly practical character, discussing the problems of the field forces engaged in the maintenance of bridges, buildings and water stations.

Letters to the Editor

"Get Out and See the Shipper"

WASHBURN, MAINE.

TO THE EDITOR:

The editorials in the *Railway Age* of April 22 on "The Art of Working with Men," and "Get Out and See the Shipper" recalled to my mind a little incident which I participated in during 1915. I was asked by an officer of the express company to solicit business during a period in which hog sales were going on in the Middle West. I accepted, and the result was surprising. The sooner transportation companies get their traffic men together and make resolutions to visit and become acquainted with the shippers the quicker business will revive.

I personally believe that visiting and becoming acquainted with the shippers means additional revenue, where the use of the typewriter will promote friction between shippers and carriers, simply because the shipper is like a child that has been whipped because it does not understand. One visit from a live wire traffic man will reveal to the shipper what he most desires to know and they will be friends as never before.

Let us do away with the grievance committee and handle the things most important to the carriers of our country in a business-like manner and all will be well. I am a "Get Out and See the Shipper" advocate.

H. SHANER.

The Simple Gospel of Self-Control

St. Louis, Mo.

TO THE EDITOR:

The operation of the law of pivotal points or diminishing returns so often amplified by the late Elbert Hubbard was well illustrated in the abuse of the privileges of the Railroad Labor Board by B. M. Jewell in his address before that board, as spokesman for railroad labor on April 28, when he took up the time of the board in making allegations manifestly and obviously untrue, i. e., that railroad laborers' losses were so great during the war period that it will take them three years to even up; that living costs had not been reduced sufficiently to warrant wage reductions, and so on, "ad infinitum, ad nauseum, ad disgustum." The effect of such manifestly misleading statements published broadcast can only have one effect; and that is to militate against the very men who are supposed to be represented.

As was pointed out in an article in your columns signed "Agriculturnist" on November 3, 1916, combinations of railroad and other labor, as a result of advantages of urban life, invariably have the best of it in the cycles of increased wages and costs, over the producers and in particular the farmers, in that these labor combinations enjoy the advantage of prices based on lower labor costs for several months after the wage increase, while the effect of the increase is finding its way into costs of the various necessities. About the time the cycle is completed another raise in wages is forced, with the same result. This is recent history. Labor finally pushed a good thing so far as to pass the pivotal point, and it finally ran up against the wall of enlightened, angered public opinion.

From conversation with many men in the ranks of railroad labor I feel that I know that this man's statements, as quoted above, do not truly represent the views or even the wishes of a large per cent of the thinking, reasoning men whom he presumes to represent.

As is well known, the thrifty, frugal railroad men have saved more money and enjoyed more of the luxuries of life during the war period than they ever did before; and the present crisis is due in large measure to the orgy of spending by a large per cent of railroad men as a result of money coming so free and easy. Many of these men now awaken to find an overdrawn bank account and no job.

Because of the devastation of the war, railroad and other workmen in this country were permitted almost to name their own terms; they profited at the expense of the unfortunates on the other continent. The war is now behind us, and the people of Europe are again at work producing and in competition with us; and we can no more avoid the result of this competition by fiat or resolution, as Jewell proposes, than we can escape by wings to the moon. Railroad labor took the lead in wage advances, and if it does not take the lead down, it will at least have to come along with labor in other lines. There is no peculiar or special fitness required in railroad labor which justifies calling it an excepted class; and the level-headed men in the ranks do not expect it.

Such extravagant statements as these attributed to Jewell come near to being treasonable; certainly unpatriotic; and it is only a little less criminal for the press to give them publicity. They incite the ignorant and unmoral element finally to class hatred and to crime, and they retard the readjustment now so necessary for the good of all. If Jewell will get away from Chicago long enough to get his ear to the ground and listen to the more intelligent of the men he presumes to represent he will hear the whisper, "We prefer work for all, at wages that will start the mills and factories; then, as a result of increased production, prices of life's necessities will come nearer to our reach; and never before."

If there were one thing more striking than another in all of our experiences incident to the great war it was that as wages were artificially held up and horizontally applied, efficiency decreased correspondingly.

We have an illustrative example in Russia today, where Lenine and Trotzky are "saving" the laboring class by the same fiat, i. e., less work and higher pay, with the sad results known to all the world.

There is a point of refinement and luxury (accompanied by lack of enthusiasm and interest and joy in labor) beyond which a nation cannot go and survive. Jewell and some of the other spokesmen for labor are cultivating the spirit of unrest and prejudice which make for that condition.

Spokesmen for labor have gone wild in their chase after luxury by legerdemain. Where today will you find one who dwells on the nobility of labor and the necessity (for the worker's best interest) to put enthusiasm into his work for the real joy in it? Or one who reminds his constituents that the real abiding joys of life come to the producer, not the spender; that man must finally "earn his bread by the sweat of his brow"?

Surely these are times which call loudly for consideration of the following words of the great Irish statesman, Burke; as loudly as did the times when they were uttered, nearly 150 years ago:

"Men are qualified for civil liberty in exact proportion to their disposition to put chains upon their own appetites—in proportion as their love of justice is above their rapacity; in proportion as they are most disposed to listen to the counsels of the wise and good, in preference to the flattery of knaves. Society cannot exist unless a controlling power over will and appetite be placed somewhere; and the less of it there is within, the more there must be without. It is ordained in the eternal constitution of things that men of intemperate minds cannot be free. Their passions forge their fetters."

When we indulge in sentimental and false self pity, we are tending toward bolshevism.

A RAILROAD WORKER.

undoubtedly bring a lower wage level. Raising piece rates always is difficult, cutting virtually impossible. How will a universal cutting be accomplished when readjustment is needed? This adjustment can be accomplished automatically in harmony with wage rates by the selection of a time-rate instead of a piece-rate system.

Simplicity and Flexibility

Keynotes of Time-Rate System

A time-rate system would involve solely the supplanting of a piece-price by a time allowance. It embodies simplicity, it is readily understandable by the worker and it automatically compensates for fluctuations in hourly rate. Furthermore, it furnishes the necessary data for comparing performance on the basis of man-hours, giving a standard which is independent of the wage rates. Another important characteristic of the time-rate system is that it insures to the worker the same proportionate increase in his hourly earnings for the same effort irrespective of any changes in the basic hourly rate.

Time, as previously explained, is the proper basis for a standard. Time can be determined for the performance of any given work, time records can be preserved to justify time standards established and the relation of actual time required to the time allowed measures the quality of performance.

Guarantee of minimum earnings at an established fair hourly rate should in justice be accorded the workman. Improper setting of the time allowance, faulty condition of the material, selection of unsuitable facilities, or other conditions beyond the control of the worker equally as well as lack of skill on the worker's part may be the cause of less earnings than the minimum guarantee.

Earnings at the flat hourly rate of an individual effort-paid worker, therefore, denote a need for investigation. They serve as an indicator or signal to arrest the attention of the local supervisor of the incentive system. Investigation will then develop whatever adjustment is required by the management or whether replacement or transfer of the employee is required due to his unfitness or lack of skill.

Time Rate System in Application

As explained, time replaces cost in the time-rate system. Thus instead of a piece-rate allowance of 25 cents for turning and fitting a knuckle pin to rod jaw only, a time-rate allowance of 30 minutes or 0.5 hours would be made. Assuming that the actual time required to perform this work was 20 minutes, so that three pieces are produced per hour, the earnings under time rate and piece rate systems with increasing hourly rates would be:

Hourly Rate	Earnings Per Hour			
	Time Rate		Piece Rate	
\$0.25	3 x 0.5 x 0.25	or \$0.375	3 x 0.25	or \$0.75
0.30	3 x 0.5 x 0.30	or 0.45	3 x 0.25	or 0.75
0.53	3 x 0.5 x 0.53	or 0.825	3 x 0.25	or 0.75
0.68	3 x 0.5 x 0.68	or 1.02	3 x 0.25	or 0.75
0.85	3 x 0.5 x 0.85	or 1.275	3 x 0.25	or 0.75

This, of course, presupposes that the piece-rate was not altered as the hourly-rate increased. Who knows how to increase the vast number of railroad piece rates and maintain a proper adjustment? Every time an adjustment is made someone must take action, while with the time-rate system the adjustment is automatic.

In simplicity and ready understandability by the worker, the time-rate system is similar to the piece-rate system. Earnings at the time rate are the product of the number of pieces multiplied by the time allowance (expressed as a decimal) multiplied by the hourly rate. Only one additional calculation is required, but compensation is provided for wage rate adjustment such as the piece-rate system cannot afford. Piece-rate earnings are the product of a fixed cost, i. e., piece price multiplied by the number of pieces.

Comparison of Time-Rate and Piece-Rate Application

The application of a time-rate and piece-rate system to a day's work is shown by Figs. 1 and 2 respectively, illustrating this similarity in ready application and simplicity of calculating earnings by the workman. Examples of the supporting work schedules for the time-rate and piece-rate system are shown in Figs. 3 and 4.

From these examples it will be observed that the application is virtually the same as that employed under the piece-

Department		Car		Date		1/25 1921	
Charge	Schedule Number	Number Pieces	Time Allowed	Total Time	Description of Work		
Car	6360	200	0.03	6.0	Rivets cut out of hopper floor and side sheets		
Car	6368	200	0.03	6.0	Rivets driven in hopper floor and side sheets		
				12.0			
Foreman						John Smith	Checked by
						Wm Jones	

Names of Workman	Date and Hours Labor Performed		Total Time Allowed	Per-centage	Hourly Rate	Earnings	
	Date	Hours					
Geo. Bear	25	4	4	60	48%	85	5/10
Henry White	25	4	4	60	48%	85	5/10
Total							10 20

Fig. 2—Typical Time Work Order and Distribution Cards

rate system. The only difference is figuring in time instead of money until the final computation, then converting into payroll equivalent. The only other main point of variance would be the necessity to set the time allowance upon a per-

Schedule Number	TIME RATE SCHEDULE		Time Allowed Hours
	STEEL CAR WORK		
	Schedule		
	Rivets cut out, includes cutting off, drifting or hacking out and removing material, as follows:		
E-3604	Rivets through end and side sheets, top or bottom angles, top corner tie plates, end sills and hopper floor or side sheets and center sills, 3/8" or 3/4" diam. each rivet, allowance per man		0.03
E-3608	Rivets driven with pneumatic hammer; includes heating and all work as follows: Rivets through end and side sheets, top or bottom angles, top corner tie plates, end sills and hopper floor or side sheets and center sills, 3/8" or 3/4" diam. each rivet, allowance per man		0.03

Fig. 3—A Typical Time-Rate Schedule

man basis and to avoid excessive manning of a job, by stating in the schedule the number of men required.

Time-Rate Insures Fair Application

Under the time-rate system, the ratio of time allowed to time consumed is a fair indicator of the quality of performance. Too often in the past this was not true with the piece-rate earnings as compared with day-rate earnings. The piece-work system has been utilized as a subterfuge to raise

wages when due to the necessity for false strict economy, it was difficult to secure authority for adequate hourly rates. Consequently, piece rates were based on earnings considered fair and desirable when working under piece-work conditions. For the reason stated above this "piece-work rate" was too often disproportionate to the hourly rate and resulted in an unusually large actual piece-work earning per hour. This condition introduces an additional serious complication to that already presented in the fixed-cost wage system in adjusting piece rates to the fluctuations of hourly rates following the trend of the labor market.

Another effect of the inflexibility of a piece-rate or cost system is the result where men of varying skill and conse-

Seasonal Coal Rate

Bill Reported Favorably

WASHINGTON, D. C.

THE FRELINGHUYSEN seasonal coal rate bill, amended to authorize the Interstate Commerce Commission in its discretion to prescribe seasonal differentials instead of having them fixed by law, was reported favorably by the Senate Committee on Interstate Commerce on May 16 after having been reintroduced in the new form by Senator Frelinghuyesen. The bill is to amend section 15 of the interstate commerce act by adding a new paragraph as follows:

(19) In order to promote continuous operation of coal mines, steady employment of coal miners, and economical use of facilities for distribution of coal, the commission is hereby authorized to initiate, establish, approve, or adjust rates for the transportation of coal during specified seasons or periods which shall be greater or less than the rates for other specified seasons or periods but which in the judgment of the commission will yield as nearly as may be the same annual revenue for like movement as rates without seasonal variation, to be maintained by carriers as a whole or as a whole in each of such coal rate groups or territories as the commission may from time to time designate for that purpose, or by such carrier or carriers as the commission may designate. The term "coal" shall include anthracite and bituminous coal, lignite, coke, including petroleum coke, and briquettes and boulets made from anthracite and bituminous coal and from coke. Whenever the commission is of opinion that an emergency affecting the transportation of coal and requiring immediate action exists in any section of the country the commission shall have, and is hereby given, authority, either upon complaint or upon its own initiative without complaint, at once if it so orders without answer or other formal pleading by the interested carrier or carriers, to suspend the operation of any schedule in so far as it affects coal rates, whether seasonal or not, upon filing with such schedule and delivering to the carrier or carriers affected thereby a statement in writing of its reasons for such suspension, and defer the use of such coal rates, and to initiate in lieu thereof such seasonal rates for the transportation of coal as in its judgment the emergency may require. The commission shall thereupon enter upon a hearing concerning the lawfulness of the schedule, the operation of which had been so suspended, and the proceedings thereon shall be the same as nearly as may be as those provided in paragraph (7) of section 15. Nothing contained in this paragraph shall be construed as repealing, modifying or denying any other authority heretofore conferred upon the commission.

Senator Frelinghuyesen's Report

In his report on the bill Senator Frelinghuyesen said in part:

The bill incorporates suggestions made by Chairman Edgar E. Clark, of the Interstate Commerce Commission, and it has the unqualified and unanimous approval of the members of that commission.

The committee believes that legislation of this character, authorizing the Interstate Commerce Commission to initiate lower freight rates on coal during the spring and summer months and higher rates during the fall and winter months, will tend to encourage consumers to develop storage accommodations, to accept deliveries of coal in advance of their seasonal needs, and thus to keep the mines operating more constantly throughout the year. The committee is of the opinion that such legislation will bring about the following beneficial results:

1. It will stabilize the price of coal. The capacity output of all the coal mines in the United States, assuming fairly constant operation, would far exceed the present consumption. The output of all these mines working as at present only intermittently during the spring and summer months and working to capacity during the fall and winter months is barely sufficient to supply the current needs and the greatly increased cold-weather demand for coal. During the winter the demand so nearly equals the currently available supply that scarcity prices prevail. In addition to this the actual cost of production per ton is unduly enhanced because the operator must during the time his mine is closed down or working intermittently keep together his organization and expend money for the upkeep and maintenance of the property, all of which must be added to the price of the coal which he

PIECE-WORK SCHEDULE

Number Schedule.	STEEL CAR WORK Schedule	Piece Price
E—3602	Rivets cut out; includes cutting off, drifting or backing out and removing material as follows: Rivets through end and side sheets, top or bottom angles, top corner tie plates, end sills and hopper floor or side sheets and center sills, 5/8" or 3/4" diam. each... Rivets driven with pneumatic hammer; includes heating and all work as follows:	.025
E—3610	Rivets through end and side sheets, top or bottom angles, top corner tie plates, end sills and hopper floor or side sheets and center sills, 5/8" or 3/4" diam. each.....	.025

Fig. 4—A Typical Piece-Rate Schedule

quently different hourly rates are employed on similar classes of work. In the event that the piece-work price is established upon a high rate man and later satisfactorily performed by a lower class workman, a decided overpayment as related to other workmen will result. Further in the operating of a piece-work price requiring the use of one or more mechanics, with one or more helpers, it will be realized that the respective earnings will be dependent upon the rates of pay and hours worked by each workman rather than upon their respective skill. In the event that a higher rate must be paid to retain helpers without a proportionate increase also being allowed mechanics, a pro-rating of piece-work earnings will increase the helpers' earnings and decrease the mechanics' without any modification in the proportionate share of work performed.

The dissatisfaction, or at least confusion, which thus frequently results under a piece rate or fixed labor cost system, from working men of varying skill and experience upon the same operation at the same piece rate, or several workmen of varying skill and experience upon the same operation and pro-rated together, can be satisfactorily overcome by a separation of the time and rate elements and the discontinuance of their combination in a piece-rate system.

Conclusions

This would be accomplished by the introduction of one of the available wage payment systems based on a time standard instead of a cost standard; the time-rate system described, however, being best suited for railroad operating conditions. Hourly rates must be allowed workmen consistent with their ability and the state of the labor market. A basic time system automatically accommodates itself to these variable demands and at the same time a system can be selected which will fully compensate the workman for effort expended in increasing production. And in the last analysis the merits to the management of the system selected are a balance between the incentive and the reduction in cost (both labor and overhead).

THE UNION OF SOUTH AFRICA will shortly seek a large loan in this country to purchase construction materials.

mines and sells during the rush season. If the demand for coal were reasonably constant throughout the year, many of these costs based on holding plant, capital, and personnel idle for a large portion of the time would disappear, and the price of coal would more nearly represent only current costs of production plus a reasonable profit, leaving no opportunity for charging scarcity prices during the months when the greatest amount of coal is consumed.

2. Such legislation will obviate very largely the pressing necessity for more coal cars. The present supply of coal cars, while totally insufficient to handle the fall and winter rush under existing conditions, would be fairly adequate to carry all the coal desired by consumers if this equipment could be kept moving with greater regularity throughout the year, as would be the case if the advantage of lower summer and spring freight rates could be held out to induce consumers to receive coal shipments in advance of their winter needs.

Would Remedy Inadequacy of Terminal Facilities

3. Such legislation would remedy the present inadequacy of terminal facilities. The large amount of coal which must now be transported within a comparatively short time in each year tends to glut already overcrowded terminals. The increasing inability of existing terminal facilities to handle extraordinary seasonal demands without entailing serious delays and disproportionate terminal costs is one of the most glaring weaknesses in the present American railroad transportation system, according to the testimony of Chairman Clark.

4. Such a measure would promote regularity of employment in the mines, and would thus settle most of the outstanding grievances of the miners.

The committee finds, from an examination of some of the disadvantages which might appear to inhere in the requirements of lower spring and summer freight rates for coal shipments, that most of these objections are untenable.

1. The revenues of the carriers would not be affected. A large amount of coal would still have to be mined and shipped in fall and winter to consumers who lacked the capital, credit, foresight, or storage accommodations to enable them to secure their supply during the warmer months.

2. The transportation of more coal in the spring and summer will not embarrass the railroads in handling other seasonal movements, e. g., crops. In some localities cars carrying grain are loaded only in one direction, returning empty to the point of origin because of lack of shipments moving in that direction. If coal could be encouraged to move at the same time, this wasteful practice of hauling empty cars might be at least partially eliminated. Operating conditions during the clear weather of the spring and summer months are much more favorable, so that railroads can better withstand heavy demands for transportation at that period of the year than during the fall and winter months when coal has heretofore moved in greatest volume. The cost to the railroads of transporting coal is also much less in warm weather, when locomotives can haul heavier trains, when they consume less fuel, and when fewer employees can handle more traffic.

3. The acquisition of more coal cars does not afford a practicable and complete remedy for existing difficulties. Under the Transportation Act, the Interstate Commerce Commission is given the power to require carriers to provide themselves with sufficient cars. But most of the railroads have neither the money nor the credit with which to buy a supply of coal cars adequate for current needs under the present system of large seasonal shipments, so it would be useless for the commission to order them to purchase this equipment. On the other hand, most of the railroads which have enough money or credit to finance such purchases already possess an adequate number of coal cars to care for the needs of their own patrons, and they could not reasonably be required by the commission to purchase additional cars to take care of the traffic of other lines.

4. It may be urged that the interstate commerce act now contains ample provisions to permit the commission or the carrier to institute lower summer freight rates for coal. The conclusive answer to this contention is that, during the many years that the same provisions have been law, this practice has never been introduced. The commission does not believe that it possesses the power to require the establishment of such seasonal rates on coal. It has never attempted to exercise this power, and its chairman states that it does not contemplate doing so in the future in the absence of further legislation. The commission assumes that, in prescribing rates and practices, it is not empowered to initiate new systems of rate making, designed principally to remedy general economic situations. It feels that this should be the subject of specific legislative authorization.

While a considerable number of coal operators appeared at the hearings and testified against the proposed legislation, the opposition of the operators was by no means unanimous. One of the most earnest advocates of this legislation is Eugene McAuliffe, of St. Louis, Mo., a gentleman who is interested in various coal mines and public utilities, and who has had many years of experience in connection with the operation of railroads. Most of the operators who opposed the legislation founded their objections on local considerations peculiar to their own properties in relation to the changes in rates proposed in this legislation. For example, certain operators whose coal is of such inferior quality that it will not store satisfactorily, feared the introduction of rates which will encourage the storage of the coal produced by their competitors. The sub-committee feels, however, that legislation which will result in incalculable benefit for the whole public, and which will entail but slight disadvantages for the great majority of mine operators, should not be denied approval because it may be injurious to the interests of isolated coal operators.

The committee realizes, of course, that the feasibility and effectiveness of the proposed legislation depends very largely upon the practicability of storing coal in large and small quantities. It therefore solicited and received a large amount of testimony from such experts as George Otis Smith, Director of the Geological Survey, various coal operators, and from coal dealers on this point. As a result of this testimony and from information secured through correspondence, the committee entertains no doubt whatever but that practically every kind of coal mined in the United States can be stored safely, conveniently, and cheaply. The tonnage of coal produced which cannot be stored satisfactorily is almost negligible.

Coal Industry Stabilization Bill

The committee also favorably reported Senator Frelinghuysen's "coal industry stabilization" bill. The object of this bill is to direct the Department of Commerce and the Bureau of Mines to make a careful study of all conditions pertaining to the coal industry, in order that the government may assist in stabilizing the coal industry and in working out the problems which now exist in the mining, distribution, and sale of coal.

The bill directs the Secretary of Commerce to investigate the production of coal, the stocks of coal on hand, the distribution of coal in commerce, and coal prices. In case of an emergency and whenever necessary in the judgment of the President, upon proclamation of the President, the Secretary of Commerce is directed to investigate costs and profits in connection with the mining, sale and distribution of coal.

Section 7 authorizes the Secretary of Commerce, upon request and to the extent he deems proper in the public interest, to place any information in his possession in the hands of public boards and commissions engaged in the arbitration, conciliation, or settlement of labor disputes in coal mines. The section provides that no information shall be given such boards which will disclose the business of any person.

Section 8 authorizes the Secretary of Commerce to investigate the practicability of a statutory zoning system defining the distance from the mine in which coal may be transported in commerce and requires a report by December 5, 1921.

Section 9 directs the Secretary of Commerce to investigate the practicability of the purchase of coal for the use of the government by one central agency and requires a report relative to the same by December 5, 1921.

Section 10 authorizes the director of the Bureau of Mines, under the direction of the Secretary of the Interior, to investigate the methods and processes for the storage, inspection, sampling, analysis, purchase, classification, and economical utilization of coal, with a view to determine the most efficient means for coal storage, and to obtain information relative to the processes involved in the preparation, transportation, and utilization of coal.

Section 14 requires the Interstate Commerce Commission to co-operate with the Secretary of Commerce in securing a proper distribution and use of coal cars, in order to promote the most efficient transportation of coal in commerce.

Economic Advantages of Large Freight Locomotives*

A Thorough Study of the Effect on Various Items of Expense
Is Necessary to Determine the Most Suitable Type

By A. F. Stuebing

Mechanical Department Editor, *Railway Age*

PROBABLY THE BRIEFEST presentation of the advantages of large locomotives is that made by James J. Hill: "Receipts are by the ton and passenger mile; expenses are by the train mile." It is not to be expected that such a general statement will hold good in all particulars, nevertheless it is true that a large proportion of operating expenses decrease as the train load increases, although not in the same proportion as the decrease in train miles. Under the operating conditions existing on most of the main line mileage of this country, the greatest possibilities for economy are probably still to be found in the adoption of locomotives of high capacity.

The large locomotive, designed merely for high rated tractive effort, is not a panacea for operating troubles. The first requisite is a design suited to the conditions of the operating territory, the traffic and the service. The relative advantage of specific designs is a problem in the economics of operation that must be solved by the application of engineering principles. It is a question of adapting the design to the operating and economic conditions and then co-ordinating the motive power with other facilities. The last requirement is of great importance for unless all the varied operations can be kept in step, the machine as a whole cannot run smoothly.

The adoption of improved motive power should be only one part of a co-ordinated program. Every appropriation for larger engines should carry with it, as an integral part, provision for facilities to insure the maximum utilization of the power. Engine terminals, shops, yards, the rolling stock and the track structure itself should be prepared to assist in obtaining the proper operating results. The co-ordination of facilities deserves careful study.*

The Selection of Motive Power

Has Far-Reaching Effects

The choice of motive power is of extreme importance because the characteristics of the power affect the earnings more than any other single factor and determine the efficiency of operation usually throughout the life of the engine. The problem of introducing new locomotives is similar to the problem of reducing grades and should be studied as thoroughly. The interrelation between the various factors affected affords large opportunities for savings and also for losses. No executive should be satisfied with a superficial analysis of the probable effect of a new type of power on operating costs. This is one of the problems of operation that has often been studied in a general way, but has seldom been analyzed quantitatively. The writer has made an attempt to develop a general method of determining the savings that might be expected from the use of high capacity locomotives, but at every step was so hampered by lack of accurate information that the conclusion was finally reached that there is no method of solving the problem without extensive research. Many investigations have been held up during the past few years, and the rapid changes in prices have made earlier data inapplicable. It would seem, therefore, that there is a large field for research in the economic problem of operation when normal conditions are restored.

A Shortcoming of Operating Statistics

The operating statistics as compiled at present are valuable for the analysis of existing conditions, but they furnish little information as to what would happen under other conditions. Thus the predetermination of operating results, which is most important from the standpoint of improved operation, is largely dependent upon the researches of the individual roads and of engineering organizations. Vast numbers of unrelated figures are compiled, but they are of little benefit in the solution of the general problem. What is needed is not merely a statement of the expenses under fixed conditions, but the rate of change of expenses under certain varying conditions, such as train load and speed. If such data were available, the analysis of operating results could be made more truly a diagnosis, rather than a mere post mortem. The investigation referred to above brought out numerous aspects of the economics of operation that apparently merit attention and a few comments on these points may be pertinent.

Many Factors Affect the Economic

Value of the Locomotive

Most of the available reports on the economic value of large locomotives consider comparatively few of the items affected. The comparative costs of wages of train crews, of fuel and water and of repairs to locomotives are often the only items considered. In some few cases the comparative mileage and fixed charges on the investment in motive power have been computed. This is not sufficient to determine conclusively the relative merits of various types of power. The locomotive has a direct or indirect influence on many items of expense in the maintenance of way, maintenance of equipment and transportation accounts. The real problem in determining the value of a locomotive is to find the effect that its operation will have on the sum total of these accounts. The complexity of the problem has apparently often deterred railroads from giving it detailed consideration. However, it is a matter that goes to the very heart of the problem of economical operation and the results of a thorough study should more than justify the labor involved.

It is the purpose of the following paragraphs to point out some aspects of the problem that apparently are deserving of attention. A search through the literature on this subject has failed to disclose fundamental data on these questions that is applicable to present conditions.

The Effect of Motive Power on

Maintenance of Way Expenses

Some roads have reached adverse decisions on the adoption of 2-10-2 type locomotives on the ground that the increased cost of roadway maintenance resulting from their use would more than offset the savings in wages. This opinion does not seem to be generally held, but as one of the arguments against heavy locomotives, it deserves recognition. Maintenance of way expenses make up about 17 per cent of the total operating expenses, but the greater part of the expenditures are independent of the character of the power. Much of the work of track maintenance is made necessary by the action of the elements, or by the necessity of maintaining the permanent way in suitable condition for fast passenger traffic. The

*A paper to be presented at the Railroad session of the Spring meeting of the American Society of Mechanical Engineers, Congress Hotel, Chicago, May 26.

expenditures which are most directly affected by heavy locomotives with long, rigid wheel base are rail, ties and track laying and surfacing.

There is little or no information available as to the comparative effect of four and five pairs of coupled wheels on rail wear and the other accounts affected. The more rapid wear of tires indicates that the effect on the rail is appreciable and the tendency to straighten out the track, no doubt, increases the cost of maintaining it in line. The actual effect will vary according to the wheel base, the curvature of the road and whether the locomotive has one or more pairs of drivers equipped with lateral motion devices.

The sum of the maintenance of way expenses which may be increased by heavy motive power is about 10 per cent of the total operating expenses and if the effect is to increase these items considerably, the saving will be difficult to make up in other accounts. However, if the wear and tear on the track is merely proportional to the weight of the engine, as is sometimes assumed, light and heavy engines would be on a par as regards these items. The difference of opinion on this question suggests the necessity for a careful investigation.

Maintenance of Equipment

In any study of locomotive operation the cost of equipment maintenance deserves careful attention. The percentage of the total operating expenses falling in this classification has shown a fairly consistent increase over a considerable period. Locomotive repairs and renewals, which in 1898 amounted to 5.9 per cent, in 1918 had increased to 11.7 per cent. So many factors may influence this ratio that no definite conclusions can be drawn, but it is significant nevertheless.

The principal difficulties in maintaining large locomotives are due to the short life of driving wheel tires, driving boxes and main pin bearings. With the proper facilities and proper construction the work of caring for these parts becomes merely a matter of routine running repairs, but where the lack or inadequacy of terminal facilities hampers repairs, the loss of service due to these minor items may become serious. In extreme cases the mileage per month may be reduced so much as to make the fixed charges per ton mile unreasonably high. It is hardly necessary to point out that this should not be charged against the locomotive itself.

While the foregoing remarks are confined to some of the more important items of roundhouse maintenance, they are equally applicable to the work of classified repairs. If the shops and shop machinery are not adequate for new power, repair charges will be high and the time out of service will be increased. The cost of these facilities should be considered when estimating the saving that may be effected by new power. The shop should be regarded as an accessory that is essential to the efficient utilization of the large investment in motive power. Too often the question is decided on the basis of the direct saving on repair operations, without considering the value of the locomotive days saved by proper facilities.

Wide differences of opinion appear to exist regarding the relative cost of maintenance and mileage of 2-10-2 type and Mallet locomotives. While the field for each is to a certain extent distinct, there are districts where either might be suitable and roads that have sufficient data to permit a fair comparison could perform a service by furnishing information that would clear up this question.

Long Trains May Increase

Car Repair Costs Considerably

A very serious problem in connection with the use of locomotives of high capacity is the effect on the cost of repairs to freight cars. The total amount spent for repairs and renewals is nearly as great as the repairs and renewals to freight, passenger and switching locomotives combined. When

the length of trains is increased beyond a certain point, break-in-tows, shifted loads and damage to the cars in general may increase at a rapid rate. It is not inconceivable that the expense resulting from hidden damage may nullify savings in other items. Local conditions determine whether or not this is an important factor. The effect of increasing the length of the train would be but slight where short heavy trains of steel cars are hauled. It may be serious where the road cannot control the character of equipment in the trains, where the car load is light, the train long and the lading is subject to damage, or of such a nature that it may shift and damage the car. It is significant to note that the study of the operation of Consolidation and Mikado locomotives made by N. D. Ballantine showed the time delayed due to car failures was more than twice as great with the Mikado engine, which had a tractive effort of 57,000 lb., than with the Consolidation of 39,000 lb. tractive effort. No record is available of the cost of repairing the cars involved in these failures nor the defects noted at terminals that were chargeable to unavoidable shocks incidental to the operation of the longer train.

A study of car failures in long trains may demonstrate that the trouble is largely due to equipment with weak underframes. The greater portion of the damage is done to the draft gear and sills, and it is doubtful whether sills meeting the recommendations of the American Railway Association would fail except under the most extreme stresses set up by surging in trains. If wooden underframes are a serious hindrance to the operation of long trains, the remedy can be applied with little difficulty. While the reinforcement of the remaining cars of this type still in service would require fairly heavy expenditures, it would no doubt be justified by the saving in repair costs and improved operation.

Transportation Expenses

The character of the motive power has a decided influence on the expenses falling under this head. Directly or indirectly, the locomotive affects items in the transportation expenses which amount to about 35 per cent of the total operating expenses. However, some of the accounts seem to be affected only slightly and the importance of locomotives, which are merely capable of delivering high tractive effort at low speed in reducing transportation expenses, has, no doubt, often been overestimated.

Two of the important items which are reduced almost proportionately as the tractive effort increases are wages of train enginemen and trainmen. The economies in these expenses are considerable and they can be predetermined with a fair degree of accuracy. Probably for this reason they have assumed undue prominence. In the year 1918 the wages of train employees amounted to 10.5 per cent of all operating expenses. The fuel bill for road engines was practically as much. The cost of locomotive repairs was even greater and freight car repairs only slightly less.

Relative Importance of Fuel and Wages of Train Crew

Some of the costly measures necessary to obtain slight increases in the train load can probably never be justified on the basis of the savings in the wages of train crews and some of the related savings are problematical. Railroad officers when considering means of promoting economy might well keep in mind this thought: The gross saving due to a given percentage reduction of the mileage of train enginemen and trainmen under average conditions is equalled by the saving due to a like reduction in the consumption of fuel.

Passing to the consideration of the relative fuel consumption of heavy locomotives, each increase in size results in slightly better fuel performance, provided that similar care is used in the design. The essential features of an efficient boiler are large grate area, ample firebox volume and tubes of suitable length to prevent excessive losses in the waste gases. All these can be obtained in the 2-10-2 type or other

heavy locomotives. The large cylinders used with such power are also advantageous because the smaller ratio of the area to the volume reduces the heat loss in the cylinders. Within the range of normal operation, however, the difference in the fuel consumption per unit of work with a well-designed locomotive of the 2-10-2 type and the Mikado type, for example, is probably negligible. The remarkable fuel performance credited to some designs of Mallet compound locomotives suggests the advisability of establishing in as conclusive a manner as possible the comparative results of this type of compound and typical large simple engines.

**Some Items of Expense That Have
Been Given Little Attention**

The expenses directly chargeable to train service aside from fuel and wages, include lubricants and locomotive and train supplies. These items are of less importance than those previously mentioned and, in general, the charges per ton mile decrease as the tractive power increases.

The expense of yard operation is seldom considered as being influenced by the character of the road engines. In hump yards the cost of switching is probably independent of the length of the train. However, in drilling yards the necessity of hauling long cuts of cars reduces the speed of switching and increases the fuel used. While the net result is largely dependent on local conditions, this factor is of some importance and should not be passed over lightly in analyzing problems of operation with heavy power.

Enginehouse expenses likewise are affected by the character of the power to an extent depending on local conditions. The reduction in the number of units handled will cause a slight decrease in the cost per ton mile unless the new equipment requires additional facilities.

While the major items of operating expenses which enter into the problem of large locomotives have been discussed above, it is pertinent to enumerate several miscellaneous items which are affected to some degree. These include accounts affected by collisions and derailments, loss and damage, damage to live stock, clearing wrecks and injuries to persons. The effect of car failures on loss and damage has already been mentioned. Insofar as these expenses are due to collisions and derailments, they are increased by an increase in train density, rather than by an increase in the length of the train and would therefore be reduced by the use of locomotives of high capacity.

Fixed Charges

The only fixed charges on road and equipment which appear in the operating expenses are the depreciation charges on certain parts of the plant. While the separation of interest charges from labor and material may be desirable in the general balance sheet, the analysis of the advantages of various facilities is best made by considering the net amount that can be earned above the prevailing rate of interest.

The fixed charges on the motive power seldom exceed three to four per cent of the operating expenses. The difference between the fixed charges on a thoroughly efficient modern engine and a crude design that might be bought to make an insufficient appropriation to cover a given number of locomotives is negligible. However, the difference in the earning power of these two types is quite appreciable and serves to show what large returns can be derived from the additional capital expended for refinements and accessories that give increased capacity and efficiency.

Reference has already been made to the advisability of considering the capital expenditure required for related facilities when deciding on the type of power. At first thought it might seem that the additional investment for terminals, shops and shop machinery would add greatly to the capital expenditure and the fixed charges. Under ordinary conditions the cost of roundhouse space required properly to house

a locomotive is a comparatively small proportion of the cost of the power. The cost of the shop buildings and machinery is even less important when the added efficiency and decreased cost of repair operations is considered.

Sometimes the introduction of heavy locomotives necessitates strengthening or replacing bridges or laying heavier rail over certain sections. The expenditures involved are often quite large, but the relatively long life of these structures decreases the fixed charges and the additional cost per ton mile becomes comparatively small and is seldom an important factor in determining the most economical equipment. When new rail must be laid the additional expenditure is a more serious item and the charge would probably not be justified except on a line with relatively dense traffic.

The preceding discussion pointing out the more important considerations involved in a study of the economic value of various types of motive power demonstrate the complexity of the problem. Probably no absolutely correct analysis is possible; surely, it is not practicable. The question is of extreme importance because the possibilities of economical operation are circumscribed by the motive power. For that reason the choice of the locomotive should be made with extreme care. The final decision should be based on a definite knowledge of the economies that can be realized, not on unsupported opinion. Engineering methods are essential in working out the solution and the study of the problem offers a field for constructive, co-operative work by the members of the engineering societies.

**Southern Roads Decline to
Reduce Melon Rates**

WASHINGTON, D. C.

SOUTHERN GROWERS of watermelons who have been seeking a reduction in freight rates on the ground that they are not receiving compensatory prices for their products were advised to try to obtain a larger share of the price paid by the consumer which now goes to middlemen, in a letter from Vice-President Green of the Southern Railway to Senator Harris of Georgia, who has been trying to assist the melon growers and had been instrumental in arranging for a conference between representatives of the growers and of the carriers, after a conference with the Interstate Commerce Commission. Mr. Green's letter advised that the southern roads do not feel that the circumstances warrant a reduction in the melon rates and that it is doubtful whether either the grower or the consumer would receive any benefit from a reduction in freight rates.

Mr. Green said in the letter:

Asking that you pass this advice to your colleagues who accompanied you in recent visit to my office, I beg to report that an informal conference between representatives of the watermelon growers and representatives of the carriers was had in Macon, Ga., on April 26.

From the report which I have of this conference, I am led to believe that while there was some division of opinion as to the effect of the increased transportation charge on the ability of the watermelon producer to market his crop it was probably the feeling of the majority, if not all, that the transportation charge was not an important factor in the situation.

In order that you may see at a glance what the last advance in freight charges represents—using an average load of 1,000 melons at an average weight of 27 pounds each, I invite your attention to the following tabulation. Using Albany, Ga., as a representative shipping point the advance per melon is as follows:

Baltimore, Md.....	4.2 cents
Philadelphia, Pa.....	4.8 "
New York, N. Y.....	4.9 "
Buffalo, N. Y.....	4.9 "
Pittsburgh, Pa.....	4.8 "
Chicago, Ill.....	4.7 "
Cincinnati, O.....	2.3 "

It developed at the meeting that the returns to the growers

on last year's crop were very small, averaging about \$75.00 per car and using the same estimate as above approximated 7½ cents per melon.

The last investigation into the price at destination yielded the fact that the consumer paid very much more than was warranted by the returns to the grower plus the transportation charge. For instance, it was shown that melons yielding the grower 7½ cents and the carrier 12.7 cents, Albany to Baltimore, or a total of 20.2 cents for the producer and the carrier, sold in Baltimore for \$1.

It was stated at the meeting that certain carload shipments of melons from Stilson, Ga., to Chicago in last July yielded the grower approximately \$50 per car. Figures were submitted from the Government report (Bureau of Markets daily market report) which showed the average sale at Chicago for melons ranging from 18 to 31 pounds during July, 1920, to have been \$349 per car of 24,000 pounds, based on every other day sales. The freight rate from Stilson to Chicago during July, 1920, was \$134.40 per car of 24,000 pounds and war tax \$4.03, making a total of \$138.43, which deducted from the average sale price left \$210.57 for the grower and speculator, which it seems was divided by the grower receiving \$50 and the speculator \$160.57.

It is reasonably certain that the grower would not receive any substantial addition to his price through a reduction in freight rates. I do not believe the consumer would get the advantage of such a reduction.

The citrus producers in Florida and on the Pacific Coast and the Georgia peach growers long since learned that they could not get fair returns on their crops by handling through commission houses in the markets of consumption and accepting whatever return the commission man rendered. They therefore formed associations and created selling agencies which have produced much more satisfactory results. The distribution under this plan is more intelligent and glutting the markets is avoided with its consequent depression of prices.

The interested carriers wish me to say to you that they do not feel that the circumstances warrant reduction in the melon rates.

In presenting this letter in the Senate for publication in the Congressional Record, Senator Harris said it "shows the amount of profiteering going on on the part of the commission merchant and the retailer" and he had taken that phase of the matter up with the Federal Trade Commission.

Short Line Problems Discussed

WASHINGTON, D. C.

THE AMERICAN SHORT LINE RAILROAD ASSOCIATION began a two-day annual meeting at Washington on May 18. President Bird M. Robinson presented a report outlining the work of the association and the problems for the future in which he said in part:

The American people have apparently lost their sense of justice in considering the railroad question. They have, in years past, followed the cry that the public must be served regardless of the rights of the owners of the properties, and during that period have enforced a policy of restriction to such an extent that they have practically starved most of the railroads.

The government took possession of the great majority of the railroads of the country for war purposes, and after operating them in an extravagant and reckless way, returned the properties to their owners not only in a dilapidated condition, but saddled with ruinous wage contracts, which have since resulted in sapping their very life blood. When returning the roads to their owners the government gave to one of its agencies unlimited power to regulate the rates to be charged for services, and gave to another agency unlimited power to determine the wages to be paid to their employees.

The result has been most disastrous for notwithstanding a large increase in rates, the revenue received has not been sufficient, in most cases, to meet operating expenses, and as a result of such limitations and impositions, solvent companies have rapidly progressed into bankruptcy.

For the purpose of developing the facts, the Senate, through its Committee on Interstate Commerce, is now engaged in an investigation of the difficulties confronting the railroads. We confidently hope that that investigation will clarify the atmosphere and remove the smoke and poison which has been injected into the situation; and at least result in a clear understanding by a majority of the Senators and Members of the House of the true facts, and of the emergency which confronts the carriers.

In the meantime, however, a large number of bills have been introduced in Congress, not only to amend the interstate commerce statutes as amended by the transportation act, but to add new and burdensome restrictions upon the carriers. The great majority of all the bills so introduced are intended to further curtail the limited authority left to the owners of the properties and to impose additional burdens.

The parties behind these various bills in Congress are prepared to fight vigorously for their adoption and it will be necessary for the carriers to be prepared to defend themselves earnestly and strongly at all times and under all circumstances; otherwise they will be afflicted with additional burdens and restrictions.

The efforts of the carriers to break the strangle-hold of the labor unions and to reduce the amount of wages paid to employees to a degree commensurate with revenues received, has precipitated a fight that has not heretofore been equaled for misrepresentations and brutish villification. The labor leaders have not only used every device to create a smoke screen for the purpose of obscuring the question at issue, but they have vigorously sought to use poison gases of untruths in the hope that they could thus kill off the efforts being made by the carriers to save about \$1,000,000 per day, which they are being forced to pay to employees beyond the amount that should be paid. Only a part of the public seem to realize that in the end it must pay this extraordinary bill, and that therefore the fight of the carriers is for its benefit, as well as their own.

The trunk roads have two very strong associations and many subordinate organizations, for the purpose of promoting efficiency and standardization and to protect their interests. While the short line railroads of the country are large in number, they are limited in mileage, and are very greatly limited in available funds. They cannot maintain more than one organization, but they can, by proper efforts and full co-operation, maintain one very strong and effective association at a cost very small when compared with results accomplished. The surrounding conditions compel that class of roads to increase and strengthen, to the fullest extent, this association, as it is the only organization available, and is the only one that has ever accomplished any substantial results for that class of roads throughout the country.

This meeting must recognize that joint and co-operative effort at this time is the only means or way by which roads of the non-trunk class can obtain protection and secure living conditions in the future. Hence the delegates should carefully consider the association as such, and adopt such plans and devise such means as will insure, not only a continuance of the efficient work heretofore done, but which will lead to greater benefits in the future.

There are about 300 additional short lines in the country that should become members, and the delegates at this meeting should consider ways and means by which these non-member lines could be impressed with the fact that they are not doing their duty to the lines that are members, especially those non-members which constantly and unblushingly take advantage of what the association does, without in any way participating in the work or rendering any assistance in accomplishing the results.

I have just made a careful review of the results accomplished by this association during the past five years, and am convinced that, taking into consideration the amounts actually obtained and recovered by the short lines of the country, or which they would have had to pay had the association not protected them in such instances as the Adamson law, and Wage Decision No. 2, together with the benefits obtained in the federal control act and from the Railroad Administration; as well as those which have accrued under the Transportation Act, but not including the \$8,000,000 or \$10,000,000 per year to be recovered through increased divisions, in the aggregate will be in excess of \$75,000,000; and that great result has been accomplished at a cost for the whole support of the association for the last five years, which is less than one-third of one per cent of those benefits.

Circumstances clearly indicate that it is vital to the short line railroads that this association be continued. In fact, there are strong indications that the organization will be needed to a greater extent in the future than it has been in the past. It is quite apparent that the government is participating more and more in the management of the carriers, and that Congress and the legislatures will have under constant consideration the enactment of laws that will affect the carriers more and more.

J. H. THOMAS, member of the British parliament and secretary of the National Union of Railwaymen, was met on his arrival in New York on May 11 by such banners as "Thomas is fleeing the wrath of his country" and "Judas hanged himself after the betrayal. Will Thomas do likewise"? Those carrying the banners proclaimed themselves members of the "Irish American Labor League" and it is understood that their animosity toward Mr. Thomas was occasioned by the failure of his union to join the striking English miners.

Non-Interlocking, No-Stop Railroad Crossing

A Proposed Signal Layout to Control Train Movements Automatically at Intersection Points

By L. B. Porter

Assistant Signal Engineer, Chicago, Milwaukee & St. Paul, Milwaukee, Wis.

THE ECONOMY produced by the elimination of train stops has been the deciding factor in favor of the installation of interlocking plants at railroad crossings and junctions. The large number of non-interlocked crossings, junctions and terminals throughout the country, over which thousands of trains are moved daily with a comparative freedom from accidents, proves conclusively that interlockings are not necessary from the standpoint of safety alone.

Careful studies, calculations and tests were made several years ago which resulted in the estimate that 45 cents would represent the average cost of stopping a train. With this as a basis it was felt that an interlocking plant would be a paying proposition when 20 or more train stops per day could be eliminated. Today the cost of stopping trains is much higher, but the cost of installation, maintenance and operation of a complete interlocking plant has also increased

The stopping of trains before reaching any railroad crossing or junction at grade is required by law, unless certain safe-guards are provided, in which event the state laws grant non-stop privileges. The following is taken from one of the state laws relating to stopping trains at crossings,—“Every company operating a railroad shall cause all trains on such railroad to come to a full stop, not less than 10 nor more than 60 rods before reaching any railroad junction or crossing at grade, unless such stoppage is rendered unnecessary by an interlocking plant or other device approved by written order of the commission or by the court upon appeal.” The statutes in other states are usually drafted along the same general lines as the one quoted.

It will be noted that an automatic arrangement of signals may be approved at the discretion of the railroad commission and that the different forms of interlocking heretofore used almost exclusively are not the only forms of protection that could be considered. The writer knows of one state where the commission's engineer has stated that an automatic signal arrangement would be approved in lieu of interlocking protection for the ordinary simple crossing or junction. Furthermore, several actual installations of this nature have been made in other states where the commissions have given their approval and the crossing or junction stop has been eliminated.

Application of Automatic Signal Arrangement at Junction

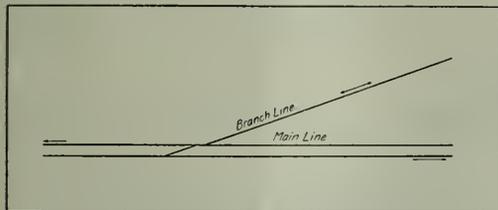


Fig. 1—Junction of Single with Double Track Line

greatly so that it will require careful estimates to prove the economy effected by the installation of a complete plant unless the traffic is quite heavy or local conditions of stopping and starting trains are unfavorable.

Substituting Automatic Signals for Interlocking

The main items of expense connected with an interlocking plant are the operators' salaries, tower supplies and maintenance of the movable parts of the plant. If these items could be eliminated there is no question but that it would pay to prevent unnecessary train stops at crossings or junctions, even though the traffic were comparatively light. Obviously it is impossible to eliminate these items and still retain an interlocking of the type which permits the passage of trains without stopping.

The question then arises: Would it be possible to substitute any other arrangement, less expensive, in place of the complete interlocking? It has been truly said that "A problem is half solved when correctly stated." The statement of this problem is: To provide a system of signal indications for governing train movements at railroad crossings and junctions, so arranged as to prevent simultaneous conflicting movements and not to require manual control except possibly during certain periods. There would be no objection to speed restrictions at these points, although the full train stop is to be avoided except where one train must give preference to another. The solution of this problem is: An automatic signal arrangement with selective controls for the signals and with certain modifications of signal circuits now in use.

As an example of what it would be possible to accomplish in the way of using an automatic arrangement in place of an interlocking plant, let us consider a simple junction of a single track line with a double track line such as illustrated in Fig. 1. There are numerous junctions of this kind located at outside points, away from towns, where there is no station work, and as the double track line is equipped with automatic block signals, and as the distance to stations on either side of the junction is not very great, there is no necessity for maintaining a telegraph or block office at the junction point. The traffic on the branch line is of minor importance. In some cases it is of such a nature that there would be no objection to or hardship in having train crews handle their own switches. In other cases the train movement can be almost entirely confined within an eight or nine-hour period so that one operator can handle the switches for the few train movements involved. Yet at present, a complete interlocking plant operated by three levermen is maintained—not because traffic on the branch line requires it; not because an open office is required on the main line; not because safety requires it; but because this is a junction point and the state law specifies that all trains must make the stop unless an interlocking plant "or other approved device" is provided, and the road can not afford to stop its main line trains. Were it not for the semi-automatic features of the home signals and the objections to leaving an interlocking plant unattended, the routes on the main line would be left normally lined up during the greater part of the 24-hr. period and the tower would be closed.

Bearing in mind that the interlocking now in use is not required primarily to handle the switches for the branch line,

but that its main function is to permit main line trains to pass without making the prescribed stop and to safe-guard such movements properly, would it be possible to dispense with the interlocking and use automatic signals instead? An arrangement of signals similar to that shown in Fig. 2 is suggested.

The crossover and junction switches are hand throw and are operated by operators employed on one or more shifts as conditions may require, or by trainmen if the branch line traffic permits. Signal No. 2 governs movements from the main track to the branch line and clears up automatically when both crossover and junction switches are thrown. Signal No. 4 clears up when block sections "B" and "D" are unoccupied and the junction switch is thrown. Signals No. 1 and No. 3 govern main line movements and are controlled the same as standard double track automatic block signals in all respects, except that signal No. 3 (and its distant signal) will show caution with a train approaching on the branch line in section "C". The crossover and junction switches must, of course, be in the normal positions for the main line signals to clear. The selection of controls through the switches prevents the simultaneous clearing of conflicting signals and

authority for the movement. If the telephone communication should be interrupted for any reason, or signal No. 4 should fail to clear, the movement onto main line would have to be made under the protection of a flag.

There would, of course, be other ways of handling the movements from the branch to the main line, such as requiring the lapse of a time interval after throwing the junction switch before a train fouls the main track so as to provide a longer overlap or a track circuit overlap might be used for the main line as well as for the branch line signal. An electric lock could be provided on the junction switch, which would be controlled through approach sections on the main track, to prevent throwing the switch with the main line train approaching. A derail might be provided on the branch line to work in connection with the main line switch and the electric lock to insure branch line trains stopping back of the fouling point. However, if proper discipline is maintained, these additional features should not be necessary.

Advantages of the Automatic Arrangement

The proposed automatic arrangement would give practically all of the non-stop advantages of an interlocking plant,

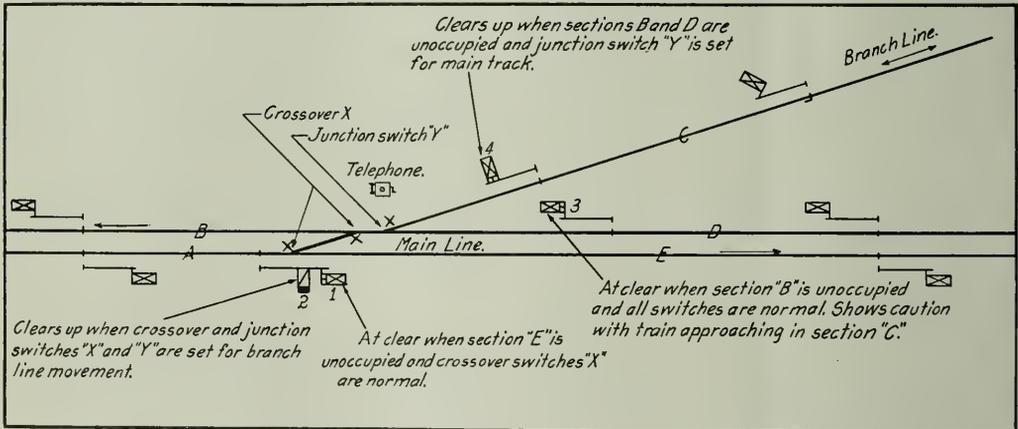


Fig. 2—Automatic Signal Arrangement at Junction

takes the place of an overlap. If desired, signal No. 4 could be made a normal-danger signal with a short clearing section, so that it would not clear up until a train had nearly reached it. This would have the effect of imposing a speed restriction on main line trains approaching the junction from this direction. Switch indicators would be provided on roads using this type of apparatus so as to prevent the throwing of switches in the face of approaching trains.

Trains on both the main and the branch line are operated under one dispatcher and under the same time card; therefore, a movement from main line to branch line "A" to "C" would be identical with any crossover movement in automatic block signal territory and would have the same signal protection. If the switches were handled by train crews, signal No. 2 would probably not be required. During the hours that an operator might be on duty at the junction, there would be no difficulty in taking care of movements from the branch to main line, since he would be fully advised as to main line movements. At other times trains on the branch line would get information regarding main line movements from the last open office on the branch, and before making any move to come out on the main line at the junction, would get into telephone communication with the dispatcher or operator at the main line station and first get the necessary

for main line movements and at a much lower cost. It would be possible to dispense with from one to three levermen and the cost of maintenance and operation would be much lower than for an interlocking plant. A smaller investment would be required for the automatic arrangement, which would reduce the taxes, the interest and depreciation charges. Delays to traffic due to the failure of the complicated electrical features of modern interlocking plants; and delays due to the difficulty of keeping switches, derails and movable parts of a plant free from snow and ice, would be decreased. An automatic arrangement is usually more flexible than an interlocking plant. Taking all of these features into consideration, a conservative estimate of the saving would be from \$300 to \$800 per month in favor of the automatic arrangement, depending upon the number of men required to handle the switches.

Disadvantages of and Objections to

The Automatic Arrangement

It is admitted that movements to and from the branch line may be somewhat handicapped under the proposed arrangement, especially if trainmen have to handle their own switches; but only junction points where facility in handling branch line traffic is of minor importance are being considered

in this discussion. The first and main objection to the proposed scheme perhaps would be that safety in train operation would be sacrificed, as derails could not be used with an automatic arrangement. Apparently there is a difference of opinion regarding the value of derails in main tracks. It is a well known fact that there are a large number of interlocking plants throughout the country at crossings, junctions, yards, and terminals where no derails have been provided. At some of these plants the speed of trains is high while at others it may be somewhat restricted. These plants without derails, the number of which is constantly increasing, cannot be considered unsafe by any means. On the contrary, the view seems to be gaining ground that the derails are no longer considered necessary, except at special locations. Indeed, it seems probable that derails have done more positive harm in causing unnecessary derailments when no danger existed than the good they may have accomplished in preventing accidents.

The function of the derail is two-fold: It has a moral effect on the enginemen in causing them to be more alert and ready to observe and obey the signal indication from the fear of the serious consequences of a derailment; it also per-

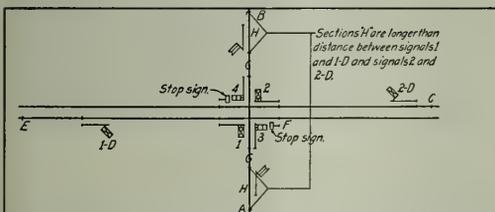


Fig. 3—Automatic Signal Arrangement at Crossing

forms the useful function of preventing possible collisions in case the engineman has lost control of his train and is unable to stop at the governing signal. It undoubtedly would be advisable always to retain the derail at certain locations where there are especially unfavorable conditions to be contended with such as a descending grade or a poor view of the signal. At such points an automatic arrangement could not be used, but it would seem that under ordinary conditions in this day of advanced signaling practice when trains are governed almost entirely by signal indications, when surprise tests are made regularly, and rules rigidly enforced, the main-track derail could be dispensed with almost entirely.

Are the chances of accident any more numerous or would the consequences be any more grave were a train to disregard an automatic signal at a junction point where no derail is used than if it should disregard a distant signal governing the approach to a signal governing over a derail; or if it should disregard the *caution* indication of an automatic signal, when running at 60 mi. an hr. two blocks behind a first-class passenger train that had stopped just out of view around a curve and the flagman failed to perform his duty; or where the automatic signal was at *stop* due to a piece broken out of a rail; or where it was due to a misplaced facing switch or an open switch point? Would the consequences be any more grave than if the engineman failed to observe a train order signal, a staff signal, or a controlled manual signal and the train proceeded on its way against an opposing train?

The argument may also be advanced that an automatic signal at a remote point is more likely to be disregarded than a manually controlled signal; also that the proposed scheme would require occasional movements to be made under flagging protection and that this could not be depended upon. Now these are conditions depending upon the discipline a

road maintains, but the odds are in favor of there being no accident at the junction, especially if an operator is employed to handle all or most of the regular movements, as against the chances of an accident at an automatic signal governing movements into a station where considerable switching movements are made daily. To admit either of these arguments is to admit a fundamental weakness in the discipline that is maintained and that train operation under the automatic block signal system is not safe on such a road.

Applications of Automatic Arrangement at Crossings

The use of automatic signals to govern train movements over a railroad crossing would involve some complications not encountered at the junction point, for the reason that in most cases the line crossed is owned by another company and train operation is entirely independent on each road, there being no common time-tables in use, and trains on one road have no knowledge of the time of arrival of trains on the other road. There are train movements in four different directions to be taken care of, whereas at the junction practically two movements only have to be considered, and one of these does not involve any special features. To prevent simultaneous conflicting movements at the crossing, full track circuit overlap protection in all four directions is necessary. The complications at the crossing are more serious as the traffic becomes heavier. But there is a certain class of crossings where it would be possible to work out an automatic arrangement that, for all practical purposes and within reasonable limits, would answer the purpose.

Take, for an example, a simple crossing of a single-track road with a double-track road, traffic on the double-track road being heavy and it being equipped with automatic block signals, while traffic on the single-track is comparatively light. An interlocking plant has been installed, and is maintained by the first-class road for its sole benefit, as the single-track road would have no objection to making the crossing stop. The crossing may be at a remote point, as at the junction, and the men who operate the plant are required for that purpose solely. While the plant may handle one or two passing track switches or a crossover, this is merely incidental, as the other passing track switches and crossovers on the division are not interlocked, and the main function of the plant is to avoid the crossing stop for the trains on the double-track road. The traffic on the single-track road often is of minor importance, and in some cases it consists of the movement of one mixed train in each direction daily except Sunday. The writer knows of one case where it consists of only one regular train movement, down one day and back the next. Yet, in order to avoid stopping its trains, the first-class road has installed a complete interlocking plant, and because of its semi-automatic features and the objection to leaving it unattended, it is necessary to maintain three levermen to operate the plant continuously.

Looking at the matter from an unprejudiced and unbiased viewpoint, giving due consideration to safety, and bearing in mind the urgent necessity at this time of reducing operating expenses, it would seem possible and advisable to eliminate the derails and to substitute an automatic signal arrangement in place of the interlocking plant. If desired, an operator could be employed during the hours when regular trains on the second-class line were scheduled to arrive, who would handle the crossing signals so as to give preference to superior trains during the time he was on duty. The crossing signals would be equipped with number plates and operated as stop and proceed signals, so that there would be no difficulty in closing the office at any time.

An arrangement of automatic crossing signals for a simple crossing of the kind under discussion, where traffic on one road is of minor importance, is shown in Fig. 3. All crossing signals stand normally at *stop*. Signal No. 1 clears up when a train enters the clearing section at E, provided

its immediate block is clear and track sections *A* and *B* on the other road are unoccupied and signals No. 3 and No. 4 are at *stop*. Signal No. 1 is controlled through a stick relay in such a manner that after it has once cleared and the train has passed distant signal No. 1-D at clear, the approach of a train on the single-track line will cause this signal to indicate *caution* only, so as to avoid tripping the signal in the face of a train. Signal No. 1 would, of course, in all cases be controlled to the *stop* position by the track circuit between signals No. 3 and No. 4. Signal No. 2 is controlled in the same manner as signal No. 1. Signals No. 3 and No. 4 clear up when the train is on the short clearing section *G* (this control being directional), provided track sections *C-D* and *E-F* are unoccupied and signals No. 1 and No. 2 are at *stop*. No signals are provided for the reverse current movements on the double track. When such movements are made, the regular crossing stop would have to be made. It will be noted that the simultaneous clearing of conflicting signals is prevented by overlap track sections and the control of each signal is carried through normally closed controllers on all conflicting signals.

The proposed arrangement could, of course, be modified in many different ways. In case an operator is employed during certain periods, some of the automatic control features could be replaced with manual control. If desired, the crossing signals on the double track road could be controlled through short clearing sections immediately in the rear of the signal, the same as proposed for the single-track road, which would act as a speed restriction in requiring trains to come almost to a stop before the signal would clear. Or, if desired, operative distant signals could be provided on the single-track line, together with preliminary clearing sections and full overlaps on both roads.

An arrangement of similar nature could be used at single-track crossings, although it would, of course, be necessary to provide crossing signals for movements in both directions on both lines. The directional control features of absolute-permissive signaling could be used to good advantage and the circuits could easily be combined with a standard single-track automatic signal control scheme. It is not necessary to go into any of the details for the proposed layout, as the arrangement would vary, depending upon local conditions, the amount and nature of the traffic, and the standards used on the individual roads. Standard automatic signal apparatus could be used, making it a comparatively simple matter to design the actual circuits. The advantages, disadvantages, and objections applying at the railroad crossing would be practically the same as outlined for the junction point, although it is admitted that train operation at the crossing is more complicated.

Conclusions

There are numerous non-interlocked crossings and junctions where the initial expenditure for an interlocking plant would hardly be warranted, even if it were possible to obtain the necessary funds, and the cost of after-maintenance and operation of the plant would overbalance the saving resulting from its use. A study of conditions at these points in many cases would show it to be possible to use an automatic signal arrangement, thereby promoting economy and efficiency. Where an interlocking plant will cost from \$20,000 to \$30,000, the automatic arrangement will cost from \$4,000 to \$5,000. There are also opportunities for reducing operating expenses at points in automatic signal territory where plants are now maintained. The main consideration is to eliminate the derail where this can be done with safety, and to make the governing signals automatic in their operation. If this makes it possible to dispense with even one leverman or to eliminate some Sunday time, it will result in a considerable saving. In many cases the existing plant can be modified to accomplish this at a moderate cost.

A Novel Crossing Sign

THE AUTOMATIC SIGNAL & SIGN COMPANY, Canton, Ohio, has placed on the market a new type of advance warning signal for the highway approach to a railroad. The signal consists of a heavy gage steel plate 24 in. in diameter coated with metallic aluminum on which letters 5 in. high are painted in black enamel. On the bottom half of the plate, a heavy special Redflex signal lens, 12 in. square, is riveted, which is hermetically sealed in a cast aluminum case, protected by a screen. The steel plate and lens are mounted on a steel post 2½ in. in diameter and 6 ft. long, which is designed to be encased in a concrete base.

This Redflex lens is the ingenious feature of the apparatus. It is a red mirror and reflects automobile lights. The glass is constructed with a thin layer of red near the one surface



The Sign and Its Application at a Busy Highway Crossing

and light is so reflected on the several surfaces as to be greatly intensified, sending out a distinctly red beam.

It is claimed that the signal can be focused in such a manner that at night lights of an approaching automobile will cause it to be seen at a distance of 1,000 ft. or more and as the automobile draws nearer the signal becomes brighter, until it assumes the appearance of a ball of fire. The signal may be placed at any required distance from the railway crossing, usually on the right side of the highway and at a height of 5 ft. above the ground, where it acts as a regulating railway warning sign during the day. It is claimed that due to the powerful reflected red light, it penetrates fog, dust or rain at nights.

The photograph above shows the sign and its application on a highway crossing the Chicago, Milwaukee & St. Paul tracks near Chicago over which heavy automobile traffic passes.



Photo by Keystone

The Allied Customs Barrier Along the Rhine—German Officials Opening Car for Inspection by British Officer

Railway Terminal Problem Has Many Phases

Congestion of City Streets, Development of Air Rights, and
Commuter Traffic Are Important Factors

THE RAILWAY TERMINAL PROBLEM will form the basis for several papers which will be presented at a joint session of the spring meeting of the American Society of Mechanical Engineers and the Terminal Committee of the Western Society of Engineers, Chicago, on May 25. Because of the many complications presented in the development of the facilities at Chicago, it has been taken as typifying the complex questions of transportation now pressing for a constructive answer as a consequence of the rapid increases in industrial concentration and commercial development. The general aspect of the problem will be outlined by J. R. Bibbins, manager of the Department of Transportation and Communication of the United States Chamber of Commerce, while various subdivisions will be discussed by others, who will take up such topics as local freighthouses and the handling of l. c. l. freight, the motor truck in its relation to the interchangeable body, terminal unification, the more intensive use of real estate owned by the railways and local rapid transit development. The following summary taken from advance papers now available reviews those features of most general interest.

The reasons for concentrating on the situation in Chicago lies in the particular intensity of the complications as outlined by Mr. Bibbins.

Outline of the Discussion

"Under the urge of European demand, the rail trunk system of today is largely concentrated in the latitude north of Chicago—St. Louis and fans out west of these points into a great collecting system of feeders. Over this great transcontinental belt travels most of the interior tonnage and the world's supply of American products. This is not simply a problem of providing continuous rail transit through a congested metropolis, but in most of these cases the gateway is a division terminal break-up and transhipment point or terminal transfer point between connecting roads, as well as a large producing district requiring carload service for incoming raw materials and both carload (c.l.) and less-than-carload (l.c.l.) service for outgoing fabricated product.

"Thus we are warranted in examining the port of Chicago, for this great gateway holds the potential place of a water gate as well as a rail head. When the possibilities are developed, Chicago will be the crossroad of the continent in fact as well as in simile, and the problem which engineers must work out in the near future is to design a proper and efficient working machine for handling quickly and cheaply this vast transcontinental tonnage as well as its own originating tonnage. The preponderance of east-west rail movement will no doubt remain, although looking well into the future it seems hardly sensible, on the ground of national safety, that over one-half of the nation's export production should be passed through the 'bottle neck' of New York harbor."

Suggested Methods for Expediting Transportation

Mr. Bibbins also calls particular attention to the fact that while Chicago has an area of over 200 square miles, the business center occupies only about one square mile and all of the railroads have located most of their local freight houses within or just as close to this area as possible. Another complication lies in the interchange of a large volume of less than carload freight between the railroads by trucking over the congested city streets.

In the main, the discussion will center on the expeditious

handling of less than carload freight and the subject will be approached from a number of different angles. E. J. Noonan, engineer, Chicago Terminal Commission, Chicago, advocates the more intensive use of property occupied by the railroads for the local freight development. His plan embodies primarily the use of the two-level freighthouse with the cars on a lower level and teaming or street vehicle service on an upper level in the same horizontal plane as the city streets. But owing to the high value of real estate this is not enough. The railroads must develop their properties in such a way that multiple story buildings may be erected over the facilities used for purely freighthouse purposes so that it will not be necessary to allocate all of the land rental or interest in land investment to the freight handled through the terminals. Mr. Noonan estimates that the single-level type of freight house with its accompanying tracks can be provided for about \$2 per sq. ft., and the double-level type for about \$5.

With these figures as a basis the relative economy, so far as interest on land used is concerned, is as follows:

	Assumed value of land per sq. ft.			
	\$5.00	\$10.00	\$15.00	\$20.00
Interest charge per ton at 6 per cent, single-level	\$0.42	\$0.72	\$1.02	\$1.32
Interest charge per ton at 6 per cent, double-level	0.30	0.45	0.60	0.75
Saving, cents per ton.....	\$0.12	\$0.27	\$0.42	\$0.57

Mr. Noonan's solution of this problem hinges primarily on the development now proposed for the rehabilitation of railway facilities immediately south of the business center of the City of Chicago. This was described at some length in an abstract of a report recently issued by the Chicago Terminal Commission appearing in the *Railway Age* of April 8, 1921, page 891.

Plans for the Interchange of Freight

Improved means for the interchange of freight between the railroads is discussed from two angles. Mr. Bibbins and Mr. Noonan have considered this from the standpoint of the possibilities of the freight tunnel of the Chicago Tunnel Company, and present data abstracted largely from the report made by Mr. Bibbins as supervising engineer for the Arnold Company to the Chicago Plan Commission last year. Excerpts from this report appeared in the *Railway Age* for July 9, 1920, page 52. This is obviously a problem peculiar to the City of Chicago of no direct bearing on the freight handling in general. However, the existence of this tunnel, which now handles 1,800 tons of l. c. l. freight daily and could possibly accommodate 10,000 tons, points to the thorough consideration of this tunnel as the transportation agency in the solution of the city's problems.

The motor truck as an agency in the solution of this problem is discussed in a broad way by Hugh E. Young, engineer, Chicago Plan Commission, Chicago, who points out emphatically the necessity for taking into account the fixed charges and maintenance of highways and streets used by the trucks. Mr. Young's paper is abstracted as follows:

"Before the motor truck replaces trap-car service in order to relieve the rail terminals of local car-movement congestion, investigation should be made to determine if a scientific handling of freight by modern terminal equipment and the employment of such schemes as those adopted in Cincinnati where package freight is loaded into demountable containers, or truck bodies, which are transported to and from motor chassis mechanically, can accomplish the same results. The

principal factor contributing to the local car congestion is a lack of modern terminal equipment.

"In reports from Cincinnati much has been said of the advantages of motor trucks for interchange between terminals and transport between main station and substation, but the effect of such traffic on the maintenance of highways, and the loss to the public due to street-traffic congestion, are not considered in the accounting.

"The tendency in the trucking business toward handling a large freight-transfer tonnage wholesale by contract has developed within late years. Quite recently a new plan has appeared, using standard two- to five-ton motor trucks built with interchangeable bodies so that the more expensive chassis may be kept in continuous operation. Thus house or shippers' freight can be loaded and unloaded in these unit containers as required, independently of the truck itself or its time of arrival and departure. It is even proposed by advocates of this system that motor trucks should replace trap-car service as now operated, thus relieving the rail terminals of much local movement.

"This contract motor-transport plan has advantages, some very real and some apparent. It aims to reduce street congestion by concentrating bulk, and, by maximum loading, reduce the number of motor trucks on the public streets required for freight service. It provides greater latitude in timing of various transport movements, so that individual shipments can be handled with greater ease and less confusion at the freight houses.

"However, for the Chicago situation the fact should not be lost sight of that any plan of motor transport, whether individual or by contract, is defective if the downtown public streets are used as a right of way for a class of traffic which is primarily rail tonnage and should be considered as such. Loop streets are now all too few and narrow, without deliberately planning for their further use for transporting railroad tonnage.

"The importance of legitimate highway transportation has been overlooked in a remarkable manner when it is considered that all movement of produce in the course of its production from raw material to finished product, starts on the highways and finishes over the highways. As a method of transportation incident to railroad transportation and as a solution of the short-haul problem, it far outranks in importance all other means of transportation.

"Recognizing the necessity of the rail carrier, realizing that the prosperity of the country depends on railroad transportation, considering the present difficulties of railroad financing, and knowing the economic waste in duplicating transportation systems for the same business, it is absurd to assume that in the final accounting there is a saving to the consumer in motor-truck delivery. Neglecting the cost of construction and maintenance of highways, which cost more per mile than railroads, and even if commodities were delivered free of charge by the motor truck, the public must still pay a return in some manner or other on the rail investment if it expects to have such a utility maintained and operated, otherwise it will be a case of dismantling the railroad. This latter procedure is already being threatened by one railroad.

"The use of the motor truck for interchange between terminals and transport between main station and substation before being accepted on its face value should be investigated as to its economy, taking into consideration the cost of maintenance of the highways over which it operates; and any plan of motor transport, whether individual or by contract, is deficient if downtown public streets are used as a right of way for a class of traffic which is primarily rail tonnage."

In concluding his paper Mr. Young contends that the ultimate economic application of the motor truck probably lies in store-door delivery and outlines the more general details involved in the application of this system through the

use of demountable bodies or containers. Particular emphasis is placed on the fact that the introduction of this system would entail a very extensive reconstruction of the local freight house facilities.

Terminal Unification

J. H. Brinkerhoff, general agent Northern Pacific, Chicago, who was Chicago terminal manager for the U. S. R. A., discusses the unification of terminals from the viewpoint of the terminal executive.

"About the time this country entered the war the situation in Chicago was such that it was necessary for some action on the part of the interested lines, and as a result a co-ordination committee was formed and a great deal of good was accomplished through the efforts of this committee.

"When the railroads were taken over by the government in December, 1917, this committee's meetings were discontinued for a time, though the changes that had been put in effect by the committee were in operation. The committee's activities were resumed in the spring of 1918 and they continued to function until July, 1918, when the Chicago terminal district was formed, and the work of the committee was taken over by the terminal manager.

With the operation of the terminal under one head many things were accomplished in the common use of the terminals. In this district there are a number of routes over which cars can be handled to and from industries and between railroads; this is particularly true of the movement between railroads. Economical operation and prompt movement of cars is greatly facilitated when the handling of commodities is concentrated in one channel. This is best illustrated by the concentration on one line that was accomplished in the handling of perishable freight, a large part of which requires re-icing. The result of this concentration gave the switching line an opportunity to handle the cars in large groups and facilitated the outbound movement.

"The Chicago district has become the most important junction point between the east and west and the supply of certain classes of equipment during times of heavy business is not sufficient to take care of the movement. The preponderance of tonnage which requires box cars, particularly grain and grain products, is largely eastbound. This makes it necessary to move empty box cars west. The product of the steel mills requires a large proportion of open top cars, and while the western lines are equipped to handle coal, they are not provided with the type of equipment necessary to handle the products of the steel mills so there is always a use in the Chicago district for the eastbound open top equipment which moves west and this requires in some cases empty open top movement into the district from the west. The distribution of equipment under these circumstances is best handled by one authority. The handling of a terminal where there is a large variety of interests is best accomplished by having it under one head whose authority should be supreme in deciding questions that continually arise between individual carriers.

"In the use of local freight stations those stations that were congested were relieved by sending business to freight stations that were not so busy. This practice kept the terminal open and made unnecessary the placing of embargoes.

"The consolidation of the 21 individual agencies at the Union Stock Yards was effected and the Stock Yards District Agency now handles, from an operating standpoint, business for that district. This furnishes the shippers one point of contact instead of 21, and has been very satisfactory. Few people are aware of the magnitude of the business handled by this agency. The remittances to the various lines interested amount to about \$75,000,000 per year.

"What was accomplished by unified operation was further illustrated by what happened in August, 1918. During a

period of two weeks there was a total of 21,693 cars of grain handled. This is the greatest volume that has ever arrived at the primary market in a similar period of time. There was also forwarded during this same period over 19,000,000 bu., part of it going by lake. No embargoes were placed, and congested individual lines were relieved promptly.

"Congestion always starts at one point and if prompt measures are not taken, the congestion spreads to other lines. Under unified control, measures can be taken to relieve congestion as soon as it is manifest. Under individual operation this has never been accomplished."

The Steam Railroads in Rapid Transit Development

A paper by Bion J. Arnold, consulting engineer, Chicago, upholds the more intensive use of railway property as the solution of the local rapid transit problem which has been agitated for a great many years primarily in the proposal to construct subways according to a number of different plans. Mr. Arnold shows that the passenger development as carried out according to present tendencies involves the construction of enormous passenger stations, entailing capital charges against the passenger traffic entirely out of proportion to the revenue which can be expected from suburban service. He also called attention to the fact that the present development provides for no direct interchange of passenger traffic between railroads or between routes occupied by the several roads.

"None of these, with the exception of the Illinois Central development, is especially adapted for the economical and

quick handling of commuter or rapid-transit business. On the other hand, they are distinctly ill adapted for handling the large growth in future traffic which will undoubtedly come. While these stations are distributed around the borders of the most intensively developed part of the business district, there is no intercommunication between them and consequently these terminals must necessarily remain as traffic "dumps," rather than as traffic distributors.

"The statement is frequently made by railroad executives, and without refutation, that the commuter rapid-transit business does not pay or is carried at a large loss which must be made up by the long-distance overland passenger and freight business. If this is true, the railroad managements of the country which are confronted with the problem of adequate revenue, stand in the inconsistent position of harboring a passenger-terminal system and conducting a public service at the expense of the stockholders or the other patrons of the system. Either aspect, if true, represents an unstable economic condition which cannot last. And if the commuter traffic is not in fact supporting the full cost of producing this service, there is no better time than the present for the railroads to establish the facts in the case and endeavor to have this traffic handled in a more practicable manner. It is believed by many engineers in railroad service and in civil life that some careful and thorough research into the economics of railroad suburban-passenger business should be instituted at once, with the specific object of finding out whether the railroads could better handle it or should turn it over to some other agency better organized for the purpose."

The American Railway Development Association

Helping the Farmer and Showing the Farmer How to Help Himself—Some Unanswerable Questions

A PART of the doings of this association at its annual meeting in New York City on May 11, 12, and 13, was reported in the *Railway Age* of May 13, page 1129. The first business on the second day, Thursday, was the election of officers, which resulted as follows: President, G. E. Bates, assistant to the general manager of the Delaware & Hudson, Albany, N. Y. Mr. Bates heretofore was second vice-president of the association. First vice-president, J. B. Lamson (C. B. & Q.), heretofore secretary-treasurer. Second vice-president, J. F. Fox, traveling immigration agent of the Northern Pacific. Secretary, J. F. Jackson, agricultural agent of the Central of Georgia, Savannah, Ga.

A large number of new members were admitted to the association, representing twenty or more prominent roads. Denver, Colo., was selected as the place for the next annual meeting, to be held in May, 1922. A motion was made, and unanimously carried, that the date of the semi-annual meeting, which is held at Chicago and comes in November, might be changed so as to make it convenient for members to attend, on the same trip, the International Livestock Show.

Helping Farmers and Others to Advertise

Methods and scope of publicity was the subject of a paper by J. D. McCartney, assistant general passenger agent of the Central of Georgia, who, however, proved to be a publicity agent; he pays as much attention to the shops and the agricultural department as to the direct cultivation of passenger traffic. The publicity agent should do everything in his power to promote the "public be pleased" theory of conducting transportation. Cultivate the weekly as well as the daily press. The development agent should remember that every

day he has interesting news to give out; see that the publicity agent of your road is informed about it. On the Central of Georgia, the president of the road, each month, issues a circular to subordinate officers containing a memorandum of subjects worth talking about, with a view to giving the public useful and accurate information. Every railroad officer must remember that the day has gone by when he can excuse himself for inaction by saying that he is not a good talker. Good talkers are now somewhat common, and it is the duty of everyone to see that he does his duty in that direction.

In the discussion on this paper, Mr. Bates (D. & H.), calling attention to the fact that "public be pleased" was not so snappy a slogan as "public be damned," suggested that "P. B. D." could still be used by making it read "public be developed."

Co-operation in Community Advertising

This was the subject of a paper by W. H. Hill, agricultural agent of the New York Central, at Chicago. The railroads should co-operate with the Community development section of the Associated Advertising Clubs of the World. These clubs are made up largely of the merchants in a given town, often a town of moderate size, to work together in the promotion of retail trade. Mr. Hill cited a notable example, that of the Maryville (Mo.) commercial club, and displayed samples of whole-page newspaper advertising which was used to promote the retail business of that town in the country immediately surrounding it; also the case of St. Louis, Mo., which advertised all over the country with a view to drawing to that city 16 different kinds of manufacturing. The speaker cited various cities which had been notably successful in

advertising: Winnipeg, Man., Asheville, N. C., Omaha, Neb., and others. A good deal of money used in experiments of this kind is unwisely spent and railroad development agents would do well to take a hand in these enterprises where opportunity offers. The railroad development agent should investigate to see whether or not he could aid the towns on his line. It will pay to transport local committees to your territory to recommend the idea to towns which have not yet made themselves acquainted with it. This means of community development has been successful in rural districts where no large town was interested; for example, on the Mackinaw division of the Michigan Central.

The Neosho Development Plan

G. R. Lowe, of Neosho, Mo., by invitation, gave an interesting talk on the Neosho community development plan, illustrated with charts. The merchants of Neosho, to stimulate their retail business, went among the farmers in the territory tributary to the town and induced them to get acquainted with each other by attending a monthly meeting, this meeting being made attractive by an auction, so managed that those attending it would have a good prospect of making a dollar. The farmers come to these auctions month after month. Having got these people more thoroughly acquainted with the town, the merchants adopted a "golden-rule sale-day"—every Monday—in which each merchant gave a specially good bargain in some one commodity. These sale-days were advertised on Friday and Saturday. Then, further to get the people of town and country acquainted with each other, meetings in the country, of the nature of a picnic, were held monthly throughout the summer; and these were attended largely by people from the towns.

The Farmer's Viewpoint

What the farmers want of the railroads was the subject of an address by S. L. Strivings, of Castile, N. Y., president of the New York State Federation of County Farm Bureaus. Mr. Strivings spoke for farmers in New York state, who—like farmers everywhere—desire good service, low rates and economical railroad management. Setting forth the fundamental truths of transportation economy, points on which both railroad men and farmers can agree, Mr. Strivings described in striking language some of the evils which must be eliminated. Some of these evils are of a kind for which neither farmers nor railroad men are responsible, but the speaker called on the railroad men to co-operate in having them cured. Like Mr. Benson, who spoke on the previous day, Mr. Strivings emphasized the difficulties of getting men to go on to the farms when they have been brought up in a less strenuous life. He characterized Secretary Lane's proposal for colonizing soldiers on the farms as a dream, and nothing more. The farmer in hiring help has to compete with the railroads, and even may have to come to the eight-hour day; yet he cannot recover excessive costs by increasing the cost of his products. The price of wheat in America is decided in the market of London and there is no help for it. Co-operation in getting just laws concerning the relations of capital and labor, and in avoiding extravagant expenditures on national highways, were two points on which Mr. Strivings bespoke the aid of the railroads.

Marketing Fruit

Developing small town markets was the subject of an interesting paper by C. B. Michelson of the St. Louis-San Francisco. By persistent industry Mr. Michelson enlarged the market for apples for the shippers along his line by promoting shipment to the smaller towns—where the farmers theretofore had confined their efforts to the large places.

F. S. Welsh (N. Y. C.) read a paper further discussing how to market fruit with the best results. The inspectors of the New York Central pay special attention to the dis-

covery and correction of all causes of loss on the road. They inspect cars as well as fruit. They have automobiles, and with these go around and get in close touch with the growers. These inspectors are college boys who have had experience in raising fruit and also in marketing. The shipping-point inspectors, as well as those at destinations, have succeeded in pleasing customers to the extent that one prominent consignee takes the road's record in case of loss or damage, presenting his bill in blank, for the road to fill out with the right sum.

Referring to complaints of New York shippers that in 1920 they were short of cars, Mr. Welsh asked members about conditions in other regions; and was informed that there was a considerable shortage on the Denver & Rio Grande. In Georgia, there was a short crop so that the shortage of cars was not so seriously felt. On the Canadian Pacific, stock cars were in some cases used for fruit, these cars having the slats close together. From Florida, large quantities of strawberries were moved north in refrigerator boxes.

Colonization Advertising

Colonization advertising was the subject of a paper by Jesse M. Jones (S. A. L.). Mr. Jones discussed briefly the value of a new settler to a railroad; it has been variously estimated at from \$300 to \$2,500 a year. In a certain newspaper campaign, Mr. Jones received 10,000 inquiries, and gave the inquirers detailed answers; telling them not only what to do, but what places and things to avoid, as being not adapted to benefit them.

Agricultural Development on the C. P. R.

Agricultural development on the Canadian Pacific was discussed by Thomas S. Acheson, general agricultural agent of that road at Winnipeg. The building up of the Canadian Pacific since 1881 by the sale of its 20 million acres of land was described in interesting fashion. In dull times the company had to accept payment for land in wheat, allowing 50 cents a bushel even when the market price was down to 37 cents. The company even advanced money to farmers to pay their taxes. The Canadian Pacific has never had to evict a buyer of its land. The company has irrigated, in Alberta, 743,000 acres of land, at a cost of \$17,000,000.

Potatoes and Yams

Storage of potatoes on farms, to stabilize the market, was described by E. T. Reed (C. B. & Q.). The problem of the potato farmer is to sell his product early and get a good price, or else store until the following year. After August 1, the price, in Colorado, goes down but the potatoes left in the ground gain in weight. Usually it is not profitable to store unless the potatoes are kept until the following May or June. In the past year, storing was not profitable, but in the year before it was. In reviewing a period of thirteen years, eight years were found to have been profitable. If 75 per cent of the farmers would provide storage room for two-thirds of their product the market could be successfully stabilized.

The same general principles apply in the case of grain. In Kansas and Nebraska the farmers last year built more grain storage space than in several years before, being led to do this by the shortage of cars; and, indeed, the car shortage was a blessing in disguise. For the past four months the movement of grain has been steady.

A careful and detailed essay on the cultivation of potatoes, by F. Benz, agricultural agent of the Northern Pacific was listened to with marked interest.

Discussion by other members brought out the fact that Mr. Benz had produced highly successful potato crops. The importance of using the best seed was emphasized by a number of members; for this purpose potatoes must not be allowed

fully to ripen. C. L. Smith (O. W. R. R. & N.) had proved repeatedly that potatoes grown in a northern climate, where they could not fully ripen, produced, in warmer regions, two or three times as large a crop as seed which had been fully ripened.

The importance of encouraging northern people to eat more sweet potatoes was set forth in a paper by J. W. Firor (A. B. & A.). Growers in Georgia and South Carolina are increasing their shipments of this product; but the best kinds (sometimes called yams) are not appreciated because most people do not know how to cook them properly.

The value of livestock in promoting diversity of crops and agricultural prosperity in general was the subject of a paper by R. R. Walker (M. K. & T.).

Careful attention to pure bred livestock not only promotes good farming, in obvious ways; it is good for the farmer socially: it promotes the happiness of his children and tends to general prosperity. The dairy industry on the M. K. & T. is rapidly increasing.

Friday

The final session, on Friday morning, was devoted mainly to an address by George E. Roberts, vice-president of the National City Bank, New York City, who made a stirring appeal for close attention to the fundamental elements of right relations between carriers and the public. The railroad, in many cases, is in the position of a non-resident landlord, and therefore must put forth unusual efforts to keep the people in its territory informed of its motives; to keep them well enough acquainted with the officers of the road to deal frankly with them, and persistently warned against unsound economic and social views. The members of this association, who are to develop, not railroads, but the railroads' neighbors, are in a fortunate position, for they can emphasize the things on which the railroad, the farmer and the shipper already agree. Europe is "coming back," and will produce food for herself; the American farmer, therefore, inevitably suffers, and we must suffer with him.

In the long run, the farmers and the rest of us must get on to the same economic level. Our virgin lands were pretty well exhausted by the end of the nineteenth century, and since then the cost of living has necessarily gone up. Today we cannot live, as we formerly did, by so freely using up the accumulated wealth of the past. What society has gained by the improvements of science and machinery has been largely offset by the higher cost of food. This cost must further increase except as methods of production are improved. The railroad corporations are doing the right thing to use their money to investigate and popularize the inventions of the few, the scientific men, for the benefit of the multitude, the producers.

The attendance at the meetings was about 100. On Friday afternoon a part of the members went on sight seeing trips around the city and others visited the immigration station on Ellis Island, New York Harbor.

At the banquet of the association on Thursday evening, Robert S. Binkerd, assistant to the chairman of the Association of railway executives, New York City, made the principal address. Mr. Binkerd said in part:

"We are now in that part of our war chapter which should be entitled 'Paying the Piper.' It is a time which demands in the largest degree patience, good temper, courage and clear sight.

"It is important that we should not be downhearted. We shall get through all this on to solid, firm ground again. It is also very important that we should know just exactly what is the matter. Those who do not know what is the matter, or knowing it refuse to act on it, contribute to making the difficulties a little bit worse. Under normal circumstances

our machinery of production works about two days a week for the rest of the world and about four days a week for our own domestic needs.

For the time being the rest of the world can take little of our products. So far as our domestic requirements are concerned the farmer has been compelled to take the largest and most rapid liquidation—much greater than that which has yet been taken by urban labor and the manufacturing industries generally. As a result the farmer's purchasing power is greatly decreased and commerce and industry are moving at relatively low speed."

Industrial Section

Those members of the association more particularly interested in manufacturing industries, as distinguished from farming, held two separate sessions, discussing matters connected with their own work.

J. M. Mallory, industrial agent of the Central of Georgia, acted as chairman. G. W. Curtis, industrial agent of the Canadian Pacific, read a paper describing practice, in this field, on his road.

The practice of railroads in all parts of the United States in connection with industrial side tracks was a principal topic of discussion, various proposals being offered looking eventually to standardization of contracts. Among the questions considered were: the advisability of charging for cost of making surveys on private property; apportionment of cost of track renewals; co-operation of two or more roads in industrial tracks and length of refund period on industrial sidings. A resolution was passed authorizing the president of the association to appoint a special committee to deal with this subject.

Labor Board Will Reduce Wages on July 1

IN A STATEMENT issued on May 17 the Labor Board announced that on June 1 wage reductions, effective July 1, would be announced affecting the employees of all roads which filed wage disputes with the Board before April 18. Cases filed with the Board since April 18 and prior to June 6 will be heard on the latter date and the decision in these cases will become effective also on July 1. There was no intimation of the extent of the wage decreases which will be put in effect. The Board stated that "prevailing conditions justify to some extent, yet to be determined, a readjustment downwards" of railway wages.

The Board also announced a new and complete classification of all railroad occupations which is still unpublished and which has been made effective as of April 18 by the Interstate Commerce Commission. This classification is to be used by the carriers in reporting the service and compensation of their employees to the Commission and the Labor Board. The Board said of this classification:

"The occupational classification is not considered by the Board, nor should it be considered by the railroads or other interested parties, as setting up jurisdictional lines for occupations or as limiting the kind of work which employees may perform or the duties which they may assume.

"In preparing the classification the Board has not aimed to standardize for any railroad occupational duties assigned to, or in the kinds of work performed by, its employees and nothing in the classification could be construed in this light."

The various positions are grouped in the occupational classification under 17 major "services," these services having been set up according to the general railroad functions as well as the special and peculiar requirements in railroad organizations. The services are subdivided into 119 groups. Within the groups are separate grades and distinctive class

titles, each of which is provided with a description of the duties generally performed and illustrative examples of pay roll titles.

On May 18 various representatives of railroad labor were said to be planning an appeal to the courts if radical wage decreases were ordered by the Board.

Outside of the executive, official and staff assistant service, which is ungraded and unclassified and in which examples of positions are shown separately under appropriate groups but not distinguished as to importance and responsibility of the work performed, there are 500 distinctive classes distributed under the remaining 16 services. The classification of railroad positions as developed by the Board is made up of the following distinctive parts: (1) An introductory statement showing the needs, purposes and general features of the classification; (2) Rules governing the preparation of reports; (3) Detail on divisions for reporting information on railroad employees; (4) Outline and index of railroad occupational classification; (5) Occupational classification of railroad positions; (6) Alphabetical list of and index to occupational classification and reporting divisions.

"Geer" Letter False

With the admission by Frank P. Walsh, attorney for the unions before the United States Labor Board, that the letter alleged to have been written by I. W. Geer, general manager of the Pennsylvania, Southwestern Region, to supervisory employees, and offered as evidence before the board on March 22, was not authentic and had not been authenticated, the letter was branded as fictitious and fraudulent, and this hearing came to a close on May 12.

This letter, alleged to have carried instructions to ascertain the position of employees on proposed reduction of wages resorting to "defamation of all labor organizations if necessary," was first offered to the board during the cross-examination of W. W. Atterbury, vice-president of the Pennsylvania, on the subject of national agreements on March 22, and at that time Mr. Walsh stated that the letter would be authenticated. At the hearing on May 12, Mr. Walsh and B. M. Jewell, in behalf of the employees, refused to present witnesses to substantiate this claim after cross-examining five Pennsylvania officers and employees, including Mr. Geer, who testified that no such letter, or any of similar purport, had ever been sent out by Mr. Geer, or any other officer.

The board then went into executive session and adopted a unanimous resolution calling upon Mr. Walsh and Mr. Jewell to produce witnesses to show the origin and authorship of the letter. The board ruled it to be in the public interest to have such information, its resolution reading as follows: "The board, through its chairman, requests Mr. Walsh, counsel for the employees, and Mr. Jewell, their representative, to present to this board, evidence of the origin and authorship of the letter in question. It is the sense of this board that the representatives of the employees owe it to themselves and to the organizations which they represent, as well as to the carriers and the public, to make known how and from whom this letter, evidently fictitious and fraudulent, came into their hands.

"It is not deemed necessary by the board to pursue this collateral inquiry further upon its own initiative or to compel the production of such proof, but the board contents itself with expressing thus to the said representatives of the employees its conception of the ethics of this matter."

Mr. Walsh in reply said, "The only thing we could hope to bring out by further testimony, would be hearsay or double hearsay evidence. We could not substantiate the letter. As representing the labor organizations I do not propose to pillorize the person from whom this information came to us. The witnesses we have here would protect that person. I desire to protect that person also. I will not be moved from my determination."

Annual Report of the Bureau of Explosives

MANY INTERESTING DATA on the handling of hazardous commodities are contained in the annual report of the chief inspector of the Bureau for the Safe Transportation of Explosives and Other Dangerous Articles for the year 1920, which has just been issued. To one unfamiliar with transportation conditions, it would naturally seem that the shipments that would cause the greatest damage would be those containing high explosives. It is interesting to note that the loss per ton for nitric acid and "strike anywhere" matches is considerably greater than for either high explosives or black powder. The greatest losses from any single commodity are those resulting from the transportation of gasoline, due principally to the large volume of the shipments.

The actual total loss for the year 1920 amounted to \$1,090,806 for all kinds of dangerous articles. This is a decrease of over half a million dollars compared with the previous year. Nevertheless, the report states that the majority of the 1,977 accidents resulting in this loss should not have happened, as they are due to carelessness or ignorance that should not have existed. Particular interest attaches to the statistics regarding transportation of gasoline, as the losses due to these shipments are greater than from any other single commodity. The total loss from this cause has been decreasing in recent years. In 1918 it was \$900,106; in 1919, \$691,635, and in 1920, \$351,262.

A comparison that has not been made in previous reports is shown in a summary of reported losses compared with the total production for several important commodities. The statistics for 1920, which are typical, show that the loss per ton was as follows:

Nitric acid	\$1.71
Matches .....	.51
Black powder .....	.19
Charcoal .....	.08
Gasoline .....	.02
High explosives .....	.00

In discussing the importance of education, the chief inspector mentioned the good results secured by the organization plan prepared by the bureau for the purpose of interesting and educating railway employees in the regulations, which has been adopted quite generally by the railroads.

The glass carboys in which acids are shipped are not sturdy containers, and many accidents are caused by breakage of these vessels. Recently an attempt has been made to prescribe suitable tests for carboys, and this work is outlined in the report.

The review of tank car matters points out that the casualties in gasoline tank car fires were reduced in 1920 to no deaths and 6 injuries, as compared with 2 deaths and 28 injuries in 1919. A review of the work being carried on by the bureau in connection with the A. R. A. tank car committee and the American Petroleum Institute is given. This pertains particularly to improvements in the bottom outlet valve, the dome closure and the safety valve.

The concluding section of the report is devoted to a discussion of the detailed work of the bureau. Numerous statistical summaries are given and circulars issued during the year are collected and reprinted.

Results for First Quarter, 1921

Tabular summaries of accidents occurring in the transportation of explosives and other dangerous articles during the first quarter of 1921 are shown in accident bulletin No. 51 of the Bureau of Explosives. The most serious catastrophe during this period was the casinghead gasoline explosion at Memphis, Tenn., on January 24 which caused thirteen deaths and a property loss of about \$150,000. The bulletin also includes suggestions on reporting violations of the regulations, accidents, damages, etc., and describes several accidents, notably a fire caused by loading pyroxylin plastic articles against steam pipes in an express car.

Railroad Hearings Before Senate Committee

Daniel Willard, A. H. Smith and Julius Kruttschnitt Explain

Reasons for Present Condition of Railroads

WASHINGTON, D. C.

QUESTIONING of Julius Kruttschnitt, chairman of the Southern Pacific, by members of the Senate Committee on Interstate Commerce in the railroad inquiry hearings was concluded on May 16 and Daniel Willard, president of the Baltimore & Ohio, appeared as the second witness for the railroad executives. Mr. Willard had a prepared statement, in which he said in part:

Conditions of Railroads Result of the War

The condition of the railroads at the present time differs only in degree from the conditions generally surrounding all business activities, and is the direct result of the economic changes brought about by the war. During the war we had in this country a condition of unprecedented business activity accompanied by an equally unprecedented increase in wages and material prices. Those engaged in private enterprises were generally able to so adjust their affairs, including their selling prices, as to enable them to operate at a satisfactory profit, notwithstanding the higher costs. The case was entirely different, however, with the railroads.

For 26 months the railroads were operated by the President or his representative, acting under authority granted as a war measure, and for no other purpose. During that period the roads, or at least many of them, were operated with entire disregard of their interests as independent properties. Notwithstanding the largely increased cost of operating the roads, the director general did not increase the rates and fares proportionately, and consequently the railroads while under federal control were operated at a loss, the deficit being made up out of the federal treasury.

This policy of the director general may or may not have been wise, but in any event it contributed largely towards bringing about the confusion of thought and general misunderstanding of the railroad situation which now exists. Congress, with a full understanding of the matter, enacted the Transportation Act of 1920, which provided for the termination of federal control, and was intended also to provide a basis for the successful operation of the roads by their owners in the future.

I take it that it is the purpose of this committee, among other things, to inquire into the operations of the carriers under the terms of the new act, and I am glad of this opportunity to be heard in that connection.

The Transportation Act

It has been claimed by some that the railroads under private management cannot be operated so effectively as a whole, and consequently cannot perform as large a measure of service for the public as could be done with the same facilities under federal ownership or control. The fallacy of that argument is clearly demonstrated by the fact that during the year ended December 31, 1920, the more than 1,800 independent railroad companies in this country, reporting to the Interstate Commerce Commission, were able to so co-ordinate their efforts that they handled during the year 9,000,000,000 net ton miles more than they ever handled before in the same length of time. This effective co-ordination on the part of the carriers was made possible by the Esch-Cummins act.

Many in the past have feared that private ownership of the railroads might fail as an economic policy because of the inability of the carriers to secure the adequate rates for the service which they perform, and on that account be unable to provide the new capital necessary for additions and betterments. Congress was fully advised concerning this phase of the problem and the capital needs of the carriers, and realized also that the necessary new capital could not be obtained unless the credit of the road was sound and on a satisfactory basis. The provisions of the Transportation Act with respect to the rate of return may appear academic at the present time. However, the principle recognized in the act with respect to the assurance of reasonable return upon the value of the transportation property devoted to public use has encouraged the owners of railroad securities, and in my judgment has been a most helpful influence in sustaining the credit of the carriers during a very trying period.

To my mind the labor provisions of this act afford a reasonable assurance to the railway employees that they will at all times and under all circumstances receive just and reasonable wages and be granted just and reasonable working conditions. While this part of the act has been somewhat criticized, it can at least be said that by virtue of the act we have had continuity of service during the critical period of 12 months, since the termination of federal control, during which time one of the most complex labor problems that ever confronted the railroads was being slowly worked out and adjusted.

Operating Results and Expenses—

1920 Compared with 1919

While subject to certain interruptions, because of strikes in the coal and steel industries, the railroads during the year ended December 31, 1919, handled a large volume of tonnage and an exceptionally heavy passenger traffic was also moved, much of it incident to the demobilization of the military forces, which traffic was handled with a lesser train mileage than would be satisfying to the public under normal conditions, resulting in decided economies in the operations for the year 1919. Furthermore, the full effect of the wage advances and changes in working conditions granted by the director general in the latter part of 1919 were not reflected in the operations of that year. These increases were in effect during the entire year 1920, and in addition thereto the award of the United States Labor Board was in effect for eight months, resulting in an average increase in rates of pay in 1920 over 1919 of something more than 20 per cent.

The properties were returned at March 1, 1920, in a somewhat depleted condition, particularly as to equipment, due in part to war conditions in 1918 and in part to an evident desire in 1919 to control and reduce maintenance expenditures. During the months January to October, 1920, there was a persistent and urgent demand for increased service, consequently every effort was made to accomplish essential repairs and to make available all equipment possible. Notwithstanding the decline in business in November and December, the service performed in the year ending December 31, 1920, shows in relation to the preceding years as follows:

CLASS I—RAILROADS OF THE UNITED STATES

	Total Tons One Mile	Passengers One Mile	Train Miles (Passenger)
1916	396,365,917,082	34,585,952,026	582,859,175
1917	430,319,014,635	39,476,858,549	582,556,148
1918	440,001,713,063	42,676,379,199	536,692,235
1919	395,679,051,729	46,358,303,740	546,180,657
1920	449,292,355,000	46,724,880,000	571,653,863
1920 over 1919 ..	53,613,303,271	366,576,260	25,473,206
Increased service 1920 over 1919 ..	13.55 per cent	0.79 per cent	4.66 per cent

The tonnage handled in 1920 was the largest in the history of the railroads, being 9,000,000,000 ton-miles in excess of that handled in the year 1918, when owing to the nature of the business and the extraordinary measures taken, the greatest tonnage moved up to that time was transported.

The increased expenses for 1920 are roundly accounted for as follows:

Increase in basis of cost 1920 over 1919 ..	\$872,400,000	19.83 per cent
Increased service performed 1920 over 1919 ..	496,600,000	11.29 per cent
Total	\$1,369,000,000	31.12 per cent
In the year ended December 31, 1919, the director general had \$454,984,900,000 net operating income applicable to compensation (estimated at \$896,000,000).		
Had the business of 1919 been done over again with the increases in rates of pay and prices of fuel and material in effect in 1920, his expenses would have been increased by	\$872,400,000	
And instead of having a net operating income of	454,984,000	
there would have been a deficit of	\$417,416,000	
Which added to the compensation of	896,000,000	
would have resulted in a total deficit of	\$1,313,416,000	

Instead of a deficit of \$421,016,000 for the year 1919.

The roads in 1920 also largely accomplished the relocation of car equipment which had been widely scattered during federal control, especially during 1919. This was particularly so with respect to coal cars which had been sent unusual

distances from customary points to take care of emergencies incident to coal strikes. This resulted in an unusually large ratio of empty car mileage.

Upon the release of the roads on March 1, 1920, 21.9 per cent of home cars were upon home lines, compared with 45.2 per cent at December 31, 1920, and 67.0 per cent at March 1, 1921.

It might be asked why it was necessary to relocate the equipment, particularly in the face of declining traffic. While it was unfortunate in a way that the expense incident to the unusual empty car movement had to be incurred at this time, it was most desirable that the equipment be returned to the companies which had provided the number and character of cars required by the trade and those best meeting the operating conditions under which the traffic must be handled, and, further, it was important that the companies have an opportunity to review their equipment and arrange for necessary retirements and repairs.

In this connection I would call attention to the following as reflecting the situation respecting bad order cars:

	Total cars owned	Home cars on home lines	Per cent of cars owned on home lines	Total bad order cars	Per cent
At January 1, 1918...	2,264,019	1,118,856	49.4	128,780	5.7
At March 1, 1920...	2,328,460	507,887	21.9	153,727	6.7
At March 1, 1921...	2,345,638	1,576,485	67.0	243,586	10.7
At April 15, 1921...	2,346,269	1,683,884	71.8	239,771	12.7
An increase over January 1, 1918.....				160,991	

It will be noted that while the expense basis of 1920 over 1916 was increased 136.34 per cent, the revenue basis during the same period was increased only 51.68 per cent. As a result the ratio of operating expenses to operating revenues which in 1916 was actually 67.32 per cent becomes 107.31 per cent when revenues and expenses are restored to 1920 costs and revenue basis and instead of earning a net railway operating income of \$447,541,000 as was done in 1916, there would be a deficit of \$359,245,000.

Railway Operating Income Following Change in Rate Structure

Question has been raised concerning the failure on the part of the railroads to realize the anticipated net returns incident to the increases in rates and charges approved by the commission under its decision in what is known as Ex Parte 74, and whether the railroads in their presentation to the commission failed to correctly forecast the results. This situation, because of the varying conditions and the difference in the rate increases in the several territories, can best be considered by the groups or districts adopted by the Interstate Commerce Commission in Ex Parte 74, and as I am more familiar with the Eastern district, I will confine my remarks chiefly to the figures relating to that group.

The commission granted increases in rates and charges for the Eastern district as follows: 40 per cent in freight on traffic local to the district and 33 1/2 per cent on inter-territorial traffic. It is estimated the effect of the inter-territorial rates and the necessary adjustments were given to the Eastern carriers an increase in freight rates on all freight traffic of approximately 34 per cent instead of 40 per cent, and based on the year 1919 would have afforded an additional revenue of about \$618,749,085, as compared with \$723,422,256, the amount that would have been received had the full effect of a 40 per cent advance been realized. The amount thus realized was approximately \$105,000,000 less than originally contemplated. The total difference resulting from under-estimate in rates of pay and lesser revenue than that recommended by the carriers was about \$146,673,000, which deducted from amount required for a 6 per cent return, \$359,409,000, leaves estimated net income for the Eastern carriers of only \$412,736,000, or a return of but 4.42 per cent.

There was a marked increase in traffic during 1920 up to and including October, followed by a sharp decline in November and December, the decline in fact being so rapid that it was not possible to adjust maintenance and operation methods so as to at once effect corresponding reductions in expenses. The increase in rates granted in Ex Parte 74 became effective in large part but not in whole in August, 1920, and the months of September and October of that year measurably reflect the effect of the higher rates in relation to the increased bases of costs. The net railway operating income of the carriers for these two months projected on the same basis for a twelve months' period would give an annual net railway operating income for the year as follows:

	September & October Net Railway Operating Income	Same Projected Over 12 Months' Period	Return on Valuation
Class I railroads of United States	\$159,765,798	\$778,388,507	4.12 p.c.

The returns for these two months, as projected through a 12 months' period, fell much below expectations. It is believed, however, that the full realization of the rate basis as actually authorized, together with such economies and reductions in operating costs as may be effected, will, with a normal business, yield results more closely approximating the intent of the act.

A careful review of the situation shows very clearly that the increases in rates of pay and prices of fuel, materials and miscellaneous items have been greatly in excess of the increase in the basis of charges for transportation and that the adjustments made with a view to correcting this situation have in part failed of their purpose because of the severe decline in traffic.

The situation, not only with respect to working conditions, but also as to rates of pay, is now before the Labor Board.

It is expected that substantial reduction will be secured in the price of fuel for 1921; in fact, a number of contracts have already been made effective as of April 1st much under last year's prices. Other material prices are showing a gradual decline, and as materials and supplies now in stock are consumed and gradually replaced with materials purchased at lower figures there will be reduced charges to expenses on this account—all of which will be reflected in lower operating costs. Meantime the railroad representatives in conference with the Interstate Commerce Commission are making such rate adjustments from time to time as are found necessary in order to remove inequalities and re-establish proper relationships.

Mr. Willard Challenges Lauck Statement

Mr. Willard also challenged the recent statement of W. Jett Lauck before the Railroad Labor Board as to how the railroads could save \$1,000,000,000 annually in operating expenses.

Taking up the specific items cited by Mr. Lauck, Mr. Willard pointed out, for example, that it was asserted that \$278,000,000 might be saved by modernizing locomotives. To realize the economies claimed to be possible in this direction would require capital expenditures on the Baltimore & Ohio alone of \$165,000,000, Mr. Willard estimated. For the railroads of the entire country the capital outlay required would amount to some \$4,000,000,000 on this basis.

With respect to the improvement of shops, Mr. Willard said that the problem on his own road had been presented in this way:

"Is it desirable to spend at this time for new shops \$2,000,000, which sum is available and which expenditure would enable to repair its locomotives at a lesser cost, or should the money be used for the purchase of new steel coaches which will mean no economy in operation, but on the contrary mean an increased cost of transportation because of the greater weight of the steel equipment?"

"It was decided that the public in this instance would be better served by spending the money available for steel coaches rather than for new shops, inasmuch as it was possible to maintain the motive power in the existing shops."

Mr. Willard stated that he raised no issue at all with the proposition that there are possibilities of still further savings on the part of the railroads. He questioned only the practicability of such savings as have been proposed by Mr. Lauck when considered from the point of view which confronts railway managements.

"The question is a very practical one," Mr. Willard said. "If a condition could be conceived of wherein the railroads had all the money that was necessary—first to provide safe and regular transportation as demanded by their patrons; second, to provide a constantly increasing carrying capacity to take care of the growing business of the country, and in addition thereto a sufficient sum to replace all facilities with modern and more efficient facilities wherever it was shown that by so doing economies could be effected—if such a condition could be conceived of, there would perhaps be no real excuse for the railway managers if they failed to adopt the policy of making the worst as good as the best, as suggested in Mr. Lauck's statement."

"The experience of the past shows that only a certain

amount of new capital in the aggregate is available in any one year for all investment purposes, and of the total amount so available the railroads require and obtain a portion. The capital requirements of other industries and undertakings must also be provided from the same investment fund, and the total amount available is provided presumably in such a way as best fits the demands and requirements of the immediate situation."

Mr. Willard also took up Mr. Lauck's charge that the railroads have given no thought to engineering research for the purpose of promoting efficiency, filing with the committee a chart showing the organization of the American Railway Association, which he said had been maintained by the railroads for 38 years and which had large committees constantly engaged in investigating and reporting on the very things which Mr. Lauck said the railroads are not giving attention to. Mr. Willard went into detail regarding the matters being studied by these committees, showing the committee a large number of the reports and pointing out that the railroads have put into effect many improvements in methods resulting from these investigations as well as the investigations made by individual railroads. He described how the American Railway Association supervises the activities of numerous other organizations which were formerly separate associations and he also outlined the work of the advisory committee, of which he is chairman, which was created last year with particular reference to the new conditions created by the transportation act. Mr. Willard said he believed the transportation act does, in fact, make the future successful operation of the railroads possible under private ownership, but that it is necessary, of course, if they are to succeed that the large railways co-operate effectively and that they are trying to do through the several agencies and particularly through the advisory committee.

Mr. Willard also took up Mr. Lauck's charge that salaries of railway officers are exorbitant. Mr. Willard said that the profession of railway officer is about the only one in which it seems to be regarded as discreditable to succeed. Large salaries paid in the coal, steel and other businesses, he said, are very generally referred to in terms of commendation, even in the case of salaries as high as a million dollars a year, but whenever the salary of a railroad president is published in the newspapers it is done in terms which seem to suggest that he ought to apologize for it. Railroads in recent years have lost many of their best officers because of more attractive offers in other lines of business and whereas formerly railroads received large numbers of applications from bright young college men for opportunities to engage in the railroad service, they now receive very few. Mr. Willard said that he had felt that his own son ought to go into the railroad business, but before he finished his college course he had agreed with him that there were greater opportunities in other directions and that he ought not to go into a business in which to succeed is regarded as a matter of public reproach. He pointed out that if a railroad officer complies with the spirit of public opinion and of many laws he cannot make investments in any business that he knows anything about because as a railroad officer he is dealing with so many other businesses and that he is, therefore, largely limited to his salary.

Senator Wolcott said he had been told by a railroad trainman that the railroads were consuming a large part of their revenue in running private cars for the benefit of their officers and asked Mr. Willard to comment on that. Mr. Willard said that he would be glad to discuss the matter from the standpoint of his own experience because it was a subject of much misunderstanding. He said that he ordinarily spends one or two days a week in his office in Baltimore and a large part of the rest of the time traveling. His car is his office and he uses it for the business of the company. His secretary travels with him and a cook and a porter accompany the

car. In order to save his time also the porter carries his baggage to and from his house and he personally pays half of the porter's salary. Before the war when he occasionally took a vacation he sometimes took the car and in that case personally paid for the supplies used. Ordinarily there was no charge for the handling of the car off his own line because railroads extend that courtesy to each other. Mr. Willard said that while he "might be considered an excrescence," certainly superintendents, general superintendents and other officers are necessary to the operation of the railroad and as their duties require them to be on the road most of the time it is a matter of real economy to have an office car. They are simply traveling officers and they are frequently required to stop at small places where hotel facilities are lacking.

Taking up another point made in an exhibit filed by Mr. Lauck, in which it was stated that 69 bad order cards had been removed from Baltimore & Ohio cars at Cumberland in order to keep them in service, Mr. Willard said he had made an investigation and found it was true, but that the cards were removed by the direction of the foreman, who had substituted his more experienced judgment for that of the inspector, as he had authority to do, because in his judgment the cars were safe to run. These cars have been running since February and nothing has arisen to indicate that the foreman's judgment was not correct. He also referred to a statement made in Mr. Lauck's exhibit that the cost of repairs to a certain number of cars in the Baltimore & Ohio shops was \$514 and that the cost of similar work in outside shops where it was having work done was \$1,015. Mr. Willard said that evidently these figures had been obtained from some subordinate clerk and he had had a check made of 10 cars mentioned and found that where Mr. Lauck's exhibit showed a labor charge of \$229 the company's records showed a charge of \$245, and where Mr. Lauck's exhibit showed \$290 for materials, the company's records showed \$380, making an actual cost in the company's shops of \$625. He had also found, he said, that the cost of repairing these same cars in outside shops under the contracts in force would have been \$680 instead of \$1,015.

Referring to Mr. Lauck's exhibit relating to interlocking directors, Mr. Willard said he was personally interested because the Baltimore & Ohio was mentioned and one of its directors, L. F. Loree. He added that R. S. Lovett and Samuel Rea had formerly been directors, but are not at present. In reply to a question, he said there was absolutely no relation between the Baltimore & Ohio and the Pennsylvania except that of competitors. When such statements as that about the interlocking directorates are made, Mr. Willard said, it is for the purpose of creating the impression that because of the interlocking relationship the directors of other companies probably exercise some influence over the Baltimore & Ohio inimical to its best interests. The directors, he said, were capable of defending themselves from such insinuations, but he was personally interested because under the ordinary form of corporate organization the only way directors can influence contracts or purchases is through the chief executive officer. They do not make contracts or buy materials themselves, but they approve what is done by the executive officer. If the Baltimore & Ohio directors had at any time exerted an influence of the kind suggested over the Baltimore & Ohio, Mr. Willard said, "it was because I was their willing tool, and I was not. Never at any time or concerning any subject did any of these directors ever suggest or hint to me that he would desire me to do anything inimical to the interests of the Baltimore & Ohio. I am saying this in the interest of the executive officers. Even though some such improper influence may have been exerted by some one at some time, it is certainly unfair and unjust to accuse everybody of the same thing."

Mr. Willard also filed with the committee a statement for the year ending February 28, 1921, in which the railroads

had a net operating income of \$2,090,000 as compared with \$530,000,000 in the previous year. This year, he said, included six months under the increased rates and 10 months under the increased wages. If the rates had been in effect for the full year \$507,000,000 would have been added to the freight revenues, \$108,000,000 to the passenger revenues, \$28,000,000 to other revenues, making a total of \$643,000,000 and if the award of the labor board had been in effect for the full year the expenses would have been increased by \$102,000,000 and on this basis the net operating income for the year would have been \$543,000,000 or hardly more than half of the 6 per cent return.

Referring to his statement of the day before regarding poor railroading in 1920, Mr. Willard said that some of his friends had thought he had not given the railroads sufficient credit for what they did in 1920 in moving the largest freight and passenger traffic in history without increase in facilities. He said that the conditions which followed the return of the railroads to private operation which the railroads had to contend with were such that they did not get as good results as he thought they ought to have, but they did move the business by increasing the train load and the car load and increasing the average miles per car per day.

A. H. Smith Begins Testimony

Mr. Willard was followed by A. H. Smith, president of the New York Central, who before beginning his prepared statement regarding the results of operation on the New York Central, pointed out the difficulties being experienced by the railroads in collecting what is due them for the period of federal control. He said the railroads before the war were the best transportation machine in the world and furnished transportation more economically than those of any other country. They did their part in the war, and he thought that even today they constitute the best transportation machine in the world and furnish transportation more cheaply than those of other countries, although, he said, that may not be saying much in view of the conditions of the railroads in other countries at present, but he felt that the country had been unappreciative of what the railroads did during the war and that some means ought to be taken to expedite the settlements with the Railroad Administration. He referred particularly to the adjustment of materials and supplies accounts. He said, however, he did not know that the Senate committee was in a position to do anything about it. Senator Cummins said that the committee probably could not do anything, although he was sure it was sympathetic and would be very glad of any opportunity to do anything. He said that he had been very much disappointed in the delays experienced in settling the affairs of the Railroad Administration and that he supposed no member of the committee had ever assumed that the work would take so long. Mr. Smith said that his company had only filed part of its claim with the Railroad Administration, but that the whole subject was so complicated that it is very difficult to do so and the principles have not been laid down on which the railroads can file their claims.

"It seems to me as a citizen," he said, "that some means ought to be found to get us together. These are good railroads and I think as good soldiers they ought to receive liberal treatment from the government."

Senator Kellogg asked questions to bring out the fact that the railroads of England, France and Canada are in a condition very similar to that of the railroads here. Mr. Smith was to continue his prepared statement on May 19.

Mr. Kruttschnitt Questioned by Committee

Mr. Kruttschnitt had completed his direct statement on May 12 and was recalled for questioning by members of the committee on May 12, 13 and 16. In response to questions he made the following points:

1. That a reduction in operating expenses is the most vital and important point now.
2. That the proposal to reduce rates in order to stimulate traffic to a profitable point is a "purely speculative" proposal and the roads are in no financial position to undertake problematical experimentation.
3. That the present financial plight of the railroads grows directly out of policies and decisions during federal control in relation to rules and working conditions, wages and prices.
4. That the Transportation Act should be allowed to have a full and fair trial without being tinkered with.

Much of the questioning was devoted to a discussion of freight rates and the probable effect on traffic of an immediate reduction.

"I have some questions as to whether the present rates have not discouraged traffic," said Senator Townsend of Michigan.

"I do not think the rates constitute an overcharge on the part of the railroads," Mr. Kruttschnitt replied.

"Do you think that the increased rates have reduced or increased the revenues?" Senator Townsend asked.

"I do not think they have had any appreciable effect," was the reply. "The increase in rates was given at a time when business was beginning to decline and prices were falling."

Mr. Kruttschnitt said that he did not believe that if the business depression had not occurred that there would have been as much necessity for a reduction in wages.

Senator Myers of Montana asked if decisions made while the railroads were under federal control were not responsible for the present situation of the railroads. Mr. Kruttschnitt replied "Yes, particularly as to expenses."

Attention was called to the contentions that a reduction in rates would have a tendency towards stimulating traffic. Mr. Kruttschnitt declared that the stimulative effect on traffic of reducing rates is largely speculative.

"Are the roads in a condition financially to engage in an experiment of that kind?" asked Senator Myers.

"No," answered Mr. Kruttschnitt. "During the last few months many of the roads have not earned their fixed charges or operating expenses. I do not want to be understood as opposing a reduction in rates where necessary, but I think there ought to be some proof demanded that would show that such a reduction would leave the carriers at least no loss."

"The outlook is extremely bad. Some roads may be able to hang on for a few months but I am afraid some will lose their grip."

"I said first of all we must reduce expenses; we now are compelled to pay laborers from 40 to 46 cents an hour for an eight-hour day on our lines while contractors, farmers and others pay only \$1.75 to \$2.00 for a ten-hour day. We are not allowed to do anything until we can get permission from the government authorities to reduce wages."

"Wasn't government control responsible for this condition?" Senator Frelinghuysen of New Jersey asked, to which an affirmative response was given.

Alfred P. Thom, general counsel for the Association of Railway Executives, reminded the committee that the increase in freight rates "had the very strong endorsement of the shippers of the country" at the time it was made.

"The idea seems to be abroad that it would help the railroad situation much to let them go into the hands of receivers and then squeeze out the water in the stock," said Senator Wolcott of Delaware. "Are the railroads earning the interest on their bonds alone, regardless of stock?"

"No," replied Mr. Kruttschnitt. "Then," remarked Senator Wolcott, "it would not change the railroad situation now even though the stock was all water, would it?"

"It would not," was the reply.

The assertions made that the roads could reduce their operating expenses through further great economies, were characterized by Mr. Kruttschnitt as extravagant.

"I do not know how any more great economies could be

put into effect than are now being practiced," the witness said. "I would be very reluctant to say that we have got to the point where we can not do better. An executive who gets to that point is about ready to be retired. But I do say that we are at a point where contentions that fabulous sums can be saved through further economies are unfounded. If the railroads were allowed to employ unskilled labor at rates other people are paying they could save \$600,000 a day."

Mr. Kruttschnitt said new economies were constantly being instituted but added that the results of those economies could not be as great in the next 10 or 15 years as they have been in the last 10 or 15 years. He said he knew of no waste of importance now being practiced in the management of the railroads.

Asked regarding his opinion of the Transportation Act, the witness said:

"I believe the Transportation Act is one of the best pieces of work Congress has ever done and I would dislike extremely to see it changed in any way until it had been given a full and fair trial. If I had an amendment in mind I would not offer it."

In response to a question by Senator Townsend the witness said he did not believe the action of Congress in directing the Interstate Commerce Commission to fix rates so as to yield, so far as might be, a return to railroads by groups of from 5½ to 6 per cent had resulted in any letup on the carriers' part in economy or caused them to be operated any less efficiently, as a railroad got no profit unless it earned it.

In compliance with a request made by Senator Kellogg, Mr. Kruttschnitt presented to the committee a table showing in complete detail what sums had been spent for railway operating expenses and taxes in each year from 1917 to 1920 inclusive. Senator Kellogg had requested especially that the exhibit show separately the sums expended in payment of salaries of general officers, division officers and for the wages of all other employees, and that this also be shown in the form of percentage expended for each item out of each dollar expended.

The tabulations showed a progressive increase for each year in the items for operating expenses, taxes, and for the total of the two. The following table gives the figures for the lowest point (1917) and the highest point (1920):

Item	1917	1920
Operating expenses.....	\$2,829,325.124	\$5,768,720.013
Taxes.....	213,920.095	278,868.668
Total operating expenses and taxes.....	3,043,245.219	6,047,588.681

The exhibit also shows that whereas in 1917, 55.27 cents out of every dollar expended for operation and taxes went for wages of employees (labor costs), it had increased in 1920 to 59.62 cents out of each dollar.

Salaries of general officers on the other hand decreased from 1.15 cents to .78 cents out of each dollar. The salaries of division officers remained practically stationary, being .74 cents out of each dollar expended in 1917 and .75 cent in 1920.

The table covering the salary and wage distribution of each dollar of money expended is as follows for 1917 and 1920:

Item	1917	1920
Compensation of employees:		
Salaries of general officers.....	1.15c	0.78c
Salaries of division officers.....	0.74c	0.75c
Wages of all other employees.....	55.27	59.62
Total compensation.....	57.16	61.15

The sum total of operating expenses and taxes rose from \$3,043,000,000 in 1917 to \$6,047,000,000 in 1920, of which the greatest increase was in labor cost, an increase in the four years of \$1,866,273,374.

The total for salaries of general officers of the railroads of the United States in 1920 was \$47,119,465, as against \$3,605,755,516 for labor. The salaries of general officers

represented two cents out of each dollar expended in 1917 and 1.27 cents in 1920.

Government Loss Estimated at \$1,800,000,000

Senator Cummins, during his examination of the witness, expressed the opinion that the 26 months of federal control would cost the government approximately \$1,800,000,000. His estimate, he explained, was based on correspondence which he had had with Director General Davis.

Director General Davis, in a statement recently submitted to a House committee, estimated that the loss to the government growing out of the 26 months of federal operation would be approximately \$1,200,000,000, or \$300,000,000 more than was estimated by Director General Hines. This estimate, Senator Cummins said, was based on the supposition that the maintenance claims would be adjusted as per the Railroad Administration's theory. "If the claims are settled on the theory advanced by the railroads as to maintenance, then it is estimated that the loss to the government for the 26 months will be not less than \$2,500,000,000. If adjusted between those extremes, I think it is safe to say that the loss will be in the neighborhood of \$1,800,000,000," he said.

Later on, calling attention to the financial condition of the railroads, the Senator intimated that unless some means were found of either increasing revenues or decreasing operating expenses, federal operation of the transportation systems of the country would result, and the government would have to stand the deficit.

"A good deal has been said in the newspapers recently about the failure of the Transportation Act," said Senator Cummins in opening his examination of Mr. Kruttschnitt. "The act did not fail to give to the railroads a larger revenue than they ever had before in the country's history, did it?"

"No," replied Mr. Kruttschnitt, "but as I have already expressed in my statement, the increase in rates were not received until very late in the year and were then only about eight per cent when applied to the whole year."

Mr. Kruttschnitt added that the revenues in 1920 were approximately \$1,041,000,000 greater than in 1919, of which amount only about \$418,000,000 was due to increased rates. He explained that the act in itself was not a failure but said that abnormal conditions in 1920 prevented the carriers from receiving what Congress expected when the bill was passed.

"Do you think it was the duty of the Interstate Commerce Commission to provide larger revenues than were provided?" Senator Cummins inquired.

"The act tells them what to do," Mr. Kruttschnitt answered. "If conditions then had warranted a higher award, I assume they would have made it."

As to the amount of increase in rates asked for by the carriers when the present increase was allowed, Mr. Kruttschnitt said their request was based on "the economic conditions of the times." He added that he believed the Transportation Act "did everything Congress could foresee" and that the law "marked a new era" in the transportation history of the country.

"Do you think the law has failed so far as the Labor Board is concerned?" Senator Cummins asked.

"I don't think the law has been given a fair chance to prove in all directions its merits or shortcomings," the witness answered.

Continuing, Mr. Kruttschnitt said he thought the "theory of the law" relative to the labor provisions was correct but he did not believe anybody thought it had been an exact success so far, asserting that he believed the Labor Board's proceedings had been too protracted and its decisions delayed too long.

Asserting that the labor difficulties had been inherited from federal control, Senator Cummins asked what would

have happened to the railroads if the law had not set up the board at the time of the labor troubles which followed relinquishment of federal control on March 1, 1920. Mr. Kruttschnitt replied that he believed a strike of railroad employees would have resulted.

"If it hadn't been for the law, this country would have been in a very disastrous strike," Senator Cummins asserted, to which the witness replied that the losses to the whole country "would have been almost incalculable."

Senator Cummins asked if it were not true that a very considerable part of the excessive expenses of 1920 was due to the unauthorized strike of switchmen. Mr. Kruttschnitt responded that the strike was very expensive to the railroads.

Asked by the Iowa senator if he thought the delay from April 1 to the following July in solving the problem of a wage increase for railroad employees was "undue delay on the part of the Labor Board in a matter of that magnitude," Mr. Kruttschnitt answered:

"No, because the board in that case offset the delay by making its decisions retroactive. The present delay of the board, however, is costing the roads from \$500,000 to \$600,000 a day because the board's decision cannot be made retroactive."

Senator Cummins asked why it was that after September 1, when the federal guaranty period expired, and when both carriers and employees were free to bring up the wage question, there was such long delay in beginning these proceedings.

"For the reason," Mr. Kruttschnitt replied, "that for several months after the rates were raised, business continued to increase and the roads to a certain extent were making the earnings contemplated by the Transportation Act and they were hoping to avoid this issue because they knew it would be a long, bitter contest. They were compelled, however, to make a protest because of the decline in traffic and earnings."

Calling attention to the fact that the hearing had just been completed before the Labor Board, Senator Cummins said it was his judgment that there has been "remarkable speed in the hearing of testimony and in the submission of the case" but said that the dispute over the abrogation of the National Agreements "engaged the board's attention for three or four months."

Mr. Kruttschnitt explained that the men who presented the railroads' case before the Labor Board were to be called later before the Senate committee to testify.

Attention was then turned to the financial conditions of the railroads. During this Senator Cummins said that if federal operation became necessary and no way could be found to increase revenues or decrease expenses, the deficit would have to be taken from the federal treasury.

Taking up the question of maintenance, Mr. Kruttschnitt called attention to the order issued by the Railroad Administration on December 16, 1920, by which the national agreement was made applicable to sectionment. This, he said, added very largely to the cost of maintenance because it established for the first time not only an eight-hour day for them but also punitive overtime.

As to the prospects for a reduction in the cost of maintenance as one of the means of reducing operating expenses, Mr. Kruttschnitt said cross ties in 1919 averaged \$1.06 apiece while in 1920 the price was \$1.31, but he said the railroads hoped to obtain a reduction this year. Cost of steel rails, he said, had already been fixed, so that no reduction in that direction is anticipated.

The cost of labor for maintenance of way constitutes about 60 per cent, according to Mr. Kruttschnitt, who said the carriers hope that will be reduced. Senator Cummins remarked "We have got to find some way to bring these costs down or you won't have any money for interest, bonds or other purposes."

In reply to a question by Senator Cummins, Mr. Kruttschnitt filed a statement showing that the results for 1920 were not materially affected by the statistics for Class II and Class III roads, because 451 of such roads had a combined deficit of \$1,060,000.

Senator Cummins by his questions tried to bring out an estimate of what economies the railroads would be able to effect this year. He asked what would be the reduction in maintenance and transportation expenses if the wage reductions proposed by the railroads are carried out and how much the roads expect to save on materials in view of the reductions in prices of coal, steel, lumber and ties. Mr. Kruttschnitt was unable to give an answer offhand but agreed to file a statement later. He was also asked to give comparisons of the labor and materials which entered into the operating expense accounts for 1920, 1919 and 1917.

"The main object of this inquiry," said Senator Cummins, "is to find whether the railways are going to be able to maintain themselves or whether we have got to find some better system. It is quite plain that if you don't do better this year than you did last year, you won't last long."

"That is quite plain," replied Mr. Kruttschnitt.

Senator La Follette followed Mr. Kruttschnitt's testimony closely and demanded copies of his various charts and statements but declined to question the witness directly.

The hearing has attracted considerable interest and all the available seats in the committee room have been occupied by railroad officers, shippers, labor leaders, and others.

Frank P. Walsh and W. J. Lauck made their appearance at the hearing on Monday and Senator Cummins read a telegram stating they had been authorized to represent the Railway Employees Department of the American Federation of Labor as counsel, consulting economist and statistician.

Fruit and produce growers of the Pacific Coast have wired to Senator Hiram Johnson, of California, asking that he appear before the Senate committee investigating the railroad situation to appeal for some remedy for the "excessive" freight rates from the Pacific Coast. The communication from the California Vegetable Union said in part:

"In marketing our vegetable crops we meet with competition from other producing sections which have always had advantage in freight rates. The recent horizontal increases have so widened the differentials to the large eastern markets we now cannot overcome this competition. As long as our competitors' products are in the markets we can only sell at heavy loss. There was average loss of approximately \$1.32 per crate on celery last season shipped from San Joaquin, Sacramento and delta regions and in consequence there will be reduction in acreage for coming season of about one-third unless some relief is had in present exorbitant freight rates. Heavy shipments of vegetables to date might be considered as indicating prosperous condition which, however, is not the case. Growers having brought their crops to maturity have shipped them because by so doing their losses were less than would have been had crops been plowed under. Although returns have not covered cost of production they did allow some margin of profit over harvesting expenses. The horizontal increases which failed to take into consideration matter of value always previously used in determining rates were incorrect in principle and fundamentally wrong."

THE CHICAGO, MILWAUKEE & ST. PAUL plans to supplement the quarters furnished by the forty-five or more hotels of Des Moines, Iowa, when the Shriners' Convention is held from June 14 to July 7, with sleeping cars, which will be parked in the yards. Shriners remaining in the cars will have more than the usual traveling conveniences as baggage cars are to be equipped with hot and cold showers and booths will be placed throughout the area where visitors will find clerks ready to provide the service desired.

Freight Car Loading

WASHINGTON, D. C.

FREIGHT CAR LOADING for the week ended May 7 showed a drop of nearly 4,000 cars as compared with the week before, according to the weekly report of the Car Service Division of the American Railway Association, after three weeks of increases. The total was 718,025, as compared with 843,184 in 1920 and 753,287 in 1919. The decrease as compared with the previous week is accounted for by a drop in the loading of anthracite coal, which caused a decrease in total cost loading from 145,010 cars to 143,323 cars.

There were decreases as compared with the corresponding week of 1920 in all classes of commodities and in all districts, but as compared with the week before there were increases in the Pocahontas, Northwestern and Southwestern districts.

The reports for the weeks of April 30 and May 7 follow:

Protecting Decks and Floors

With Asphalt Mastic

NOTHER EQUIPMENT of a railroad undergoes rougher usage than its floating equipment, such as barges and steel car-floats. Derailments, unequal expansion and twisting, all form depressions in the steel decks which demand continual overhauling. Rust also is a permanent bug-aboo. In order to counteract the necessity of continual overhauling, the Pennsylvania has recently covered ten of its newest steel floats with a flooring of Texaco asphalt mastic. This covering is usually applied to a thickness of from 3/4 to 1 in., sticking firmly and expanding and contracting with the steel as the latter expands and contracts with the repeated changes in temperature. One instance of its use is on barge No. 68, belonging to the Pennsylvania. Freight cars ran off

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY—ALL DISTRICTS; COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO. FOR WEEK ENDED SATURDAY, APRIL 30, 1921

Districts	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Mdse. L. C. L.	Miscellaneous	Total revenue freight loaded			Received from connections		
										This year	1920	1919	This year	1920	1919
										1921	1920	1919	1921	1920	1919
Eastern	1921	6,111	2,722	48,285	889	5,578	919	67,310	178,124	55,300	183,660	185,122	185,360	201,850	
Allegany	1921	2,776	3,085	44,126	2,477	2,306	950	42,427	46,958	145,105	167,099	155,838	98,139	17,878	
Pocahontas	1921	118	867	18,095	54	1,355	25	2,634	5,838	29,205	28,667	34,181	13,339	107,149	
Southern	1921	3,102	2,021	19,953	485	14,724	724	38,077	33,329	112,325	127,347	111,949	61,709	78,006	
Northwestern	1921	8,579	8,255	3,723	445	14,296	3,870	27,690	29,952	96,810	60,264	52,301	40,486	56,084	
Central Western	1921	9,354	11,388	15,464	158	4,229	576	30,199	31,815	103,183	111,593	99,196	46,392	60,182	
Southwestern	1921	4,386	2,352	4,332	391	6,094	2,680	21,610	43,369	66,165	57,245	52,301	43,648	45,752	
Total all roads	1921	34,426	29,909	145,010	4,659	48,554	7,725	213,792	237,922	721,997	800,960	752,362	489,073	545,205	
Increase compared 1920		4,904	.....	.....	.....	.....	.....	6,551	.....	43,727	.....	752,362	.....	554,350
Decrease compared 1919		476	.....	.....	.....	.....	.....	213,762	.....	76,977	.....	.....	.....	65,132
Increase compared 1919		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Decrease compared 1919		2,161	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

L. C. L. merchandise loading figures for 1921 and 1920 are not comparable, as some roads are not able to separate their L. C. L. freight and miscellaneous of 1920. Add merchandise and miscellaneous columns to get a fair comparison.

April 23	1921	32,715	29,602	138,576	4,595	46,711	5,691	211,627	235,010	704,527	717,772	715,042	486,040	426,958	521,991
April 16	1921	33,367	26,530	135,658	4,165	47,900	4,941	214,022	237,044	703,896	691,695	706,012	472,107	417,323	525,277
April 9	1921	33,415	25,339	128,044	4,835	47,806	4,787	212,147	237,351	693,719	801,559	711,282	466,513	560,040	530,996
April 2	1921	33,354	23,548	109,284	4,862	46,911	5,508	211,244	231,895	666,642	858,827	688,567	459,161	607,872	518,098

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY—ALL DISTRICTS; COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO. FOR WEEK ENDED SATURDAY, MAY 7, 1921

Districts	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Merchandise L. C. L.	Miscellaneous	Total revenue freight loaded			Received from connections		
										This year	1920	1919	This year	1920	1919
										1921	1920	1919	1921	1920	1919
Eastern	1921	6,016	2,657	37,009	885	5,509	2,364	57,091	65,554	177,085	190,735	183,630	190,735	199,075	
Allegany	1921	4,666	2,867	47,476	1,967	7,849	3,888	33,534	38,588	143,708	190,735	183,630	99,283	191,716	
Pocahontas	1921	124	85	21,623	44	1,167	32	2,599	5,428	31,242	175,256	163,613	13,641	121,923	
Southern	1921	3,268	2,010	19,518	499	13,970	633	38,155	31,288	109,343	129,762	119,157	59,878	79,564	
Northwestern	1921	8,275	6,895	3,939	448	14,573	7,421	27,207	31,022	99,780	63,312	52,301	40,843	59,639	
Central Western	1921	8,376	8,723	7,279	172	18,386	30,243	20,712	43,196	99,546	137,828	116,344	47,296	66,115	
Southwestern	1921	9,790	10,181	13,680	166	4,188	529	30,150	30,853	99,546	137,828	116,344	47,296	66,115	
Total all roads	1921	34,847	27,123	143,323	4,626	48,095	13,041	213,535	233,435	718,025	800,960	752,362	489,073	545,205	
Increase compared 1920		7,724	.....	.....	.....	.....	.....	.....	.....	43,727	.....	.....	.....	554,350
Decrease compared 1919		874	.....	.....	.....	.....	.....	.....	.....	76,977	.....	.....	.....	65,132
Increase compared 1919		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Decrease compared 1919		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

L. C. L. merchandise loading figures for 1921 and 1920 are not comparable as some roads are not able to separate their L. C. L. freight and miscellaneous of 1920. Add merchandise and miscellaneous columns to get a fair comparison.

April 30	1921	34,426	29,909	145,010	4,659	48,554	7,725	213,792	237,922	721,997	800,960	752,362	489,073	545,205	554,350
April 23	1921	33,426	26,530	138,576	4,595	46,711	5,691	211,627	235,010	704,527	717,772	715,042	486,040	426,958	521,991
April 16	1921	33,715	29,602	135,658	4,165	47,900	4,941	214,022	237,044	703,896	691,695	706,012	472,107	417,323	525,277
April 9	1921	33,357	26,302	138,576	4,395	46,711	4,941	214,082	237,351	693,719	801,559	711,282	466,513	560,040	530,996
April 2	1921	33,415	25,339	128,044	4,835	47,806	4,787	212,142	237,351	693,719	801,559	711,282	466,513	560,040	530,996

The number of surplus cars showed a decrease for the fourth consecutive week during the week of May 8. The total was 471,922, or over 9,000 cars less than for the last week of April. Of the total 174,227 were box cars or nearly 4,000 less than the week before and 220,529 were coal cars, or nearly 9,000 less than the week before.

the tracks of this barge, cutting holes in the steel flooring and causing it to bulge. In order to repair the damage, the company had asphaltic mastic applied over the flooring, the holes covered thoroughly, and then the entire surface given a 1-in. mat of the mastic.

In doing this class of work the kettles for heating the

material, as well as the material itself, were installed on the dock adjoining the barge, while smaller installations were made on the transfer platform of the barge itself. The



Applying and Spreading the Mastic

heated mastic was then distributed by means of buckets to the section to be covered, where it was poured and spread out by the workmen to the desired thickness.

A Scale-Proof Boiler for Locomotive Cranes

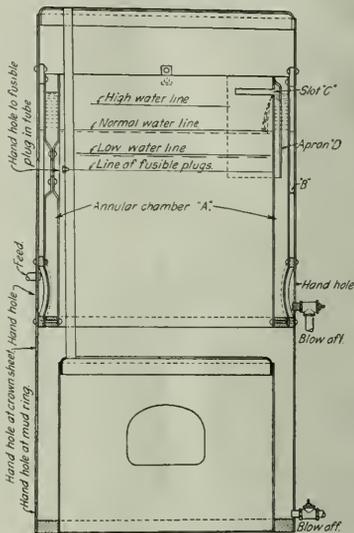
THE INDUSTRIAL WORKS, Bay City, Mich., has recently built a new patented locomotive crane boiler equipped with an annular scale chamber between the tubes and the shell plate. The design of this scale chamber in conjunction with the rest of the boiler design is such that the various impurities present in the feed water are precipitated and held where they can do no damage.

In this boiler the feed water is slowly passed through the scale chamber (at about 1/200 of the speed through the intake pipe) and attains a temperature at which the scale-forming impurities will be liberated from solution without the use of any chemicals. The impurities are then carried in suspension and as the movement of the water is slow these suspended precipitates settle down readily to the bottom of this chamber. This settling is accelerated by the decrease in its fluid friction.

The purifier consists of the annular scale chamber "A" extending completely around the tubes, with a one-inch water space "B" between this chamber and the boiler shell. The outlet into the main portion of the boiler is the slot "C", guarded by the apron "D." The feed water is admitted directly to the scale chamber "A" at a point farthest from the outlet slot. It then travels slowly around this chamber to the outlet, the apron "D" keeping any floating impurities from being discharged into the main boiler.

The sulphates of calcium are the hardest of the scale-forming impurities to get rid of. They are precipitated at 280 deg. F., corresponding to a boiler temperature when holding steam at only 35-lb. gage pressure. The carbonates and magnesia are precipitated at lower temperatures. These are all caught in the scale chamber together with mud, oil, and, in fact, all solids except common salt, for the first application of heat is what causes the liberation of these solids. The impurities left in the scale chamber do not bake into scale, as they do not come into contact with the hot furnace sheets, but are left as a soft mud which may be readily blown or washed out.

In a test of a 42-in. diameter boiler of this type, feed water naturally carrying 5 grains per gallon was loaded with 70 grains of calcium and 70 grains of earth, a total of 145 grains per gallon. The feed was taken from a barrel agitated with carbonic acid gas to form calcium carbonate. After about 1,200 gallons of this kind of water had been passed through the boiler it was allowed to cool. The heating surfaces and the lower mud ring were found to be per-



Vertical Section of the Boiler

fectly clean, with mud about six inches deep in the scale chamber. The blow-offs were both plugged so all impurities remained in the boiler. It was interesting to note that the presence of so much precipitated impurity in the scale chamber did not interfere to any appreciable extent with its operation.



Photo by Ewing Galloway

Railroad Station and Statue of Columbus in the Station Plaza at Genoa, Italy

General News Department

Walter H. Riddell has been appointed general superintendent of the Railway Mail Service, succeeding William I. Denning.

Repeal of the Transportation Tax on freight and express charges and passenger fares is proposed in a bill introduced in Congress on May 12 by Senator Trammell of Florida.

The Eastern Railroad Association, headquarters Washington, D. C., held its annual meeting in New York City on May 12, and re-elected A. W. Gibbs (Penn.), president, and E. N. Bessling, secretary.

Frank H. Alfred, president of the Pere Marquette, has issued an appeal to manufacturers and coal dealers, advising immediate purchase of fuel for the coming Winter. The road is already storing coal for next Winter's operation.

The Railroad Yardmasters of America, at their third annual convention, held at St. Louis, Mo., last week, discussed working conditions on railroads throughout the country. Changes in the constitution of the organization were proposed and additional details of the insurance plan of the order were worked out.

At Island Pond, Vermont, on May 13, the entire crew of a freight train of the Grand Trunk was arrested, together with another man, on charges of smuggling liquor into the United States from Canada. Customs officers are said to have surprised the gang, in a secluded spot, unloading liquor from the train into automobiles.

The American Electric Railway Association will hold its annual convention at Atlantic City, N. J., in the week beginning Monday, October 3, in the spacious and beautiful building which has just been completed on the boardwalk at North Carolina avenue immediately in front of Haddon Hall. The exhibits this year will be omitted.

F. M. Feiker, vice-president and chairman of the editorial board of the McGraw-Hill Company, publishers of Engineering News-Record and other technical publications, New York City, has been appointed personal assistant to Herbert Hoover, Secretary of Commerce, with the title of assistant to the secretary. Mr. Feiker was graduated from the Worcester Polytechnic Institute with the degree of electrical engineer. He has been in editorial work for fifteen years, and with the McGraw-Hill Company for the last six years.

The American Association of Engineers, at its annual convention at Buffalo on May 9, 10 and 11, elected officers as follows: H. O. Garman, chief engineer, Public Service Commission of Indiana, Indianapolis, Ind., president; A. N. Johnson, dean of engineering, Maryland State College, College Park, Md., first vice-president, and A. S. Morris, auditor of capital expenditures, Chicago & North Western Railway, second vice-president. W. R. McKeen, president of the McKeen Motor Car Company, of Omaha, Neb., was elected a director.

Senior Signal Engineers, Grade 1, salary \$3,600, are called for by the last circular of the United States Civil Service Commission, which will receive applications for that position until June 7. A vacancy is to be filled in the Bureau of Safety, Interstate Commerce Commission; age limit, 25 to 55 years. The commission calls for graduates of a college or technical school who have had several years' practical experience. Employees of the Bureau of Safety are entitled to retirement annuities if they serve until the age of 70 and have been in the employ of the government 15 years. A deduction of 2½ per cent is made from the monthly salary to provide for the annuity.

Arthur Hale, formerly with the American Railway Association, has opened an office in the Union Trust Building, Washington, D. C., where he will act as agent and attorney for railroads. He is prepared to handle claims, valuation questions and generally to advise railroads in their relations with any branch of the federal government or with associations located in Washington. When Washington counsel is required, he proposes to engage Minor, Gatley & Rowland, who were attorneys in the private car case. Mr. Hale entered railway service in 1882 and was with the Pennsylvania 19 years. He was then on the Baltimore & Ohio for eight years and in 1909 was appointed general agent of the American Railway Association. Since his retirement from that position he has been vice-president of the Cumberland & Pennsylvania Railroad and the Consolidation Coal Company.

Operating Costs Reduced In February

A reduction in the cost of operation per train mile in February as compared with January is shown in the monthly bulletin issued by the Interstate Commerce Commission. The total of the selected accounts used by the commission to represent the cost per freight train mile was \$2.112 as compared with \$1.923 in February, 1920, and \$2.166 in January. The total of the selected accounts for passenger train service was \$1.142 as compared with \$1.061 in February, 1920, and \$1.164 in January. The cost of coal per ton was \$4.61 as compared with \$3.58 in February, 1920. The cost in January was also \$4.61.

Careful Automobile Drivers

The Baltimore & Ohio began its campaign to enlighten automobile drivers in November, 1919, and the four million notices distributed since then, through the co-operation of state officers, and others, are believed actually to have reduced carelessness at crossings. About 100,000 observations have been made, and the percentage of automobile drivers who do not observe safety rules at crossings is smaller than it was in 1919. In January of this year, with 8,000 observations, the failures were five per cent; in February, 17,000 observations, failures four per cent; and in March, 23,000 observations, failures six per cent. Two years ago these percentages were about 25, and in 1920, 16 per cent. Non-observance of safety rule is, wherever possible, called to the direct attention of the driver; and the campaign is to be kept up with full vigor.

Money Talks

The Narragansett Pier Railroad, an eight-mile line in Rhode Island, which has been threatened with insolvency because of the competition of an electric line and automobile trucks, and from other causes, is to be kept running by the aid of contributions from two towns on its line. The president of the road having explained the situation, and the dependence of the towns on the road for the movement of coarse freight being clearly realized, town meetings unanimously voted specific appropriations. The town of Narragansett appropriated \$5,000 and South Kingstown \$10,000. By agreement with the road each town appoints a citizen to sit with the board of directors of the company. It is understood that the company agrees to continue operation at least until March 28, 1922, and to declare no dividends prior to that date. The road has three locomotives, and its line connects with the New York, New Haven & Hartford at Kingston (township of South Kingstown).

Operating Statistics of Large Steam Roads—Selected Items for the Month of February, 1921.

Region, road and year	FREIGHT SERVICE										Locomotives on line daily				
	Average miles of road operated	Locomotive-miles		Car-miles		Ton-miles (thousands)		Gross. Excluding locomotive and tender	Net. Revenue and non-revenue	Service-able	Un-service-able	Per cent un-service-able	Stored		
		Trains-miles	Principal and helper	Light	Loaded (thousands)	Empty (thousands)	Per cent loaded								
New England Region:															
Boston & Albany.....	1921	394	240,140	258,441	30,152	3,344	2,416	61.1	219,841	89,683	127	30	19.1	...	
1920	394	222,082	237,370	27,230	3,140	1,078	74.4	161,535	74,175	128	32	19.9	...		
Boston & Maine.....	1921	2,481	494,339	548,666	50,873	6,373	4,879	63.3	318,462	238,311	338	67	25.7	56	
1920	2,482	512,883	555,024	49,215	7,466	2,774	75.9	392,526	180,776	322	121	27.3	3		
N. Y., N. H. & H.....	1921	1,959	394,434	426,026	34,336	8,270	4,154	69.8	452,955	200,711	299	65	17.9	31	
1920	1,938	355,352	367,527	30,858	6,031	1,376	81.4	288,339	134,308	273	100	26.8	1		
Great Lakes Region:															
Delaware & Hudson.....	1921	880	378,159	525,679	34,148	8,363	6,357	56.8	601,043	292,723	280	35	11.1	50	
1920	858	341,257	458,282	30,221	6,990	3,092	69.3	462,162	248,889	279	36	11.4	27		
Del., Lack. & Western.....	1921	997	448,220	553,326	113,241	12,017	6,406	65.2	693,233	321,373	319	58	15.4	35	
1920	979	471,749	610,819	142,500	13,079	5,233	78.8	723,889	363,296	306	128	18.3	40		
Erie (inc. Chic. & Erie).....	1921	2,259	454,200	976,717	16,634	13,933	13,773	16.827	879	173,463	570	128	18.4	30	
1920	2,259	1,019,837	1,157,582	37,345	27,865	10,102	73.4	1,626,984	828,856	509	189	27.1	8		
Lehigh Valley.....	1921	1,431	504,204	564,407	52,362	12,822	7,657	62.6	812,951	390,497	406	133	24.7	93	
1920	1,429	562,995	635,447	65,347	14,337	5,643	71.8	836,085	419,880	375	150	28.6	46		
Michigan Central.....	1921	1,729	422,789	462,334	16,634	11,128	2,907	25.93	216,687	103,569	107	66	19.7	112	
1920	1,826	535,843	574,822	18,793	17,082	4,242	79.7	661,526	414,700	333	76	18.6	...		
New York Central.....	1921	5,646	1,679,905	1,850,209	130,096	48,583	38,250	55.9	3,007,178	1,602,829	1,043	516	33.1	171	
1920	5,646	1,938,177	2,201,504	164,115	58,498	22,451	72.3	3,272,136	1,628,886	(1)	(1)	(1)	(1)		
N. Y., Chic. & St. L.....	1921	572	312,491	343,611	18,121	8,243	63.0	354,291	178,441	69	63	25	29		
1920	572	357,174	369,087	1,297	10,221	2,272	81.8	504,817	244,290	110	66	37.5	9		
Pere Marquette.....	1921	2,207	234,952	240,086	4,091	5,299	3,204	62.3	278,807	131,961	172	34	16.7	34	
1920	2,300	294,593	311,359	6,201	6,964	1,865	78.7	358,534	182,225	157	51	24.5	...		
Pltts. & Lake Erie.....	1921	225	101,455	111,882	1,128	1,128	2,007	2.093	58.1	216,687	103,569	67	14	19.3	...
1920	225	143,946	150,459	7,387	4,551	2,708	62.7	331,989	188,953	65	16	19.8	...		
Wabash.....	1921	2,418	471,060	500,007	3,970	12,672	5,911	68.2	692,284	301,907	270	65	19.4	34	
1920	2,418	573,631	590,877	7,992	15,083	3,517	81.1	769,313	383,445	256	85	24.9	...		
Ohio-Indiana-Allegheny region:															
Baltimore & Ohio.....	1921	5,185	1,524,400	1,910,327	102,728	37,702	26,237	55.5	2,235,122	1,026,686	1,058	303	22.3	198	
1920	5,154	1,839,917	2,303,858	143,004	49,941	19,226	71.4	2,893,142	1,500,613	1,040	299	22.3	23		
Central of N. J.....	1921	678	247,323	270,085	28,611	4,945	3,773	56.7	351,384	175,293	262	63	23.5	14	
1920	679	295,795	325,514	37,054	5,063	2,966	62.9	322,261	171,598	208	66	32.2	...		
Chicago & Eastern Ill.....	1921	4,131	1,077,287	2,087,435	4,431	13,935	3,139	58.0	3,359,900	1,765,631	107	66	38.2	11	
1920	4,131	292,346	299,264	4,914	7,170	3,553	66.9	434,069	225,183	100	74	42.5	2		
C., C. & St. L.....	1921	2,396	587,750	618,701	21,888	13,779	11,588	54.3	933,291	377,906	315	117	27.1	47	
1920	2,393	724,123	754,544	133	20,159	8,141	71.2	1,171,640	584,428	299	102	25.4	...		
Elgin, Joliet & Eastern.....	1921	832	181,555	193,863	7,692	7,692	1,863	24.3	216,687	103,569	107	66	19.7	112	
1920	832	161,308	185,191	12,371	4,464	2,789	61.5	326,573	177,232	94	14	13.0	...		
Long Island.....	1921	395	36,284	41,470	7,343	425	235	64.4	22,555	8,987	34	7	16.6	3	
1920	395	32,509	37,790	11,203	349	143	70.9	17,638	7,137	36	12	25.4	...		
Pennsylvania System.....	1921	11,450	3,765,561	4,114,824	314,912	82,857	58,792	58.1	5,909,925	2,907,022	2,313	813	34.7	302	
1920	10,927	4,331,454	4,814,348	367,290	103,656	47,154	68.7	6,521,778	3,443,996	2,025	1,036	33.8	30		
Phila. & Reading.....	1921	694	489,651	560,276	74,107	11,099	7,689	59.1	790,879	415,046	347	89	20.4	87	
1920	690	608,045	696,159	84,415	13,149	5,667	68.8	867,524	492,032	297	83	21.8	4		
Pocahontas region:															
Chesapeake & Ohio.....	1921	2,543	587,141	640,327	19,226	15,072	12,560	54.4	1,147,897	585,329	406	155	27.7	84	
1920	2,517	784,349	881,441	27,417	22,272	13,548	62.2	1,579,681	862,805	400	129	24.0	142		
Norfolk & Western.....	1921	2,110	571,828	696,520	24,271	14,329	10,296	58.2	1,089,423	571,135	478	203	29.8	141	
1920	2,189	726,203	925,530	47,341	20,827	10,869	65.7	1,496,081	828,332	401	277	40.9	6		
Southern region:															
Atlantic Coast Line.....	1921	4,892	635,191	630,409	11,231	13,436	8,476	61.3	720,670	272,832	282	133	32.1	2	
1920	4,893	699,621	702,364	12,421	14,797	6,558	69.3	752,976	305,017	276	128	31.7	...		
Central of Georgia.....	1921	1,916	282,816	212,570	21,885	4,166	1,766	70.2	233,511	110,036	107	110	10.7	...	
1920	1,916	222,881	274,616	4,089	4,812	1,166	77.4	226,460	110,717	96	25	26.0	...		
I. C. (inc. Y. & M. V.).....	1921	6,151	1,508,839	1,517,942	31,813	34,625	20,730	62.6	2,261,312	1,048,935	732	110	13.1	13	
1920	6,152	1,730,378	1,740,326	39,256	45,423	18,073	71.5	2,680,672	1,308,875	715	117	14.1	18		
Louisville & Nashville.....	1921	5,026	1,331,205	1,422,891	46,681	20,948	14,265	59.1	1,359,816	636,022	515	105	16.2	4	
1920	5,026	1,479,217	1,479,217	54,399	54,399	20,948	75.3	1,895,089	795,631	514	200	38.8	...		
Seaboard Air Line.....	1921	3,537	422,350	428,723	8,969	8,444	5,901	60.6	476,858	178,718	174	78	30.9	...	
1920	3,537	434,596	448,269	10,076	10,164	3,500	72.0	535,925	234,548	182	93	33.8	...		
Southern Ry.....	1921	6,944	1,129,047	1,150,060	24,109	22,529	10,885	67.4	1,215,793	523,116	884	240	21.4	70	
1920	6,944	1,356,156	1,393,656	48,615	32,190	8,993	78.2	1,586,771	749,967	967	169	14.9	6		
Northwestern region:															
C. & N. W.....	1921	8,320	1,394,473	1,434,977	18,093	24,765	16,822	59.5	1,492,786	675,825	639	319	33.3	2	
1920	8,062	1,614,675	1,645,607	21,587	35,084	13,778	71.8	1,899,012	837,452	687	225	24.7	2		
C., M. & St. P.....	1921	6,014	1,181,677	1,216,555	16,540	20,000	16,273	61.1	1,481,662	723,622	547	158	22.2	30	
1920	10,623	1,696,845	1,752,524	77,536	45,268	23,723	75.3	2,388,861	1,101,573	705	294	29.4	2		
C., St. P., M. & O.....	1921	1,726	294,543	312,226	13,154	4,882	2,675	64.6	273,580	111,630	152	52	25.5	27	
1920	1,726	357,778	383,250	17,744	6,659	2,349	73.9	349,209	164,096	157	86	26.3	15		
Great Northern.....	1921	7,980	618,104	636,972	23,085	17,970	9,811	71.3	824,907	408,600	589	180	23.4	245	
1920	7,986	1,021,156	1,064,841	51,511	26,730	8,730	75.1	1,364,275	681,966	499	231	31.6	16		
M., St. P. & S. Ste. M.....	1921	4,225	423,190	429,672	6,552	8,379	3,938	68.0	441,263	212,940	341	66	16.2	51	
1920	4,227	581,757	491,308	9,060	13,046	3,143	80.6	599,106	306,715	329	75	18.5	38		
Northern Pacific.....	1921														

Compared with February, 1920, for Roads with Annual Operating Revenues above \$25,000,000

Region, road and year	Cars on daily line			Freight Service		Gross tons			Net tons			Net ton miles			Pounds of coal		Passenger service	
	Home	Foreign	Total	Per cent un-service-able	Stored	per train, excluding locomotive and tender	Net tons per train	Net tons per car	Net ton miles per car-day	Car-miles per car-day	per mile per day	per 1,000 gross tons	Train-miles	Passenger train-car-miles	Passenger service			
															Trains	Passenger train-car-miles		
New England region:																		
Boston & Albany.....	1921	3,178	4,681	9.1	7,859	6.4	1,350	914	374	23.3	408	28.6	8,131	233	285,359	1,765,969		
1920	3,013	9,314	4.1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	286,245	1,739,906
Boston & Maine.....	1921	15,626	15,110	30.786	15.2	2,244	1,048	462	24.6	265	15.8	6,499	308	779,707	4,067,156			
1920	7,371	31,428	38,799	8.3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	775,564	3,947,412
N. Y., N. H. & H.....	1921	22,983	17,689	40,672	14.4	4,981	1,148	509	24.0	176	11.0	3,660	220	979,198	5,077,262			
1920	7,772	41,406	49,178	5.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	925,101	5,409,243
Great Lakes region:																		
Delaware & Hudson.....	1921	9,784	7,868	17,652	8.2	321	1,589	774	35.0	592	29.8	2,389	214	168,117	848,607			
1920	2,159	14,982	17,141	5.9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	175,330	801,166
Del., Lack. & Western.....	1921	15,909	7,255	23,164	5.7	3,511	1,547	717	26.7	355	28.4	11,515	207	448,793	3,109,290			
1920	3,669	21,970	25,639	5.4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	426,986	2,999,173
Erie (inc. Chic. & Erie).....	1921	31,475	20,618	52,093	12.7	9,370	1,845	835	30.1	489	27.8	12,268	177	604,461	4,584,459			
1920	6,569	50,741	57,310	9.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	653,695	4,556,906
Lehigh Valley.....	1921	27,452	11,365	38,817	9.6	2,686	1,612	775	30.5	359	18.8	9,748	196	330,968	2,456,578			
1920	8,515	14,076	22,591	5.8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	246,826	1,812,636
Michigan Central.....	1921	16,730	12,495	29,225	11.2	1,464	1,546	627	24.1	324	23.2	5,178	155	518,334	3,468,309			
1920	3,414	36,331	39,745	6.8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	583,285	4,811,359
New York Central.....	1921	78,864	60,757	139,621	9.6	21,854	1,838	774	26.8	333	22.2	8,228	150	2,156,578	16,175,346			
1920	20,293	137,671	157,962	7.1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,208,179	15,837,200
N. Y., Chic. & St. L.....	1921	1,141	4,675	9,816	14.8	799	1,454	588	22.3	668	46.7	11,469	134	79,365	454,787			
1920	1,308	10,580	11,888	6.2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	64,980	408,645
Pere Marquette.....	1921	9,700	7,135	16,835	9.5	2,000	1,187	562	24.9	280	18.0	2,135	189	259,700	1,219,586			
1920	3,859	19,089	22,948	9.4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	285,440	1,387,836
Pitts. & Lake Erie.....	1921	10,931	10,643	21,574	11.4	3,612	2,134	1,170	40.8	172	7.3	18,870	90	104,932	520,512			
1920	3,636	21,791	25,427	9.1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	90,784	484,136
Wabash.....	1921	12,307	10,310	22,617	10.8	.....	1,470	641	23.8	477	29.3	4,460	196	490,733	2,469,594		
1920	4,812	18,714	23,526	10.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	493,348	2,464,221
Ohio-Indiana-Allegheny region:																		
Baltimore & Ohio.....	1921	64,993	38,059	103,052	7.2	5,718	1,466	674	31.4	356	20.4	7,072	221	1,246,118	7,810,727			
1920	16,634	79,871	96,505	5.8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,238,739	7,523,675
Central of N. J.....	1921	16,542	10,456	26,998	19.9	2,914	1,421	709	35.4	232	11.5	9,238	192	263,450	1,335,876			
1920	3,928	19,440	23,368	7.7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	288,792	2,226,558
Chicago & Eastern Ill.....	1921	15,905	3,240	19,145	11.2	.....	1,418	692	31.3	268	14.7	4,532	207	218,359	1,384,118		
1920	8,374	11,769	20,143	9.1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	218,734	1,410,465
C., C. & St. L.....	1921	17,717	11,035	35,812	11.1	7,005	1,588	643	37.4	377	25.3	5,632	159	608,756	4,166,980			
1920	3,271	33,472	36,743	6.3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	681,687	4,161,927
Elgin, Joliet & Eastern.....	1921	10,271	8,193	15,384	6.1	1,627	1,123	1,165	42.8	304	10.9	5,957	166	(?)	(?)			
1920	1,840	10,340	18,480	5.2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	(?)	(?)
Long Island.....	1921	1,565	3,595	5,160	4.7	257	617	246	21.1	67	4.6	8,774	419	171,661	904,055			
1920	3,561	5,842	9,403	4.7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,657,901	788,875
Pennsylvania System.....	1921	191,728	81,343	273,036	4.9	73,110	1,571	774	34.0	380	18.6	9,573	171	4,644,890	30,263,113			
1920	85,567	202,403	288,010	7.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4,930,162	31,470,065
Phila. & Reading.....	1921	24,669	15,115	39,784	8.9	2,889	1,615	848	37.4	373	16.9	21,353	223	476,339	2,107,947			
1920	5,261	30,622	35,883	5.4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	481,527	2,049,619
Peachwater region:																		
Chesapeake & Ohio.....	1921	34,239	15,177	49,416	6.5	17,700	3,455	997	38.8	423	20.0	8,222	163	402,436	2,205,304			
1920	4,878	30,306	35,184	8.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	380,281	2,064,780
Norfolk & Western.....	1921	35,239	9,947	45,186	6.7	10,794	1,905	680	35.0	451	19.0	8,451	198	580,826	3,107,636			
1920	8,139	24,458	32,597	7.3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	372,383	2,301,815
Southern region:																		
Atlantic Coast Line.....	1921	21,927	12,683	34,610	11.1	.....	1,152	436	20.4	281	22.6	1,993	148	972,966	5,550,992		
1920	6,120	29,093	35,213	9.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	817,192	5,896,114
Central of Georgia.....	1921	4,528	4,070	8,598	10.3	.....	1,093	324	45.7	246	25.6	2,060	180	911,500	1,486,114		
1920	1,385	8,789	10,174	2.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	306,136	1,540,950
I. C. (inc. V. & M. V.).....	1921	42,623	20,641	63,264	5.9	10,569	1,499	695	30.3	592	31.2	6,090	163	1,307,844	7,450,308			
1920	10,978	44,793	55,771	5.8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,315,800	7,621,403
Louisville & Nashville.....	1921	36,219	16,033	52,252	12.2	12,622	1,622	719	35.2	412	22.9	9,870	206	1,345,870	9,069,565			
1920	43,655	29,947	73,602	7.2	126	1,072	538	304	62.0	304	23.7	5,461	184	844,756	6,991,600			
Seaboard Air Line.....	1921	10,662	10,338	21,000	15.0	.....	1,129	423	21.2	304	23.7	1,804	194	567,905	3,418,427		
1920	3,157	21,467	24,624	6.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	563,213	3,475,662
Southern Ry.....	1921	35,983	26,368	62,351	7.8	12,117	1,077	627	33.3	301	22.6	12,600	226	1,620,626	10,067,066			
1920	14,551	53,360	67,911	2.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,366,684	8,248,493
Northwestern region:																		
C. & N. W.....	1921	45,683	25,262	70,945	6.8	3,600	1,071	485	27.3	340	20.9	3,719	209	1,538,567	9,898,398			
1920	22,680	63,132	85,812	6.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,318,378	9,979,882
C. M. & St. P.....	1921	20,663	20,662	41,325	8.9	8,669	1,243	538	25.0	369	24.5	2,158	194	1,322,587	7,975,226			
1920	18,660	71,798	90,458	5.8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,293,985	8,084,569
C. St. P. M. & O.....	1921	3,300	11,154	14,454	11.3	1,414	999	370	22.9	276	18.7	2,309	205	291,309	1,626,784			
1920	(?)	(?)	13,835	7.5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Great Northern.....	1921	45,353	11,967	57,320	11.9	.....	1,333	650	27.2	250	22.0	2,798	201	903,986	5,356,085		
1920	18,269	29,463	47,732	7.7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	889,155	5,392,015
M., St. P. & S. Ste. M.....	1921	15,923																

International Railway Fuel Association

This association will hold its thirteenth annual meeting at Hotel Sherman, Chicago, on Tuesday, Wednesday and Thursday, May 24, 25 and 26. The program of the meeting shows addresses by Samuel O. Dunn, J. B. Hurley, Eugene McAuliffe and Robert E. Woolley.

The subjects of committee reports, with the name of the chairman of the committee following each subject, are as follows: Constitution and By-Laws, T. D. Smith; Firing Practice, M. A. Daly; Front Ends, Grates and Ash Pans, H. B. MacFarland; Fuel Accounting, J. N. Clark; Fuel Stations, W. E. Dunham; Pulverized Fuel, W. J. Bohan; Storage Coal, H. H. Stock; Locomotive Feed Water Heating, E. E. Chapman; Briquettes and Sub-Normal Fuels, E. E. Ramey.

Nine individual papers are scheduled; these, with their authors, are as follows: Cost of Production of Coal, Mont B. Morrow; Fuel Conditions on French Railways, Mr. de Boysson; Fuel Department Organization, L. G. Plant; Oil Shale as a Source of Oil Supply, Martin J. Gavin; Other Duties of a Fuel Inspector, H. L. Reynard; Preparation and Distribution of Coal, P. E. Bast; Standards of Fuel Economy Practice, D. C. Buell; Fuel Economy, C. E. Uddenberg; Value of Individual Enginemen's Performance Record, Robert Collett.

The Kushequa Route

What may be called a "seasonal" time-table has been issued by the Mt. Jewett, Kinzua & Riterville Railroad, otherwise known as "The Kushequa Route," in northwestern Pennsylvania. The time-table for the coming summer is headed "For Fire Season, 1921," and beneath the heading it says, "No Trains east of Kushequa on Dry days." The meaning of the word "dry" in this connection is not that which is so familiar nowadays in the humorous columns of the newspapers, but relates to weather conditions. Because of the existence of extensive dense forests adjacent to the railroad line, the danger of fire must constantly be guarded against. Judging from the newspaper accounts which give this information, the five locomotives owned by the road are not equipped with perfectly satisfactory spark arresters.

The total length of this road is about 25 miles (including six leased lines) and that portion east of Kushequa has a length of about 15 miles. One of the features of the road is a locomotive named "Roosevelt," which name was adopted, it is said, because the engine is a rough rider. This railroad is an important one, in that it affords to many residents of McKean County their only convenient means of getting to their county seat, Smethport.

Fire at Grand Central Terminal

The burning out of a positive third rail feeder at 6:30 a. m. Sunday, May 16, at Tower U interlocking Grand Central terminal, threatened to tie up all train movements into and out of the station and in addition caused damage to the interlocking estimated at \$20,000. Trouble was first noticed when trick fuses could not be kept in on one track circuit. When an inspection of the track circuit was made a thin line of smoke was noticed curling up from the ballast. Electrical department employees were notified, but before their arrival the feeder burned out and the heavy current discharge was carried through the ground, over pipes, and structural steel work in all directions. It appears that this current was carried into the interlocking tower on the steam heating pipes which, in running to the tower, are buried in ballast at this point. From these pipes the current spread to all metal parts of the tower and the insulation on the wires for all the interlocking and intercommunicating circuits was set on fire and burned fiercely, completely destroying all circuits. The city fire department on arrival completely flooded the tower, adding materially to the damage to the machine and instruments. Tower U is an electric interlocking plant with a 92-working-lever machine, and with the exception of the frame and mechanical locking this had to be stripped and entirely rebuilt by the force who immediately started to work to repair the damage. With a train movement of about 400 trains on Sunday over this plant, the accident resulted in only 65½ minutes of accumulated delay, a large portion of which was caused by the fire department requiring all power to be cut off

at this point for about 40 minutes. By 5:35 a. m. Monday, emergency repairs had been made so that all switches and signals needed to handle the heavy inbound suburban and through service were in operation, and with about 625 trains on weekdays, no train delays occurred on Monday.

Signal Section—A. R. A.

The notice of the annual meeting of the Signal Section, American Railway Association, which is to be held at Chicago on June 6, 7 and 8, has just been issued by Secretary H. S. Balliet. It fills 200 pages and contains the full reports of the committees. Committee X presents a report, prepared by a sub-committee, of which H. K. Lowry is chairman, on the requisites of signal locations for automatic block signals. This committee, among other things, reports on automatic train control, and on a proposed short code of requisites for light signals. Specifications to be discussed at the meeting include those for mechanical interlocking, for power interlocking, for a battery jar, for a concrete battery box and for portable ammeters and voltmeters. Twelve proposed standard drawings of details will be presented. Committee IV presents a code of instructions for making torque tests of power-operated signals, and a drawing of torque testing apparatus. Other subjects to be presented are: Rules for signal maintenance; general provisions for use in major specifications; information for calculating power supply and distribution in alternating current signal systems, and forms of contractors' proposal including invitation, bond, and a full contract.

Committee XV on valuation, J. M. Carley, chairman, presents a report of a dozen pages giving the result of studies in valuation details made by several sub-committees.

Chicago Belt Line Hearing Continued

Witnesses called by Luther M. Walter, attorney for the roads, protesting against the acquisition of the Chicago Junction Belt Line by the New York Central, in the hearing before Examiner W. A. Colston of the Interstate Commerce Commission, continued their arguments against the plan this week. John F. Wallace, former chairman of the Chicago Railway Terminals Commission, on May 16, declared that trunk line control of the property would make it less flexible in meeting shippers' requirements, and stated that the opportunity for terminal expansion of the New York Central's present holdings north of Sixty-third street, Chicago, was entirely possible. He also stated that the plan of the city of Chicago for terminal improvement north of Sixteenth street, would give the New York Central a chance for intensive development which would afford it practically four times its present facilities now north of that street.

Other witnesses called to the stand who favored joint operation of the property were Fred Zimmerman, vice-president of the Monon; H. E. Poronto, vice-president of the Chicago Belt Line; and Ira L. Burlingame, president of the St. Louis Freight Service Association and former general manager of the St. Louis Terminal Railroad Association. Mr. Burlingame said: "Shippers are better served by jointly owned belt lines than by one under the control of one line. I have located many industries in St. Louis and the big shippers always desire to be on the joint line. As general manager of the St. Louis Terminal Road, I was not hampered in any way by roads interested in the property. When I wanted money for improvements, I went to the president of the company and I got it. Jointly owned belt lines do not discriminate in favor of any one road."

J. A. Spoor, president of the Chicago Junction, testifying on May 16, declared that of the capital stock of \$5,500,000 of the Junction Road, only \$200,000 represented actual cash paid into the property by the stockholders. The balance came from earnings placed back into the property.

Abraham Harris, of Harris Brothers, one of the industries situated on the Chicago Junction, who was called to the stand on May 16, was asked by Mr. Walter why he had quit, after starting active opposition to the plan. He finally admitted that heavy financial pressure had been brought to bear on him by big banks.

Traffic News

The National Industrial Traffic League will hold its Spring meeting at Hotel Winton, Cleveland, Ohio, on May 25 and 26.

Five railroads in Missouri have made an offer to country newspaper editors to accept advertising space in return for transportation, in order to help the editors go to the twelfth annual journalism week at the University of Missouri, Columbus, Mo., from May 23 to 27.

Iron and steel producers at Chicago have filed an application with the transcontinental lines for a readjustment of through rates on rolled steel from Chicago to the Pacific Coast, to enable them to compete with the Eastern mills now enjoying low water rates.

The recovery in production of soft coal gained additional momentum in the week ending May 7, according to the weekly bulletin of the Geological Survey. The total output is estimated at 7,296,000 net tons, an increase of nearly 5 per cent when compared with the preceding week.

J. H. Beek, executive secretary of the National Industrial Traffic League, called upon President Harding at the White House on Monday to invite him to speak at the next meeting of the league in Cleveland and incidentally discussed with the President the railroad situation from the point of view of the shippers.

The Louisville & Nashville has announced advances, which it is proposed to put in force on June 16, in freight rates on coal, from mines in various sections, to Louisville, Ky., and to certain other places, at the same time making reductions in rates to Lexington and certain territory. In Louisville, loud threats are made that the Interstate Commerce Commission will be asked to suspend the proposed increases. Some of these rates are intrastate and some interstate. The average freight rate on coal received in Louisville is said to be about \$1.25 a ton and the proposed increases average about 15 cents a ton.

The Pacific Railway Club and the Central California Traffic Association held a joint meeting at Oakland, Cal., on May 12, to discuss the topic "Co-operation of Railroad Men with Commercial and Industrial Traffic Managers." C. D. Myers, district freight agent of the Southern Pacific, spoke "On the Value of Solicitation"; G. H. Baker, assistant general freight agent of the Atchison, Topeka & Santa Fe, delivered an address on "Some Phases of the Claim Question"; "High Freight Rates" were discussed by Theodore Harte, assistant general freight agent of the Western Pacific and T. W. Gates, in charge of the tracing reconnaissance bureau of the Southern Pacific, spoke on "How Tracing Service May Be Made of Value."

Disturbing a Privilege of Sixty Years' Standing

A move on the part of the Erie Railroad to do away with certain free lighterage privileges in New York Harbor (on all lumber except that in carloads, where cars are set ashore and unloaded by consignee) is interpreted by Brooklyn business men as probably the first step in a program of all the trunk line roads serving that city to economize at the expense of Brooklyn, Queens and other boroughs that depend on free lighterage. The Brooklyn Eagle, commenting on the Erie's notice, and reviewing the history of the lumber trade, says:

"Lighterage of lumber from the New Jersey terminals has been part of the railroad freight service for generations. Six or eight big lumber yards on Newton Creek have been established as receiving points for lumber, largely on the basis of free lighterage. To do away with this lighterage would materially add to the cost of the lumber. The service has been in effect since 1862, when the Erie and the New York Central were compelled by competition of water transportation to make the lighterage part of the rail rate. During the war lighterage was

curtailed and in many cases abolished. Cars were scarce, lighters were not available and the lumber supply in Brooklyn was kept down to a minimum. The present move is the boldest that has been made by any road, and it looks like the first move in a general plan to do away with lighterage, except as the consignee wants to pay extra for the service, which would mean adding 4 or 5 cents a hundred pounds. This lighterage service must be maintained as long as our rail connection with the rest of the country is as antiquated as it is."

Anthracite Shipments—April, 1921

The shipments of anthracite in April, as reported to the Anthracite Bureau of Information in Philadelphia, amounted to 5,967,465 tons, an increase over the preceding month of 229,694 tons, and 1,153,254 tons over April last year when the Switchmen's strike was on.

Shipments by originating carriers were:

	April, 1921	March, 1921
P. & R.	1,123,585	1,018,858
L. V.	1,102,965	1,022,714
C. of N. J.	537,822	540,556
D. L. & W.	929,271	1,020,381
D. & H.	812,967	837,644
Penna.	416,847	333,687
Erie	630,471	561,013
N. Y. O. & W.	128,684	144,930
L. & N. E.	284,853	257,988
Total	5,967,465	5,737,771

Fraudulent Claim for Freight Damage

An indictment was returned by the Federal Grand Jury at Chicago, on April 29, against the Lakeside Fish & Oyster Company (a corporation) and Benjamin Sacks, president of that company, for filing a false loss and damage claim against the New York Central, in violation of Section 10 of the Act to Regulate Commerce. The claim was filed in connection with a carload shipment of fish consigned to the Lakeside company. Damage was claimed to the amount of \$1,288 based on alleged sale of the fish by the claimant for \$301. The indictment charges that the fish were in fact sold for \$1,135 and that the claim is false to the extent of the difference between this realization and the alleged realization of \$301. The case was developed through an investigation conducted at Chicago by the Interstate Commerce Commission. Benjamin Sacks was arrested on May 3 and his bond was fixed at \$5,000. Both defendants were arraigned before Judge Landis on May 6 and entered pleas of not guilty. For the offense charged in the indictment there is a maximum penalty of \$5,000 fine for a corporation and \$5,000 fine and two years' imprisonment for an individual.

Eighteen Dollars Per Car Mile

An overcharge of \$3,000 on 52 carloads of freight moved only a little over six miles, is one of the curious incidents disclosed in a recent report of the Interstate Commerce Commission. The excess collection remained in the hands of the railroad for about a year and a half, thus adding to the overcharge nearly \$300 in interest.

In August and September, 1919, the Procter & Gamble Manufacturing Company had 52 tank car loads of silicate of soda shipped from Rahway, N. J., to Port Ivory, Staten Island, N. Y., over the Pennsylvania and the Baltimore & Ohio, 64 miles. The rate was fifth-class, 12 cents per 100 lb.; and at this rate the revenue was \$113.28 a car, equal to \$18.27 per car mile, the average load being 94,400 lb. After about a month the carriers made a special rate of 5.5 cents and the commission rules that that rate was as high as could reasonably be charged on the 52 cars which, apparently, were shipped while the application for a special rate was being considered. At the lower rate the yield per car was \$51.92 per car, or \$8.37 per car mile. The plant of the shipper at Rahway began operations on August 1, 1919, and application was at once made for a commodity rate, silicate of soda being a raw material of low value. It is used in the manufacture of soap and for coating the inside of oil barrels to make them proof against leakage. Rates of 5.5 cents were shown to be in force in various places for distances much more than six miles.

How long it would have taken for the carrier to grant the low commodity rate if it had not been for the restrictions of the Interstate Commerce law, is not stated.

Commission and Court News

Interstate Commerce Commission

The commission has suspended until September 12, the operation of certain schedules which provide increased rates on naval stores between South Atlantic ports and also between interior points and these ports.

The commission has suspended from May 16 until September 12, the operation of certain schedules which propose the cancellation of the existing through rates on cement from certain points in New Jersey, New York and Pennsylvania to points on the Washington, Baltimore & Annapolis Electric Railway, leaving combination rates applicable instead.

The Interstate Commerce Commission has issued its decision in the Arizona intrastate rate case, which is similar to those in the other state rate cases, finding that the failure of the state authorities to authorize increases in rates corresponding to those authorized for interstate traffic results in discrimination, and ordering an increase of the state rates.

The commission has suspended from May 15 to September 12, the operation of certain schedules proposing to establish a terminal charge of \$15 per car, applicable between points in Western trunk line territory, to cover cost of policing shipments of intoxicating liquors while in the hands of the carriers, such charge to be in addition to the line haul rate.

The commission has further suspended until July 1, 1921, the operation of certain schedules which propose to transfer El Paso, Texas, from the eastern boundary of the Mountain-Pacific territory taking 25 per cent increase under Ex Parte 74 decision, over August 25, 1920 rates to the western group, making applicable instead the interterritorial percentage increase of 33½ per cent, applicable on transcontinental class and commodity rates between El Paso, Texas, and the Pacific Northwest, the operation of which was suspended until June 1 and 15, 1921, by orders previously entered.

Mississippi Valley Case

The hearing before the Interstate Commerce Commission, involving the Mississippi Valley rate adjustment, which was heard by Examiner E. L. Gaddess in Memphis, beginning April 5, and subsequently transferred to St. Louis, April 25, was concluded in St. Louis on May 6. At the conclusion of the hearing the examiner fixed the time for filing briefs at 30 days from that date, subject to the approval of the commission, in view of the short time intervening before the expiration of the suspension, June 28.

In view of the extent of the record in this case (there being approximately 5,000 pages of testimony taken and over 1,100 exhibits filed, some of which are 70 pages in length), and because of the necessary delay that must follow before the transcript of record will be received by the parties in interest, the commission has now fixed June 25, 1921, as the date for filing briefs.

The argument in the case will be heard by the whole commission in July on a date to be hereafter named. The carriers have agreed voluntarily to postpone the effective date of the tariffs for four months from July 28, and the commission has under consideration the necessary modification of its fourth section orders to permit such postponement.

In view of the magnitude of the adjustment of rates involved and the great mass of testimony and exhibits to be considered, this action was necessary in order to properly adjudicate the matter. Certain commodity schedules were filed so hurriedly that justification thereof is admitted by the carriers to be impossible. Thus rates on cement and asphalt have been withdrawn from the scope of this proceeding. In the case of other schedules, where carriers are willing to file amended schedules, and where the schedules are acceptable to the shippers, such amended schedules may be sent to Examiner Gaddess on or before the date fixed for the filing of briefs; but such schedules so filed must show the agreement of both carriers and shippers thereto.

State Commissions

The Chicago, Rock Island & Pacific filed a protest with the State Public Utilities Commission of Illinois on May 11, at Springfield, Ill., against the use of hard roads by motor bus companies styled as "an appropriation of public improvements to private interest without any compensation." The filing of the protest is a direct objection against the operation of the Peoria White Star Bus Company and the Ivy Way Bus Line, which the railway complains will force it to curtail its service.

Personnel of Commissions

Harley W. Brundige has been elected president of the California Railroad Commission, succeeding Frank R. Devlin, who resigned on May 1. Mr. Brundige was appointed to the railroad commission for a six year term by Governor W. D. Stephens, in January, 1919. At the time of his appointment he was publisher and editor of the Los Angeles Express.

Court News

Yard Tracks and Switch Engines

Not Necessarily a Nuisance

The Indiana Appellate Court holds that a railroad's general power under the state statute to erect and maintain all buildings and station facilities necessary for efficient service includes the maintenance of tracks near a station with switch engines thereon ready for immediate use. Where a railroad has been constructed in a district devoted wholly to railroad and manufacturing purposes, those choosing the district for residential purposes do so at their own risk and must take the consequences. They must be held to have anticipated the incidental damages resulting from smoke, gases, fumes, and noises, which must be regarded as *damnum absque injuria*; and a bill to enjoin the maintenance of switch engines with steam up at night as a nuisance will not lie.—Bennett v. Lake Erie & Western (Ind.), 127 N. E. 777.

Hours of Service Act—"Daytime" and

"Night and Day" Telegraph Offices

The federal district court, M. D., Pennsylvania, holds that a telegraph office open 15 hours in winter and 16½ hours in summer is not an office "operated only during the daytime" and therefore is a "night and day" office, within the meaning of the Hours of Service Act, and an operator's time on duty is limited to nine consecutive hours in such an office.

The total period of an operator's duties in a daytime office was about 14 hours 20 minutes, but three periods for his meals, ranging from 20 to 50 minutes each, if deducted, would bring his time on duty within the 13-hour limit. It is held that such intermissions allowed for meals should not be deducted from the time of service. They are "trifling interruptions" in the language used in United States v. Atchison, T. & S. F., 220 U. S. 37. 31 Sup. Ct., 362.—United States v. Cornwall & Lebanon, 268 Fed. 680.

Liability for Injury Caused by Defective Brake

A carrier furnishing cars to a shipper is liable for injuries to him or his employee due to a defect in a car which might have been discovered by reasonable care in inspection. If the carrier is negligent in furnishing the car, and the shipper in turn is negligent in furnishing it to his employee to be loaded, the carrier and shipper are both liable to the injured employee; but the use of a car obviously so defective as to be dangerous would be either assumption of risk or contributory negligence, according to the circumstances, on the part of the person operating it. Applying these rules, the Circuit Court of Appeals, Fourth Circuit, holds that, where there was evidence that the railroad company furnished a car with a brake seriously defective, due to worn shoes, causing excessive slack, knowing that the brake would be depended on to hold the car loaded with coal on a steep grade, and that the defect in the brake was the proximate result of an injury to an employee who tried to

stop the car with a piece of timber, the railroad company would be liable, if nothing else appeared.—Waldron v. Director General of Railroads, 266 Fed. 196.

Coal Car Distribution in Emergencies

The Circuit Court of Appeals, Fourth Circuit, construes the provisions of section 402 of the Transportation Act of February 28, 1920, as to coal car distribution in time of shortage as follows: By subdivision 12 of the section Congress intended to abolish all preference to mines furnishing railroad fuel coal under the assigned car rule in periods of ordinary car shortage. But under subdivision 15, providing that whenever the Interstate Commerce Commission is of opinion that an emergency requiring immediate action exists, it may give directions for preference or priority in transportation, embargoes, or movement of traffic under permits, the commission may suspend the rule prescribed by subdivision 12. When the commission issues an order suspending the rule based on its opinion that an emergency exists it is not within the power of the court to annul the order on the ground that the administrative power conferred on the commission was unwisely or improvidently exercised. *Baltimore & Ohio v. Lambert Run Coal Co.*, 267 Fed. 776. *Certiorari denied*, 254 U. S.—41 Sup. Ct. 148.

Decisions Under the Federal Employers' Liability Act

The Circuit Court of Appeals, Third Circuit, holds that a person killed while on his way to work upon a crane used for unloading coal cars so as to create a coal reserve to be used in both interstate and intrastate commerce in case of a threatened strike could not recover under the act, the crane not being engaged in interstate commerce.—*Kozimo v. Hines*, 268 Fed. 507.

The Texas Supreme Court holds that a trucker injured in unloading freight shipped from another state is within the act.—*Cox v. St. Louis & San Francisco (Tex.)* 222 S. W., 964.

The Arkansas Supreme Court holds that a brakeman employed on a train hauling ballast to be used on the main track of an interstate railroad is within the act.—*Kansas City Southern v. Leinen (Ark.)*, 223 S. W. 1.

The Illinois Appellate Court holds that a pipe fitter, employed by an interstate railroad in repairing an engine on a sidetrack preparatory to its being used to haul a passenger car between states is within the act.—*Sheehan v. Wabash*, 214 Ill. App., 347.

The Illinois Supreme Court holds that a railroad employee, returning to a station after delivering interstate mail pouches to another carrier for further transmission is still engaged in interstate commerce, so that the state Industrial Commission cannot award compensation for his death while so returning.—*Cleveland, C. C. & St. L. v. Industrial Com. (Ill.)*, 128 N. E., 516.

United States Supreme Court

Rates for Transportation of Soldiers

On several occasions in 1914 and 1915 the Atchison, Topeka & Santa Fe at the request of the United States furnished transportation from one state to another for officers and enlisted men of the United States army. In each instance the tariffs provided a through individual rate from the initial point to destination, and also intermediate rates to and from intermediate points. In no instance was there a through party rate, but in all there was a party rate for a part only of the distance. Except in two instances the transportation was furnished without any prior contract. Bills for the transportation, with appropriate land grant deductions were presented to the accounting officers, who in each bill allowed only a part of what was claimed. The Court of Claims, without opinion, sustained the action of the accounting officers, and the company appealed to the Supreme Court.

The accounting officers proceeded on the theory that the collectible rate should be determined by combining the party rate covering a part of the distance and the individual rate for the remainder. In this the Supreme Court holds the accounting officers erred. By requesting and accepting the service without some special arrangement the United States assented to and became obligated to pay the tariff rate.

The judgment was reversed and the suit remanded to the Court of Claims. *Atchison, Topeka & Santa Fe v. United States*, Decided April 18, 1921. Opinion by Mr. Justice Van Devanter.

Foreign Railway News

Locomotives and Cars for China

The Peking-Hankow Railway is about to close a contract for 30 locomotives and is in the market for 30 more according to Commercial Attaché Julean Arnold at Peking. He reports further that the Peking-Suiguan expects to purchase 1,000 cars and 74 locomotives. It is understood that the South Manchuria Railway has secured a loan for \$600,000 for the construction of a new line from Taonan to Tsenkiatum.

Rolling Stock Repair Companies in Roumania

LONDON.

A group of Roumanian financial institutions with a capital of approximately \$7,000,000 (at the present rate of exchange) have made an offer to the Roumanian State Railway Administration to undertake the repairs of the rolling stock of the state railways, since it is thought that the offers from foreign companies to undertake this work are much too high. These financial institutions engage to erect plants capable of repairing 7,000 locomotives within seven years as against 5,000 proposed by the foreign concerns. They undertake also to construct plants capable of repairing within seven years 5,000 passenger cars instead of the 3,000 proposed by the foreign firms and repairing 45,000 freight cars instead of 30,000 as proposed by the foreign companies which offered to undertake the equipment repairs.

English Exports of Railway Supplies

LONDON.

The Board of Trade returns give the value of the railway materials exported from Great Britain during the first two months of the year as follows:

	1921	1920
Locomotives	\$4,431,660	\$1,911,676
Passenger cars	860,660	858,808
Rails	3,555,716	791,924
Freight cars	3,796,228	1,128,956
Wheels and axles	1,575,388	1,128,956
Tires and axles	1,177,724	821,004
Rail chairs and metal ties	1,438,216	234,268
Miscellaneous track material	2,084,076	1,251,560
Total track material	9,829,680	4,262,776

The weight of rails exported was 33,290 tons for the first two months of the present year as against 11,792 tons for the same period of the year 1920, and of rail chairs and metal ties 14,565 tons as against 2,646 tons a year ago.

English Railway Agreements

LONDON.

The report of the Colwyn Committee appointed by the Ministry of Transport to examine and arrive at some clear interpretation of the various agreements entered into between the government and the railways since 1914, when the government assumed control of the roads, was recently discussed in parliament. It was pointed out that there were three principal agreements under which governmental liabilities arose: (1) By the original agreement the government undertook, in effect, to bear any loss to the railway companies arising from any cause during the period of control; (2) Deferred maintenance was to be made good by the government despite any increase in costs; (3) The railway companies were to receive the difference in the value of any stores in their possession at the end of the period of control and that which would have been the value of those stores at the end of 1914.

It was maintained by some in the House of Commons that by these agreements the railways were greatly relieved from the effects of the war such as no industry nor individual had been. Sir Eric Geddes, Minister of Transport, re-

ferred to the Ministry as the "treasury watch-dog" and stated that during its existence it had challenged some \$97,000,000 in claims. He claimed that the Colwyn report had shown a possible liability of some \$760,000,000 on the part of the government under the existing agreements but that an agreed liability had been entered upon between the government and the Railway Companies' Association of only \$250,000,000, which would be incorporated in the government railway bill to be presented shortly. This payment it was proposed to make in two installments; one at the end of this year and the second at the end of next year.

Railways of India in Great Need of Equipment

Authoritative statements in the Weekly Bulletin of the Department of Trade and Commerce of Canada tell of the dire need of the railways of India for "enormous quantities of all classes of supplies, and without doubt rolling stock more than any other." It is said further that "it would be practically useless for India to increase her production" until the railways are able to handle more traffic. Violent competition for the supply of manufactured material and labor difficulties in England, together with the decreased production during the war, are blamed for the present difficulties. Relatively little equipment is manufactured in India although it is understood that plans are being worked out for increasing the production of railway supplies. In addition to the serious equipment shortage it is said that India is in great need of new lines and other additions and betterments. A loan of \$36,450,000 (at par) for the Indian railways was floated in London a few weeks ago so easily that an observer has remarked that the railway authorities probably regret that they did not ask for more.

British Railways in South America

Show Increased Earnings

The annual reports of the British operated railways in Argentina, Paraguay and Uruguay for the fiscal year 1920 show that on all the lines except the Northern Extension of the Central Uruguay the net earnings were in excess of those of the previous year, according to Trade Commissioner Brady at Buenos Ayres. While the Northern Extension showed a decrease in net earnings, it was still able to pay dividends of 8 per cent on the capital stock. A compilation of the gross receipts and operating expenses of some of the more important railroads of the southern republics is given in the following table:

Road	Mileage	Gross Receipts	Operating Expenses
Southern (Argentina).....	3,792	\$46,363,360	\$32,080,729
Central Argentine.....	3,305	47,335,204	32,100,038
Buenos Ayres & Pacific.....	3,536	39,853,103	27,761,472
Western (Argentina).....	1,882	25,535,563	17,744,030
Entre Rios (Argentina).....	811	6,908,763	4,407,748
Central Cordoba (Argentina).....	1,205	15,143,760	11,775,780
Central Uruguay:			
Northern Extension.....	185	966,620	446,653
Eastern Extension.....	311	1,641,635	757,013
Montevideo.....	474	5,860,063	4,447,114
Paraguay Central.....	274	1,253,870	738,934

NOTE.—Pounds to dollars at par.

All the lines showed a material increase in freight and passenger traffic. The Central Cordoba announced that the shortage of rolling stock was a limiting factor and that, at the time of reporting, 250,000 tons of goods were at its stations awaiting cars. On the Southern the freight traffic increase was 32 per cent over the previous year. This company paid a total dividend of 7 per cent for the year. The Central Argentine paid 6 per cent on its common and 4½ per cent on its preferred stock. The three lines in Uruguay paid dividends of 7, 8 and 9 per cent on the common stock. The lack of coal makes the fuel problem a serious one for these roads. In the past they have been burning wood, but they are turning to oil now wherever possible. Nearly all the lines have asked for rate increases to care for prospective wage raises and other mounting costs. Wage rates at present range from 40 per cent to 70 per cent higher than the 1914 scale.

Equipment and Supplies

Locomotives

THE NATIONAL RAILWAYS OF MEXICO are inquiring through the locomotive builders for 100 locomotives. Francisco Perez, director general of the National Railways, is now in the United States arranging for the purchase of this equipment.

Freight Cars

THE MONTOUR RAILWAY is inquiring for 200 car bodies of 50-ton capacity.

THE UNITED FRUIT COMPANY, New York, is inquiring for 50, 2 compartment cane cars of 12-ton capacity.

Iron and Steel

THE JAPANESE GOVERNMENT has ordered through Takata & Co., New York, 6,000 tons of 60 and 75-lb. rails, including accessories.

Track Specialties

THE NEW YORK CENTRAL will receive bids until noon, May 27, for 128,620 square and oval track bolts, manufactured in accordance with New York Central standard plans D-9-A.

Miscellaneous

MITSUI & Co., New York, has ordered 270 sets of Westinghouse air brakes to be used on locomotives, passenger and freight cars, of the Japanese Government Railways.

THE NORFOLK & WESTERN will receive bids until noon, June 1, at Roanoke, Va., for parts for electric apparatus; 5,000 No. 2, B & S gage copper rail bonds; 650 lb. flux rods; 6 clamps for holding bonds; 800,000 gal. creosote oil and 425,000 gal. creosote oil.

THE INTERNATIONAL GENERAL ELECTRIC COMPANY, New York, has been given a contract amounting to about \$1,500,000 for switch gear, transformers and other equipment by the Victorian Electricity Commission for development of the coal production near Melbourne, Australia. According to advices from Melbourne, the International Company's figure was about \$800,000 below the lowest combination of British sectional bids submitted. No British firm made a single bid for furnishing the material.

Signaling

THE BOSTON ELEVATED has ordered from the Union Switch & Signal Company 68 automatic block signals to be installed on its elevated lines in the Charlestown and Roxbury districts, together with a large quantity of other signaling material, most of which is to take the place of apparatus installed about 20 years ago. The signals are to be three-indication, color-light, and they take the place of electro-pneumatic semaphores. Electro-pneumatic automatic stops will be put in at each block signal and the blocks will be about 1,000 ft. long, thus keeping trains about 2,000 ft. apart. The old apparatus is still doing its duty, but it was desired to shorten the block section and this seemed a suitable time to introduce these improvements. Alternating current apparatus is to be introduced, in place of direct current, and extensive changes are to be made in the interlocking at North station, Tower C. Color-light signals will be introduced here also. Tower D will have a new electro-pneumatic machine, seven levers. Alternating current was introduced at Sullivan Square about three years ago and the interlocking machine then taken out from that station is to be used, with new locking and other improvements, at Tower C.

Supply Trade News

The Industrial Car Manufacturers' Institute has removed its executive office from Pittsburgh, Pa., to 68 William street, New York City.

The Ralston Steel Car Company moved its Chicago offices from 20 East Jackson boulevard to the Fisher building, 343 South Dearborn street, on May 1.

W. F. Robinson, for many years connected with James B. Sipe & Co., Pittsburgh, Pa., has been appointed manager of the railroad sales department of the Tropical Paint & Oil Company, Cleveland, Ohio.

The Jones & Laughlin Steel Company, of Pittsburgh, Pa., has purchased 15 acres of ground with a 2,700-ft. frontage on Lake Michigan, just east of the Illinois-Indiana state line near Chicago. This company already owns other land in the Calumet district and it is reported that plans are being made to build a steel plant in that district.

V. Z. Caracristi, until recently a member of the Railway & Industrial Engineers, Inc., has opened consulting offices at 43 Broad street, New York. Mr. Caracristi has been identified

with the railway and industrial fields for the last 22 years. He was at one time shop engineer and maintenance supervisor of the Richmond plant of the American Locomotive Company, and later general maintenance supervisor of all the plants of that company. He was associated as designer and constructor of the Union Station, Washington, D. C., and was assistant to the general superintendent of motive power of the Baltimore & Ohio. He was later in the employ of the Wheeling & Lake Erie, where

he carried out improvements in the Brewster shops, and shortly after did similar work in the Watervliet shops and Carbondale terminal of the Delaware & Hudson. He also supervised the layout, design and equipment of extensions to the plant of the Lima Locomotive Works, Inc. From 1913 to 1919 Mr. Caracristi was engaged in consulting work for banking interests and during this period devoted considerable effort to development work on the burning of pulverized fuel in suspension. In 1919, with J. E. Muhfeld, he formed the Railway & Industrial Engineers, Inc. Mr. Caracristi will specialize in consulting work in railroad and shop design, operation and betterment.

V. Z. Caracristi

Obituary

George Jesse Foran, for many years manager of the condenser department of the Worthington Pump & Machinery Corporation, New York, died on May 12, at his home in New York City. He was born on January 22, 1862, in Boston, Mass., and graduated from the Massachusetts Institute of Technology in May, 1883, in the department of mechanical engineering, with the degree of bachelor of science. The following September, he entered the employ of the Deane Steam Pump Company, Holyoke, Mass., and shortly afterwards was transferred to the Boston office of that company. In November, 1886, he went with the George

F. Blake Manufacturing Company, as a salesman and later served also as consulting engineer to the president and treasurer of the Blake company. From 1890 to 1897, he was office manager of the new Blake works at East Cambridge, Mass., also head of the estimating and cost department, later returning to the engineering sales department. The above companies were consolidated with others in 1901, to form the International Steam Pump Company, and Mr. Foran then went to New York, as manager and chief engineer of the condenser department of Henry R. Worthington and the associated companies of the International Steam Pump Company. He continued in that position with the Worthington Pump & Machinery Corporation which succeeded the International Steam Pump Company. Mr. Foran was active in the design of high vacuum apparatus during the entire development of that class of machinery and was at the head of the department at the time of his death. During the war, Mr. Foran served upon the committee for condensing apparatus of the United States shipping board and war industries board and as chairman of the American Engineering service of the Engineering Council, which dealt with all questions of personnel between the various departments of the United States Government and the four national engineering societies.

Trade Publications

WELDING SPECIALTIES.—A small pamphlet has recently been issued by the Transportation Engineering Corporation, 200 Fifth avenue, N. Y., which describes and illustrates a number of the electric arc welding accessories manufactured by this company. The specialties described are welding helmets, goggles, a portable sand blast, a metal electrode holder and various types of coated electrodes.

CONSERVATION.—In a 16-page bulletin the Lyster Chemical Company, New York, presents a brief exposition of the subject of timber preservation with creosote, placing special stress on open tank, brush and spray treatments. Some space is devoted to the properties of creosote and methods of application and photographs are shown of representative structures that have been subjected to treatment.

BLAWFORMS FOR GENERAL CONSTRUCTION.—The Blaw-Knox Company, Pittsburgh, Pa., has recently issued a large size, 52-page, illustrated pamphlet descriptive of the line of forms manufactured by this company for general concrete construction. Among the numerous kinds of forms illustrated and described are various sizes and types for sewer construction, tunnels, subways, heavy walls, piers, fixed and traveling type centers for bridges and others for miscellaneous construction work.

NARROW GAGE LOCOMOTIVES.—The Burton Engineering & Machinery Company, Cincinnati, Ohio, has issued a new publication describing its line of gasoline and kerosene locomotives for narrow gage hauling systems. The publication is a 16-page illustrated booklet, describing its equipment and presenting information as to its adaptability and scope. Included in the book are tables giving the hauling capacity of the machines on various grades with various train resistances.

CONCRETE HARDENING AND BONDING.—The Livingstone Company, Baltimore, Md., has issued a 12-page folder on its "Livingstone" bonding cement and "Lithotex" concrete hardener. The folder devotes space to the theory and practice of bonding top finishes to concrete bases and contains information relative to its two products together with specifications for its use on new construction and patchwork. This information is supplemented with illustrations of buildings on which it has been applied and also classified lists of users, including railroads.

COAL AND ASH HANDLING SYSTEMS.—Catalogue No. 40, 72 pages, illustrated and descriptive of various types of coal and ash handling systems for boiler houses, has been issued by the R. H. Beaumont Company, Philadelphia, Pa. The text of this booklet is descriptive of the various classes of material handling machinery which this company installs, such as skip hoists, crushers, cable drag scrapers, ash cars, hoppers, larries, bunkers, conveyors. The illustrations show many actual installations as well as plan drawings of the different units and sketches of typical systems.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company will shortly accept bids for the construction of the bridge over the Des Moines river near Dumas, Mo., to cost approximately \$356,000.

ATCHISON, TOPEKA & SANTA FE.—This company has ordered new electrically operated cinder conveyor equipment from the Roberts & Schaefer Company, Chicago, for installation at Albuquerque, N. M.

ATCHISON, TOPEKA & SANTA FE.—This company is accepting bids for the construction of a second floor extension with dimensions of 24 ft. by 100 ft., to its station and office building at Slaton, Tex.

CHICAGO UNION STATION.—This company, which was noted in the *Railway Age* of May 6 (page 1093), as contemplating the completion of the filled portion of the Polk street viaduct, at Chicago, at a cost of about \$12,000, is accepting bids for the work.

ILLINOIS CENTRAL.—This company, which was noted in the *Railway Age* of May 6 (page 1093), as contemplating the construction of additions to its roundhouse at Freeport, Ill., is now accepting bids for this work.

ILLINOIS CENTRAL.—This company has awarded a contract to P. A. Shugart and Blythe Brothers, Nevada, Iowa, for grading in connection with the construction of yard facilities at Clingon, Ill. The improvements include the construction of a northbound unit of 14 tracks and a southbound unit of 10 tracks, each of 100 car lengths. The total cost of the work will be \$650,000. A contract has been awarded to the Unity Construction Company, St. Louis, Mo., for the construction of a viaduct over McLemore avenue, Memphis, Tenn. The company has also awarded contracts to the Ellington-Miller Company, Chicago, for the construction of subways at Eighth and Fourteenth streets, Fort Dodge, Iowa. The company is accepting bids for the construction of 6 additional yard tracks at Paducah, Ky., at a cost of \$225,000. Bids will shortly be accepted for the construction of 8,000 feet of storage tracks at Destrehan, La., and for 11,500 feet of storage tracks at Good Hope, La.

NEW YORK CITY.—The governor of the State of New York has signed a bill requiring the municipal authorities of New York City to begin within two years the construction of a railway tunnel under the Narrows to connect Staten Island with Brooklyn. The new tunnel will provide the Staten Island Rapid Transit, a subsidiary of the Baltimore & Ohio, with a connection in Brooklyn with the New York Connecting and the Long Island. In this manner the roads terminating on the New Jersey side of the Hudson river will be given direct rail connections for freight with Brooklyn and with the New York, New Haven & Hartford and the Long Island. In addition the proposed tunnel will provide rapid transit service for passengers between Staten Island and the rest of New York City.

ST. LOUIS-SOUTHWESTERN.—This company will build a frame passenger and freight station at De Witt, Ark. The dimensions of this building will be 24 ft. by 198 ft. This structure is being erected by the company forces and will cost approximately \$20,000. It will replace a station destroyed by fire.

UTAH RAILWAY.—The Interstate Commerce Commission has issued a certificate authorizing the construction of an extension of 19.4 miles from the present terminus at Watson, Utah.

UNION PACIFIC.—This company, which was noted in the *Railway Age* of May 13 (page 1144), as accepting bids for the work of lining its Sherman tunnel, near Hermosa, Wyo., with concrete, has awarded the contract for this work to the Utah Construction Company, Ogden, Utah.

UVALDE & NORTHERN.—This company contemplates the construction of a new station and warehouse at Camp Wood, Tex., in addition to stations at Laguna and Kelly Field, Tex.

WABASH.—This company is accepting bids for the construction of a brick or stucco passenger station at Macon, Mo., with dimensions of 122 ft. by 24 ft.

Railway Financial News

ATLANTIC COAST LINE.—*Annual Report.*—The corporate income account for the year 1920 compares as follows:

	1920	1919
Operating revenues (4 months).....	\$25,304,073	.....
Operating expenses, taxes, etc.....	22,417,739	.....
Operating income (4 months).....	\$2,866,334	.....
Standard return (2 months).....	1,689,505	.....
Operating income guaranty period (6 months).....	5,478,458	.....
Other income.....	*5,198,486	.....
Gross income.....	\$15,252,783	\$14,116,304
Interest, taxes, rentals, etc.....	7,362,221	6,827,605
Net income.....	\$7,890,562	\$7,288,699
Sinking fund, etc.....	24,935	12,904
Appropriation, physical property.....	181,471	88,258
Surplus.....	\$7,684,156	\$7,187,537

*Includes adjustment of standard return.

The annual report of the Atlantic Coast Line will be reviewed editorially in an early issue.

BOSTON & MAINE.—*Directors Advise Stockholders.*—At a special meeting of the directors in Boston on May 9, it was voted that the following letter be sent to the stockholders:

Certain persons styling themselves the "Boston & Maine Railroad Stockholders' Protective Association," are asking you to sign a paper favoring an investigation of the Boston & Maine under their direction at the expense of the corporation. The directors of the Boston & Maine feel that they should inform you that this movement is entirely without authority from them and does not have their approval.

CHESAPEAKE & OHIO.—*Asks Authority to Pledge Bonds.*—This company has applied to the Interstate Commerce Commission for an order authorizing the authentication and delivery of \$8,836,000 of its first lien and improvement, 20 year mortgage bonds and the pledge of \$6,274,000 of the bonds as security for a loan from the United States of \$5,338,000.

CHICAGO & NORTH WESTERN.—*Equipment Trusts Sold.*—This company has sold to White, Weld & Co. two series of equipment trust 6½ per cent certificates, to be issued under the railroad's equipment trust agreement of 1920.

To provide the cash equity, the first three installments of each of such series are to be canceled, so that the first instalments of the certificates will be payable in the year 1925. Series J will mature annually March 1, 1925 to 1936, inclusive; Series K will mature annually April 1, 1925 to 1935, inclusive. The total of the certificates thus sold is \$5,436,000. They are to be secured by locomotives and cars having an approximate total cost of \$6,820,000.

CHICAGO, MILWAUKEE & ST. PAUL.—*Stockholders Approve Purchase of C. T. H. & S.*—The stockholders of this road met at Milwaukee, Wis., on May 12, and approved the purchase of the Chicago, Terre Haute & Southeastern, at an assessment of \$10 a share.

CHICAGO, TERRE HAUTE & SOUTHEASTERN.—*Purchase by C. M. & St. P.*—See Chicago, Milwaukee & St. Paul.

CINCINNATI, NEW ORLEANS & TEXAS PACIFIC.—*Dividend Reduced.*—The extra dividend on the common stock has been reduced from 3½ to 2½ per cent. The regular dividends of 1¼ per cent quarterly on the preferred stock and 3 per cent semi-annually on the common, have been declared.

CUMBERLAND & MANCHESTER.—*Asks Authority to Issue Securities.*—This company has applied to the Interstate Commerce Commission for authority to issue \$375,000 of 10-year, 6 per cent notes, \$125,000 of general mortgage, 10-year, 6 per cent gold bonds and \$100,000 of equipment trust 6 per cent notes.

DELAWARE & HUDSON.—*Annual Report.*—A review of this company's annual report for 1920 appears on another page of this issue.

DELAWARE, LACKAWANNA & WESTERN.—*Coal Properties to be Sold.*—A contract for the sale of this company's anthracite coal properties to the Glen Alden Coal Company has been prepared

and will be submitted to the stockholders for approval at a meeting to be held July 21. William W. Inglis, vice-president and manager of the coal mining department of the Lackawanna at Scranton, Pa., has been elected president of the Glen Alden Company. The following notice signed by Mr. Inglis has been sent to the road's stockholders:

The Glen Alden Coal Company has offered The Delaware, Lackawanna & Western Railroad Company the sum of sixty million dollars for its anthracite coal properties, to be paid as per terms of contract of sale, with interest at four per cent. A formal contract of sale has been prepared to be executed upon your approval. The Glen Alden Coal Company is a corporation of the state of Pennsylvania, incorporated in the year 1866. We propose to merge the company with the Diamond Anthracite Coal Company, a Pennsylvania corporation which we also control, and, by action in conformity with the laws of the state of Pennsylvania, increase the number of shares of the capital stock of the merged companies to eight hundred forty-six thousand (846,000) shares, of no par value. We shall offer this stock to the stockholders of The Delaware, Lackawanna & Western Railroad Company of record at the close of business June 15, 1921, on the basis of one share of Glen Alden Coal Company stock for each share of railroad company stock, at five dollars (\$5.00) per share, payable on or before August 20, 1921. Arrangements have been made with the Farmers' Loan and Trust Company, of the City of New York, to act as transfer agents of the company, and with the First National Bank of New York to act as registrar of the stock of the company. On or before June 20th next subscription blanks will be mailed to all stockholders of record June 15, 1921, for the number of shares to which they may subscribe, in accordance with the foregoing plan. This company will be operated by officials now employed in the coal mining department of your company, the vice-president and manager of such department having been selected as its president.

DENVER & RIO GRANDE.—Stockholders Appeal to Senate Committee.—Arthur M. Wickwire, counsel for the stockholders' protective committee, has made public a letter sent by him to Senator Cummins, chairman of the Senate Committee on Interstate Commerce, which is investigating the railroad situation. Mr. Wickwire states in the letter that the committee which he represents has filed a bill in equity in the United States District Court in Colorado to set aside judicial sale of the Denver & Rio Grande properties to the Western Pacific. His letter, in part, says:

One fundamental difficulty that confronts the country arises from the laxity in the incorporation laws of various states governing the railroads. The stockholders have been subject to great wrongs arising through interlocking directors, and there have been no proper restrictions preventing railroad magnates from engaging in a multiplicity of schemes for their personal enrichment and aggrandizement at the expense not only of the stockholders but also of vast numbers of innocent citizens. The jurisdiction formerly conferred upon the Interstate Commerce Commission gave them no power save to investigate and then to publish their reports of wrongs already consummated, which amounted to nothing more than locking the barn after the horse was stolen.

Recent legislation of Congress has advanced somewhat in the right direction, giving the commission some little supervisory power in advance, and certain phases of the wrongs, committed in the case of the Denver & Rio Grande are now forbidden and punishable by fine and imprisonment. But the committee believes that the facts of this Denver & Rio Grande case when fully revealed to you will demonstrate that the present legislation does not go far enough. The honest, hard-working people of the United States have been plundered long enough and often enough in railroad steals, and they are now looking to Congress to pass laws rendering it impossible for the perpetrators of these gigantic outrages to repeat them.

Appeal to Stockholders for Funds.—The protective committee has issued a call for contributions from the stockholders of 50 cents a share with all new stock deposited. Stockholders who have contributed 20 cents a share are asked to pay the balance of 30 cents. The additional funds are needed to carry on the fight before the courts.

EVANSVILLE, INDIANAPOLIS & TERRE HAUTE.—Loan Approved.—The Interstate Commerce Commission has approved a loan to this company of \$400,000 from the revolving fund for 15 years to assist the company in financing additions and betterments to the amount of \$800,000.

GRAND TRUNK.—Shareholders Vote for Government Control.—At the meeting of shareholders in London on May 12 it was decided to ratify the agreement between the management and the Canadian government providing for the transfer of the control of the railway to the government this month.

Dominion officials expressed satisfaction with this ratification, which they said would extend the time limit in which the arbitrators could make awards and would make further legislation unnecessary during the present session. Government nominees will supplant the existing board of directors. The shareholders will name a committee to present their case before the board of arbitration.

HOCKING VALLEY.—Annual Report.—The corporate income account for the year ended December 31, 1920 (which includes ten

months' operation from March 1, 1920), and comparison with year ended December 31, 1919, is as follows:

	1920	1919
Operating revenues:		
Freight traffic.....	\$12,784,092	.....
Passenger traffic.....	1,175,118	.....
Total operating revenues.....	\$14,949,529	.....
Operating expenses:		
Maintenance of way and structures.....	\$1,826,197	.....
Maintenance of equipment.....	5,714,856	.....
Traffic.....	85,893	.....
Transportation.....	5,714,248	.....
General.....	426,662	\$73,767
Total operating expenses.....	\$13,764,929	\$73,767
Net operating revenue.....	\$1,184,600	\$73,767
Railway tax accruals.....	798,879	108,000
Railway operating income.....	\$384,378	\$181,767
Net railway operating income.....	\$1,377,165	\$181,767
Compensation under contract with director general of railroads.....	461,302	2,637,167
Other income.....	302,423	246,794
Gross income.....	\$2,140,889	\$2,702,194
Total deductions.....	\$1,795,093	\$1,672,326
*Net income.....	\$345,796	\$1,029,868
Dividends, 4 per cent.....	\$439,980	\$439,980
Old accounts written off, and sundry adjustments.....		\$9,846,075
		156,921
Balance to credit of profit and loss, December 31, 1920.....		\$9,689,154

*The income account for year 1920 contains no payment or accrual on account of the guaranty by the United States Government for the six months' operation from March 1 to August 31, 1920, under section 209 of the Transportation Act, 1920, as the amount is not yet ascertainable.

The annual report of the Hocking Valley will be reviewed editorially in an early issue.

INTERSTATE RAILROAD.—Asks Authority to Issue Stock.—This company has applied to the Interstate Commerce Commission for authority to issue and sell \$3,000,000 of capital stock, the proceeds to be used for building and extension.

KANSAS CITY SOUTHERN.—New Director.—W. C. Loree, of New York, has been elected a director to succeed John J. Mitchell, of Chicago, who has resigned in compliance with the provisions of the Clayton Act.

LOS ANGELES & SALT LAKE.—Authorized to Issue Notes.—This company has been authorized by the Interstate Commerce Commission to issue at par promissory notes in an aggregate amount of \$2,500,000 to meet anticipated requirements during the year 1921 by loans from two of its stockholders, William A. Clark and the Oregon Short Line.

MAINE CENTRAL.—Asks Authority to Lease Road.—This company has applied to the Interstate Commerce Commission for approval of a lease of the Belfast & Mooshead Lake as an extension of the lease dated April 27, 1871, which expired on May 10.

MISSOURI, KANSAS & TEXAS OF TEXAS.—Asks Authority to Issue Equipment Notes.—This company has applied to the Interstate Commerce Commission for authority to issue \$450,000 of 6 per cent equipment notes, a first lien on 300 tank cars, and to pledge them with the Secretary of the Treasury as security for a loan of \$450,000 to be used in payment for the cars.

MISSOURI PACIFIC.—Purchase of Little Rock & Argenta.—The transfer of the Little Rock & Argenta has just been completed after the sale contract which was made last December. The Little Rock & Argenta is an industrial line connecting the Chicago, Rock Island & Pacific and the Missouri Pacific at Little Rock, Ark. The sale price was \$50,000.

NASHVILLE, CHATTANOOGA & ST. LOUIS.—Annual Report.—The corporate income account for the year ended December 31, 1920, compares with the previous year as follows:

	1920	1919
Standard return (January and February, 1920, full year 1919).....	\$490,236	*\$3,182,089
Operating revenues (10 months):		
Freight.....	\$14,306,223	.....
Passenger.....	4,225,018	.....
Total standard return and operating revenue.....	\$20,908,566	\$3,182,089
Operating expenses (10 months):		
Maintenance of way and structures.....	\$4,399,363	.....
Maintenance of equipment.....	5,171,302	.....

Traffic	582,355	
Transportation	9,778,057	
General	614,940	62,069
Total operating expenses	\$20,611,171	\$62,099
Railway tax accruals	\$27,500	118,869
Total operating income	Def. \$231,274	\$3,001,121
Total non-operating income	\$2,912,141	180,431
Gross income	2,680,868	3,181,551
Total deductions from gross income	\$1,817,354	\$1,391,046
Net income	\$863,513	\$1,790,505

*The standard return finally fixed by the Interstate Commerce Commission was \$3,163,576, instead of \$3,182,089 per annum. The amount shown for 1920, therefore, includes return at the correct rate for January and February (\$527,563) less \$37,927 to adjust the amount of the standard return as originally certified and used in reports for 1918 and 1919, to the correct basis.

Miscellaneous income, amounting to \$2,009,875, includes:	
Guaranty under Transportation Act, 1920	\$1,581,788
Deficit net railway operating income, guaranty period, to close of August accounts	334,600
Interest at 6 per cent during guaranty period on improvements added January 1, 1918, to March 1, 1920	93,487

The annual report of the Nashville, Chattanooga & St. Louis will be reviewed editorially in an early issue.

NASHVILLE, CHATTANOOGA & ST. LOUIS.—Authorized to Issue Bonds.—This company has been authorized by the Interstate Commerce Commission to issue \$1,000,000 of its consolidated mortgage 5 per cent gold bonds and to sell or repledge all or part thereof as collateral security for short term notes.

READING.—Company Files Modifications of Segregation Plan.—Modifications to the Reading dissolution plan were filed in the United States District Court at Philadelphia on May 12, by William Clarke Mason, counsel for the Reading interests. The most important modification is the proposed sale by the Reading company of all its stock in the Reading Coal and Iron Company for \$5,600,000, subject to the lien of the general mortgage. This stock will be sold to a corporation to be formed, which will issue 1,400,000 shares of stock without par value, and this can be sold to stockholders of the Reading company, preferred and common, share and share alike, for \$2 a share. This is conceded to be an effort to eliminate the controversy that has been waged between these classes of stockholders, many of whom have filed petitions to intervene in the present suit.

The modifications suggested for the court's approval are as follows:

The Reading Company will agree with the coal company that, at or before the maturity of the general mortgage bonds, it will obtain the release of the coal company's property from the lien of the general mortgage and the discharge of the coal company from liability on the general mortgage bonds.

The Reading Company will, subject to the lien of the general mortgage, sell, assign and transfer all its rights, title and interest in and to the stock of the coal company, including the present right to vote and receive dividends thereon, to a new corporation to be formed with appropriate powers, and will agree to save the new corporation and said stock harmless from the lien of the general mortgage, and will agree to obtain, at or before the maturity of the general mortgage, the release of the stock of the coal company from the lien of the general mortgage, and the assignment, transfer and delivery of said stock to the new corporation—all in consideration of the payment by the new corporation to the Reading Company of the sum of \$5,600,000 and its agreement to issue its shares to the stockholders of the Reading Company as hereinafter provided.

The new corporation will issue 1,400,000 shares of stock without par value. Such no par value stock will be sold by the new corporation to the stockholders of the Reading Company preferred and common, share and share alike, for \$5,600,000, or \$2 for each share of Reading stock. Provision will be made for the disposition by the Reading Company of any rights to subscribe which may not be availed of by the Reading stockholders within such period as may be fixed by the court, to the end that the new corporation shall receive the full purchase price of \$5,600,000.

There will be embodied in the final decree a permanent injunction against the new corporation exercising its voting power on the stock of the coal company in such a way as to bring about any new revelations between the coal company and the Reading Company of the character complained of in the present suit.

The final decree may provide that if, by reason of default on the general mortgage bonds the trustee, the Central Union Trust Company, shall exercise the right to vote the stock of Reading Coal Company, it shall so exercise that right as not to bring about a unity of management between said coal company and Reading Company.

SOUTHERN PACIFIC.—Asks Authority to Guarantee Bonds.—This company has applied to the Interstate Commerce Commission for authority to guarantee the principal and interest of \$364,000 of first mortgage 5 per cent bonds of the Houston East & West Texas.

SOUTHERN RAILWAY.—Dividend Action Deferred.—The directors, at their monthly meeting on May 12, failed to take action on the regular semi-annual dividend of 2½ per cent on the preferred

stock usually paid June 30. This does not mean that the dividend will be omitted; the board may declare a dividend in June.

TOLEDO, ST. LOUIS & WESTERN.—Authorized to Issue and Pledge Receivers' Certificates.—The receiver has been authorized by the Interstate Commerce Commission to issue \$692,000 of receivers' certificates and to pledge them as security for a loan from the United States.

VALDOSTA, MOULTRIE & WESTERN.—Right to Dismantle.—Confirmation of the sale of this road to C. L. Jones and his associates for \$87,000 with the right to dismantle the line, was given in an order by the United States Court, Savannah, Ga.

The order stipulates that the process of dismantlement shall not be started before July 15. In the meantime, the control and operation of the railroad shall remain in the hands of Robert P. Murray, receiver, who is authorized to make arrangements for freight movements on the line.

WHEELING & LAKE ERIE.—Annual Report.—This company has issued a report covering the years ended December 31, 1918, and December 31, 1919. The report does not give figures for 1920. The corporate income account for 1918 and 1919 based upon "standard return" is as follows:

	1919	1918
Income from lease of road	\$1,592,037	\$1,592,037
Gross income	1,687,337	1,725,508
Interest on funded debt	979,224	1,023,416
Total deductions from gross income	1,380,691	1,425,212
Net income	\$306,636	\$300,295

Railroad Administration Settlements

The United States Railroad Administration reports the following final settlements, and has paid out to the several roads the following amounts: Missouri & Illinois Bridge & Belt, \$13,559; New York Connecting, \$1,395,000; Lake Superior & Ishpeming, \$140,000 Munising, Marquette & Southeastern, \$90,000; Kansas City, Mexico & Orient, \$250,000; Cambria & Indiana, \$70,000; Great Northern, \$6,500,000; Texas Midland, \$100,000; Duluth, Missabe & Northern, \$8,525,000; Duluth & Iron Range, \$4,866,000; Gulf, Texas & Western, \$40,000; Northern Pacific, \$9,000,000; Des Moines Union, \$330,000; Bessemer & Lake Erie, \$3,050,000; Western Pacific, \$4,200,000; Ulster & Delaware, \$390,000; Jay Street Terminal, \$290,000; Clinton & Oklahoma Western, \$75,000. The payment of these claims on final settlement is largely made up of balance of compensation due, but includes all other disputed items as between the railroad companies and the Administration during the 26 months of federal control.

Guaranty Certificates Issued

The Interstate Commerce Commission has issued certificates to railroads for partial payments on account of the six months' guaranty as follows:

Alabama Central	\$3,000
Baltimore & Ohio Chicago Terminal	735,000
Chicago, St. Paul, Minneapolis & Omaha	227,000
Chicago, West Pullman & Southern	22,000
Cincinnati, Lebanon & Northern	150,000
Copper Range	150,000
Grand Rapids & Indiana	780,000
Gulf & Ship Island	20,000
Illinois Northern	35,000
Lehigh & Hudson	200,000
Wisconsin & Northern	27,500

Dividends Declared

Alabama Great Southern.—Common, 3 per cent, semi-annually, payable June 29 to holders of record May 3; preferred, 3 per cent, semi-annually, payable August 18 to holders of record July 14.

Chestnut Hill Railroad.—75 cents, quarterly, payable June 4 to holders of record May 21 to June 3.

Cincinnati, New Orleans & Texas Pacific.—Common, 3 per cent, semi-annually, extra 2½ per cent; both payable June 27 to stock of record June 6. Preferred, 1½ per cent, quarterly, payable June 1 to holders of record May 21.

Cripple Creek Central.—Preferred, 1 per cent, quarterly, payable June 1 to holders of record May 14.

Erie & Pittsburgh.—87½ cents, quarterly, payable June 10 to holders of record May 13.

New Orleans, Texas & Mexico.—1½ per cent, quarterly, payable June 1 to holders of record May 25.

North Pennsylvania.—\$1.00, quarterly, payable May 25 to holders of record May 12 to May 19.

Philadelphia, Germantown & Norrisstown.—\$1.50, quarterly, payable June 4 to holders of record May 21 to June 3.

Southern Pacific.—Common, 1½ per cent, quarterly, payable July 1 to holders of record May 31.

Union Pacific.—Common, 2½ per cent, quarterly, payable July 1 to holders of record June 1.

Railway Officers

Executive

George R. Loyall, assistant vice-president of the Southern, has been elected to succeed J. H. Young as president of the Norfolk Southern, effective when Mr. Young assumes his new duties as president of the Denver & Rio Grande.

H. S. Ray, whose promotion to assistant to the president of the Chicago, Rock Island & Pacific, with headquarters at Chicago, was announced in the *Railway Age* of May 13 (page



H. S. Ray

1149), was born at Griswold, Conn., on July 23, 1869, and entered railroad service in October, 1890, as a clerk in the office of the Rock Island at Philadelphia, Pa. Later in the same year he was made city passenger agent at Philadelphia, and served in this position until 1892, when he was promoted to traveling passenger agent with headquarters at New York. In 1893, he was made assistant city passenger and ticket agent at des Moines, Iowa, where he served until 1895, when he was promoted to district passenger agent, with headquarters at Wichita, Kan. In 1897 he was transferred to Pittsburgh, Pa., and two years later was again transferred to Philadelphia. In 1902, Mr. Ray was promoted to general agent, passenger department, with headquarters at Denver, Colo., and two years later was made general eastern passenger agent, with headquarters at New York. He was promoted to assistant general passenger agent, with headquarters at St. Louis, Mo., in 1906. In 1908 he was transferred to Chicago, and in 1912 he was transferred to Des Moines, Iowa. In February, 1917, he was commissioned captain in the quartermaster reserve corps, and was called into service in April of that year. After serving in the railway transportation division of the quartermaster general's office in Washington, D. C., Captain Ray was ordered overseas, where he was assigned to the general staff of the American Expeditionary Forces, being engaged in working out problems in connection with the evacuation of troops and property from Europe. He was promoted to Major in April, 1918, and to lieutenant-colonel in August of that year. Upon his return from military service, he resumed his position as assistant general passenger agent of the Rock Island with headquarters at Des Moines, and was serving in that capacity at the time of his recent promotion.

Financial, Legal and Accounting

William F. Peter, assistant general counsel of the Chicago, Rock Island & Pacific, with headquarters at Chicago, has been given additional jurisdiction over all matters pertaining to real estate and taxation, effective May 2, succeeding John W. Mulligan, deceased. The firm of **O'Brien, Stone, Horn & Stringer**, St. Paul, Minn., has been appointed attorney of the Rock Island in Minnesota and South Dakota.

W. A. Northcutt, general attorney of the Louisville & Nashville, with headquarters at Louisville, Ky., has been promoted to general solicitor, with the same headquarters. **Ernest Woodward** has been appointed general attorney, succeeding Mr. Northcutt. **J. H. McChord**, attorney, with

headquarters at Louisville, has been promoted to counsel. **Sidney Smith** has been appointed valuation counsel. The promotions and appointments were effective May 1.

Operating

R. King, division superintendent of the Canadian National, Western Lines, with headquarters at Saskatoon, Sask., has been transferred to Calgary, Alta., effective May 1, succeeding T. J. Brown, who has been assigned to other duties.

M. Sawyer, assistant general superintendent of the Chicago, Milwaukee & St. Paul, with headquarters at Minneapolis, Minn., has been appointed superintendent of the Olympic division, with headquarters at Port Angeles, Wash., and the position of assistant general superintendent has been abolished. Mr. Sawyer succeeds **A. O. Veitch**, who has been appointed trainmaster with headquarters at St. Maries, Idaho, succeeding **W. E. Cummins**, who has been assigned to other duties. The appointments and changes were effective May 1.

C. E. Lanhan, who has been appointed superintendent of car service of the Gulf, Mobile & Northern and the Meridian & Memphis, with headquarters at Mobile, Ala., was born at Augusta, Ga., on June 17, 1888. He entered railway service in October, 1904, as a clerk on the Mobile, Jackson & Kansas City, now part of the Gulf, Mobile & Northern. In 1906, he entered the service of the Mobile & Ohio, and served successively with that road as clerk, chief per diem clerk, assistant chief clerk to the general superintendent transportation and chief clerk to the car accountant. He returned to the Gulf, Mobile & Northern, in August, 1920, and was serving as assistant chief clerk to the general manager at the time of his recent promotion.

The East and West Iowa divisions of the Chicago & North Western have been consolidated, effective May 8, and are to be known as the Iowa division. Coincident with this consolidation, appointments and changes have been made as follows: **F. F. McCauley**, superintendent of the West Iowa division, with headquarters at Boone, Iowa, has been appointed superintendent of the Iowa division, with the same headquarters. **F. O'Brien**, superintendent of the East Iowa division, with headquarters at Belle Plaine, Iowa, has been appointed superintendent of the Northern Iowa division, with headquarters at Eagle Grove, Iowa. Mr. O'Brien succeeds **S. A. Morrison**, who has been appointed assistant superintendent of the Wisconsin division, with headquarters at Milwaukee, Wis. Mr. Morrison succeeds **P. G. Campbell**, who has been transferred to the Galena division, with headquarters at Chicago, succeeding **J. J. Burns**, who has been transferred to the Dakota division, with headquarters at Huron, S. D. Mr. Burns succeeds **C. E. Sainsbury**, who has been appointed trainmaster of the Dakota division, with the same headquarters. Mr. Sainsbury succeeds **P. F. Braden**, who has been appointed chief dispatcher of the Dakota division, with the same headquarters. Mr. Braden succeeds **L. B. Kendall**, who has been assigned to other duties. **E. L. Henry** has been appointed trainmaster of the Sioux City division, with headquarters at Wall Lake, Iowa, succeeding **H. J. Ewing**, who has been transferred to the Southern Illinois division, with headquarters at South Pekin, Ill. Mr. Ewing succeeds **C. L. Strom**, who has been appointed chief dispatcher of the Southern Illinois division, with the same headquarters, succeeding **I. B. Sherman**, who has been assigned to other duties.

Traffic

D. P. Skinner has been appointed western dairy agent of the Merchants Dispatch Dairy Line, with headquarters at Chicago, succeeding **George B. Horr**, deceased.

F. W. Sedgwick has been appointed general agent of the Southern Pacific, with headquarters at Denver, Colo., succeeding **L. B. Banks**, who has been transferred to Kansas City, Mo.

C. C. Gardner, general agent, passenger department, of the Chicago Rock Island & Pacific, with headquarters at Detroit, Mich., has been transferred to Des Moines, Iowa, succeeding

H. S. Ray, who has been promoted to assistant to the president. P. W. Johnston, district passenger agent, with headquarters at Wichita, Kan., has been appointed general agent, passenger department, with headquarters at Detroit, Mich., succeeding Mr. Gardner. O. Collins, traveling passenger agent, with headquarters at Oklahoma City, Okla., has been promoted to district passenger agent, succeeding Mr. Johnston. These appointments and promotions were effective May 1.

Engineering, Maintenance of Way and Signaling

D. M. Lamdin, division engineer of the Atlantic Coast Line with headquarters at Waycross, Ga., has been appointed engineer of construction, effective May 11, succeeding C. M. James, resigned.

W. J. Foster, regional engineer of the Erie with headquarters at Hornell, N. Y., has been appointed division engineer with headquarters at Buffalo. The office of regional engineer at Hornell has been abolished. F. S. Wheeler, division engineer with headquarters at Buffalo, has been transferred to Salamanca, N. Y., succeeding C. A. Daley, who has been assigned to other duties with the same headquarters.

W. S. Hanley, whose appointment as chief engineer of the St. Louis Southwestern, with headquarters at Tyler, Tex., was announced in the *Railway Age* of May 13 (page 1150), was born at Terre Haute, Ind., on September 9, 1877. He was educated at Rose Polytechnic Institute, and entered railroad service in 1902, as an assistant in the engineering corps, of the Pennsylvania, being assigned to the Logansport division. In 1905, he was appointed assistant division engineer of the Chicago & Eastern Illinois, with headquarters at Danville, Ill., and was later promoted to principal assistant engineer, with headquarters at Chicago. In 1912, he was appointed chief engineer of the New Orleans Great Northern, and was serving in that position, with headquarters at Bogalusa, La., at the time of his recent appointment.

C. R. Mee, whose appointment as chief engineer of the Louisiana Railway & Navigation, with headquarters at Shreveport, La., was announced in the *Railway Age* of April 22 (page 1012), was born at Post Oak Springs, Tenn., on August 1, 1880, and entered railroad service in 1898 as an axe-man on the Tennessee Central. In 1900 he entered the service of the Lake Erie, Alliance & Western, as assistant to the resident engineer, and in 1901 he went with the Pittsburgh, McKeesport & Youghiogheny as a transitman on location. Later in the same year he was appointed assistant to the division engineer on the Wabash, and served in that position until February, 1903, when he was appointed locating engineer of the Louisiana Railway & Navigation Company. He was promoted to general roadmaster in 1908, and served in that capacity until December, 1918, during part of which time he was assigned also the duties of chief engineer. On the latter date he left railroad service to take up private engineering practice, and was engaged in this work until he returned to the service of the road, as above noted.

Purchasing and Stores

J. E. Mahaney, general storekeeper of the Seaboard Air Line, has been appointed superintendent of stores of the Chesapeake & Ohio with headquarters at Huntington, W. Va., effective May 1.

R. M. Nelson, purchasing agent of the Chesapeake & Ohio, has been appointed assistant to the director of purchases and stores with headquarters at Richmond, Va., effective April 10. The position of purchasing agent has been abolished.

W. H. King, Jr., whose appointment as general purchasing agent of the Seaboard Air Line was announced in the *Railway Age* of April 29 (page 1056), was born on April 20, 1883, at Portsmouth, Va. His education was continued through high school and preparatory school. In 1900 he entered railway service with the Seaboard Air Line as a clerk in the accounting department. Two years later he became a clerk in one

of the company's agencies and the following year became a clerk and statistician in the accounting department. In 1910 he was appointed assistant statistician in the operating department and, in 1912, chief statistician and fuel agent. He was promoted to chief statistician in 1913 and four years later became the assistant to the president and federal manager and also general manager of subsidiary lines. He was appointed assistant to the vice-president, and vice-president of the Baltimore Steam Packet Company in 1920, which position he held at the time of his recent appointment.

Obituary

L. H. Korty, former superintendent of telegraph of the Union Pacific, died at his home in Omaha, Neb., on May 15. Mr. Korty was born at Hanover, Germany, on October 22, 1846, and entered railway service in 1862, as an operator on the Chicago & North Western at Minnesota Junction, Wis. After serving from 1863 to 1866, in the military telegraph service of the United States, and from 1867 to 1869 as an operator with the Western Union Telegraph Company, Mr. Korty entered the service of the Union Pacific. He was appointed superintendent of telegraph in 1887, and retired from active railroad service in 1908.

Robert C. Perkins, former general freight agent of the Illinois Central, died at Covington, Ky., on Friday, May 6. Mr. Perkins was born on March 20, 1857, near Brookhaven, Miss., and entered railway service in 1880, as a waybill clerk on the St. Louis, Alton & Terre Haute at St. Louis, Mo. Two years later he was made claim agent of that road and served in that capacity until 1884, when he was appointed superintendent of the St. Louis Weighing Association. In 1886, he was appointed traveling freight agent of the Mobile & Ohio and a year later was promoted to general agent, with headquarters at New Orleans, La. He entered the service of the Illinois Central on May 1, 1901, as division freight agent, with headquarters at New Orleans, and was promoted to general freight agent with the same headquarters, on January 1, 1905. Mr. Perkins retired from active railroad service on December 31, 1919, on account of ill-health.

William Henry Davisson, assistant district engineer, Bureau of Valuation, Interstate Commerce Commission, with office at San Francisco, died at his home in Oakland, Cal., on May 3, at the age of 58. He was born in Kalamazoo, Mich., and was educated at Griswold College, Davenport, Iowa. He began his railroad service on the Chicago, Rock Island & Pacific, in 1884, as chairman. From 1896 to 1900 he was general roadmaster and in 1906 he was appointed assistant chief engineer. A year later he went to the Chicago, Milwaukee & St. Paul, where he was in charge of construction on the Puget Sound extension, in Montana. In 1910 he was principal engineer on the construction of that part of the present Union Pacific System which lies between Ayer Junction, Wash., and Spokane. He remained here until the work was completed, and in January, 1914, entered the employ of the Interstate Commerce Commission, in charge of roadway inventories in the Pacific district.

Franklin K. Lane, LL. D., Secretary of the Interior in the administration of President Wilson and for eight years a member of the Interstate Commerce Commission, died at Rochester, Minn., on May 18, at the age of 56. He had gone to Rochester for a surgical operation, from which he rallied; but he died later of angina pectoris. Mr. Lane was born near Charlotetown, Prince Edward's Island; but passed his early life in California, engaged in journalism and the practice of law. He was an Interstate Commerce Commissioner from 1905 to 1913, when he resigned to enter the cabinet. In 1918 he was chairman of the railroad wage commission. In all of his public offices he was a genuine statesman, while he was a man with broad, human sympathies and a facile power to express them. He lifted his cabinet office from one of relatively minor importance to one of the first rank. During the war his patriotic services were notable, especially in connection with the Liberty Loans; and after the war he was energetic and original in works of relief and restoration.

EDITORIAL

Railway Age

EDITORIAL

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The present is a buyer's market. The seller, in an effort to obtain sufficient business to keep his organization together and pay fixed charges, has established prices based on a minimum margin over the out-of-pocket cost. This is evidenced daily. Prices noted in current awards for structural steel fabricating contracts indicate the minimum spread over the cost of plain materials so characteristic of the slack season. One recent award for steel truss spans in the middle west was made at less than four cents, f. o. b. shop, while a contract for plate girders for an eastern road was taken at a little more than four cents, erected. The present condition of the lumber market is well known. The tie producers are also in a most receptive mood. Taking this situation as a cue a few roads are anticipating the restoration of earnings by entering the market for these products when everything is in their favor. There is, however, that weakness in human nature which leads one to expect the impossible, namely, a period of large earnings and low prices, so that many desire to see earnings definitely assured before making purchases with the idea that they will be able to get into the market just ahead of the other fellow. Unfortunately, this plan can never be a complete success. Somebody always gets left. Don't be the last man in.

**Be Sure
You Are Not
Too Late**

In analyzing the operations of a railroad such as the Virginian or any other carrier which moves large tonnages of bituminous coal to tidewater, one is particularly struck by the great increases which have been made in the amount of coal for export. This brings out the idea that those who are interested in these roads should watch with particular interest the developments in the British coal mining situation which must be so disconcerting to our British friends. Prior to the war the larger part of those countries of the world which did not have coal of their own secured it from the United Kingdom, the British being especially fitted to supply it because of their well-organized export business and their predominance in shipping. When the war came on, the British were unable to supply their usual markets because the efforts of their merchant fleet had to be devoted to the needs of warfare and were further handicapped by German submarine activity. Since the termination of the war, another and equally serious complication has arisen in the continued labor difficulties which have cut down the supply of coal through strikes characterized by animosity and lack of patriotism such as the world has seldom seen. The result has been that British coal is now no longer available for the world in the same quantity as before the war. Those countries needing coal have had to come to America for their supply and our coal export business out of Hampton Roads, Baltimore, etc., has expanded to proportions hitherto not thought of. There is no one who will say that our export coal business is what it should be. As yet we have not the organization, nor have we gotten to the point where we have granted the desired credits. However, it seems highly probable that this export business in coal is here to stay and that we may look forward to having good and

**Exports
of
Coal**

permanent markets for coal abroad, more particularly in South America, in the Mediterranean countries, etc. The result is going to be an increased demand for transportation on those coal roads which reach tide-water. In the case of the Virginian, which is referred to because so much attention is given that road in the present issue, the effect upon the growth of traffic has been particularly striking.

There has been a lot of loose talk about the danger to American producers of foreign competition in the domestic market due to high freight rates in this country and an instance of rates from inland American points to the Atlantic seaboard higher than the ocean charges for similar commodities from Argentina

**Freight
Rates in
Argentina**

has been cited in high government circles. As Daniel Willard pointed out to the Senate investigating committee last week, these rates on imported commodities do not take into consideration the inland rail haul in the country of origin. It is interesting to note, therefore, in this connection, that the shippers of Argentina are complaining about the high freight rates on the railways of that country which, they say, are putting them at a disadvantage with American competition in European markets. The railways all over the world have found it necessary to increase their rates for much the same reason that rate increases have been made necessary here and the charges for rail transportation in America are still very low when compared to those of most countries. The success of American producers and of American exporters hinges on the exchange rate, which in turn resolves itself into a problem of credit extension—the present freight rates offer no serious barriers to successful competition by Americans in any market.

The question as to the relative rights of the common and preferred shareholders of the Reading Company as to the stock of the new corporation which is to take over the equity in the coal properties seems to be about as difficult of solution as any question that has arisen for some time. It seemed by way of solution on Saturday, when the Federal district court announced, after considerable discussion and consideration, its decision that the preferred and common shareholders should be given equal rights. On Monday morning, however, the matter was again brought to the fore when it was stated that the common shareholders would appeal to the Supreme Court with a view to continuing their fight for exclusive participation. However, the district court has apparently settled the other leading question which it had before it, namely, that relating to the disposition of the Central of New Jersey stock. The court decided that this stock should be put in the hands of trustees and held until a more suitable time for its disposition had arrived. The government attorneys desired, it will be remembered, the setting of a definite time limit on the sale of the Jersey Central stock. In view of the provisions of the Transportation Act relating to railway consolidation,

**Reading
Plan
Approved**

this would have been a real hardship on the Reading Company, as there could have been no sale except at a great sacrifice until the disposition of the Central of New Jersey in the consolidation plan had been finally decided upon. The court in this case has made the only proper decision as to the disposition of the Jersey Central stock and, fortunately, refused to listen to the argument of the government attorneys, who in this matter showed themselves to be without adequate comprehension of what Congress intended when it passed the Transportation Act.

The efficiency of mechanical devices in railway offices is no longer a matter of doubt, provided the devices are carefully selected and properly utilized.

Selecting Office Equipment

The selection of proper equipment for any particular office, however, the care and maintenance of the devices and intelligent supervision of their use presents a problem as important and perplexing as ever. Frequently expensive mechanical equipment has been purchased without sufficient preliminary investigation to determine the kind of machines best suited to the work, the number of them required and whether the savings to be expected would justify the necessary outlay. Often, too, equipment carefully designed to effect great savings has failed to come up to expectations because of improper use and maintenance. On the Pennsylvania a method has been adopted whereby all purchases of mechanical office equipment must be passed upon by a committee of officers representing several departments. This committee has made extensive studies of the various devices on the market and, after a careful investigation of the office ordering the equipment, is able to say authoritatively whether or not the proposed purchase is justified. The work of this committee and of the office which keeps the records and oversees the repairs of all mechanical devices is described in an article by D. T. Jones, elsewhere in this issue. In view of the great savings often made possible by the careful selection and proper utilization of mechanical devices in railway offices and the possibilities of heavy losses when equipment is purchased without sufficient study, the success of the Pennsylvania in meeting the difficulties of the situation suggests the advisability of a study of this road's methods by those who are confronted with the same problem.

The Thirtieth Annual Session of the Freight Claim Division of the American Railway Association, which is noted elsewhere in this issue, marked the launching of an organized effort to cut in half the constant drain on revenues caused by freight claims. For some time past it has been apparent that the

"It Can Be Done"

conditions which caused the outlay for loss and damage of freight to leap from \$35,000,000 in 1917 to \$51,000,000 in 1918 and \$106,000,000 in 1919, and then to increase to \$109,000,000 in 1920, demanded correction. It remained for the Freight Claim Division to recognize the seriousness of this situation officially, and to break precedent by setting aside a day at its annual session in which to discuss, analyze, and more important still organize for a claim prevention campaign. The movement is one which should command the interest and active support of every officer and employee on the railroads. Freight claims represent an absolute waste which can be reduced with no additional outlay for new equipment. It was established at the recent session that the success of a prevention campaign depends in considerable measure upon two factors. First, there is the necessity for closer co-operation between the carriers themselves. For instance,

if the clear record which is necessary to the proper settlement of a claim is to be made, there must be more active co-operation between the carrier on whose lines the freight originates, and the road finally called upon to settle the claim. Second, much can be done to eliminate the carelessness and neglect which result in a considerable part of the loss and damage, if efforts will be made by each individual carrier to interest its employees in a prevention campaign. The results to be derived from frequent meetings of division officers and employees for discussion of the subject, to say nothing of the interest which can be aroused by a series of claim prevention bulletins posted in conspicuous places, are so decidedly worthwhile, that they can hardly be overlooked. The Freight Claim Division has chosen as its slogan "Cut Claims In Half—It Can Be Done."

The development of the Port of New York, both as to its present status and its possibilities have already been commented upon in these columns. One point outstanding so far in this work

Tunnel to Staten Island

has been the understanding shown by the legislatures of New York and New Jersey of the need for better and more comprehensive rail and water terminal facilities at this port. The passing of a recent bill, mandatory in its character, concerning the construction of a tunnel across the lower bay at New York for freight and passengers between Brooklyn and Staten Island now served by ferries and car floats, is still more evidence of the desire, at least, of the New York legislature to provide increased facilities. The bill as passed is purely a mandatory one and requires that the City of New York begin construction of the tunnel mentioned above within two years, thus bringing the project off the back of the stove where it has been cooling since the administration of Mayor Mitchel. It is estimated that the work will cost at least \$50,000,000 and will include facilities capable of extension or expansion to fit growing needs. Since it is desired to furnish arrangements whereby freight, in addition to passengers, may be moved from Brooklyn piers to connections with the Baltimore & Ohio on Staten Island and the Long Island and New York Connecting on Long Island, the improvement will practically unite the New England roads with those now terminating along the New Jersey waterfront. There is also present the possibility that the completion of the tunnel may bring about a more comprehensive development in this section, leading ultimately to a much greater unification in the handling of freight between the transcontinental and New England lines. In compliance with the law, preliminary work has already been started. Routes are being discussed, surveys being made and soundings taken. Several different plans will be submitted, after the surveys have been completed, probably at public hearings, and the most feasible one chosen.

The Moshassuck Valley Railroad, a short line (two miles, with two locomotives) is a time-honored institution of the

A Second Lesson from Rhode Island

smallest state in the Union, but its experience affords a big lesson; big, that is, in its simplicity. It is a lesson applicable to the most extensive and important railroads of the country; and yet it is entirely free from the bewildering array of figures which the railroad executives have to use in presenting their case at Washington, and should make a convincing appeal to those citizens, congressmen and shippers who declare that they cannot see why the railroads are so sorely in need of money. A dewdrop will mirror the sun, and a two-mile railroad can illuminate financial problems measured by

billions. The Moshassuck Valley, in 1920, earned \$68,026 and its expenses were \$110,125. The net loss, \$42,100, is chargeable mainly to the unprofitable passenger traffic; and on May 16 the Public Utilities Commission of the state authorized the entire suspension of passenger trains after the end of this month. There is a street railway near enough so that the public will not suffer much inconvenience. This decision to economize might perhaps have been taken long ago, but for feelings of sentiment; the line has been running for 44 years. Its "train" is a familiar sight, at Woodlawn, to passengers who travel frequently on day trains between Providence and Boston. The report of the hearing before the Utilities Commission indicates that it took eight persons to accomplish this simple act: the three commissioners; the controller, the clerk and the counsel of the corporation; a stenographer and a newspaper reporter. There were no remonstrants, and no spectators except the reporter.

After long months of delay, the government, represented by Sir Eric Geddes, Minister of Transport, has introduced in

British Railway Legislation

the British House of Commons a bill covering the return of the railways to their owners, which is scheduled for August. This bill, which is described in greater detail elsewhere in this issue,

follows in some respects our own Transportation Act, but it differs from it in many essentials. The most striking feature of the bill is the provision for consolidation of the railways into six groups, and this section, unlike our Transportation Act, is mandatory. Furthermore, these groupings are on a regional basis and do not form "independent competitive systems." The companies designated in each group are to amalgamate by January 1, 1923, unless by consent of Parliament some variations in the present grouping scheme are allowed. An "Amalgamation Tribunal" is to be constituted to adjudicate disputes arising out of the amalgamations. The Ministry of Transport and the Railway and Canal Commission are given authority to require the companies to furnish reasonable services and facilities not prejudicial to their financial well being. An elaborate commission, known as the "Railway Rates Tribunal," will be given authority over charges, which are to be fixed to allow a certain fair return to be earned by the carriers. Labor disputes are to be referred first to joint conferences in each group. Failing settlement there, a dispute may be carried to a "Central Wages Board" in which the railways and employees only are represented and, finally, to a "National Wages Board," in which the public also is to appear. The railway unions will not be represented on the boards of directors, as was expected in some quarters, but shippers are to be represented by a minority on each board. British labor is a strong factor politically in spite of the recent disagreement in the ranks, and the government's proposal will doubtless elicit strong protest from them; while the railways themselves will probably not be entirely satisfied with all the provisions of the act. Consequently, it is expected that the fate of the government's proposal will be watched with considerable interest.

The study of the operations of a railroad of such interesting characteristics as the Virginian Railway which appears on

The Virginian Railway

another page of this issue should prove of particular interest at this time for a number of reasons. The Virginian uses the heaviest equipment and the most powerful locomotives in use on

any railroad. It was the first road to use the 120-ton coal cars and its 2-10-10-2 Mallet locomotives of 147,200 lb. tractive effort are as yet without an equal. In 1920, the

Virginian led the railroads of the country in heavy train loading. Its net tons per train averaged for the year no less than 1,800, the second carrier in the list being the Bessemer & Lake Erie, which managed to secure an average of 1,764 net tons per train. This high average on the Virginian is being brought about by the operation of trains in regular service aggregating between 8,000 and 9,000 gross tons—trains of 90 to 100 cars being hauled over some districts with a single locomotive. Further than that, in an effort to show what the real possibilities in the situation might be, on Tuesday last a test train was run consisting of 100 of the new 120-ton cars and handled by one of the huge 2-10-10-2 Mallet locomotives, which train had an aggregate gross tonnage of no less than 16,000 gross tons. The full details of how the road secures its heavy train loading and more particularly how it managed to run a train of 16,000 gross tons will be found in the article. Further than all these things, the Virginian was one of those few roads which earned in 1920 well over its standard return and guaranty; in fact, in 1920 its net railway operating income was nearly double that earned in 1919. The Virginian is a bituminous coal road almost exclusively, 92 per cent of its tonnage in 1920 being of that commodity. It was built for handling this coal as cheaply as possible, its engineering standards being such as to permit the heaviest possible train loading. The manner in which the road has realized upon the constantly expanding coal business which moves to its tidewater terminal at Hampton Roads is one of the most interesting features of American railroad operation.

The Railways and the Commission Merchants

IF THE RAILWAYS individually and collectively would make as much of a row when they are attacked as do the commission merchants who handle fruits and vegetables, those who make a business of attacking the railways would soon be so deeply buried under counter propaganda they would perish before a rescue party could dig them out. Whatever else the *Railway Age* may think of the wholesale produce merchants of the country, we bow in reverence before their propaganda department. It is one of the most active, energetic and ubiquitous organizations of its kind in existence.

In its issue for April 22, page 967, the *Railway Age* published an editorial entitled "Piratical Commission Merchants' Attacks on Freight Rates." We charged the commission merchants with carrying on a dishonest and a selfish propaganda to make the producers of fruits and vegetables believe the low prices the producers are receiving are due to the advances in freight rates, and thus to cause agitation by the producers to drive down the rates. We showed that prices being paid to producers in Texas for cabbage, white onions and spinach, plus all the transportation charges to Chicago, were only 25 per cent, 36 per cent and 10 per cent, respectively, of the prices for which these things were selling at retail in Chicago. In other words, some other person or persons besides the producers and the railroads were getting 75 per cent of the retail price of cabbage, 64 per cent of the retail price of white onions, and 90 per cent of the retail price of spinach. We charged the propaganda of the produce merchants was dishonest because the facts showed it was a gross misrepresentation to allege that the low prices the growers were receiving were due to the advances in rates. We charged it was selfish because it was being carried on by the commission merchants to increase their own profits at the expense of the railroads. We even went so far as to imply that the commission merchants bore the reputation of having been "remorseless profiteers."

Our editorial has been very widely quoted. In consequence

the *Railway Age* has been deluged with personal calls, telegrams and letters from individual commission merchants and organizations of commission merchants throughout the country who have loudly complained that we have misrepresented their practices and profits and have demanded that we retract the statements made concerning them. No retraction having been made, one of the organs of their trade, the *Packer*, published a garbled account of a conference between the commission merchants and the editor of this paper at Kansas City in which it falsely stated that the editor of the *Railway Age* admitted that the editorial in question, in so far as it concerned the wholesaler, was "utterly wrong."

Space will not permit us to publish all the communications we have received. In order, however, that the commission merchants may have opportunity to present their case to our readers we publish elsewhere a letter entitled "A Protest from the Commission Merchants," and signed by officers of the National League of Commission Merchants of the United States, the Western Fruit Jobbers' Association of America and the International Shippers' Association.

In three respects all the communications we have received are alike: (1) They all deny that the commission merchants are making excessive profits, and denounce the *Railway Age* for its alleged unjust attack upon them; (2) none of them denies that they and their organizations have been engaged in widespread propaganda to drive down freight rates; (3) none of them has attempted to disprove the correctness of the figures we gave regarding the prices paid to the producers, the amounts received by the railroads for transportation and refrigeration of the commodities in question, or the retail prices charged for them. We are willing to let the commission merchant and retailer fight out between them the question of who got the 64 to 90 per cent of the total retail prices of cabbage, onions and spinach which the railway and the grower did not get. Since we are giving the commission merchants space elsewhere to denounce us and tell how little money they are making, we shall confine our comments to the real subject of the editorial in our issue of April 22 to which they take exceptions.

The real subject of that editorial was the propaganda being carried on by the commission merchants against the existing freight rates. They protest violently against what they call "unjust attacks" upon their business. But what have they been doing with respect to the railroad industry? They have been persistently and completely misrepresenting the effects of the advance in rates upon fruits and vegetables. The last advance in the freight rate from Texas to Chicago on cabbage, which recently sold at retail for \$140 a ton or 7 cents a pound in Chicago, was \$5 a ton or 2½ mills a pound. The advance in the rate was less than 4 per cent of the retail price at which the cabbage sold. On spinach, which sold in Chicago at retail for \$300 a ton, the last increase in the rate from Texas was \$6 a ton. This was 3 mills a pound, or 2 per cent of the retail price. Is it not manifestly absurd to contend that an increase in freight rates amounting to 2 to 3 per cent of the retail prices of vegetables which sold at retail for \$140 to \$300 a ton is responsible for the fact that the grower of the vegetables received only \$5 or \$7 a ton for producing them? The retail price the consumer paid was large enough to have covered a reasonable profit for the retailer, a reasonable profit for the wholesale merchant, the total amount received by the railroad for transportation and, in addition, three or four times as high as a price the grower was paid. That the grower did not receive a reasonable price obviously was not because the charges made by the railroad was excessive, but because somebody else took a toll that was excessive. This somebody else was either the commission merchant or the retailer. If, as the commission merchants' communications to us necessarily imply, it was the retailer, why do the commission merchants carry on their

propaganda against the railways instead of against the retailer?

The commission merchants complain that they and the grower, under present conditions, cannot make reasonable profits. Doubtless it never occurred to them that the railroads have some right to make a reasonable profit. The commission merchants say that the "turn-over" on their business averages only 2½ per cent. In the year 1920 the net operating income of the railways of the United States was only \$62,000,000, which was a turn-over of less than 1 per cent on their total business, and, unlike commission merchants, they have enormous fixed investments upon which they must earn and pay a return or be plunged into bankruptcy. Railway rates were advanced last August because the railways were incurring an enormous deficit and without an advance in rates actually would have been thrown into bankruptcy. If without previous large reductions of railway operating expenses the rates in effect prior to last August should be restored, practically every railway in the country would speedily be rendered hopelessly insolvent. Nevertheless, the commission merchants and their organizations without the slightest consideration for the financial needs of the railroads, carry on a nation-wide propaganda to force down freight rates, and then, when the *Railway Age* attacks their propaganda, have the effrontery to write us letters urging us to be "fair" in our comments on their business and to refrain from "trying to break down that splendid spirit of co-operation which the shippers are building up with the carriers."

The fairness of the propaganda for reductions in freight rates on fruits and vegetables was illustrated at a recent conference between the southern lines and the watermelon growers. It was developed that the recent average increase in rates to northern points varied from 2.3 cents to 4.9 cents per melon. It was shown the grower received an average of 7½ cents per melon, and the carriers 12.7 cents per melon for transportation, or a total of 20.2 for the producer and railway, and that the melons sold in Baltimore for an average of \$1 each, or 400 per cent more than the amount received by both the grower and the carrier.

In his recent testimony before the Senate committee J. Kruttschnitt, chairman of the Southern Pacific, gave the following facts regarding lettuce: "Parties in Washington calling themselves 'Producers and shippers of perishable and high tonnage commodities on the Pacific coast' had issued a circular containing the statement, 'Increased freight rates put tax of \$185 per car on lettuce.' The increase in freight rates from California amounts to 7/10 of 1 cent for large sized heads running 54 to the crate. The number of heads grown per acre is about 9,530, which at 7/10 of a cent a head, makes the increase in the rate \$66.71 per acre and not \$185 as asserted. The cost to the producer of one carload of the lettuce sold to distributors in New York, all charges paid including transportation and refrigeration, was \$638.51. The carload at retail prices sold in New York for \$2,382. Naturally the question is asked 'who gets the other \$1,743.49?'"

The *Railway Age* agrees with those who contend that the grower of fruits and vegetables is not, at present, receiving high enough prices for his products. It declines, however, to subscribe to the manifestly false doctrine of the commission merchant that the low prices being received by the grower are due to the present freight rates and that the freight rates should be reduced in order that the grower may make more money. It is the commission merchant, not the railroad, that buys the produce from grower and pays him the present low prices.

Since the commission merchants are so greatly concerned because of the low prices the grower is getting, we suggest to them that instead of advocating reductions in railroad rates to enable the producers to get better prices, they

might themselves voluntarily pay the grower higher prices. The commission merchants will reply, of course, that they are not making enough money, but neither are the railways. The railways are incurring heavy losses even with the present rates. The public certainly would be no more injured by the ruin of the commission merchants than it would be by the ruin of the railways.

Undoubtedly many of the present railway rates are too high. Undoubtedly when the reductions in railway operating expenses that ought to be made have been secured many rates should and will be reduced. But those who, like the commission merchants, carry on propaganda grossly misrepresenting the effects of the present rates and advocating reductions absolutely regardless of the ability of the railroads to stand them, are not helping to solve the present railway problem or any other problem that confronts the country, and they are in a very poor position to protest against alleged unjust attacks upon their own business.

Proposed Wage Reductions and Rates

REPORTS are being persistently circulated to the effect that the reduction in wages to be announced by the Railroad Labor Board in the near future will average only 10 or 12 per cent, or, as some reports have it, will aggregate about \$400,000,000 a year. The circulation of these reports is accompanied by speculation regarding what changes in freight and passenger rates will be made if the reported reductions in wages are made.

The Railroad Labor Board has not itself made any public statement indicating what the total reduction in wages will be. There are reasons for believing that the reports mentioned regarding the probable extent of the reduction in wages are originating with persons who are interested in having them made as small as practicable.

The public should understand that if the average reduction in wages granted shall be as small as these reports indicate they will not be sufficient to make practicable any substantial reductions of rates. The advances in wages granted by the Railroad Labor Board on July 20, 1920, when the cost of living was about 112 per cent more than before the war, averaged about 20 per cent for each employee, and, on the basis of the number of men employed in 1920 amounted to about \$775,000,000.

It made the average compensation per employee about 136 per cent more than before the war. The reduction in the average cost of living since that time, according to the most reliable estimates, is at least 40 per cent, and since the present wages were based chiefly upon the cost of living prevailing at the time they were fixed there seems no good reason why the reduction in wages should not be at least equivalent to the advance in wages granted last July. On the basis of the cost of living there would be justification for making the wages even lower than they were before the last advance in wages was granted.

With the present wages in effect, it was found in the latter part of 1920, even when the railways were handling a heavy business, that they were failing at the rate of about \$500,000,000 a year to earn a net return at the rate of 6 per cent upon the valuation placed upon their properties by the Interstate Commerce Commission.

The business being handled at the present time is much smaller than then and the railways thus far in 1920 have earned almost no net operating income at all. Unless, therefore, the Railroad Labor Board shall both wipe out the national agreements and make a reduction of wages equivalent to the advance in wages which was granted last summer, the prospect of any substantial reduction in rates necessarily will be very remote.

Letters to the Editor

"A Protest from the Commission Merchants"

WASHINGTON, D. C.

TO THE EDITOR:

Our attention has been directed to an editorial in the *Railway Age* under date of April 22, headed "Piratical Commission Merchants' Attacks on Freight Rates" which for its vehemence and misstatement of facts in an attempt to influence the public mind against the commission merchants, savors only of railroad propaganda, and, we are convinced, will act as a boomerang in its attempt to influence the minds of those high in authority, who have under consideration the necessary downward adjustment of freight rates.

These organizations, representing as they do many of those whose honesty and sincerity of purpose you so unjustly attack, are now in the thirtieth year of successful operation and are recognized by the carriers and governmental agencies as one of the indispensable and most important links in the chain of economic and proper distribution of fruits and vegetables. Therefore, their officers and members strongly and justly resent your unwarranted attempt to defame an industry so important to the carriers, the producers and the consumers of this country.

In your editorial, you link up with the commission merchants in this alleged "piratical attack" two of the leading trades papers, viz., the *Packer* and the *Produce News*, and say that the commission merchants through and in conjunction with these and other trades papers, are conducting one of the most dishonest and selfish propagandas you have ever observed. Why shouldn't we use those papers which print facts concerning our industry and not such papers as the *Railway Age*, which evidently panders to anything that will give the public a misconception of facts concerning the so-called middleman, or commission merchant. It was the *Packer* which took the very statements upon which your editorial was based concerning the enormous profits on onions, spinach, etc., and proved by actual conditions and government figures the falsity of your figures and that instead of the alleged high profits, the dealers suffered a loss.

These organizations composed of wholesale dealers and distributors of fruits and vegetables, hold no brief for the retailer whom you have linked up with the commission merchant, but we do feel that you owe to them the same duty you owe to us; that of investigating and proving your facts before attacking, and inflaming the minds of the consumer, with unjust and unwarrantable statements regarding the retailer, which can but have the effect of retarding the free movement of fruits and vegetables with resultant injury to everyone concerned, and not the least to the railroads.

In your editorial you go so far as to say that "It has long been known that the commission merchants dealing in fruits and vegetables have been among the most remorseless profiteers in this country." If this was not such a serious utterance, we would be inclined to laugh. It is serious because it is such a bald, deliberate misstatement of facts. Why didn't you take the time to investigate and really find out what the average margin of profit is on the annual gross sales of the commission merchants? We can tell you that it is less than 2½ per cent. Why didn't you take the time to look up in connection with the question as bearing on profits, the financial statement of the United States Food Administration, completed on February 1, 1919, which showed the net profit of the wholesale fruit and vegetable dealers in the United

States from August 1, 1917, to August 1, 1918, to be 2.42 per cent on the turnover? This should be ample evidence, and will be to the right thinking mind, that the fruit and vegetable trade was and is efficient in the performance of its duty and by no stretch of the imagination could be considered profiteers.

You know, we know, and the carriers know, that freight rates are too high. The issue cannot be dodged by such attempts as your paper is making. President Harding in his address to Congress said: "*Freight carrying charges have mounted higher and higher until commerce is halted and production discouraged. Railway rates and cost of production must be reduced.*"

Every word of this is true, so let's go at it in a sensible way, as this industry is doing with the carriers and every one concerned, and work out the problem. Stop your mud slinging and get down to facts.

We recall that in 1917, on invitation from you, R. S. French, general manager and secretary of the National League of Commission Merchants of the United States, served as one of three judges in a contest put out by your paper for the best paper on "The Reconsignment and Diversion Privilege," for which a prize was awarded. This was an interesting, constructive and instructive contest and experience.

Why not continue a constructive policy and devote your energy to a campaign of investigation to determine the effect of the high transportation costs on the commerce of the country?

The congress wants this information, and so does the Interstate Commerce Commission in its investigations which are now going on, and will welcome real facts such as these and other organizations are giving them.

Do this instead of trying to break down that splendid spirit of co-operation which the shippers are building up with the carriers and which was so manifest in the conference between seventeen railway traffic executives and representatives of shippers at New York on November 17 and December 14, 1920, and of which Chairman Clark of the Interstate Commerce Commission was advised, and to which he replied as follows:

"I appreciate your promptness in giving me this information and I desire to express to you the satisfaction which I feel over the fact that such a meeting has been held, and congratulate you upon the spirit which was entertained by those in attendance and the acquiescence in the broad principles which it was agreed should be followed. I have an abiding faith in the good effect of such conferences and of the great good that will come from the developing and fostering the spirit which prompted calling the conference and which permeated the proceedings. I sincerely trust that this spirit will not be allowed to languish but that it will be accepted and co-operated in by all of those who were present in person and that the result may be a general acceptance of the principles agreed upon and a cordial determination to not only abide by them but to further their acceptance by others.

"This spirit is especially fitting preceding the holiday period when our minds turn to 'Peace on earth, good will to men,' and I hope that it may survive as all truly good and right things survive."

We were a party to this conference and like all other shippers, we are doing everything possible to carry out the spirit and understanding of the conference.

As we write this letter, our attention is called to an article in the Packer of May 6, in which it is stated that at the request of fruit and vegetable dealers in Kansas City, you met with them on Wednesday of last week in the Chamber of Commerce and were given first-hand information concerning profits and losses of wholesale dealers; that you acknowledged to the dealers at this meeting that you had made no investigation concerning wholesale selling prices before writing your editorial, but tried to justify its publication by pointing out that retail prices were high compared with the prices producers were receiving; that it was also shown you that wholesale prices, after transportation costs were paid, were out of line, and that your article, insofar as it concerned the wholesaler, was utterly wrong. It is also stated that you admitted that transportation rates should be reduced,

but stated that operating expenses of the carriers precluded such reduction at the present time.

In view of these statements, the accuracy of which we have no reason to doubt, and as your editorial article was directed primarily at the wholesaler, you should at once set the public right, through your paper, by a frank admission of your error and a retraction of your statement, which we trust you will do. Furthermore, in fairness to the members of these organizations and others whom you have so unjustly attacked in your editorial, we ask that you print and give to this letter the same prominence in the next issue of the *Railway Age* as you did to your article.

NATIONAL LEAGUE OF COMMISSION MERCHANTS OF
THE UNITED STATES

F. WM. MORF, President
R. S. FRENCH, Gen'l Mgr. and Sec'y.

WESTERN FRUIT JOBBERS ASSO. OF AMERICA

A. D. HITZ, President
W. D. TIRWELL, Sec'y.

INTERNATIONAL APPLE SHIPPERS' ASSO.

E. T. BUTTERWORTH, President
R. G. PHILLIPS, Sec'y.

Freight Rates Not Restricting Traffic Movement

HOUSTON, TEXAS.

TO THE EDITOR:

I have read with great interest the editorial in the *Railway Age* of April 22 concerning the propaganda which is being carried on in the United States to bring about a reduction in the freight rates. These propagandists are claiming that the high rates are curtailing the movement of traffic. They evidently fail to remember that traffic was likewise curtailed during the panic of 1907 and again in 1914, when the freight rates were very low.

As a practical example that high rates do not curtail traffic to any extent we have before us at present the situation in Mexico. There is considerable accumulation of traffic for Mexico at all of the Rio Grande crossings, due principally to the shortage of motive power on the National Lines of Mexico. In order to help out this situation the Mexican lines have for some time been allowing private concerns, such as mining companies, contractors and others to operate trains over the tracks of the National Lines. These private concerns charge the full freight rates in effect in Mexico, plus 50 per cent, and they have all been offered more traffic than they have been able to handle on this basis. It is understood that they pay the Mexican Railway Lines the regular rates and the additional 50 per cent is retained by them for their services.

It has been stated recently that shippers in some cases have offered to pay these private train operators as much as 100 per cent more than the regular tariff rates in effect in Mexico in order to get their traffic handled.

As a practical illustration, this would seem absolutely to dispute the statements of the propagandists in the United States that the present freight rates are restricting the movement of traffic.

THEORWELL FAY,
International & Great Northern.

A BILL has been introduced before the Illinois legislature to require all railroads to construct and maintain an illuminated danger signal on each side of the railroad at all highway grade crossings. The bill provides that the signal shall consist of a wired glass disc not less than 17 in. in diameter with a 5½-in. optical lens in its center, and light to be projected by intermittent flashes of not less than 30 per minute; all crossings to be equipped before July 1, 1922. It is estimated that it would cost about \$650 to equip each highway crossing as here provided, and approximately \$60 a year for maintenance and inspection.

Record Train Loading Features Virginian Operation

Describing the Methods Used to Handle Loads of 8,000 to 9,000 Tons in Regular Course

ALL records for heavy train loading were shattered on Wednesday last when there was handled from Princeton, W. Va., eastward to Roanoke, Va., on the Third district of the Virginian Railway, a train of 100 loaded 120-ton cars of coal aggregating 16,000 gross tons. This train was a test train run to demonstrate what could be done with the new 120-ton cars and the heavy power used by the Virginian Railway. It marks the latest step in the progress towards heavier train loading which has characterized the operations of the Virginian Railway since its inception.

The Virginian Railway's theory of operation is stated in the following words: "The more loads you haul in one trip the less trips you'll have to make." The road was built with that idea in mind. Today the company is operating with the largest capacity equipment and most powerful locomotives which are in service in this country and therefore in the world. The success the road has been having in working out its scheme of operation is attested by the fact

put in complete operation. At his death the line from Princeton, W. Va., east to tide-water had been put in its desired shape, with one pusher grade of 0.6 per cent on one district, with grades against eastbound traffic of but 0.2 per cent otherwise on the three districts and on the whole with a line descending to tide-water. The line west of Princeton—that is, into the coal fields themselves, was not up to the standards which characterized the other three districts. It has gradually been improved, however, the most important feature of this improvement being the double tracking and accompanying tunnel widening between Elmora and Clark's Gap now nearing completion. Eastbound traffic at this point has to overcome a 2.07 per cent grade and until this work was carried out this section was in reality the neck of the bottle in the road's operations.

Bituminous Coal 90 Per Cent of Traffic

The traffic of the Virginian is predominantly bituminous coal, the tonnage of that commodity making up about 90



The Virginian Railway

that the road is hauling in regular service trains of 90 to 100 loaded cars aggregating 8,000 to 9,000 gross tons. The average net tons per train—the figure which includes all freight trains of whatever kind—in 1920, totaled 1,800, the largest for any road in the country. A study of the operations of the Virginian Railway is further of interest because in 1920 the road was one of the few which earned well over its standard return and guaranty. In the first three months of 1921 its net railway operating income exceeded that for the same three months of 1920.

Of Exceptional Engineering Standards

The Virginian Railway was built by H. H. Rogers of the Standard Oil Company who had become financially interested in coal properties in West Virginia, particularly in the neighborhood of Page. Mr. Rogers built a short line to a connection with the Chesapeake & Ohio, but being unable to secure from that carrier a division of the through rates, or a satisfactory outlet over the Norfolk & Western, he conceived the idea of building a line of his own to tide-water. The result was the Virginian Railway. In building this line, Mr. Rogers spared no expense and the final result insofar as the project was carried out before Mr. Rogers' death was a low grade line of exceptional engineering standards. Unfortunately Mr. Rogers died before the road was

per cent of the road's total tonnage. In 1920 the proportion was 92 per cent. This coal all moves eastward, about 80 per cent of the total being dumped at tide-water. The coal is secured on the main line and branches which constitute what the Virginian terms its Deepwater district. The Virginian's lines reach a few mines in the Pocahontas coal fields, but, as will be seen from the map, by far the larger part of the tonnage is secured in the New River fields. This New River coal moves to tide-water under a rate of \$2.80; the average haul is 410 miles.

The coal territory is adjacent to the New River fields served by the Chesapeake & Ohio, and in fact a larger number of mines are served by both roads through trackage agreements which permit mines to ship over either road. New River coal is a low volatile steam coal. Until the last few years the demand for it was for bunker coal and for coastwise movement to industries in New England, etc. During the war large quantities of the better grades were supplied to the United States Navy. With the elimination of British coal during the war and the subsequent disorganization of the British coal mining industry, there arose a great demand for this coal for export with the result that the coal business in the Virginian's territory has increased by leaps and bounds. The prospects of the British coal now are rather problematical, but it is probable that the

growth of American export business will be continued, in which case except for uncertain periods, like the present, the Virginian's traffic will continue to expand in large proportions. In 1920, the road handled 7,621,555 tons, representing an increase of 32 per cent over 1919. This coal was supplied by 103 mines, of which 73 are on lines owned by the Virginian and the remainder on the lines of the Chesapeake & Ohio, or on the Kanawha, Glen Jean & Eastern, a coal property.

The rapid expansion of the Virginian's coal business can best be shown by the following figures:

Year	Total tonnage all freight	Coal tonnage	Coal dumped at tide-water
1911	2,713,135*	2,141,009*	2,012,445
1912	3,614,011*	3,103,309*	2,474,052
1913	4,410,622*	3,775,423*	3,283,667
1914	4,776,663	4,122,987*	2,841,433
1915	4,088,609*	3,603,390*	.....
1915	4,415,952	3,890,565	3,116,903
1916	6,093,013	5,509,798	4,366,243
1917	7,096,532	6,398,836	4,429,296
1918	6,866,089	6,279,289	4,220,778
1919	5,983,824	5,463,321	3,618,432
1920	.....	7,621,555	5,497,131

*Years ended June 30.

The Virginian is the third carrier, in point of coal business handled, in the Pocahontas district. The figures given above indicate that it is more than holding its own in this rapidly growing group and show what may be expected of the road in years to come.

The Virginian's Equipment

Inasmuch as bituminous coal constitutes so large a percentage of the total tonnage of the Virginian Railway, it is, of course, natural that its operations should be characterized by heavy train loading and by the features in general peculiar to handling traffic of this kind. It is next in order to see why it is that the Virginian is the leader in heavy train loading and how it is that the road is able to make up and handle a record-breaking train of 16,000 gross ton.

It has been noted that the Virginian has on its lines the largest cars and most powerful locomotives in use on any railroad. This equipment is as follows:

FREIGHT CARS			Total capacity, tons
Number in service	Type	Capacity in lb.	
534	Box	80,000	21,360
182	Flat	80,000	7,280
944	Stock	80,000	37,760
148	Hopper	100,000	7,440
2,171	Steel hopper	105,000	113,978
998	Steel hopper	110,000	54,890
2,984	Flat bottom gondola	105,000	150,660
590	Flat bottom gondola	114,000	84,450
983	Flat bottom gondola	218,000	107,147
9,834			560,925

COMPARISON WITH PREVIOUS YEARS		
December 31, 1918	8,896	452,057
December 31, 1919	8,875	451,192
December 31, 1920	9,834	560,925

LOCOMOTIVES				
Number in service	Type	Class	Tractive effort	Total
5	0-8-0	SA	45,200	226,000
6	4-6-0	EA	21,400	128,400
4	4-6-0	TA	30,900	123,600
6	4-6-2	PA	44,300	265,800
1	2-8-0	CA	29,400	29,400
2	2-8-0	CA	29,400	58,800
2	2-8-0	CB	29,400	58,800
1	2-8-0	CC	29,400	29,400
2	2-8-0	CD	29,400	58,800
				979,000
2	2-8-2	MA	45,200	90,400
4	2-8-2	MA	45,200	180,800
42	2-8-2	MB	56,000	2,352,000
18	2-8-2	MC	60,800	1,094,400
4	2-6-0	AA	70,800	283,200
8	2-6-0	AC	90,400	723,200
1	1-8-2	AB	97,400	97,400
6	2-8-0	AD	115,000	690,000
10	2-10-10-2	AE	147,200	1,472,000
20	2-8-2	US	101,300	2,026,000
				9,006,200

144 locomotives Total..... 9,985,200 lb.

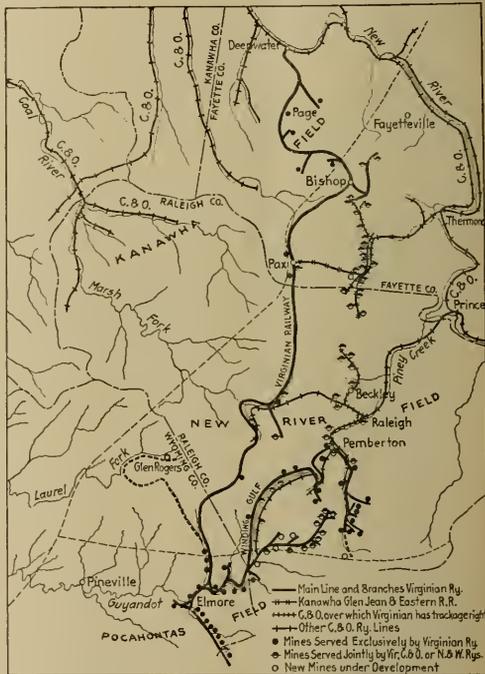
TOTAL LOCOMOTIVE TRACTIVE EFFORT COMPARED WITH PREVIOUS YEARS

December 31, 1918	119	7,859,700
December 31, 1919	139	9,884,790
December 31, 1920	144	9,985,200

Probably the most noteworthy feature of these figures, other than the size of the equipment used, is the great increase which has been made in the total tractive effort of the locomotives and the total carrying capacity of the cars.

Cars Assembled at Elmore, W. Va.

It has been noted that the Virginian secures its coal along the lines in its Deepwater district. As will be seen from the map showing the coal district, all the mines, excepting a very few, lie north of Elmore. The cars of coal are assembled by mine runs and brought into Elmore. The yards at Elmore have a capacity of almost 800 cars, and they serve also as the distributing center for empties returning



The Coal Fields Served by the Virginian

to the mines. From the yards at Elmore the loaded cars must be brought up to Princeton. Between Elmore and Clark's Gap there is a grade against east bound traffic of 2.07 per cent. The usual procedure is to make up trains of about 75 cars handled by an AA, AC or US Mallet with two of the heavy AE or 2-10-10-2 type Mallets cut in the train. These pushers are dropped off at the summit or Clark's Gap whence the single Mallet handles the train to the end of the freight district at Princeton. The AE Mallets are the largest locomotives in service on any railroad. They have a total weight in working order, including engine and tender, of 898,300 lb. Working simple, they have a tractive effort of 176,000 lb. and compound, 147,200 lb. The Virginian owns 10 of them. It was an engine of this type which was used to handle the test train of 16,000 gross tons mentioned as setting a new record in heavy train loading. The 14 miles of 2.07 per cent grade between

Elmore and Clark's Gap was at one time the most difficult obstacle the operations of the Virginian had to overcome. With the larger power in the form of the AE Mallets and the double tracking now nearing completion, the problem is by way of being solved.

The following figures showing the amount of coal moved over Clark's Gap will indicate clearly the results that have been attained:

COAL MINED OVER CLARK'S GAP							
1920				1919			
Month	Trains	Loads	Tons	Leads at mines	Trains	Loads	Tonnage
January	203	11,012	863,114	11,223	137	8,048	636,735
February	159	8,604	674,315	7,845	85	5,167	383,384
March	203	11,996	941,501	12,066	114	6,049	457,018
April	191	11,798	922,507	11,383	86	5,300	396,281
May	135	8,267	640,467	8,287	122	9,006	658,869
June	181	11,069	856,207	11,257	142	10,012	774,197
July	218	13,521	1,056,296	13,492	125	8,985	675,932
August	241	13,457	1,052,667	13,517	152	10,597	827,424
September	217	12,842	1,009,044	12,813	157	10,938	848,489
October	242	13,947	1,095,729	13,361	179	11,749	914,516
November	220	11,640	903,894	12,321	161	9,927	773,693
December	231	10,749	868,133	10,064	160	9,498	745,226
Total	2,441	138,902	10,894,074	137,629	1,620	105,294	8,091,784

The following brings the table up to date and gives some interesting details concerning trainloading in 1921 as compared with 1920:

Month	Trains	Loads	Tons	Loaded in 1921 month, 1920	Average tons per train, 1921	Average tons per train, 1920
January	272	9,852	852,857	11,028	3,135	4,350
February	129	6,617	558,757	6,630	4,331	4,233
March	110	6,712	568,929	6,995	5,177	4,638
April	132	8,153	695,444	8,868	5,268	4,829

Dropping Trains Down 1.5 Per Cent Grade Present Operating Feature

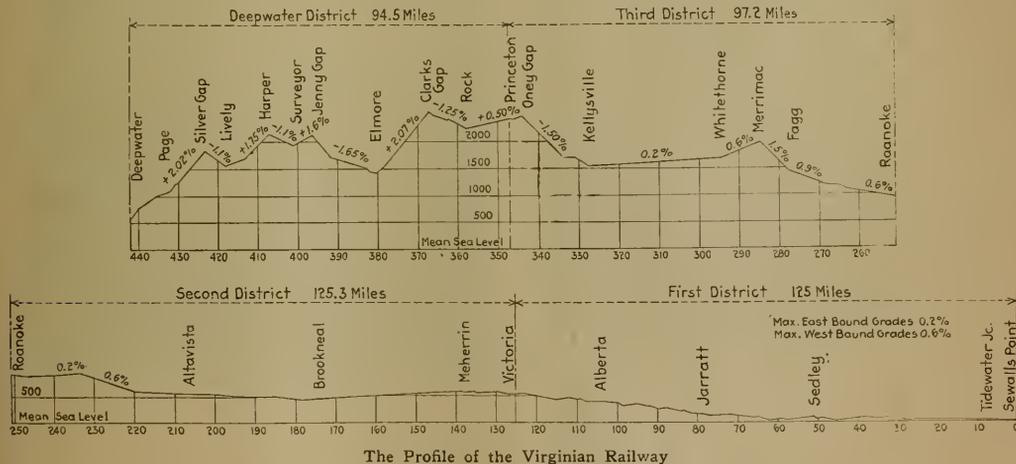
With the difficulties contingent upon the operation of the trains up the Clark's Gap hill nearing solution, the next

solution came about through the use of the empty and load brake, by which as is well understood, the loaded car may be given considerably more braking capacity than when empty. The Virginian has about 2,000 cars equipped with the empty and loaded brake. One thousand of these are hopper cars of 110,000 lb. rated capacity; the other thousand are the new 120-ton gondola cars which have recently been put in service. It was early developed that to secure the required results, it was necessary to put in a train cars with the empty and load brake to the amount of 15 per cent of the total train—in other words, 15 cars in a total of 100. At first it was thought necessary to keep the empty and load brake cars at the front of the train. This was later found to be unnecessary, so they are now distributed throughout the train as they happen to come, the only requirement being to get the 15 per cent empty and load brake cars.

A Train of 16,000 Gross Tons

The impressive run—the peak of heavy train operation on any railroad—which was made on the Third district of the Virginian on Wednesday, May 25, presumably sets a record in heavy train loading which will not be again reached for some time. On that day a train of 100 of the new 120-ton gondola cars, each loaded to its full capacity, making an aggregate train load of approximately 16,000 gross tons, was successfully handled both on the heavy grades and on the comparatively level sections between Princeton and Roanoke. This train was handled with one of the Virginian, Class 800, AE 2-10-10-2 Mallet locomotives at the head end. Pushers were used in starting the train and on the grade between Rich Creek and Merrimac, as noted in a following paragraph.

The distance from Princeton to Roanoke is 97.2 miles. Train operation over this district, as has been noted, is down



problem that had to be attacked was that of dropping the trains from Princeton east. Beginning at a point a short distance east of Princeton, there is a descending grade of 1.5 per cent down to Kellysville, 12 miles from Princeton. Between Princeton and Roanoke—the third district 97 miles in length—the coal trains are operated in 80 to 100 car-lengths, their tonnage averaging from 8,000 to 9,000 tons depending upon the size of the cars making up the train. To handle trains of this size with one locomotive down a 10 or 12 mile descending grade of 1.5 per cent was not a thing that could be worked out in a day. Naturally, the problem was one of securing proper braking capacity; its

a descending grade beginning a short distance out of Princeton and extending to Kellysville, 12 miles east of Princeton, the grade being of 1.5 per cent. The successful operation of the train down this grade was the real test which the train had to meet. From Rich Creek east of Kellysville there is an ascending grade of 0.2 per cent which presents no particular difficulty. Between Whittherhorne and Merrimac an ascending grade of 0.6 per cent is encountered and in regular operation, as in the case of the test train, pushers are used. Beyond Merrimac, there is a short descending grade of 1.5 per cent, followed by descending grades of 0.9 per cent and of 0.6 per cent into Roanoke.

Test Demonstrates Train Load Limit Not Yet Reached

The project of handling this long and heavy train over this particular district was undertaken with the idea of demonstrating that the limit for train loading has not yet been reached and also to observe, in actual service, the new Westinghouse empty and load brake with which the cars are equipped. During the run to Roanoke, records of the brake performance were made by means of recording instruments on the locomotive, on the fifth car and on an observation car at the rear end of the train. The speed of the train was also shown by speed indicators installed in the observation car.

To start the loaded train at Princeton, three eight-wheel switching locomotives were used as pushers, these being dropped when the train had reached a speed of 12 miles an hour. A 2-8-8-2 Mallet pusher was also used from Rich



A Coal Operation on the Winding Gulf Branch

Creek to Merrimac, over the 0.2 per cent grade to White-thorne and thence up the 0.6 per cent grade from White-thorne to Merrimac. The start at Princeton was made smoothly. The run down the 1.5 per cent grade from Princeton to Kellysville was made at a speed of 20 to 27 miles an hour under control at all times. Due to the long and heavy train it was necessary to put a pusher on at Rich Creek instead of at Whitethorne as is done in normal operation. The pusher was dropped at Merrimac. From Merrimac to Fagg down the short stretch of descending 1.5 per cent grade, the train was handled at a speed of from 20 to 30 miles an hour, and from there on to Kumis and Roanoke at 15 to 20 miles an hour. During the trip the train had two break-intwos due to defective knuckles and to the fact that the engineer was not familiar with so heavy a train.

Before starting on the run to Roanoke a thorough inspection of the train was made and every precaution taken to have the cars and brakes in good condition. In order to insure proper action of the brakes, and also to demonstrate the special features of the empty and load brake to the railroad men and other engineers and observers who were present, a number of standing tests were made in the yard at Princeton. For the purpose of making these standing tests, the train was parted at the middle, the two parts placed on adjacent tracks, and the brake line connected up so that the front and rear ends were brought near together where both the start and finish of the brake action might be observed. These tests included an emergency serial action of the brake which was completed in 7.5 seconds; a quick service serial action in 10.5 seconds; and an emergency action in 7.75 seconds after the completion of a heavy service application. The value of such a brake performance, particularly in the severe service on the Virginian, will at once be apparent to men familiar with train operation. Demonstrations were also made of the operation of the take-up

cylinders; the operation of the brake under both empty and load conditions; and the automatic return from load to empty position.

On Thursday, May 26, a train of seventy-five empty 120-ton gondolas was hauled up the grades from Roanoke to Princeton. During this run tests were made of the empty and load brakes in order to demonstrate the practical elimination of shocks during heavy service and full emergency applications.

The train was hauled by a 2-10-10-2 Mallet to Rich Creek. A full service stop was made west of Salem (about 8 miles west of Roanoke) from a speed of 18 miles an hour in 38 seconds with a brake pipe reduction of 12 lb. A full emergency stop was made on the grade near Eggleston (about 55 miles west of Roanoke and 22.6 miles east of Rich Creek) in 18 seconds from a speed of 20 miles an hour with the brakes in the light capacity position.

On Friday, May 27 (today), it is intended to take another heavy train over the line from Princeton to Roanoke. On this run more complete records will be made of the application of the brakes. The data thus obtained will be the basis of an exhaustive study of the problem of braking extremely heavy trains on severe grades and the handling of practically empty trains of about one-third the tonnage in the opposite direction—a condition which prevails on the Virginian Railway. Tests are to be made of the reserve capacity of the brake which is designed to compensate for losses due to air leakage on individual cars even though the leakage might exceed the capacity of the air compressors. For this test, air leakage will be purposely caused on a number of cars. Emergency applications will be made and also emergency application after a heavy service application.

The records for the entire four days' test will be compiled by the engineers in charge and will be available at an early date.

Some 150 railway officers and supply men were present at the tests. The party was in charge of R. C. Cusick, of



One of the Mines on the Virginian Railway

the Westinghouse Air Brake Company, and the members of it were the guests of the Westinghouse Air Brake Company under the auspices of which company and the Virginian Railway, the unusual tests were conducted.

Big Cars Not Run in Solid Trains

The Norfolk & Western in using its large 100-ton cars runs them in solid trains. This the Virginian does not do. The test train of 16,000 tons, however, was a solid train of 100, 120-ton cars, which explains why it is that it totaled 16,000 tons, while the 100-car trains run in regular operation total from 8,000 to 9,000 tons.

Between Princeton and Roanoke, the trains are handled by a U. S. Mallet of the 2-8-8-2 type and of a tractive effort of 101,300 lb. Other than the complication accom-

panying the handling of the trains down the grade to Kellysville, there is no other difficulty met with, other than the fact that a pusher—an MC heavy Mikado, is used on the 10-mile 0.6 per cent grade between Whitethorne and Merri-
 mac.

From Roanoke east over the Second and First districts, there are no complications to operation, the maximum east bound grades being out 0.2 per cent and the descending

become or how great strides it was to make in the way of heavier and larger trains. These aspects are shown by the fact that a large number of the sidings are not long enough to hold the heavy trains. The method adopted, therefore, is for the loaded trains to keep the main line at all times. Trains of empties, and such few passenger trains as are run, take the siding and the heavy trains are run around them. Another difficulty the Virginian has to contend with is maintenance, the heavy locomotives and cars being especially hard on track. The rail now being put in track is of 100 lb. weight, although some 130 lb. rail has been laid, more particularly on the hill up to Clark's Gap. A considerable amount of 85 lb. rail is still in use. The road is rock ballasted practically throughout; the plates are used on curves only. With all the care that is taken derailments occur occasionally and in all fairness, it must be said that they are a potential handicap which is always present.

The Facilities at Tide-Water

In 1920 the Virginian dumped at its tide-water pier at Sewalls Point on Hampton Roads a total of 5,497,131 tons



There Are Two Car Dumping Machines at Sewalls Point Pier. This Tandem Dumper Handles in One Operation Two 55-Ton Cars or One 120-Ton Car

grades 0.6 per cent. The MC Mikados are used between Roanoke and Victoria and MB and MC Mikados east from Victoria.

41.6 Miles Per Car Per Day in 1920

The most interesting feature of the Virginian's operations that we have yet to discuss is the operation of the Sewalls Point pier, the tide-water terminal at Norfolk or Hampton Roads. Before discussing that facility, it may be interesting to note one of the other features of the Virginian's operations that gives it another reason to stand out as an exceptional road. In 1920, the Virginian moved its cars on the average of 41.6 miles per day. During April, 1920, its best month, the car miles per day of coal cars was 61.9 and of all cars 48.1. With its heavy car loading averaging 53.4 tons per loaded car, it is not surprising that in the twelve months of 1920 a figure should have been reached of 1,152 net ton miles per car per day.

A great deal might be said of the engineering standards of the Virginian Railway. That feature of the Virginian is, however, well known and comments concerning it have appeared in these pages from time to time. The road was built with more than ordinary foresight. Other than its low grades, it is characterized by bridges built in many places for double track over which but one track has been laid, and over which the other track may not be laid for some time. Nevertheless, the builders, even with all their foresight, did not foresee how important a carrier their road was to



The Elevator Which Carries the Heavy 120-Ton Tractor Cars to the Top of the Pier. The Inclined Track to the Left Is the Barney Incline Used by the 60-Ton Tractor Cars; the Center Track Is That by Which the Tractor Cars Return to the Foot of the Pier

of coal, or a million tons more than was dumped in the best previous year, 1917. The best month in 1920 was October, when 581,968 tons of coal were handled. The pier, when working at its capacity, can dump 90 cars an hour. The best record it has ever made for a single day is 675 cars; an average day's dumping approximates 475 cars. One of the performances to which the road points with particular pride is that of having put on the U. S. Collier Orien, 10,000 tons of cargo coal and 250 tons of bunker coal in 6 hours and 15 minutes, the loading going on simultaneously with that of other ships.

The fact, mentioned above, that approximately 80 per cent of the coal handled over the Virginian is dumped at

tide-water, shows how important is the Sewalls Point coal pier in the efficient operation of the railroad. The coal pier when it was built was of the most modern type yet constructed up to that time. It has since been considerably increased in capacity and through the improvements that were made is still one of the leaders among facilities of its kind.

The pier is of steel construction and is electrically operated. As built originally, it had a car dumper of sufficient capacity to handle 55-ton cars. The road cars were classified and brought forward as needed into a storage yard known by the name of a "barney" yard built on an incline descending towards the pier. When a car was to be dumped it was dropped down by gravity to the pier and pulled up onto the dumping machine by a barney and cable. It was then turned over on the dumping machine, the coal falling into a 60-ton self-propelled electric tractor car, whereupon the empty car was kicked off the dumping machine by the following car, run upon a kick back and then moved by gravity down to the tracks for empties. The tractor car was then run over the scales, propelled to the top of the pier by a barney and then proceeded forward under its own power to the place on either side of the pier where it was to be dumped. The car had two hoppers which were dumped by air. The coal fell into the desired hopper on the pier and thence down the chute into the hold of the ship. The empty tractor then proceeded to the end of the pier and ran by gravity down a track in the center of the pier back to its starting point. With this method of operation, about 30 cars could be dumped an hour when the pier was worked to its capacity.

A Tandem Dumper of 120-Ton Capacity

The addition in capacity included the installation of an additional car dumping machine of 120-ton capacity. This machine operates similarly to the original one which it supplemented, except that it handles at one time two 55-ton cars or one of the new 120-ton capacity cars. New electric tractor cars were added, these being of 120-ton capacity. They have three hoppers instead of two and are carried to the top of the pier, not by a barney arrangement, but by an elevator. They are dumped in the same way as the 60-ton cars and are returned to the foot of the pier down the same inclined track as before. To facilitate their operation down this track, they are equipped with dynamic brakes. This new dumper can handle in one hour, when working at capacity, 60 of the 55-ton cars or a proportionate number of the 120-ton cars. With both dumpers working together, this gives us our capacity of 90 cars dumped in one hour. Twelve of the electric tractor cars are used, six of 120-ton capacity for the tandem dumping machine and six of 60-ton capacity for the single dumper.

The Virginian has at Sewalls Point a classification yard holding about 2,100 cars. Cars are classified into 12 classifications, 6 of these being pool classifications, and 6 other. The Virginian has the usual arrangement for pooling coal which is typical of the tide-water coal piers at Hampton Roads or at Baltimore. About 90 per cent of the coal handled is pool coal and coal for the two more important pools predominates. The usual procedure is for the coal to be brought forward to the barney yard as wanted, that yard holding about 90 cars. Under the present scheme of operation, the coal is weighed in the road cars instead of in the tractor cars as formerly, the car running over a 90-ton scale on its way from the barney yard to the foot of the barney incline up to the dumping machine. Inasmuch as the amount of work done is dependent upon the speed of the dumping machines, it is highly essential that these be in the hands of expert operators. Another feature of the operation of the pier is the extremely skilful manner in which the car riders spot their cars; operation is further assisted by what is termed a disappearing barney, this being a con-

trivance whereby the barney when about half way down on its return trip is dropped to a lower track than that on which it runs up the incline. Something should be said also of the skill of the motormen on the tractor cars and concerning the men who operate the hoppers and chutes of the pier itself.

It is interesting to examine some of the figures relative to the operation of the pier. It has already been noted



The 120-Ton Tractor Cars Used with the Tandem Dumping Machine at the Sewalls Point Pier

that the total dumpings in 1920 were 5,497,131 tons. This figure represented 25.5 per cent of all the dumpings at Hampton Roads, the totals for 1919 and 1920 having been as follows:

Road	1920		1919	
	Tons	Per cent	Tons	Per cent
Norfolk & Western	8,807,803	40.8	5,735,095	44.9
Chesapeake & Ohio	7,264,390	33.7	3,430,626	26.8
Virginian	5,497,131	25.5	3,618,432	28.3
Total	21,569,324	100	12,784,153	100

The largest dumpings for any month in 1920 were in October when 581,968 tons were dumped. The following figures will show how this coal was divided between bunkers, coastwise and export, and the comparison with the same month in previous years will be of special interest as pointing out the great increase in coal for export:

	DUMPINGS AT SEWALLS POINT, MONTH OF OCTOBER		
	1920	1919	1918
Coastwise cargo	112,733	110,249	194,987
Coastwise bunkers	3,117	7,476	6,908
Foreign cargo	385,432	267,772	41,903
Foreign bunkers	61,499	31,394	4,286
Total, including government coal and coal for inside capes	581,968	449,800	316,852

Other interesting figures showing the performance of the pier in October, 1920, the pier's best month and in April, 1921, the most recent month for which figures are available, are given as follows:

	TOTALS FOR MONTH		
	October, 1920	April, 1921	
Cars dumped	11,746	5,598	
Average net tons per car	55.5	64.7	
Gross tons dumped	581,968	323,490	
Percentage of all coal dumped at Hampton Roads	27.8	23.8	
AVERAGES PER DAY			
Cars dumped	430	215.3	
Tons dumped	21,292	12,441	
Average cars dumped per hour	18.7	19.2	
Average tons dumped per hour	925.7	1,110	

These figures for the two months selected are, of course, not strictly comparable because of the difference in the amount of the business handled. However, the increase in the average net tons per car dumped in April, 1921, over that for October, 1920, is especially noticeable. It should be further noted that the daily averages for April, 1921, given in the lower part of the table are affected by the fact that in that month, the pier was operated only 26 days, 14 days of which were on but one shift.

English Railway Bill Proposes Many Changes

Roads to Be Returned to Owners in August—Wholesale Consolidations Planned

LONDON.

COMPULSORY CONSOLIDATION of the railways of Great Britain into six large groups and the establishment of tribunals to deal with rates and wages are provided for in the government's bill to govern the conditions of the return of the roads to their owners which is to take place on August 14. The bill was introduced in Parliament by Sir Eric Geddes, Minister of Transport, on May 12, several weeks after the railway unions had presented a bill providing for government ownership and operation of the carriers. In view of the early date when government operation, under existing law, is to terminate, considerable irritation had been manifest in many quarters at the government's delay in bringing out its bill. The bill is divided into six parts dealing respectively with reorganization and consolidation, regulation, rates, wages and working conditions, light railways and general items.

Wholesale Consolidations Proposed

The railways, exclusive of the underground or subway systems in and about London which are not considered in this bill, are to be divided into six distinct groups as follows:

1. Southern Group—London & South Western; London, Brighton & South Coast; South Eastern; London, Chatham & Dover.
2. Western Group—Great Western.
3. North Western and Midland Group—London & North Western; Midland; Lancashire & Yorkshire; North Staffordshire; Furness.
4. North Eastern and Eastern Group—North Eastern; Great Central; Great Eastern; Great Northern; Hull & Barnsley.
5. West Scottish Group—Caledonian; Glasgow & South Western; Highland.
6. East Scottish Group—North British; Great North of Scotland.

These groups which are to be formed on a regional basis are non-competitive, differing widely from the plan of the Transportation Act in the United States, which provides for combination into competing systems. The purpose of the consolidation, according to the bill, is the "reorganization and more efficient and economical working of the railway system of Great Britain." The principal railway companies in each group mentioned above are to be amalgamated into a single company. Other less important companies are to be absorbed in a manner provided by the act.

The consolidations are compulsory except that the bill provides for a variation in the grouping outlined, provided it is promulgated on or before June 30, 1922, and is approved by the Minister of Transport and by a resolution passed by both houses of Parliament.

The constituent companies in each group are permitted to submit to the Minister a plan of amalgamation, in accordance with the provisions of the act, for his approval and for the approval of an Amalgamation Tribunal, consisting of Sir Henry Babington Smith, Sir William Pender and G. J. Talbot, on or before June 30, 1922. If such a plan is not presented or approved by that date, the Amalgamation Tribunal is to proceed with the formation of the groups which are provided for in the act. These amalgamations are to become operative January 1, 1923, unless otherwise directed by the Amalgamation Tribunal.

Shippers to Share in Management

The boards of directors for the amalgamated companies are, for the first year, to be elected from the boards of the constituent companies, the total number of directors on each

board not to exceed 21 members. After the first year a board of 21 members for each group will be elected by the shareholders. Four members of this board are to be important shippers in the amalgamated company's territory. Employees are not, as had been expected in some quarters, to have places on these boards. Each member of the board will serve for three years with the exception of the first board elected, of which one-third of the membership will serve one year and one-third for two years, such members to be selected by lot.

Officers and employees displaced or otherwise affected as a result of the amalgamation are to be reimbursed by the amalgamated companies with rights to appeal to a standing arbitrator or board of arbitration appointed by the Lord Chancellor, this arbitrator or board having the power to award damages to be paid by the amalgamated company.

The major constituent companies of the various groups are to prepare plans for the absorption of the smaller railways in their respective groups. Such plans are subject to the approval of the Ministry of Transport and the Amalgamation Tribunal on or before June 30, 1922, in default of which the Tribunal will order the absorptions as it sees fit.

The Amalgamation Tribunal is to hold office until all matters under its jurisdiction are settled. This Tribunal may, and if so required by the Court of Appeal, must state in the form of a special case for determination by the Court of Appeal (the decision of which shall be final) any question of law which may arise before it. The Tribunal has the power to call and examine witnesses under oath and to demand the production of documents. The expenses of the Tribunal are to be met by the Minister of Transport but are to be repaid with interest by the amalgamated companies after they are formed.

Payment of Claims

The Bill provides that a total of \$291,600,000 shall be set aside by the government for the payment of all claims by the railways which obtain at the end of the period of control, of which one-half will be available December 31, 1921, and the other half a year later. This sum will be distributed among the railway companies in accordance with a plan agreed to by themselves. In case of no such agreement the Amalgamation Tribunal shall decide upon the proportionate distribution. Out of the first \$145,800,000, \$121,500,000 is to be set aside for distribution among the railways in proportion to their net earnings for 1913, and the remaining \$24,300,000 for distribution in payment of claims for compensation for any abnormal increase in the ratio of operating expenses over revenues for the period commencing August 15, 1921, and ending December 31, 1921, as compared with the ratio of operating expenses over revenues for the year 1913.

Of the remaining \$145,800,000, a sum of \$121,500,000 will be available for payment to the railways which on August 15, 1921, are in arrears in maintenance and replacements, in ratio to the extent to which they are so in arrears. The balance, \$24,300,000, will be distributed similarly as the previous sum of like amount, but for the period of the year 1922.

Regulation of the Railways

The bill gives the Railway and Canal Commission or the Minister of Transport authority to require any railway company to afford reasonable railway services, facilities and con-

veniences which is proved to be necessary, unless the railway company can prove that any such undertakings would affect prejudicially the interest of the stockholders.

The Minister is to have the authority to require any or all railways to conform gradually to general standardization of way, plant and equipment, and to adopt plans for the co-operative use of rolling stock, shops and other facilities; unless the railway companies affected can prove to the satisfaction of the Railway and Canal Commission that the order is such that the capital expenditure involved would prejudicially affect the stockholders' interest. Existing leases or working agreements may be continued with the approval of the Minister, and all future agreements of this nature must receive this sanction.

Regulation of Rates

Rates are to be provided which yield the aggregate net revenue for 1913, plus a sum equal to 5 per cent on capital expenditures made by the railway during government control, plus a reasonable allowance for capital expenditures on revenue producing improvements (not to be less than £100,000 for any individual improvement) which at the beginning of 1913 had not become fully remunerative.

Authority over rates is vested in a Railway Rates Tribunal, consisting of three permanent members. The three permanent members, who are to hold office not more than seven years, are to be appointed by the King on the joint recommendation of the Lord Chancellor, the President of the Board of Trade and the Minister of Transport. The chairman of this Tribunal is to be a railroad man, one of the members a lawyer and the other a business man. The salaries of the members of this Tribunal and its employees are to be determined by the Minister of Transport and paid by the government, which is to be reimbursed therefor by the railways in a proportion to be determined by the Tribunal.

In order to secure a larger Tribunal when occasion may require, two panels, one made up of 12 shippers appointed by the president of the Board of Trade and another, consisting of 12 members representing the railways and appointed by the Minister of Transport after consultation with the Railway Companies' Association, are provided. When the Minister desires to add to the Rates Tribunal temporarily, he is given authority to select two, one from each panel.

The Rates Tribunal is to have power—

(i) to prescribe in relation to the carriage of passengers and merchandise by railway—

(a) The rates applicable to the carriage of merchandise and the conditions under which those rates shall apply;

(b) The conditions under which exceptional rates may be charged;

(c) The charges to be made as station and service terminals and the accommodation and services to be included in those charges;

(d) The fares for the conveyance of passengers and their luggage and the articles and things that may be conveyed as passengers' luggage;

(e) The conditions under which fares less than the standard fares may be charged;

(f) The conditions (other than those relating to dangerous goods) upon which merchandise shall be carried by railway;

(ii) to determine any questions that may be brought before them in regard to the following matters:

(a) The alteration of the classification of any article, or the classification of any article not at the time classified.

(b) The alteration of any standard charge;

(c) The granting variation or cancellation of any exceptional rate;

(d) The disintegration of any exceptional rate;

(e) The institution of new or the modification or cancellation of existing group rates;

(f) The variation of any toll payable by a trader (i.e. shipper) or by one railway company to another;

(g) The rebate to be allowed when any terminal services are not performed;

(h) The alteration of any terms and conditions which they may have determined or prescribed;

(i) The reasonableness or otherwise of any charge made by a railway company for any services or accommodation for which no authorized charge is applicable;

(j) The reasonableness or otherwise of any conditions as to packing of articles specially liable to damage in transit, or liable to cause damage to other merchandise;

(k) Whether any merchandise is properly included in the category of dangerous goods;

(l) The granting, variation, or cancellation of through rates with power to allow the rate with or without modification either as to amount or as to terms and conditions;

(m) The apportionment between the railway companies concerned of any through rate.

An entire new classification of freight is now being developed by the Rates Advisory Committee appointed under the Ministry of Transport Act, 1919. This is to be incorporated into the present bill and the constituent companies of each group must put forward before December 31, 1921, standard rates under this classification for their own particular group, for the approval of the Rates Tribunal. The Rates Tribunal is to determine after hearings just what the standard rates shall be for each individual group. No deviation from these standard rates will be permitted except:

(o) Where an exceptional rate has been granted.

(b) Where a special rate is granted for a special and non-recurrent purpose.

(c) Where in the case of two railways connecting the same places the route by the one railway is longer than the route by the other, in which case the company owning the longer route may charge the rate applicable to the shorter route.

(d) Where in the case of fares, fares lower than the standard fares are adopted under conditions prescribed by the Rates Tribunal.

The bill provides for a revision of these standard rates with the approval of the Rates Tribunal.

The bill further provides that the Rates Tribunal shall review the standard and exceptional rates yearly. If it is found that any company is earning in excess of its standard return and it is, furthermore, deemed advisable by the Rates Tribunal, the rates will be reduced so as to absorb 80 per cent of the excess of the net revenue earned during the year reviewed.

Wages and Conditions of Service

For the settlement of labor disputes the bill provides a Central Wages Board and a National Wages Board, the latter to consider appeals from the former. Councils are to be provided on each railway composed of officers of the railways and representatives of the employees. The constitution and functions of these councils are to be agreed upon by a committee consisting of six representatives from the railways and six from the various railway unions.

The Central Wages Board is to consist of five representatives of the railway companies, three representatives of the National Union of Railwaymen, and two representatives of the Associated Society of Locomotive Engineers and Firemen and the National Wages Board is to be made up of four representatives of the railway companies, four representatives of the two unions above-mentioned, and four representatives of the users of railways.

Further Powers of the Minister of Transport

The Minister of Transport is to be given authority over the light railways of the realm which has heretofore been vested in the Light Railway Commission. Furthermore, the Minister is empowered to prescribe forms and methods by which the railways are to keep their accounts and statistics.

SAFETY BULLETIN No. 53 of the Delaware & Hudson, reports the number of employees, on duty, killed in 1918 as 40; in 1919 as 18; and in 1920 as 19; and the number per million locomotive miles averaged in the three successive years 2.9; 1.5; 1.4. The numbers injured in the three successive years were 1,615; 920; and 1,815.



The Train Shed for the Boston & Maine Section of the Station Was of an Unusual Construction

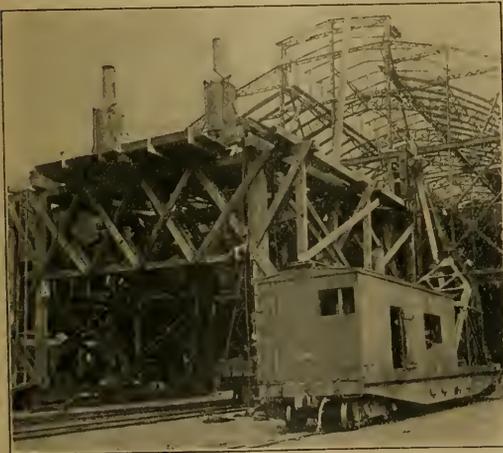
The Passing of an Historic Passenger Train Shed

Structure Over Tracks of North Station, Boston, Removed
After Nearly Fifty Years' Service

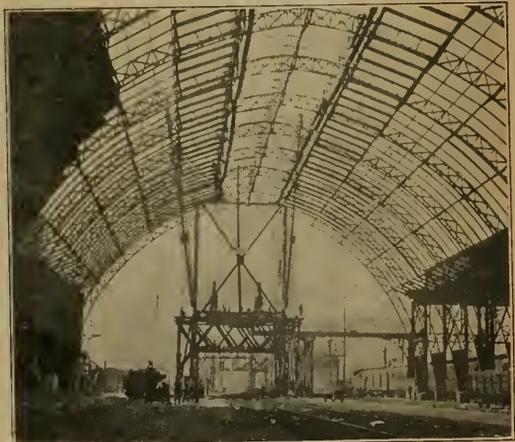
THE RECENT RETIREMENT of the train shed structure over the 23 tracks of North Station, Boston, marked the passing of two noteworthy train sheds. One of these was the arch shed over the six tracks of the original Boston & Lowell station, built in 1872 and one of the first large train

sheds constructed in this country. The other was the shed over the 17-track extension to the original station, built by the Boston & Maine in 1893 and 1894 according to a multiple gable or monitor construction that is unique in American station practice. Loss of metal by corrosion made it necessary to remove these old structures and they have been replaced by platform awnings or sheds of frame construction of the type illustrated in the drawings and photographs. The chief interest lies not in the new structure but in the old ones and the manner of their removal.

The arched roof of the shed was built by the National



Erecting the Traveler Used to Remove the Old Boston & Lowell Train Shed



Under the Old Arch Shed Built in 1872

sheds constructed in this country. The other was the shed over the 17-track extension to the original station, built by the Boston & Maine in 1893 and 1894 according to a multiple gable or monitor construction that is unique in American station practice. Loss of metal by corrosion made it necessary to remove these old structures and they have been replaced by platform awnings or sheds of frame construction of the type illustrated in the drawings and photographs. The chief interest lies not in the new structure but in the old ones and the manner of their removal.

Bridge & Iron Works of Boston, Mass., and erected in 1872. There were at that time no published methods of computing the stresses in parallel braced arches and the contractors deduced the probable weight of material necessary for these arches from illustrations of the St. Pancras arched roof train shed which had been recently built in London. The braced

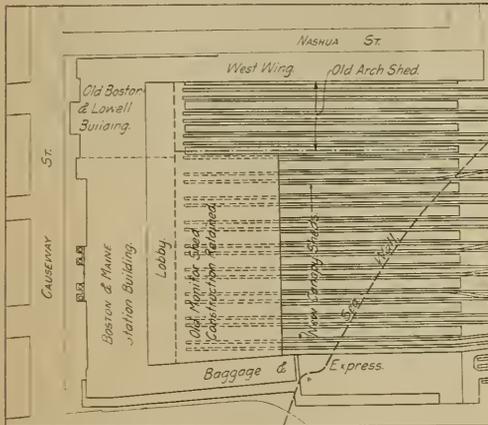
arches for the (old) Grand Central train shed in New York City were in process of erection before erection was begun upon the Lowell railroad train shed, but no information or advice as to computing the stresses could be obtained from the engineers of the New York Central. The graphical system of plotting the stresses in open truss work had not

10,000 lb. per sq. in. and in compression considerably less. The iron used was asserted to have a tensile strength of from 48,000 to 50,000 lb. per sq. in. and the arches weighed about $13\frac{1}{2}$ tons each."

Original Structure Extended in 1893

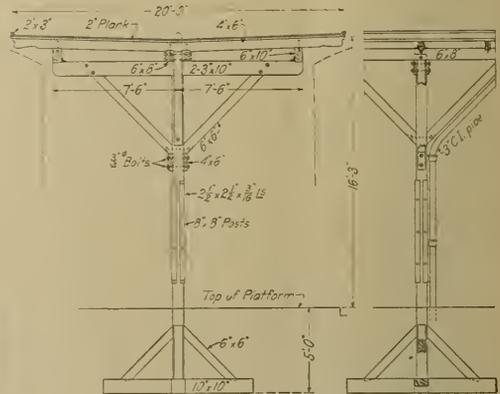
In 1893 the Boston & Maine built a new station building beside the old Boston & Lowell terminal, making such minor modifications in the old station as were required to permit of the use of the combined facilities as a single terminal which has long been known as the North Station. With the completion of this addition, the combined shed substructure was 472 ft. wide by 540 ft. long and covered 23 tracks, with a capacity of 184 cars (of the sizes prevailing in 1893). The train shed built at that time was of an entirely different construction than the old arch shed, consisting of nine spans of roof trusses, each covering two tracks except the one adjacent to the old shed which covered only one track. The roof trusses were supported on posts set in the center of each platform, making a spacing of 39 ft. transversely and 32 ft. longitudinally.

Photographs of the interior of this train shed appearing in the Railroad Gazette of May 25, 1894, showed that this

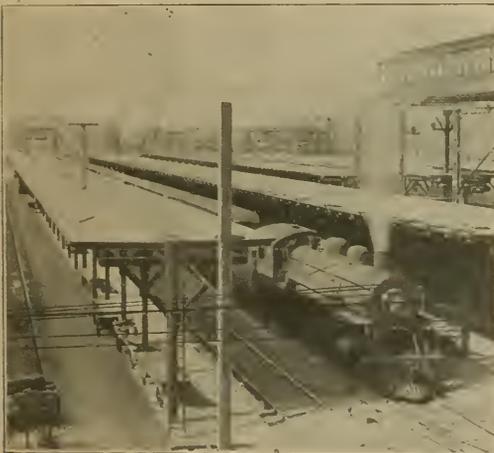


Plan of North Station, Boston, As Now Arranged. The Old Sheds Covered All of the Area Now Occupied by the Canopy Sheds

then been practically developed and a study was made by the use of a catenary chain distorted by weights hung over sheaves with all possible friction eliminated. The calculations were all based upon the braced arches extending to the



Details of the New Canopy Sheds



Type of New Canopies Built. A Portion of the Old Monitor Shed at the Right

shed was of a gable roof construction with a very large proportion of the roof area in glass (reported to aggregate a total of four acres). This design was modified subsequently so that at the time that the structure was wrecked it consisted of a series of longitudinal monitors with flat roofs, the glass area being restricted to the vertical walls of the monitors. This is shown clearly in one of the photographs.

Problem in Removal of Large Arches

The recent alterations included the removal of all of the old arch shed except the three ribs nearest the headhouse and over the concourse, since the metal in these ribs was still in fairly good condition. In the case of the monitor type shed the removal was carried back to the last seven panels nearest the headhouse. These were also in good condition, owing no doubt to the fact that the tracks under this shed are used primarily for outgoing trains so that ordinarily the locomotives stood only under the outer end of this shed.

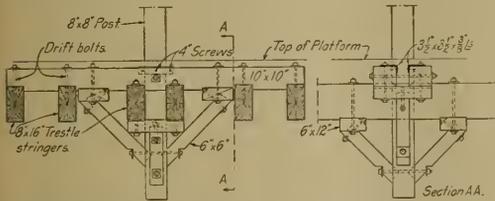
The wrecking of the old arches was undertaken first and represented the most difficult feature of the project, particularly because it was necessary to keep the tracks in this shed clear for use during the morning and evening rush hours each week day. Because of this demand on the use of the tracks under this shed, the wrecking operations were re-

foundation. The foundations of the arches were not calculated to resist the thrust at the bottom of the arches and an iron rod of sufficient size was carried under ground from one arch foot to the opposite foot. The material used was wrought iron of the strength of which no test can be recalled, but the stress in tension allowed under the calculation was

stricted to the hours between 9 a. m. and 4 p. m. on week days and to regular working hours on Sundays when all six tracks could be released from station service.

The work was carried out with the aid of a special traveler designed to stand astride of the two center tracks and capable of being moved longitudinally on rollers and skids on the two adjoining platforms. This traveler supported a pair of stiff leg derricks on a platform 30 ft. above the track level and since these derricks had masts 40 ft. high and booms 70 ft. long, the ends of the derrick booms reached well above the top of the shed. After being relieved of the roofing and purlins and bracing, each arch rib was cut apart at the crown and at the haunches while each half was being supported by one of the derricks and as soon as the cutting had been completed, each derrick lifted down its portion of the rib. After the arches were taken away the lower portions of the ribs or uprights were removed by a bridge derrick car standing on the outer tracks.

The removal of these column portions of the arch ribs introduced one complication along the west side of the train shed owing to the fact that the west wing of the station, which was built after the arch shed had been erected, was supported in part by these columns. As a consequence, the



Method of Supporting the Canopy Posts Where the Platforms Are on the Trestle

east wall of this wing had to be largely rebuilt, providing supporting columns to take the place of the old columns removed. In addition the wall had to be remodeled so that it would support a canopy that was cantilevered from the side of this building as a shelter for the platform adjacent to track No. 23.

Owing to the fact that three arch ribs left standing adjacent to the headhouse extend to such a great height as compared with the new platform canopies, the great open space at the ends of the outer arch left the train concourse at the head of the platforms particularly exposed to driving rain or drifting snow from the west. Consequently, it was found necessary to cover the concourse with a continuous wooden shed designed to make suitable juncture with the canopies.

The removal of the trusses of the monitor sheds was less difficult. The two tracks under one span of this construction were released to the wrecking work at a time and a derrick car occupying one of these tracks lifted off the roofing construction and removed the trusses in turn.

Portion of the Train Sheds Over Pile Trestles

The construction of the new platform canopy offered no particular problem, except over that portion of the station where the tracks and platforms are supported on pile trestles over the waters of the Charles river. Here the posts supporting the canopy are carried by a pair of 8-in. by 16-in. stringers, forming a part of the trestle deck, but with the posts extending below the stringers for a distance of about three feet so that they could be adequately knee braced on the underside to secure the required stability.

The wrecking of the old structure and the construction of the new sheds were under the general direction of A. B. Corthell, chief engineer of the Boston & Maine, Boston,

Mass., F. C. Shepherd, assistant chief engineer and B. W. Guppy, engineer of structures. G. L. Huckins, construction engineer, was in direct charge of the work, which was done under contract by the Boston Bridge Company.

Short Lines to Ask Court to Determine Status

WASHINGTON, D. C.

THE AMERICAN SHORT LINE RAILROAD ASSOCIATION is planning to go to the Court of Claims for the purpose of obtaining a decision as to whether the short lines relinquished by the Railroad Administration just prior to July 1, 1918, were or were not under federal control for the first six months of 1918. This was decided upon at the annual meeting of the association in Washington on May 19 after the members of the executive committee had held a conference with Director General Davis of the Railroad Administration for the purpose of determining their status. L. S. Cass, vice-president, who read the report of the committee at the meeting, said that the Interstate Commerce Commission had held that the period during which these roads were to be reimbursed by the government for losses during the period of federal control under Section 204 of the transportation act, was the 20 months' period beginning July 1, 1918, and it had refused to issue certificates covering the first six months of 1919. On the other hand, the Railroad Administration had refused to pay compensation to the roads for the first six months of 1918 on the ground that the roads had never actually been operated by the federal government. Mr. Cass stated that the director general had told the committee that he might lay their position before the President and ask for instructions, but he would prefer to have the organization join the Railroad Administration in going to the Court of Claims and ask for a ruling as to whether the Railroad Administration was responsible for the six months' period. Mr. Cass said that the director general was of the personal opinion that the short lines were under federal control during that time and that they had been discriminated against by the Railroad Administration, but that he desired a definite ruling from the court. The committee seemed to be of the opinion that the present director general intends to give fair treatment to the short lines and that there are reasons for hoping that the situation would be straightened out soon.

A Short Line Purchasing Agency

Action was also taken at the meeting in the direction of establishing a purchasing department of the association to handle purchases for such short lines as desired to take advantage of the opportunity on a co-operative basis. At the last annual meeting the president of the association was authorized to establish such a department, the necessary funds to be provided by borrowing from the general fund of the association. The association, however, did not have sufficient funds available and nothing had been done in that direction. A resolution was adopted authorizing the President to establish a purchasing agency under a plan by which the necessary funds could be contributed by the roads that desired to take advantage of the opportunity and urging the railroads not to make individual purchases until after they had consulted the purchasing agency to ascertain whether it could effect a saving. There was a suggestion that the agency should be created as a joint stock company, the stock of which would be held by individuals or individual members. It was stated that the Interstate Commerce Commission was inclined to regard the present purchasing methods of some of the short lines as extravagant and that it would look with favor upon a plan for effecting economies.

There was a considerable discussion at the meeting of the

serious effect on the traffic of the short lines in many communities and the competition of motor trucks and auto busses handling freight and passengers for hire on highways paralleling the railroads, which are taxed to sustain the highways while the competing motor truck lines are not required to pay adequately for their share of the maintenance of the highways. A resolution was adopted to be put in appropriate language later by the officers of the association, taking the position that automobile transportation for hire should be required to pay an adequate share of the taxes and be subject to some form of regulation which would require them to abide by published tariffs and regular schedules. Another resolution provided for a recommendation on behalf of the association to the Congressional committee having jurisdiction over federal aid to state highway construction that the federal assistance should be rendered only on condition that the users of the highways for the carriage of freight or passengers for hire be required to contribute proportionately.

Accounting Methods

Another point of discussion was the necessity for improvement in the methods of accounting, particularly in view of the necessity for having the accounts in shape to present claims to the Interstate Commerce Commission under Section 204 and in view of the closer scrutiny now being given by the commission to the subject of railroad expenditures. A letter was presented from Commissioner Eastman of the Interstate Commerce Commission, calling attention to the great difficulty experienced by the commission in handling the claims of the short lines because of the fact that so many of them have

A resolution was adopted opposing any general reductions in rates at this time, but expressing the opinion that there ought to be a reasonable readjustment of the existing rate structure after business has increased and the railroads get into a better condition.

The present officers of the association were re-elected, but it was decided to increase the membership of the executive board by adding a new Pacific Coast district and dividing the membership of the board among the four districts, Eastern, Southern, Western and Pacific, in accordance with the grouping used by the Interstate Commerce Commission in the general rate advance case. C. M. Oddie, G. F. Dietrich and D. M. Swobe were elected additional members of the board for the Pacific Coast district.

Freight Car Loading

WASHINGTON, D. C.

Freight car loading showed a good increase during the week ended May 14, according to the weekly report of the Car Service Division of the American Railway Association. The total was 750,158 as compared with 843,145 in 1920 and 739,945 in 1919. This is a gain of 32,000 cars in a week and shows a gain over the corresponding week of 1919 almost for the first time this year. A large part of the gain as compared with the previous week was in the coal loading, which amounted to 161,782 cars.

The summary of the report follows:

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY--ALL DISTRICTS; COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO. FOR WEEK ENDED SATURDAY, MAY 14, 1921

Districts:	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Merchandise L.C.L.	Miscellaneous	Total revenue freight loaded				
										This year	Year ending 1921	Year ending 1920	Year ending 1919	
Eastern	1921	6,098	2,565	42,842	1,113	5,456	2,375	56,472	67,125	184,046				196,600
	1920	4,694	3,184	44,934	2,282	7,736	5,292	32,636	92,173		192,921	185,364		219,777
	1919	2,151	2,548	52,143	2,538	2,143	4,058	33,298	46,799		155,677			96,762
Allegheny	1921	2,106	2,924	49,461	5,209	3,297	6,646	38,785	66,613		175,041	165,703		127,785
	1920	134	76	23,714	53	1,370	19	2,643	5,348		33,357			13,659
	1919	140	96	16,953	700	2,181	333	175	10,290		30,868	33,603		19,570
Peachontas	1921	3,465	1,833	20,013	523	14,491	829	38,906	31,113		111,185			60,454
	1920	2,777	2,311	21,721	129	19,734	2,607	25,465	52,713		127,457	108,531		73,175
	1919	1,465	1,465	16,953	700	2,181	333	175	10,290		30,868	33,603		19,570
Southern	1921	8,353	9,481	14,692	167	4,448	536	30,389	31,335		100,400			48,760
	1920	8,171	11,755	17,546	421	5,127	3,055	22,548	45,156		114,779	92,835		68,846
	1919	4,848	2,155	3,944	134	6,446	750	16,342	23,549		58,168			43,174
Northwestern	1921	3,979	2,437	6,160	171	7,425	717	15,877	25,200		61,966	49,465		51,331
	1920	34,418	25,599	161,782	5,126	49,365	22,806	215,524	235,538		750,158			501,228
	1919	30,710	31,403	163,608	9,899	64,428	51,355	156,128	335,614		843,145			620,196
Central Western	1921	32,004	26,553	165,964		51,660	42,562		421,202			739,945		540,955
	1920	3,708						59,396						118,968
	1919	5,804	1,826		4,773	15,063	28,549		100,076		92,987			118,968
Southwestern	1921	2,414				5,126								620,196
	1920	954	4,182			2,295	19,756		185,664					39,727
	1919													

L.C.L. merchandise loading figures for 1921 and 1920 are not comparable as some roads are not able to separate their L.C.L. freight and miscellaneous of 1920. Add merchandise and miscellaneous columns to get a fair comparison.

	1921	1920	1919	1921	1920	1919	1921	1920	1919	1921	1920	1919	1921	1920	1919
May 7	34,847	27,123	143,323	4,626	48,095	13,041	213,535	233,435	718,025	843,184	753,287	494,405	586,667	549,712	
April 30	34,426	29,909	145,010	4,659	84,554	7,725	213,792	277,922	721,997	800,960	752,362	545,205	554,350		
April 23	32,735	26,602	138,376	4,363	46,711	5,691	211,627	235,010	704,527	717,772	715,042	486,040	425,958		
April 16	33,367	26,530	135,658	4,365	47,909	4,941	214,082	237,944	703,896	601,695	706,012	472,107	317,933		

apparently failed to appreciate the necessity for keeping their accounts in conformity with its regulations. He called attention to the fact that it had been necessary to withdraw the commission's examiners from some of the roads until the accounts could be re-stated in accordance with the regulations, and urged the importance of a reform in the accounting practices of some of the lines, suggesting that they take steps to acquaint themselves with the commission's accounting regulations and particularly those pertaining to the destruction of records. A resolution was adopted under which the president of the association was authorized to take into consideration the establishment of an accounting department of the association to assist the roads.

The freight car surplus for the week ending May 15 was 450,453, a reduction of 21,000 as compared with the previous week. Of the total 170,595 were box cars, or about 4,000 less than for the week of May 8 and 202,348 were coal cars, a decrease of 18,000 in a week.

A total of 309,971 freight cars, or 13.5 per cent of the total, were in bad order on May 1, according to the semi-monthly report of the Car Service Division. Of these 228,219, or 99 per cent, required heavy repairs and 81,752, or 3.6 per cent, required light repairs.

On the same date 18.8 per cent of the locomotives were out of service for repairs requiring over 24 hours and 5.4 per cent for repairs requiring less than 24 hours.

Selection and Maintenance of Office Equipment

Pennsylvania's Methods—Committee Must Pass on All Requisitions—History for Each Device

By D. T. Jones

Assistant to Purchasing Agent, Pennsylvania Railroad, Eastern Region.

WITH THE GREAT INCREASE in the use of mechanical devices in railway offices in recent years adequate supervision over the operation and maintenance of these devices and the intelligent selection of additional equipment of this character have become problems worthy of considerable study on the part of railroad officers. A carefully planned system of choosing, maintaining and supervising the utilization of these machines has been evolved by the Pennsylvania by careful study over a number of years and has been found effective in producing the desired results.

Mechanical devices have been used in the offices of this road for many years. They have assisted the clerical forces in the performance of their work by relieving much of the mental strain and have produced a more efficient and accurate

the purchase price of the equipment will prove to be only the first installment of continued expense.

Committee on Office Mechanical Devices

The nucleus of the Pennsylvania's method of solving this problem is the committee on office mechanical devices. This committee is composed of officers representing the purchasing, accounting and operating departments and all requisitions for new equipment must be approved by it. Every requisition submitted to this committee must bear the signature of the general superintendent, if it comes from an operating office, or from the proper superior officer, if it is from other than an operating office.

Data relative to the need for the equipment must be fur-

PENNSYLVANIA SYSTEM

COMMITTEE ON OFFICE MECHANICAL DEVICES

J. S. Donaldson,
Frank C. Hoff,
D. T. Jones,
Chairman.

GENERAL OFFICE, BROAD STREET STATION,
Philadelphia, Pa.

File 818
Broad 495

Dear Sir:—

In connection with requisition dated

Consignee:

Calling for

Please note numerical numbers under classification listed below— which is a cross reference to enumerated data on the reverse side, which must be submitted in detail prior to Committee action on your request.

- A. Typewriters 1—2—3—4—5—6—7—8—9—10.
- B. Typewriter Adding.... 1—2—3—4—5—6—7—8—9—10—11—12.
- C. Adding—Listing 1—2—3—4—5—6—8—9—11—12.
- D. Calculating 1—2—3—4—5—6—11.
- E. Dictating 1—2—3—5—6—12.
- F. Duplicating 1—2—3—4—5—6—14.
- G. Numbering 1—2—3—5—7—13.
- H. Registering Time 1—2—3—5—14.
- I. Pencil sharpeners..... 1—2—5.
- K. Scales 1—2—5—15.

An early reply will be appreciated, thus assuring prompt attention to your requisition.

Yours truly,
Chairman, Committee.

DETAIL OF DATA TO BE SUBMITTED FOR COMMITTEE CONSIDERATION.

1. Is it additional equipment?
2. a Is it a direct replacement, if so why?
b Is it a re-arrangement to provide additional equipment for some other office? If so outline in detail, basing your answer as applying to the office receiving the additional equipment.
3. Its use: (a) Approximate hours in service daily (b) semi-monthly (c) monthly.
4. Character of work: (a) outline in detail giving samples or quoting form numbers; (b) show volume of each, daily, semi-monthly and monthly.
5. What are conditions in office affected? (a) Is request caused by an increase or a decrease in number of employees? (b) Total number of employees at present. (c) Number of employees using present equipment. (d) Number of employees who will use additional machines. (e) The number of devices similar to one requested.
6. Why is make mentioned preferred to others?
7. Style type preferred.
8. Size carriage; give dimension of largest blank to be used.
9. Do you need any special attachments?
10. For billing, reports or both? If the former, fanfold, single or double?
11. Adding or calculating capacity; number and size of registers desired?
12. Hand or electric? If latter give current and voltage.
13. Is movement to be consecutive, duplicate and repeat or otherwise?
14. Automatic or electric?
15. Standard; mail or parcel post? The former, beam to 4 lbs., the latter spring to 24 lbs.; which is preferred?

Fig. 1—The Form of Questionnaire Sent by the Committee to Offices Ordering Mechanical Devices

service at a decidedly decreased cost. The use of mechanical devices in an office may be compared to the use of automatic signals, instead of hand motion signals, in the movement of trains. They promote safety and accuracy and save valuable time.

On a large railroad any important change in the methods of office work is fairly sure to disarrange the work and call for temporary additional expense and the Pennsylvania is no exception to this general rule. The introduction of mechanical devices has occasioned inconvenience in varying degree, but the final results in each case have been satisfactory. With the value of mechanical devices in office work once established the problem resolves itself into one of determining methods for selecting the most efficient machines to meet the requirements of each particular office and, after the machines are purchased, of supervising the utilization and maintenance of the equipment. Unless due care is taken in these matters

nished in accordance with the inquiry blank shown in Fig. 1, which is required to accompany all requisitions. Whenever necessary, a personal investigation is made by an expert on mechanical devices who makes reports and recommendations, first, as to the necessity of the purchase, and, second, as to what is the most efficient machine, at least cost, which will meet the needs of the office making the request. All requests for trial machines must be submitted to the committee.

Experience has proved that offices making requests for new equipment, or for trials of new equipment without the information which the committee has available, are often at the mercy of manufacturers' representatives who make attractive demonstrations. It is not an uncommon occurrence to have requests made for machines costing several hundred dollars, when a device costing much less is better adapted to the needs of the office.

Requests are often made for the machines of a special type,

posed of to the one who offers to allow the company the highest credit for the used machines.

Repairs

The extent of repairs to machines by the department is limited somewhat by the size of the force and the available facilities. Some of the work done in this department may give a better idea of its effectiveness: Typewriter cylinders are recovered at a cost of 50 cents, representing a considerable saving over the purchase of new cylinders which cost from \$2 to \$3. Broken main frames of typewriters are welded at a total cost of \$7 or \$8 instead of purchasing new ones at a price of \$20 or \$25 each. At least 80 per cent of the cost of overhauling and repairing this equipment is a labor charge, and the greater part of the work of dismantling, cleaning and assembling does not require great mechanical skill. By employing junior repairmen at relatively low wages the company is able to effect a considerable saving in cost over the high rates paid to outside concerns for this work.

In order to facilitate the giving of shipping directions on machines and to insure prompt and efficient handling of them when they arrive, a system of records is kept as shown in Fig. 5. This card is filled out in triplicate as soon as directions for shipping a machine are given. The memorandum under which these orders are issued is numbered and the office which ships the machine affixes this number to the box in which the machine is packed. When the machine arrives the receiving clerk notes the memorandum number and refers from it to the form, Fig. 6, which shows exactly what is to be done with the machine. On each of these cards, Fig. 6, the date of receipt is then stamped. One card is then filed under the memorandum number, another is sent to the repair department for its work file and the third is attached to the machine. When the machine is repaired by the department's repairmen, the reverse side of the card on the machine and its duplicate in possession of the repair department are filled out. This card is then sent to the department office and the cost of repairs and other data are taken from it and filled in on the individual machine card and the repair requisition and all the correspondence connected with the transaction are properly filed. This method has been found to provide an excellent check on the receipt and disposition of equipment.

The Northwestern Pacific's Safety Organization

By William S. Wollner

General Safety Fire Prevention and Welfare Agent, Northwestern Pacific, San Francisco, Calif.

PRIOR TO THE PERIOD of federal control, the responsibility for the safety of employees and patrons of the Northwestern Pacific was vested in the division superintendents and in the heads of the various departments. During federal operation, however, a safety department was organized under the uniform plan recommended by the Safety Section of the United States Railroad Administration. This organization, as inaugurated in September, 1918, consisted of a general safety agent, a safety supervisor, a general safety committee and four subordinate safety committees. The general safety agent, the safety supervisor and all the members of the five committees were appointed to their positions by the general manager of the road; the "officer members" permanently, and the "alternating members" for a period of six months.

The alternating or employee members selected in this way were the local chairmen of the various brotherhoods and other employee organizations. Fortunately it happened that the committee personnel which this election produced was of such high character that the safety organization functioned

as it was intended. At the same time it was realized that this method of choosing would eventually produce a different personnel not fitted to secure these good results. The fact that members of the safety committee were selected by the management might lead the employees to look upon this organized effort for safety as a scheme adopted solely in the interest of the company. Furthermore, the selection of organization chairmen or other organization representatives might easily result in the safety committee meeting assuming the character of a "grievance conference."

Realizing that the securing of increased safety is very largely a problem of the human element and that, in consequence, the responsibility must be placed primarily upon those most interested, the Northwestern Pacific, in January, 1919, issued the following statement to its employees, outlining a new plan:

"The term for which employee members of our various safety committees were elected will expire February 28, 1919.

"In replacing the retiring committeemen, the safety department wishes to experiment with a plan which should create a craft which is truly representative of all the employees; if this plan operates successfully, its use will be continued in the future.

"The method to be followed in this election is: Each retiring safety committee member will nominate two men of his own craft, one of whom is to be elected as his successor. These nominations are to be made immediately and ballots will be printed, carrying the names of all nominees, and a space where the name of any other person may be written in.

"A ballot will be handed to each employee with his pay check for services rendered during the first half of the month of February. Each employee should indicate with an "X" or by writing the name on his ballot of the man he wishes to represent his craft on the safety committee, and hand the ballot to the retiring committeeman who has represented the craft. The ballot will carry nothing to indicate by whom it was cast. Retiring committeemen will canvass the ballots and furnish the names of their duly elected successors to the chairmen of committees."

This method of electing safety committee members proved so successful that upon the expiration of the term for which they were elected, that is to say in February, 1920, a similar election was held. A further change was made at this time by having each retiring safety committee member nominate three fellow craftsmen instead of two. By another ruling, ballots were forwarded to safety committee secretaries instead of being handed to the retiring committeemen.

The results of the third election that this road has held for safety committee members has just been announced. This last balloting, it is believed, shows a further improvement. Publicity was given to the election several months before it was held through the medium of the company's bulletin. It was desired that the interest of every employee be stimulated, since it appeared likely that the employee who took an interest in the election would also be concerned with the general safety program. Each safety committee member who had been elected a year before by the votes of his fellow employees was asked to nominate three fellow craftsmen, one of whom would be elected as his successor. The nominations were made to the safety committee chairmen who in turn forwarded them to the general safety agent. In the previous election, the names of all candidates had been printed on the ballot, but some of the employees called attention to the possibility of men voting for other than members of their own craft. They pointed out, for instance, that if engine-men and firemen were interested in the election of a certain conductor, they might place him in office regardless of the desire of the majority of the other conductors. It was decided, therefore, that in this election the ballots distributed among the members of each craft should contain only the names of the candidates from that craft.

The large proportion of our employees who voted in this election indicated the real interest that they are taking in safety matters in general. At the present time the Northwestern Pacific is instituting a special campaign to bring before safety committee members their responsibility for the prevention of accidents caused by unsafe practices, as well as those caused by unsafe conditions.

It is believed that the realization by the individual safety committee members of the fact that he has been elected to office by his fellow craftsmen as their representative increases his sense of responsibility for their safety.

Railroad Hearings Before Senate Committee

Testimony by A. H. Smith and Howard Elliott Regarding Causes for Poor Financial Showing of the Railroads

WASHINGTON, D. C.

A. H. SMITH, president of the New York Central Lines, concluded his statement before the Senate Committee on Interstate Commerce in the railroad inquiry on May 23 and was followed by Howard Elliott, chairman of the Northern Pacific. Mr. Elliott began with a general statement, followed by a statement applying more particularly to the Northern Pacific. He said in part:

Transportation Act Not Responsible for Present Conditions

There is much discussion in this period of business depression and deplorable results from the operations of the railroads about the recent Transportation Act and whether it is a wise or unwise measure and can accomplish what was expected.

Final judgment of this act now would be like judging some great manufacturing plant before it had been furnished the raw material to be used. The Transportation Act was to apply to something like normal conditions and was not intended to be a "cure-all" for a world-wide depression of unexpected severity in all kinds of business.

The act did not undertake to create commerce; its object was to insure to the public adequate means of transportation and to this end secure the safety of securities of sound railroads; to protect the existing transportation machine and to encourage its development to meet the needs of the country; to regulate the transportation of commerce by railroads in such a way that those engaged in that business, either owners or employees, should, if possible, have a fair return for services rendered to the public.

One provision of the act provides that until March, 1922, the rates shall be such that, as nearly as may be, there will be a return of 5½ per cent or 6 per cent on the fair valuation of the railroads, but the act did not and could not insure the business necessary to earn such return.

If the policy of extreme regulation of the railroads by the government is to continue, then this particular provision of the act is of great importance.

The Transportation Act and the principles and rules contained therein are not responsible for the present unfortunate disappearance of railroad net earnings. The Congress, the public, the railroads, and the labor organizations should do all they can to help those upon whom the very great responsibility is imposed of administering the act.

Two boards, with vast powers over the railroads, are set up; one dealing with rates and regulations affecting commercial questions, and the other with wages and rules about wages and working conditions.

If those two powerful boards, one in Washington and one in Chicago, with no close relations between them and with no common authority over them, short of the Congress, and with their large membership, should find that the questions submitted to them are so numerous that they are unable to act promptly and decisively, then no matter how good the fundamental principles may be, there is danger that the full benefit of the law will not be obtained.

I know that it is the earnest desire of the officers of the railroads to cooperate to the best of their ability, both individually and collectively, with the commerce commission and the labor board, to make the administration of the act effective and to obtain the results intended when the act became a law. Much has already been done in this direction, and the managements of each road are all the time hard at work on the home road, and through various associations of executives, operating and traffic officers, working together and with the commission and labor board to improve results and obtain, to as great degree as practicable, for all roads what the law calls for—"honest, efficient and economical operation."

A railroad is a complicated and delicately adjusted manufacturing plant and its product is transportation, manufactured daily and in countless forms, and under widely varying conditions. Its product, however, must be used as produced; it cannot be stored up for the future. Other people are manufacturing other commodities; generally they can raise their prices in prosperous times and can store their products in poor times for future delivery, or close their plants entirely; the railroad has not been allowed to raise its prices to the extent that the manufacturers and producers have and it has nothing accumulated from the large business of

the past few years to care for the present period, and it cannot close down its plant.

It is self-evident that the railroad, manufacturing transportation, cannot, on a falling business, long continue to be a solvent enterprise, if it cannot, as other manufacturers do, have some control of its income and outgo and pay wages substantially on the same basis as may be paid by other employers in similar territory. This is not the case to-day and the inability of the railroad to adjust promptly its costs to meet depressed business conditions is the chief cause of the present situation.

Results on Northern Pacific

During the past 20 years, about \$430,000,000 has been spent by the Northern Pacific for additions, improvements, betterments, equipment and new lines, so as to make a better transportation machine for the development of the country. Here are statements showing the general financial data for the Northern Pacific for the years ending June 30, 1912, 1913, 1914, 1915, 1916, 1917, and for the calendar years ending December 31, 1918, 1919 and 1920. Figures for the average of the three years ending with June 30, 1914, are given, also for the three years ending June 30, 1917, and so-called test period.

	1st Period	2d Period	1919	1920
Operating revenue.	70,111,933.62	74,860,736.16	101,474,968.80	111,872,097.43
Operating expenses	43,022,796.93	41,559,336.84	78,672,509.37	100,983,374.19
Operating ratio....	61.36	55.56	77.53	90.26
Transportation ratio	31.86	29.05	37.71	43.29
Net Ry. op. income	24,667,774.81	30,196,329.98	15,104,113.74	6,737,147.87
Income balance after interest and 7 per cent div....	3,097,689.17	6,854,944.36	*6,597,407.53	*15,741,260.00

*Deficit.

This statement shows that the operating revenues of the property increased from the first period, \$70,111,933.62, to \$111,872,097.43 for 1920, but the ratio of operating expenses to earnings increased from 61.36 per cent to 90.26 per cent and the ratio of transportation expenses to revenues increased from 31.86 per cent to 43.29 per cent. The result was that while the property, for the period ending June 30, 1914, paid all of its expenses, taxes, interest, a 7 per cent dividend and had \$3,097,689.17 left, in the year 1920, with an increase of over \$41,000,000 in gross revenue, the expenses had so increased that it failed to meet expenses, interest, taxes and dividend charges by \$15,741,260.

The figures also show that the efforts of the company, its officers and men, to improve operating methods, resulted in a reduction of the operating ratio in the second or test period to 55.56 per cent for all expenses, and to 29.05 per cent for transportation expenses (an improvement over the first period) which, however, under government wages, methods, etc., increased to 77.53 per cent and 37.71 per cent respectively for 1919, and to 90.26 per cent and 43.29 per cent respectively for 1920. This very great increase in the amount of each dollar of operating revenue used in operating expenses was, for reasons already fully explained by the previous witnesses, beyond the control of the railroad operating officers.

In the case of this particular property, the figures for units of service produced from the use of tracks, cars and locomotives show, in the main, a steady improvement, as per the following figures:

	Test period	1919	1920
Net ton miles per road mile....	1,218,310.	1,310,924.	1,364,961.
Av. gross tons loco. mile.....	1,366.7	1,347.6	1,350.5
Av. tons per loaded car mile....	23.9	26.7	27.3
Per cent of net ton miles to gross	46.66	48.09	48.74
Per cent of loco. miles to train miles	111.41	113.17	113.04
Per cent of loaded to total car miles	72.45	71.20	70.58
Av. miles per frt. car per day....	26.6	27.5	32.9
Net ton miles per car day.....	461.	522.	633.7

It will be noted from this table that the amount of tonnage over each mile of track, the loadings of engines and of cars, and the movement per day of cars were better in 1920 than in 1919, or than in the test period, clearly showing that if wages, working rules and prices of coal and other materials necessary to carry on the business had been on the same basis as in the test period, the costs would have been lower in 1920 than in the test period.

Effect of Increase in Expenses

Statements are herewith submitted in considerable detail showing various units measuring the operations of the railroad for

the test period for the years 1918 and 1919, and for the year ending December 31, 1920. These statements show that the physical use and operating performance of the railroad in 1920 was equal to, and in many items better than during the test period, and the same compared with 1919. This shows clearly that good use was made of every part of the plant, as already explained in the figures for density of traffic, car loading and movement, train loading, etc., and indicate that the increases in expense do not come from mismanagement, but from higher costs for fuel and materials, increases in wages, and the disturbing influences generally of the war affecting, as they did, the morale and general effectiveness of large bodies of men in all walks of life.

The following figures are interesting on this point:

	Test period	1919	1920
Total expense per mile of road.....	\$6,408.61	\$11,934.71	\$15,178.04
Aver. cost, maint. of way per mile of main track.....	1,293.96	2,187.32	2,806.02
Operating revenue per train mile.....	3.54	4.79	5.11
Operating expense per train mile.....	1.97	3.71	4.61
Net oper. revenue per train mile.....	1.57	1.08	.50

Number of Employees, Hours

Worked, and Compensation

In 1917, the average number of officers and employees managing, maintaining and operating the road was 31,887; they worked 1,312,420 days, and 91,710,810 hours, and received \$35,877,879.

In 1919, there were employed 33,700 officers and employees, who worked 1,286,092 days and 80,886,575 hours, the compensation amounting to \$52,605,395.

In 1920, the average number of officers and employees was 35,553, working 1,371,933 days and 86,058,373 hours, receiving therefor \$66,503,794; on the basis of the wages fixed by the Labor Board and applied to the entire year, 1920, their compensation would have been \$69,975,740, very nearly double the amount of money for a smaller amount of time worked than in 1917.

Some Reasons for Decline in Net Revenue

The remarks already made and various statements submitted have a bearing on the first, second and fourth questions of Senate Resolution No. 23.

Speaking for the Northern Pacific and considering the first paragraph of the resolution, the increases in expenses and the consequent decrease in net earnings are due almost entirely to causes beyond the control of the management, and what is true for the Northern Pacific is true for other roads; namely, to

The increases in wages brought about by war conditions and by orders of agencies of the United States government.

The more general application of the 8-hour day, greater payments for punitive overtime, changes in rules and working conditions, all as a result of governmental action and orders; and also to the general disturbed morale incident to the upheaval of the world war.

The increase in prices (over which the carrier could have very little control) of fuel and materials due in part to higher wages paid for the production of said fuel and materials, and to the excessive demand for them during the war period and for some time after.

The increases in taxes, affecting all business and individuals.

The increase in the volume of passenger train service given in 1920 as compared with 1919, because of the desire of the railroad managements to restore, in part, the unexcelled service given prior to the war.

While it is true advanced interstate rates were authorized, taking effect September 1, such rates were only in effect for one-third of the year in interstate business, and on intra-state business were in effect less than one-third of the year in all of the states traversed by this company's lines, and in one state, namely, North Dakota, the new rates are not in effect to-day. Therefore, the increased revenues derived from these new rates were not anywhere near sufficient to offset the increase in expenses due to the causes already given, or to produce the result anticipated.

The wage award of July 1, retroactive to May 1, increased wages for four months \$3,818,033, for which there was no corresponding increase in rates.

Maintenance of way increased in 1920 over 1919—\$4,780,000. This was brought about by the following conditions:

The railroad of the Northern Pacific was under-maintained during the period of federal control and sustained itself, in part, because of the very high standard of maintenance in years gone by and the unusually good condition in which it was when it was turned over to the Government on January 1, 1918.

The wages under the Labor Board's award, retroactive to May 1, 1920, were on a much higher basis than in 1919, together with time and a half for overtime for all maintenance of way employees.

The cost of much material used in 1920 was, on the whole, higher than in 1919.

When the properties were turned back to the companies, they had a very proper and praiseworthy desire to restore them as

quickly as possible to a condition to serve the public thoroughly well, on the theory that in the autumn of 1920, there would be a very good business, and it was most desirable to have maintenance work well out of the way, thus permitting the maximum attention to the moving of the business. For these reasons, maintenance work was pressed vigorously in 1920.

Effect of War Conditions on Efficiency

As to paragraph 4 of the resolution about efficiency. It is proper to say that the officers of the railroad of every rank were, during the war and the period of federal control, as patriotic and as energetic and helpful in doing their allotted tasks as any class of men in the United States. They were, however, disturbed over a change in their relation to the properties where many of them had spent their lives; they did not know what their relations were to be in the future; their powers and responsibilities were changed and in some cases reduced; decisions that they formerly could make promptly were made at some point off the road or in Washington; discipline was weakened; and there was an increasing tendency to long-distance management, and the affection and pride of the officer in his particular road was weakened by telling him he did not work for that road but for a part of a United States system of railroads. In an effort to save a relatively small amount in supervision, men were given more territory and spread out too thin.

All of this had some effect on the mind and courage of the officers, and we all know that suspense and uncertainty have a disturbing effect in efficiency. But in spite of it all, the officers of the railroads did splendid work during the period of federal control and they are "on their toes" now to get the best results they can since the properties came back to the owners.

In addition "leadership," so important in any undertaking, was changed and men looked to the officers on their division or on their road to a much less extent than formerly, for reward for good work or punishment for bad. They rather looked to some more distant person or board in Washington and to the head of their union.

The relation between the men and management, which should be close, co-operative and friendly, without interference from outside if the best results for the country are to be obtained, was not so close as in pre-war times.

There was less interest, there was more slack and careless work and not as high efficiency as prior to the war. This condition was not peculiar to the railroad employee; everyone knows that it existed in the household, the store, the office, on the farm, in the factory and the mine, as well as on the railroad. It had a marked effect on the cost of everything and on the cost of maintaining and operating the railroads. It is difficult to measure that cost in dollars and cents and operating officers have varying opinions in accordance with their personal experience and the part of the country in which they worked. Generally the conditions were better the further away you got from Washington, and from those manufacturing and shipbuilding regions where the necessity of the war required that production be speeded up regardless of costs.

Estimates have been made that efficiency at times was only 50 per cent of the best pre-war record, and from that up to 65 per cent, 75 per cent, and 80 per cent, and in some cases were 100 per cent, but the consensus of opinion is that there was a noticeable reduction on the whole.

Officers and men since federal control have slowly been getting together again and the disturbed conditions developed during the war and federal control are improving, and began to change for the better in the autumn of 1920, when it was evident that the man wanted the job rather than the job the man.

Effect of Increases in Rates

The third paragraph of the Senate resolution relates to the reasons for the fall in business and the influence of increased rates in causing such fall. I have made many inquiries of all kinds of people during the past few months about this question because the decrease in the volume of the business on the road I represent has been as severe as on any road. The almost universal opinion, and my own judgment coincides, is that the increase in rates has been a negligible element in the decrease in the volume of business.

The reduction in the volume of business, in my judgment, results from many causes entirely distinct from the increase in freight rates. Merchants and manufacturers had accumulated stocks of goods at the end of 1919 and in 1920, bought at high prices, and they were naturally slow in reducing prices. The retailers were in the same condition; orders for foreign and domestic goods were cancelled; raw materials were not moving because no one would buy them, until it was evident that stocks of finished goods already on hand could be disposed of and until there was a demand for new stocks. The reaction from the extravagance of the war, the increasing unemployment, the fall in the price of farm products brought sharply to the attention of thousands that it was necessary to save. Buyers, hoping that

prices would fall, were waiting until they thought the bottom was reached and there was a widespread buyers' strike.

The aftermath of the war, the inability of Europe, one of our best customers, to buy and pay for goods, the disturbed condition of foreign exchange, the long delay in settling the war, and the question of the German reparation are all very vital factors in the world situation which affects the United States most seriously.

Making a general reduction in freight rates will not help solve the present complicated, economical and psychological conditions in this country, but will reduce still further the ability of the railroads to survive and become buyers themselves of those articles which, when they are prosperous, they use in such large quantities.

In saying this, I do not mean that no rates should be readjusted, because there are some now in process of adjustment, but I believe it would be unfortunate to give the impression at this time that the railroads can be sustained, as contemplated by the Transportation Act, and, at the same time, make any general reductions in freight rates, until it is evident that expenses have been reduced enough to justify such reduction.

It should be remembered that prior to governmental control the general level of rates in the country was not enough to sustain the carriers and to permit them to expand and take care of the growing business of the country. The director general recognized this and in 1918, attempted to bring his income up to his outgo by increasing freight and passenger rates, but the increase in expenses during federal control overtook the increase in rates, as has already been shown by the figures submitted.

Prior to the end of federal control, the director general was urged repeatedly to bring the earning power of the roads back at least to the 1917 basis when the government took them over, by increasing the rates as he alone had the power to do; but he declined, claiming it was better to make up deficiencies in railroad operations from the general funds of the Treasury, although he did take action in regard to the working rules which still further increased the cost of operation. So the railroads were turned back with their earning power practically annihilated and nowhere near the basis of 1917 which, in itself, was too low for the general health and growth of the transportation machine.

There was no "inflation" of railroad prices to a point where any large profit was received, as was the case with many industries; in fact, no profit was made at all in 1918, 1919, and 1920, so there is no basis for "deflation" of railroad prices or rates at the present time. Rather there is a necessity for holding them where they are until the country finds out what will be the results on the railroads under the new Transportation Act and the orders of the Commerce Commission and the Labor Board.

The Transportation Act recognizes the possibility that rates may produce earnings that are too high in the judgment of the commission, by providing in such cases that any excess shall be disposed of partly to the owners for certain defined purposes, and partly to the government, to be administered for the common good. To-day, considering the sore distress of the railroads and the fact that very few of them are earning enough to more than pay expenses and taxes, and many not even that much, the sound national policy would seem to be one of liberality to the roads in their rate structure, rather than parsimony, because, as already stated, any excess earnings are disposed of by law. In addition, the power at all times rests with the commission to reduce rates if and when the rates are earning enough to comply with the principles laid down by the Transportation Act.

Development of Regulation

The gradual development of the law since 1887 has been in the direction of encouraging and protecting the buyer of transportation and safeguarding him from possible injustice, extortion and unwise financing on the part of the producer. Admitting for the sake of argument that this course was necessary, the time has come when the producer of the transportation must be protected and encouraged or he will be unable to furnish the transportation needed by the buyer at any price.

The Transportation Act is a protecting and encouraging measure and reflects a growing public opinion that legislation has gone too far in reducing the earning power of the carriers. The recent repeal of the full crew law in Pennsylvania is another indication of this.

I believe the Transportation Act should be given a fair trial under more normal business conditions than exist today, and that before making changes it should have such fair test.

Regulation of private corporations serving the public is necessary, but I believe that the best results can be obtained for the public by allowing the individual, in any kind of business, the maximum freedom of action consistent with due protection of the public interest.

The Hepburn act in 1906 took away from the railway owner and manager the right to make effective the price at which he should sell his service to the country. The Commerce Commission found itself subjected to pressure of 100,000,000 buyers of

transportation who thought that their interest was in getting the lowest rates, regardless of the effect on the seller of the transportation. The influence of the great body of buyers has been more powerful than that of the smaller number of sellers and the general tendency has been towards rates entirely too low to maintain the railroads properly, pay satisfactory wages, and make such return to the owners that they can continue in the business and increase their plants.

Congress recognized this situation in the rule of rate-making in the new law which gives the commission instructions and support in allowing rates that will enable the owner to carry on the business and furnish the necessary transportation to the public. With a more normal volume of business it is reasonable to believe that this principle in the law will produce the results anticipated.

Congress also in passing the act reflected the opinion of the country that it wanted its railroads owned and managed by private individuals. Imposing this responsibility upon the owner necessarily carries with it the idea that he shall be allowed reasonable freedom to act so as to produce the results expected from him. In interpreting and administering the law, it is certainly a sound policy to give the owner, who is responsible for the results, the maximum of freedom, consistent with the public interest, so that the undoubted talents and ability of the American business man can be exercised.

I believe that the tendency of the laws and the administration of the Transportation Act and, if it should be found necessary, any new legislation should be along the line of permitting the owner and manager to utilize to the highest extent, compatible with the public interest, his vision, enterprise, judgment, initiative and skill.

In creating our railroad system the work was done through the courage, brains and money of the individual man who developed a wonderful transportation machine with the lowest rates, the best service and the highest wages of any railroad system in the world. I believe the owner and manager can continue to do this in his activities are not curtailed too much.

The wage cost for operating a train one mile, Mr. Elliott said, was \$2.92 in 1920 compared with \$1.47 in 1917 and \$2.39 in 1919 while if the wage increases made by the Railroad Labor Board in last July had been in effect the entire year, the average cost per train mile would have been \$3.07.

The cost per mile run by all freight locomotives in February last was \$124.46 compared with \$96.93 during that month the previous year and \$59.42 during that month in the test period, 1915-1917. Cost per mile run by passenger locomotives was \$71.21; \$58.56 and \$34.61 during those periods.

"I give these figures," he continued, "because they show that increase in locomotive costs in 1921 has not been due to poor management or the inability of the locomotives to handle the business, but is due to higher cost of fuel and materials, changes in working rules and conditions and to increased wages."

Mr. Elliott called attention to the "very significant effect caused by the increase in the prices of materials and wages, the rules in the so-called national agreements and the general disturbing effect of the war" on the cost of repairing freight cars and locomotives. This together with the financial condition of the carriers, he said, has resulted in an increase "to beyond the danger point" in the amount of equipment out of repair because the carriers have not got the money with which to make such repairs.

Approximately 13.8 per cent of the cars owned by the Northern Pacific are in bad order, he said, of which about 4,000 require heavy repairs, requiring approximately \$1,500,000 to repair. On April 15, he said, statistics showed about 19 per cent of the locomotives on the railroads of the country were in need of repairs requiring more than 24 hours. Ten per cent is regarded as the maximum to be allowed in normal times.

The average cost of repairing a car on the Northern Pacific during the test period was \$4.05 while in 1920 it was \$13.69. Mr. Elliott told the committee, while the total cost of freight car repairs during the test period was \$2,987,697 compared with \$12,140,554 in 1920. One reason for this enormous increase in the cost of repairing cars he said was the fact

that since 1916, car repairers have been increased 229 per cent in wages.

Mr. Elliott also said that during the test period which covered the three years prior to June, 1917, 12,437,188 hours were spent by labor in the maintenance of equipment on the Northern Pacific at a cost of \$3,729,839, or an average of 29 99/100 cents per hour.

In 1919, the hours put in at this work totaled 14,723,837 while the total labor bill was \$9,526,696, or an average of 64 70/100 cents per hour. In 1920, the hours totaled 16,333,388 and the total labor bill was \$12,401,287 while the average cost per hour was 75 63/100 cents. On this basis, the increase in hours in 1920 over those for the test period was only 31.33 per cent while the increase in the total cost was 232.49 per cent.

He furnished the committee with figures which showed that there was an increase of 76 per cent in the cost of materials for equipment repairs during the year which ended on February 28, 1919, compared with the test period, and of 97 per cent for the year which ended on February 28, 1921, over the test period.

Mr. Elliott filed with the committee a table which showed that out of 30 classes of railroad employees, the wages of 19 increased more than 100 per cent from 1916 to 1920 and only 9 received less than 100 per cent.

Mr. Elliott read into the record a report made to him by an official of the Northern Pacific in Seattle, Washington, which showed that the increased rates have had very little effect on the movement of lumber and other products from that territory. The report said in part:

"With reference to your inquiry as to the extent to which I think the increased rates on lumber or other products in this territory have checked business, I can truly say that it has had little, if any, appreciable effect in that direction, and this opinion is almost daily confirmed in discussion with various interested shippers of different commodities.

"Take forest products, for instance. The reductions in selling prices during last year amount to more than the entire freight rate to Missouri River territory, notwithstanding which there is a decreased movement.

"A year ago the ocean rate from Puget Sound to the Orient was \$45 per thousand. Today it is \$10, but notwithstanding this heavy reduction in the ocean rate, together with very much lower prices for lumber, has not stimulated the demand or increased the movement, indicating conclusively that there are other and more controlling factors determining the present situation. This is also true of many other commodities.

"The public generally are not yet satisfied to buy. Readjustment is necessarily a slow process, and out in this territory at least retailers are still endeavoring to hold up their prices until they can dispose of their high priced stocks. However, I believe the situation is gradually improving."

While Mr. Elliott was discussing the effect of the rate increases, Senator Pomerene said that he had had information from all over the state of Ohio that many shipments of roadbuilding and building materials have been prevented by the high rates and that lower rates would give the railroads more traffic in these materials. Mr. Elliott replied that he had said that some of the rates should be readjusted and the railroads were giving close study to that situation. Senator Pomerene asked if it were not possible for the railroads and the shippers to get together with a view to discussing such readjustments without the necessity for long hearings. Alfred P. Thom, counsel for the railway executives, said that a conference between the traffic officers and the shippers of roadbuilding materials had already been arranged for June 2 and that he proposed to present as a witness later Edward Chambers, vice-president of the Atchison, Topeka & Santa Fe, to discuss the rate situation. He said he thought the committee would be surprised to learn from Mr. Chambers of the extent of the readjustments in

rates that have already been made. Senator Cummins remarked at this point that when Congress is willing to make another appropriation to help sustain the railroads it will be time to talk about reducing rates, but when the railroads are receiving very little net income it is quite obvious that many rate reductions cannot be considered until expenses decrease.

During Mr. Elliott's discussion of maintenance expenses, Senator Cummins remarked that he understood the Northern Pacific had just made a settlement with the Railroad Administration and asked how much the government had paid for undermaintenance. Mr. Elliott replied that the government had been unwilling to specify how much of the amount was for undermaintenance or to allocate it specifically and had taken the position that it did not intend to do so in the case of any railroad. The company had finally agreed to settle on a trading basis by which they received \$9,000,000 in cash with an agreement that the amount should be readjusted later as a result of the check of the stocks of materials and supplies. One million dollars of the amount was specifically stated as for materials and supplies and the balance represented undermaintenance and other items. The company did not think the settlement entirely fair, he said, as it represented about 50 cents on the dollar of its claim, but thought it was better to make a settlement. He said that the railroad is not yet up in maintenance to where it was in 1917 and expects to spend a large part of the \$9,000,000 to restore Northern Pacific standards. He said the roadway and the locomotives were now in better condition than when the property was returned, but the cars are not. Mr. Elliott said that in the negotiations with the Railroad Administration, Director General Davis had made the point that there was not enough money in sight to pay all the claims of the railroads, whereas the railroad officers had taken the position that that was a consideration for Congress rather than the Railroad Administration. Mr. Elliott said the sticking point in the negotiations was the difficulty in proving the amount of undermaintenance of the equipment. The company had claimed about five and one-half millions on this account, whereas the Railroad Administration also had a claim against it for overmaintenance.

Senator Cummins said it had been charged that the railroads had increased their operating expenses by their failure to continue various unifications made during federal control. Mr. Elliott said that some unifications had produced savings and some had been found to produce an increase in expenses and had been discontinued. The entire question of unification of facilities, he said, is now being carefully considered by a special committee of the Association of Railway Executives and railway officers are keenly alive to the situation, but in many instances where a superficial view appears to warrant unification closer investigation shows that it is not practical. At Seattle, he said, the unification of terminals produced an increase in expenses, and while the total amount of savings that might result from unification of facilities is substantial, it is such a large sum as to represent an important element in the situation. Senator Cummins asked the witness' opinion as to the economy that might result from the pooling of freight cars. Mr. Elliott said that this is a big question with two sides to it. In tight times the railroads have practically pooled the cars, but he was inclined to the opinion that better results can be obtained in the long run under individual ownership of cars. He pointed out that the Interstate Commerce Commission now has power to move cars in an emergency and the railroads have their own organization working with the commission.

Senator Cummins asked Mr. Elliott, as he had asked Mr. Smith, to file with the committee a statement of the operation of the railroads by months for the past several years, saying he wanted the data to prove or disprove the charges made that the railroads had expended too much for maintenance and operation during the guaranty period of 1920. Mr.

Thom pointed out that the transportation act makes the railroads responsible for maintenance expenditures above an amount to be determined by the commission.

Railroads Should Be Allowed More Latitude

In response to requests by members of the committee for specific recommendations as to what could be done to improve the present system of governmental regulation of the railroads, Mr. Elliott submitted the following suggestions:

It is a very grave question whether *regulation* has not been overdone, encroached on the field of *management*, and by dividing responsibility and checking initiative done more to increase costs and therefore rates than would have been the case with more freedom of action permitted.

Inasmuch as the Interstate Commerce Commission, under the new transportation law, controls the aggregate earnings of the railroads, and there is a limitation upon the rates to produce that aggregate, and a provision for sub-dividing the earnings if there is any excess, it would seem as if there was no longer any need of the Hepburn act.

Better and more prompt results for the public could be obtained if railroad managements, familiar with all local conditions, studying constantly their business, and trying to expand it, should be allowed to make rates effective, subject to investigation and review by the commission and to be set aside after such review, if found in any way contrary to public policy, and due reparation then made.

The labor board has been empowered to take up and settle disputes about wages, and about rules if a dispute about rules threatens strikes. Here is a tribunal set up by the Congress for the purpose of handling any labor disputes, and prompt action is very necessary; also the hands of the labor board should not be tied by a mandatory statute such as the Adamson law, and I believe, in the interest of the public, that law should be repealed.

The public are allowed to appeal to the Commerce Commission if they think rates are too high. I believe the public should be allowed to appeal to the labor board if they think wages (ultimately paid by the public) are too high.

Let the railroad managements and the men get together and try to settle their differences, and authorize the railroads to name the rates of pay, and working conditions, subject to review by the labor board, and subject to reparation if the railroads should do anything that was unfair.

It would seem as if it was a mistake to attempt to enforce so-called standardization of all wages and rules, which standard, so far as pay is concerned, is a misnomer, because by giving a man the same rate in a little town in northern Vermont that he gets on the outskirts of New York is really paying the New York man less than the Vermont man, because the latter can live more cheaply.

Let labor organizations be incorporated and state clearly in the charters what is intended; they should be bodies that could sue and be sued, and there should be the same publicity of all their transactions as there is about the transactions of the railroads, reporting the number of members, amount of money received, distribution in detail; in a general way just as much information filed with governmental authorities as there is by the carriers.

If disputes threaten a strike, let the federal government, possibly the Secretary of Labor, frame the form of question about which the strike vote is to be taken, and not let that vote be framed by either the labor organization or the railroads. Have that ballot handled by the Secretary of Labor and the vote should be secret—neither the railroads nor the labor organizations to know how any man votes—the Secretary of Labor to count the ballots and announce the result.

Unless at least 75 per cent of all employees in the craft about which there is a dispute voted to strike (not 75 per cent of the ballots cast) then the strike vote is not carried. If 75 per cent of all employees vote to strike, then a strike not to begin until 30 days' notice has been given.

Under such plans, the public would be protected, because the owner and manager would always, in naming his prices or rates, have in mind the fact that if he went too far, his price or rate could be set aside by the commission and reparation made. He would also have the labor board's power to reckon with if he attempted to be unfair in his wage adjustments and here again make reparation if he did wrong.

In other words, restore to the owner and manager some of the functions surrounding other business and which, when exercised in the upbuilding of the railroads in years gone, produced a most remarkable transportation machine with the lowest rates in any country, the highest wages in any country and the best service in any country. The war and the interference by the government in this delicately adjusted transportation machine have produced conditions resulting in greatly increased charges and poorer ser-

vices to the public, and a checking of developments so necessary for the next uplift in business.

Action, courage and vision is needed now and imperatively needed.

We talk about frozen credit and we have a frozen transportation system that helps to keep credit frozen and retards the growth of the country.

Let the railroad owner and manager have a little liberty of action and in the long run, in my judgment, better results will be obtained for the country.

Mr. Elliott also suggested the appointment of a Secretary of Transportation to have the same advisory power as other cabinet officers. He commended the work of the Interstate Commerce Commission but said it was overburdened with work. He thought that a Secretary of Transportation, by advising with the Interstate Commerce Commission, the Railroad Labor Board and the railroads, could bring about the desired result—promptitude of action.

A. H. Smith Describes Results on New York Central

Resuming his testimony before the committee on May 19, A. H. Smith, president of the New York Central, said that "less in the effectiveness of labor" due to the operation of the national agreements and the increase in the labor bill as a result of reclassification of employees, was one of the main reasons for the increase in the cost of furnishing transportation service to the country.

The witness declared that due to the reclassification of employees cases were numerous where a number of employees were required to do work formerly performed by one. The average pay per man in the locomotive repair department increased from \$134.47 per month in 1919 to \$166.52 per month in 1920 and in the car department from \$147.19 in 1919 to \$187.25 in 1920.

As reflected in the cost of maintenance of equipment, Mr. Smith testified that because of the abolition of piece work and the advent of the national agreements, it cost the New York Central \$5,448,300 more and required 60 per cent more men to turn out only 2 per cent increased work in the company's locomotive repair shops compared with 1915.

"Under piece work and the other shop conditions existing in 1915, 2,799 men turned out 73,072,000 shop miles," he said. "In 1920 practically the same amount of miles were turned out, namely 74,655,000, but it required the services of 4,521 men. The cost in 1915 was \$2,903,700 and the cost in 1920 was \$8,352,000, or an increase of \$5,448,300. That is to say, there was an increase in men of 60.3 per cent and an increase in money of 187 per cent and the mileage output was increased but 2 per cent."

Mr. Smith told the committee that from the standpoint of the railroads nothing was gained by the reclassification of employees which has resulted now in "everything being done by agreement and regulation."

"Not only were wages of specified classes of employees raised but many employees were placed on higher grades than those in which they were prior to the orders and national agreements," Mr. Smith said. "The reclassification not only had the effect of increasing wages but very largely increased the number of men."

In the locomotive department alone of the New York Central Lines, Mr. Smith said, the number of employees on the monthly rolls was increased from 11,545 before the agreements took effect to 11,972 immediately following the agreements and to 13,665 in 1920. In the car department the average number of men employed in 1919 was 12,350. By the operation of agreements and rules made at the close of federal control, the average number of men in this department was increased to 13,888.

Going into details, Mr. Smith stated that an air brake repairer in December, 1917, was paid 27 cents an hour. Under an order of the director general, the rate of pay was raised to 58 cents and under the national agreements, his

classification was changed to that of tender repairer and automatically his wages were raised to 68 cents per hour.

An engine cleaner, who in December, 1917, was paid 22 cents per hour was raised successively to 45 cents and then as a painter-helper to 49 cents.

A stripper was raised from 30 cents an hour in December, 1917, to 68 cents an hour and then under the national agreements became a machinist at 72 cents an hour.

In the car department, a passenger car inspector in December, 1917, was paid 37½ cents per hour, then 63 cents and under the national agreements became an inspector leader at 67 cents.

Oil room men in 1917 were paid 28¼ cents per hour, then 68 cents and under the national agreements became blacksmiths at 72 cents an hour.

Starting at 55 cents, blacksmiths under orders of the director general went up to 68 cents and classified as hammer-smiths under the national agreements received 82 cents an hour.

An additional cause of increased labor costs due to these orders and agreements was the application of punitive overtime to all classes of employees. Overtime which had previously been paid at pro-rata hourly rates was placed on a time and half basis, increasing by 50 per cent the rate per hour for overtime pay.

Mr. Smith pointed out that the above rates were those prevailing before the increased wage award made by the Railroad Labor Board in July and made retroactive to May 1, 1920. This involved for the New York Central Lines alone an increase in wages of approximately \$21,640,000 including back pay of \$8,100,000.

Mr. Smith was frequently interrupted during the reading of this part of his statement by Senators who inquired as to the reasons for the various reclassifications which were made by the railroad administration in the fall of 1919. At one point, Senator Pomerene of Ohio inquired as to how an oil room man came to be classified as a blacksmith. "I haven't the slightest idea," Mr. Smith replied. "They might just as well have called him a saint and paid him accordingly."

Mr. Smith presented an exhibit showing how a man previously engaged in sharpening crow bars and similar work and classed as a laborer had been reclassified as a blacksmith at 65 cents an hour and with \$1,710 back pay.

Another exhibit filed with the committee showed the increases in pay of train service employees in 1920 over 1917. Among these were freight engineers, 54 per cent; firemen, 70 per cent; yard engineers, 73 per cent; firemen, 124 per cent, and passenger conductors, 56 per cent.

Interrupting the reading of his statement, Mr. Smith praised the loyalty and services of the trainmen and engineers. Unlike ordinary workmen, he said, they are specialists, men who have devoted their lives to railroading and who are the backbone of the transportation system.

"Overtime payments on the New York Central for 1920," said Mr. Smith, "amounted to \$25,540,073 at the punitive rates. Under former arrangements providing for straight overtime at pro-rata rates this would have amounted to only \$17,786,188. The additional \$7,753,885 represent the penalty imposed upon the company by the agreement requiring payment of punitive rates. There is no argument about overtime. We ought to pay that. Everyone recognizes that. But it is this punitive overtime to which we object."

Mr. Smith said he sought to have the director general modify the rule, telling him that the railroads would rather pay a premium to employees to get the trains in on time than a reward for keeping them out overtime.

Mr. Smith told the committee that the property of the New York Central was "very much undermaintained" during 26 months of federal control. Under the standard set by the company, 7,315,000 ties, 1,325,000 cubic yards of ballast,

138,500 tons of new rail and 134,000 tons of second hand rail would have been put in during the 26 months had the road been under private managements during that time. In reality, he said, the director general only put in 5,445,000 ties, 1,000,000 cubic yards of ballast and 138,000 tons of rail. This deficient maintenance imposed a heavy burden upon the road when it was turned back to its owners.

Causes for Decline in Traffic

Taking up the causes for decline in traffic beginning in January, Mr. Smith attributed this decline in part to falling off in export business amounting to \$657,000,000 in the first three months of 1920, as compared to the same months of 1919. It is a matter of common knowledge, Mr. Smith said, that the harbors were crowded with idle vessels, whereas prior to January it was necessary in order to avoid congestion at terminals for the railroad to issue export permits. Now the permit system has been abolished because there is much more shipping than there is freight to be carried.

High discount rates also tended to curtail business, the witness stated. "Another cause," he added, "was the propaganda which spread through the country against purchasing at high prices, and which led to a marked reduction in the purchases of commodities generally.

"It was well understood that the period of war inflation would have to be followed by a period of deflation. The general causes were in effect and were manifesting themselves prior to the rate increase of August, 1920, and it is not believed that this increase had any decided bearing upon the falling off in business, which became apparent in January, 1921."

Taking up the question of efficiency as reflected in the transportation department of the New York Central, Mr. Smith said that the average revenue per ton-mile increased 54 per cent in 1920 over 1917. The average monthly pay of all employees increased 86 per cent. "The relative efficiency of employees in producing revenue ton-miles decreased 10 per cent. That is to say it took 10 per cent more men in 1920 to do the same amount of work. This comparison is made as between 1920 and 1917 because the number of revenue tons carried one mile in 1920 was practically the same as the revenue tons carried one mile in 1917, the actual figures being 22,567,929,000 in 1920 and 22,452,548,000 in 1917."

The efficiency of a railroad, Mr. Smith said, depends principally upon its men. "It is estimated that 95 per cent of railroading is human; it is a business of moving things; it is a live thing. At the close of government control labor naturally desired to have rules and regulations set up for their best interests in the future, and the corporations inherited what was awarded to them. Railroad men are no different in their desire than labor in other endeavors."

"These men engaged in this special endeavor of handling transportation on which our country so greatly depends should receive an adequate wage. But after compensation comes results—that is, what shall labor do for what it receives, and that is in a measure where our difficulties have been. It is a matter between management and labor, to be decided on its merits, and will no doubt now be taken care of."

In concluding his prepared statement Mr. Smith said:

From the foregoing statements and figures the following facts are stated and conclusions are drawn:

For the year ending December 31, 1920, revenues increased 19.5 per cent over 1919. For the year ending December 31, 1920, operating expenses increased 40.8 per cent over 1919.

For the last four months of 1920 freight revenues increased 40.1 per cent over the corresponding months of 1919 and all revenues increased 29 per cent over the corresponding months.

For the same four months operating expenses increased 1920 over 1919 43 per cent. For the eight months from May 1, during which the increased wage order of the Labor Board was in effect, operating expenses increased 55.4 per cent. Of this in-

crease 37.7 per cent is represented by labor. The remainder is accounted for by the increased cost of material and supplies.

Neither traffic nor earnings decreased during 1920. The diminished traffic in 1921 was caused by the general business depression. That depression was not caused by increase in freight rates. Other causes sufficiently powerful to cause the depression were operative before the increase in freight rates was made.

The railroad management, hampered by the necessity of undertaking the operation of the property burdened with the large advances in expenses, with undermaintenance of way and equipment, and further burdened with the additional increase of expenses by reason of the orders of the Labor Board, moved all the tonnage that was offered during 1920, and endeavored to make substantial progress toward restoring the property to the standard which the best judgment considered necessary to enable it to do properly and safely the business of the public.

The enormous increases in operating expenses have been in the main due to the great war. War necessities broke through and largely destroyed normal conditions in the industrial world. The materials of war had to be supplied at any cost of labor and material. The situation had to be met in the railroad world, and it was met. This statement does not attempt any apportionment of the responsibility. The war ended, but normal conditions could not at once be restored. That restoration can only come through time and patient effort, but pre-war or normal conditions and a normal cost of living can only be restored by general reduction in the cost of both labor and material.

Senator Watson asked if the falling off in traffic which began late in the fall resulted from the increased rates or from a falling off in the industry of the country. Mr. Smith replied that it was due to the industrial situation, "the state of mind of the people" being a great factor. Industrial stagnation had been brought about by the fact that many persons were holding off buying in the hope of a reduction in prices.

"If rates were lower, what would be the effect on traffic," asked Senator Pomerene of Ohio.

"I wish I had the power to try it out," replied the witness, "I'd like to have the authority to move a million bushels of grain and see if there was a market for it."

If the railroad operated on maximum traffic with the present rates and costs in effect, Senator Watson asked as to whether it would make money.

"You can't do it because the costs are too high," answered Mr. Smith. He added that he believed some rates should be readjusted because successive percentage increases had thrown some of the rates out of line. There could not, however, be any general reduction in rates until there is a reduction in expenses which will assure the earning capacity of the carriers.

Compilations made by the New York Central showed, Mr. Smith said, that in the locomotive repair shops of that railroad there was a decrease of 25½ per cent per man hour in the output of employees in the last six months in 1920 compared with the first six months in 1918.

In the first six months of 1918, he said it required one man 113.4 hours to produce 1,000 shop miles, which is the yardstick of efficiency in the repairing of locomotives. During the first half of 1919, this had been increased to 134.8 hours and in the first half of 1920, it was 146.9 hours. For the last six months of 1920, the labor had increased to 152¼ hours, which was an increase of 30.1 hours or 34½ per cent compared with the first six months of federal control of the railroads.

Asked by Senator Cummins as to the reasons for this showing, Mr. Smith replied that it was due to the abolition of piece work and the injection of rules whereby two men were required to do work formerly performed by one "as well as the hundreds of things that have been injected into this work since the war began.

"Senator, you are playing with human nature all the time and a man will not perform as well when his work is measured by time as when it is measured by performance."

Senator Wolcott sought to ascertain if Mr. Smith knew who issued the various Railroad Administration orders.

"I hold no brief for the Railroad Administration," said the Senator, "but there is a tendency to blame the administration for the superimposing of various orders to which objection is now being made."

"Mr. McAdoo is not a railroad man and we all know that," interjected Senator Kellogg.

"I've not mentioned Mr. McAdoo," quickly rejoined Senator Wolcott.

"He's the man who did it and everybody knows it," declared Senator Kellogg.

Outside Contracts for Locomotives

Taking up the repair of locomotives in outside shops, Mr. Smith declared the New York Central was forced to let outside contracts because, while the company shops were being operated at the maximum, it was impossible to repair all the locomotives requiring attention. He denied that any work done for the company in outside shops had been performed at excessive prices or that the company had any interest whatever in the Baldwin Locomotive Works.

"In view of the fact that everything possible was being done to realize output from the company's shops and as it was apparent that they could not, from the pace being made, repair the locomotives that required attention, the only alternative was to contract for the work in outside shops," Mr. Smith said.

He explained, however, negotiations were entered into with the Baldwin works as well as the Lima Locomotive Works and the American Locomotive Company in order to "obtain the lowest price at which repairs could be made by them."

"Was this work done at a fair price?" asked Senator Cummins.

"Yes," he replied, "but it was done in a seller's market and a seller's market is higher than a buyer's market." The outside shops did not want repair work," Mr. Smith said, "and in some cases pressure had to be brought to bear to induce them to accept it. I told the Lima people we would never buy another engine from them unless they did."

During the period that locomotives were sent to the outside shops for repairs 13,239 men were employed in the company shops compared with 11,326 in July, 1919. In August there were 13,882 men employed compared with 11,410 during the same month the previous year; in September, 14,343 compared with 11,449 the previous year and October 14,039 compared with 11,972 in October, 1919.

"During this same period the shop mileage output notwithstanding the number of men employed, decreased sharply in September and October," he said.

"The repairs in the outside shops were made under the supervision of competent representatives of the railroad company acting as inspectors. Criticism has been made of the amounts paid or agreed to be paid to those outside companies for the repairs and this criticism has been sought to be fortified by statements that the same repairs could be made or that repairs of the same class actually were made in railroad shops for vastly less amounts of money. It is sufficient to say as to this that the reported cost of the repair of a locomotive in a company shop covers only the labor and material involved and no other factor enters into it. To these costs the outside shops add 120 per cent for profit, interest, and other overhead charges, which are not shown in the railroad shop costs." He added that after business fell off he stopped sending engines to outside shops.

Regarding charges that have been made that part of the increase in operating expenses was due to failure of the railroads to introduce mechanical improvements designed to bring about economies in operation, Mr. Smith said:

"If there is anything that can produce economy and we can get the money to do it, you can rest assured we will get

it. I know of nothing in the last word of engine construction that we have not adopted."

Eighty-five per cent of the total number of locomotives on the New York Central Lines, he said, are equipped with superheaters, while 96 per cent of the locomotives fit to have them are so equipped. He also said that 98 per cent of the locomotives have brick arches.

In addition to the improvements already installed, Mr. Smith said the New York Central was constantly experimenting with new devices designed to improve efficiency.

He estimated that the company would be able to save in the neighborhood of five and a half or six million dollars in its coal bill this year.

Mr. Smith said several times during his testimony that he had no desire to criticize the government for what was done during the period of federal control and that he had once or twice tried to interject the statement that it was up against a difficult situation. He referred to the fact that he was with the government as regional director, that the railroads had difficulties before the war and the government found many difficulties afterward. It was a question of winning the war and doing the best under the circumstances, he said. Senator Kellogg asked why if piece work was considered more efficient, an order was given to abolish it. Mr. Smith said that he was merely on the firing line and that the general had ordered the piece work taken out. He hated to make the move, but he did it. "I was merely a soldier in the ranks," he said, "so why they did it, I don't know. I used to kick, but it did not do any good."

At another point Mr. Smith said he was not claiming that the increase in wages was not necessary, but if he had had his way he should like to have had a good bonus given to the men during the war and then looked it over afterward in accordance with the conditions existing and not tie it up for the future. He also pointed out that the rules of the national agreements were put into effect just before the government let go of the railroads, although it was known that they were to be returned.

Senator Watson asked the witness if he made his recital the basis of some recommendation by which the railroads could get back to average man efficiency.

"The recital is made," replied Mr. Smith, "because you asked us for the facts. You asked us to tell you why 1920 was as it was. As to the future, of course, we have got to change the situation in some way or we cannot go on. We are in bad shape today and getting worse every day. What has happened is not concerning me one-tenth as much as what we are going to do because we are going the wrong way this moment and the things that governed me then in regard to these methods and these actions are no help to me now. I should be up and figuring what I am going to do for next winter because just as soon as business returns, and it will return, then you will want these transportation machines and I say to you they will not be ready. You will want them and they will not be there. We have not had any chance to get any fat on us in 20 years. We haven't had the opportunity that other business has had. Other business has good years and can lay up a sum in real money for the rainy day, but we have never had that opportunity and now while we should be repairing these locomotives and getting this plant in the very best order, for the future, we are not doing it. We haven't the money."

Senator Watson said he wanted to "put the grease where the squeak is."

"Well," replied Mr. Smith, "the squeak is that our cost factors are too high. I don't mean only labor, but our material is too high and our fuel has been too high and all of these things have gone up. Our taxes are awfully high. I don't imagine they can be reduced, but there they are. I think labor on railroads should have liberal consideration,

but in some instances labor is out of line now. I should say that we have gotten out of balance with the outside. There was a time when that was the reverse. There was a time when these rates were held so low on us that a railroad was not paying its men fairly, but the people did not give us money enough so we could and we were always having an argument with our men, they wanting more and we not being able to give it to them."

Railroads Should Have More Latitude

This led to a discussion of the effects of railroad regulation and Mr. Smith pointed out that the railroads no longer have much latitude. "What made the railroads," he said, "was vision, initiative, energy, study, competition. Now when you tie us up so there is nothing of that left we just plod along like the plow horse hitched to the other one."

Senator Cummins asked what particular restriction should be removed. Mr. Smith replied that he was not a lawyer and that perhaps his suggestions would be considered too general, but he would like to see more freedom of activity allowed to the railroads. "I do not mind regulation," he said. "I do not mind coming in and telling you what we have done or that we have not done it. I do not mind a yardstick of duty laid on me and if I do not do my duty, why do something with me, but we cannot do much nowadays. If we want to buy anything or if we want to get anything we have got to come down and have a long hearing before it is done. We must show all there is to it." In reply to questions, he said he would not advocate the withdrawal of the supervisory power of the Interstate Commerce Commission over rates, but he would like to see the Interstate Commerce Commission so placed that they could allow him to put in an emergency rate, see whether it would move traffic, and if it did not, put the rate back. The difficulty, he said, is that if a rate is reduced and fails to produce the desired effect, it is necessary to "go over some pretty high hurdles" before it can be put back. He said undoubtedly some rates are too high as a result of the percentage method of advance and also many are too low. He thought they could be readjusted if the railroads were allowed more latitude, but that to do so it is necessary to move faster than can be done under the present system.

Senator Cummins asked whether he would advocate the abolition of the labor board.

"No," replied Mr. Smith, "I think the labor board is a good thing. I would like to see the board situated so that it can function more rapidly and perhaps it will when it gets more practice. I have no quarrel with the labor board and the Interstate Commerce Commission is a necessary umpire in this game, but, to use a baseball illustration, we are not allowed very much latitude on the bases. We are held up pretty tight."

Senator Cummins announced that he had had a request from the heads of the four train service brotherhoods for an opportunity to testify at the hearing and that they would be allowed to appear at a date to be determined later.

Mr. Elliott completed his statement before the committee on May 25 and he was expected to be followed by H. E. Byram, president of the Chicago, Milwaukee & St. Paul; Samuel Rea, president of the Pennsylvania; Edward Chambers, vice-president of the Atchison, Topeka & Santa Fe, and E. T. Whiter and J. G. Walber as representatives of the railroads' committee that presented the evidence of the railroads before the labor board.

THE MONTHLY MEETING of the Railway Club of Pittsburgh was held on May 20 at the Fort Pitt Hotel. Judge Joseph Buffington of the United States Circuit Court addressed the meeting on "Government, Patriotism and Duty." The next meeting will be held in September.

old engines, and the conversion of old engines into up-to-date ones that did it. This demonstration justifies the policy of equipping so many old engines with improvements that compel a ton of coal to do more work. That policy has made good completely. These capacity increasing factors are ready to do more than anybody realizes. Only the surface has been scratched.

This Is Ready Now

A certain large passenger locomotive, built five years ago, and which was up-to-date at that time, was being taxed to its capacity. It had reached its limit of load and speed. It had no reserve for bad weather or unusual conditions of service. A thorough study reveals the fact that this locomotive, already among the largest and most powerful of its class, may be replaced by one of the same type, but giving 58 per cent more starting drawbar pull, producing 30 per cent more drawbar pull at 60 miles per hour and with no more destructive effect upon the track than the present engine at 60 miles per hour, the destructive effect at 70 miles per hour, being less than that of the present engine. In this study absolutely nothing new or untried was contemplated. Refinement of design was considered, also enlarged capacity by a specially high degree of superheat, an improved firebox, the arch, light reciprocating parts of high grade steel, plus the booster to give greater starting power.

Think a moment of the operating advantages to be had from over 50 per cent more starting power and 30 per cent more drawbar pull at 60 miles per hour. This design did not include the feed water heater because it was not ready for consideration at the time. Heating the feed water by waste steam would still further increase the power of this engine.

Any builder may build this engine. It is the first example, of which I have record, of a design for high power, which was prepared co-operatively by a railroad, a locomotive builder and by the engineers of the concerns which are devoting themselves to improvements for increasing capacity. Similar improvement is available to any railroad.

Of course, such a locomotive will cost more than a weak and obsolete one. It will, however, increase operating speed, reduce double heading, will apply high wage crews more effectively and will cheapen operation.

This increased power per engine will reduce the number

years, the maximum revenue tons handled in a regular train being 3,200. This road shows 233 per cent increase in weight of train and 66 per cent increase in speed in 25 years. It hauls 5,000 ton trains on 25 mile schedules. It makes excellent use of improved locomotives. In five years the average revenue train load of the country as a whole increased from 475 tons to 728 tons, or an increase of over 53 per cent since 1915.

Second: The 20th Century is the direct successor of the World's Fair Flyer of 1893 and represents continuous development. The weight of that train has increased 215 per

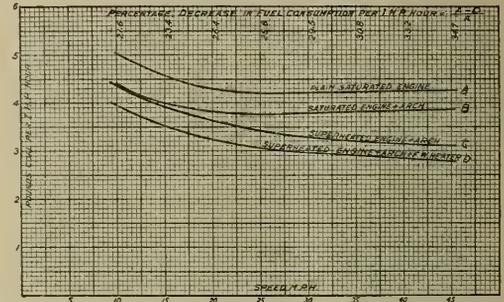


Fig. 4—Fuel Consumption of Locomotives With and Without Power-Increasing Factors

cent and its speed has increased seven per cent. *Only an improved locomotive can haul it today.*

Third: Consider the fact that the heaviest passenger trains on one of the Western roads weigh 1,290 tons and are on fast schedules with maximum speed of 68 miles per hour. It is only 25 years ago that the newspaper men of New York were invited to see a 600 ton passenger train slowly pulled out of the Grand Central Terminal by what was then considered a monster locomotive. That locomotive is now hauling a milk train on a branch line. It and its class have given place to really powerful ones that were not then dreamed of. Today the fastest long distance trains in the country weigh twice as much as the exhibition train referred to. Until we are reminded of the past we do not appreciate what the railroads have accomplished.

Capacity First

In the usual sense of the expression saving fuel will not greatly reduce the cost of transportation, but conserving fuel by compelling every pound to yield more power will do so because it involves operation as well as engineering improvements. Power to get the maximum business delivered is the cheapest power. Heavy pulling at favorable speeds will reduce cost and as congestion increases, speed becomes a greater factor. Power to keep trains on time, to get through storms, to get in under the overtime limit is what is needed. Let us take a glance at some of the power increasing, capacity increasing factors with a view of giving the operating officer greater power capacity to work with. Many others are important and would be discussed here if time permitted.

Brick Arch

For many years arches have been used in locomotive fireboxes. Their function is to baffle the gases and flame on its way to the flues. They mix the gases from the fire, aiding combustion. They cause the burning of many of the cinders and they protect the flues from streams of cold air from the fire door, or from holes in the fire. They protect flue sheets and materially reduce honey-combing. Arches increase the heat making capacity of coal and reduce boiler failures, thus

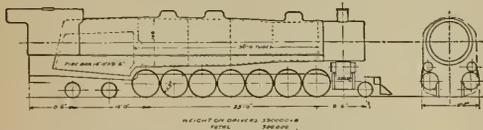


Fig. 3—A Plain Saturated Locomotive to Deliver the Same Drawbar Pull at 45 Miles an Hour as the Engine Shown in Fig. 2

of engines required to do a given amount of work. This will reduce maintenance. Obviously, it is easier to maintain two engines with these capacity increasing factors than to keep up three without them. The cost of these improvements is now going into coal and wages. It may go into new engines when by improving old ones the new ones will not for a time be needed.

Progress

Progress in the use the railroads are making of locomotive improvements is revealed by many examples of heavy trains and fast schedules. Here are three:

First: A well known road has increased its average revenue tonnage from 400 tons to 1,700 tons per train in 25

increasing the availability of engines. Success of the present arch and arch practice is due to structural improvements in the bricks themselves and in methods of support that renders renewal easy and to improved firebox design. Over 43,000 locomotives now have these arches. Every engine fit to run at all should be equipped on coming out of the shops if it did not have an arch when built. There is no other capacity increasing factor so easily and so inexpensively applied to existing locomotives.

Superheater

To this improvement the largest increase in locomotive capacity is due. The heavy trains of today could not be handled without superheaters. In June, 1910, the Superheater Company got fairly started. Since 1910 our railroads have applied 33,000 superheaters to new and old locomotives, about 90 per cent of new ones having been equipped during the past few years. The application to many more existing engines offers a promising opportunity to still fur-

for the same amount of coal. Feed water heating is a success.

Booster

This capacity increaser is well named. It boosts a heavy train in starting and also on the critical points on grades. It is the latest improvement. It supplies an ideal method of utilizing weight and steam that is not needed for other purposes at low speeds and only at the time that the boost is wanted.

When the train is going the demand for steam is greatest. Immense boilers are needed at speeds. There is a surplus of boiler power when starting and at low speeds. The big boiler requires trailing wheels to carry it. This weight on trailing wheels is also a surplus when starting or when running slowly. The booster couples up this surplus steam and idle weight, making both useful to get the train going and to keep it from stalling on ruling grades. Usually there are a few points on a division which determine the load an engine can haul over the entire division. If these are mastered the rest is easy. This is one of the booster functions. Another is in starting a heavy train, getting it out of a siding or through the switches of a yard. Here is where the 70 to 100 feet of slack between the cars of a long train causes havoc with draft gear. The booster works like an automobile in low gear. It applies its extra power smoothly, avoiding the jerks that a big engine otherwise must give to get going at all.

Again, it solves the problem of the big passenger engine. With 20 to 25 per cent more starting power backing up to take slack is avoided, eliminating the frequent five to 10 minutes' delay in getting a heavy train moving every time it stops. Operating men will appreciate this advantage, especially when they have big passenger trains in several sections, each losing minutes every time they start, especially when they start on grades.

The booster will help keep passenger trains on schedule and the road clear for freight. It puts in your hand the means for placing any engine having trailing wheels into the class above itself in starting capacity. It is as good as another pair of drivers but avoids the larger cylinders, heavier rods and extra weight that these drivers entail and which are wanted only in starting. In fact the booster is better than another pair of drivers because it changes trailing wheels into drivers when wanted, and then changes them back into trailers when the pull is reduced after the wheels are rolling. This is conservation of the highest order.

Control is semi-automatic, giving the engineers the maximum resource for starting power and a negligible minimum of attention or mental effort. Tests on a large railroad show for the booster the following results on a Pacific type freight engine:

1. An increase of 23 per cent in train tonnage, or
2. An increase of 12 per cent in speed on the division in question.
3. An increase of 18 per cent in drawbar pull at 7½ miles per hour.
4. An increase of 13 per cent in drawbar pull at 13 miles per hour.
5. An increase of 22 per cent in starting power.

It is an important tonnage increaser. It is capable of doing more to reduce the cost of transportation than any locomotive improvement except the superheater, and it does more to supplement the superheater than any other factor available.

David L. Barnes will long be remembered for advocating the wide firebox for locomotives. The change "came hard." Dr. Goss helped it immensely with his grate area test at Purdue. At first fireboxes were extended over the frames, but this was not enough. In those days locomotives had leading trucks and the rest of the wheels were drivers. The real wide firebox, needed for steam making at speed, brought the

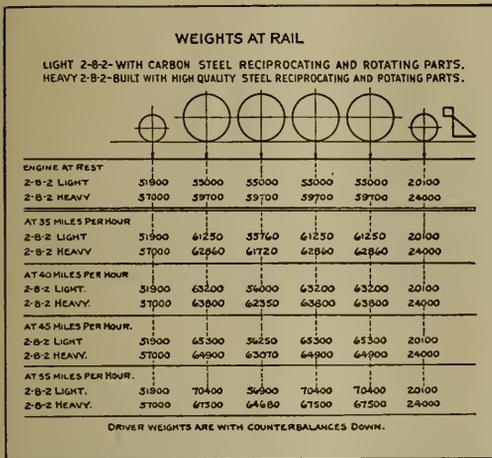


Fig. 5—Decrease in Rail Pressure Effected by Using High Quality Steel

ther reduce the cost of transportation. It is a financial error to operate any locomotive today without a superheater, and the penalty is perpetuated as long as the engine runs.

Feed Water Heaters

This conservation factor is the first to utilize waste heat. It gives back to the boiler heat that is on its way to waste. For generations stationary and marine steam plants have used feed water heaters as a matter of course. The application to locomotives has been attempted many times and has waited only for practicable heater and pump. Thousands of European locomotives are already equipped and several thousand are being applied every year.

For over four years feed water heaters raising the temperature of the water from 40 to 50 degrees to from 230 to 250 degrees have been in successful service on locomotives in this country. These equipments also return for use again about 15 per cent of the exhaust steam in the form of water that has been distilled and filtered. This increase in the tender tank capacity is important in operating because of the ability to save some water stops.

Heat from the exhaust steam is returned to the boiler, giving the boiler less work to do. Therefore, less coal is burned to do a given amount of work or more work is done

trailer axle with its "idle" wheels. We hated the thought of wheels under a locomotive that did not work. This explains the struggle of the Prairie type which persisted until distrust of pony trucks at high speeds effectively buried that type of engine. We gave up not gracefully but under force. Next we became blind to the "idle" weight and went ahead until the country has a lot of it. The booster has given back what was lost and more. The booster uses this idle weight by applying power to the trailers.

Someone will say: "You are talking power and more power. We have too much power now and are compelled to run big, powerful Pacific type engines on light local passenger trains of five and six cars." Let me answer "yes." This work is being done with big engines because lighter ones will not make the time with the frequent stops of local trains. Put boosters on old Atlantic type and the lightest Pacific type engines that have been superheated and do this work with these engines that are suitable for it.

Increase of Capacity

The accumulated increase of capacity due to the superheater, arch, feed water heater and booster is indicated in Fig. 1. At 45 miles per hour the increased power due to these factors is 79.7 per cent, when they are applied in combination. This is now considered too high speed for such a heavy engine. These combined curves indicate that at 30 miles per hour the power increase for the same coal is 50 per cent, at 25 miles per hour 40 per cent, at 20 miles per hour 29 per cent. The diagram also shows the increase in the speed possible with the same load and fuel in case speed rather than heavier loading is wanted. At 30 miles per hour two engines completely equipped give as much power as three "plain" engines. The increased power in this case costs half that of another plain engine and the cost of maintaining two sets of improvements will be less than the cost of maintaining another complete plain engine. The base engine in the case is the Administration light Mikado, as it would appear if built without any of the improvements we are discussing. If greater drawbar pull, due to these improvements, is not desired, the curves show the increased speed that may be had with any given pull.

Fig. 2 outlines an engine equipped to give this power. The absurdity of trying to get it without the efficiency factors is shown in Fig. 3. This engine (Fig. 3) is as "simple as a grindstone." A plain engine to do this work would be a freak that could not be put on any railroad. Look at the wheels, the flue length, the size of the firebox and then think of what this means. I cannot present a better demonstration.

The fuel consumption as affected by these capacity factors is shown in Fig. 4. Of course, increased power means stronger cars, longer sidings and removal of other physical restrictions which in every case are paying business propositions.

High Quality Steel Reciprocating Parts

High quality steel forgings if applied to the reciprocating parts of the United States Railroad Administration heavy Mikado locomotives reveal an interesting possibility. Both light and heavy Administration Mikados were actually built with reciprocating parts of open hearth steel. The results in rail pressures which would be obtained if the heavy Administration engine had been built with high quality steel reciprocating parts of light weight are shown in Fig. 5. The first sets of figures show the rail pressures of the light Mikado with open hearth reciprocating parts at rest and at different speeds. The lower figures in each case show the rail pressures of the heavy Administration Mikado if fitted with light parts of high quality steel. These are shown at rest and at speeds of 35, 40, 45 and 55 miles per hour. At speeds between 40 and 45 miles per hour the light Mikado

becomes more destructive to the track because of driving wheel pressures than the heavy Mikado when equipped with light reciprocating parts. In other words, at all speeds where the engines are likely to damage the track the heavy Mikados with light parts are safer engines than the light Mikados with heavy parts. In this comparison, it should be borne in mind that the heavy Mikado has 10 per cent more tractive power than the light one and 14 per cent more heating surface. The total weight of the heavy Mikado is $9\frac{1}{2}$ per cent greater than the light one. As railroad officers with track and bridge responsibilities, which engine would you choose? Remember that the heavy one has 10 to 15 per cent greater capacity than the light one.

Stokers

Locomotives of greatest power when coal is the fuel have passed the physical capacity of the fireman to maintain steam enough to supply the large cylinders that present operating conditions demand. As the result of development in the severest service known, mechanical stokers are ready not only for present needs but they provide reserve capacity for years to come. In considering the stoker, the chief question is one of increased capacity to get the power from the tender to the grates, in order to get the greatest loads over the road at the least cost. The vital question is the provision of the horsepower at speeds that bring economy in use of tracks and yards and economy in the application of high wage schedules and prohibitive overtime. The stoker development began at about the right time to be ready for power demands that are coming. Power stokers emancipate the big locomotive from the limitations of the human fireman. They render it possible to operate locomotives that require too much coal for the ablest of firemen to handle. They also provide means for getting higher horsepower out of engines at high speeds than otherwise would be possible.

Air Brakes

Air brakes have increased the capacity as well as safety of railroads. By improved brakes alone the capacity of the New York Subway was more than doubled. Without highly efficient air brakes heavy trains could not be run at all. This great subject is merely mentioned here, but it must be considered in connection with the future because today the improved equipment of brakes is in the lead of common practice.

Look Forward

New locomotives are going to last almost indefinitely when kept up-to-date as to modernizing. They lose their useful lives only by obsolescence. The design of new equipment is therefore of the utmost importance and someone on the road should be charged with the responsibility of looking ahead and determining what new engines are to be, long enough in advance to be sure that they absolutely fit conditions as they are and that they will fit as nearly as may be conditions that are to come. This involves a deep study of operation in all its phases. It seems obvious that the general manager or operating vice-president would find his job much easier if every new engine built should receive the same attention that the building of every new big bridge receives. But bridge design is a routine. Locomotive design is improving so fast that most of us cannot keep up with it. The new engine question in itself is a big task, offering great possibilities.

Then comes the question of the existing power and what may be done to it to increase its capacity, increase its pulling power, reduce its failures on the road, to quicken and cheapen the maintenance work and to increase its thermal efficiency and the number of hours that it is available. This involves intimate knowledge of progress in machine tools, in labor-saving equipment, in equipment of locomotive terminals and particularly equipment for running repairs at the round-

houses. Some of the roads are approaching this ideal now. The roads which come nearest to doing it are those which are making best use of their power, and which are in the best shape financially.

The kind of problems which need working out are represented by a study of locomotive drawbar pull which will show whether it is cheaper to increase the power of locomotives or to cut down a certain grade. The money value in reduced cost of operation due to reducing certain grades is already well worked out. It is practically reduced to a formula, but the effect of increased drawbar pull needs to be reduced to a formula. This would at once reveal the money value in operation of increasing the drawbar pull of a Mikado by 50 per cent at a speed of 30 miles per hour or by nearly 30 per cent at 20 miles per hour. Another study of great value is that of considering available drawbar pull hours of locomotives as if it were a deposit in the bank. Figures that show how much of this deposit is used under daily conditions and how much it can be increased by relatively small expenditures offer a promising field for saving.

Because of the improvements of 20 years the locomotive, its construction, its operation and its maintenance presents

the trump card in the reduction of the cost of transportation in the present emergency. That card has been well played, play it now to win.

In conclusion there are two very important points which I do not wish to leave either unsaid or unheeded:

First: In emphasizing the importance of all these items of modernizing, of vitalizing, locomotives we have discussed tonight, I wish to make most prominent the first and greatest obligation of the railroad companies, namely, their responsibility to their owners and stockholders, who first and above all others are entitled to a fair return upon their investments.

Second: As I have already attempted to point out railroad managements have done and are doing wonderfully well in the application of capacity increasing factors to locomotives to augment power. These improvements will by necessity result in substantial savings. There are, however, additional means of economy which are not so closely hooked up with pure problems of capacity increase. These must be further considered by themselves. Funds for carrying out programs in this direction will be made available quickly when the possibilities and necessities are fully appreciated.

Freight Claim Division Plans to Reduce Losses

Organization Contemplates Active Campaign to Arrest Increase in Payments for Loss and Damage

PREVENTION WAS THE KEYNOTE of the Thirtieth Annual Convention of the Freight Claim Division of the American Railway Association (formerly the Freight Claim Association), which was held at the Hotel Sherman, Chicago, from May 17 to 19. The meeting was featured by the setting aside of an entire day for the discussion of causes of, and means for preventing freight claims. It was the first time in the history of the organization that any part of its annual session had been thus set aside for a special order of business centering around claim prevention, and the interest which was manifested, as well as the presence of numerous representatives of the operating departments of the roads, who had been invited to attend, indicated clearly the general realization that the sum of \$109,000,000 paid out in claims in 1920, must be materially reduced. Especially noteworthy was the fact that the 350 representatives of the claim departments of the carriers who attended did not limit their prevention campaign to a discussion, but followed it through with a complete analysis of the causes of the situation, together with recommendations for bettering it.

Following the usual custom, the opening day of the meeting was given over to committee reports and other routine business. The convention was called to order by H. C. Pribble, general claim agent of the Atchison, Topeka & Santa Fe, and chairman of the Freight Claim Division, who emphasized the importance and seriousness of the problems confronting the meeting in his opening remarks. Upon the recommendation of its executive committee, endorsed by the Committee on Rules and Order, the Freight Claim Association voted to incorporate formally in the American Railway Association. By this action the former Freight Claim Association becomes Division VII, Freight Claim Division, of the American Railway Association. Its assets were turned over to the A. R. A. and its members were accorded full voting privileges in the latter organization.

Freight Claim Prevention Most Important Topic

It was obvious from the unusual attendance at the second day's session, that notwithstanding the interest in the amal-

gamation with the American Railway Association, the special order of business was claim prevention. The necessity for an organized claim prevention campaign was emphasized by R. H. Aishton, president of the American Railway Association, who addressed the session in the absence of N. D. Maher, president of the Norfolk & Western and representative of the Freight Claim Division on the Board of Directors of the American Railway Association. Mr. Aishton stated that the Division had made an excellent start toward a reduction in the heavy drain on revenues caused by freight claims, especially in view of the generally run down condition of equipment following federal control, the switchmen's strike of a year ago, and other serious obstacles with which it had been confronted.

President Aishton was followed by Francis C. McAdams, assistant director of accounts of the Interstate Commerce Commission, who presented the views of that body on the claim prevention movement.

Campaign Already Under Way

That the interval since the last session had been utilized in preparing and launching the prevention campaign, was brought out in the report of the Committee on Cause and Prevention, which was presented by the chairman, J. B. Baskerville, assistant general claim agent of the Norfolk & Western. The outstanding feature of the year's effort was the employment of three special claim prevention representatives, to devote their entire time to the work.

In connection with the report of the Committee on Cause and Prevention, it had been decided that the task of analyzing and recommending means of preventing the main causes for claims, in view of the large general session, would be facilitated if the more important subjects were grouped for discussion into five general classes, as follows: *I.* Robberies, resulting in losses of nearly \$2,000,000 per month; *II.* Loss of Entire Packages, costing approximately \$1,500,000 per month; *III.* Rough Handling, responsible for claim payments of about \$1,000,000 per month; *IV.* Defective Equipment, involving a cost of slightly less than \$1,000,000 per month;

1. Delay, resulting in charges of approximately \$500,000 per month.

Aside from the specific recommendations on each of these subjects, two outstanding facts were developed during the session. The first was that excellent results were to be derived from frequent meetings of employees and officers on individual roads for the discussion of prevention of loss and damage claims. Investigations in this connection disclosed that only 57 per cent of the roads of the country were properly organized to interest their employees in investigating and helping to cut down claims. It was the consensus of opinion of those present that strenuous efforts should be made to secure the active co-operation of every carrier in the claim prevention movement. A second feature of the special session was the launching of a movement to secure closer co-operation in the settlement of important claims between the carrier on whose lines shipments originated and the carrier called upon finally to settle the claim.

Robbery and Lost Packages

The subject of robbery, which, it developed, is resulting at the present time in a more serious loss to the carriers than ever before, was discussed at length. It was brought out that the increasing number of depredations was due in large measure to the widespread unemployment at the present time, coupled with the leniency of the courts. It was further established that the pilferers were not confined to any special class of persons, but were in the service of carriers, draymen and shippers alike. The session recommended that the president of the American Railway Association be petitioned to impress the seriousness of the situation upon the various railroad executives throughout the country. It was further recommended that the protective sections of the various carriers be further strengthened at the present time rather than curtailed, in order that freight, as well as the large amount of idle equipment, be amply protected.

The Division agreed that the serious drain resulting from lost packages was due principally to the large number of these packages which go astray and, in consequence, are never recovered. To remedy this difficulty, three proposals were laid down:

1. The carriers should require proof of ownership on astray packages at destination.
2. Notice should be sent to all lines at destination point of the delivery of astray packages.
3. The delivery should be "followed up" to secure revenue billing, in order that the line "short" might be fully advised of the delivery of the "over."

Rough Handling Discussed

The subject of rough handling was brought before the session from a new angle by J. L. Pilcher, mechanical engineer of the Norfolk & Western. Mr. Pilcher illustrated by charts the result of tests which indicated that cars in switching must not be brought together at a speed greater than two miles an hour. It was claimed that the movement at the time of contact can be brought down to this speed, although representatives of the operating departments who were present declared that this practice would slow up operation. The subject of rough handling was referred by the session to the Mechanical, Transportation and Operating Divisions of the American Railway Association for further consideration, in view of the fact that the theory outlined was new and somewhat drastic, and pertained especially to the work of the other Divisions.

Defective Equipment and Delay

Delays, it was established, are not a serious cause of claims at the present time. Those present agreed with representatives of the operating departments, that freight in general is now

moving practically on schedule time. In the same way the meeting held that the subject of defective equipment could well be deferred until the financial condition of the carriers had improved. The sense of the meeting was that equipment had been allowed to run down in many instances during federal control, and that claims resulting from that cause could be reduced only as a favorable opportunity for placing equipment in good condition was again presented.

Election of Officers

The remainder of the session was devoted to outlining the claim prevention campaign for the coming year when a determined effort will be made to reduce the bill for loss and damage claims materially.

The final day of the meeting was occupied with committee reports and with the election of officers. H. C. Pribble, chairman of the Freight Claim Division during the past year, was re-elected. H. C. Howe, freight claim agent of the Chicago & North Western, was re-elected first vice-chairman; W. C. Fitch, freight claim agent of the Southern Pacific, was elected second vice-chairman; Lewis Pilcher was re-elected secretary, and J. B. Baskerville was re-elected chairman of the re-organized Committee on Freight Claim Prevention. These officers were also appointed members of the General Committee of the Division. In addition to the officers, the following were elected members of the General Committee: R. L. Calkins, freight claim agent, New York Central; J. A. Beahan, freight claim agent, New York, New Haven & Hartford; W. B. Kellett, freight claim agent, Fort Worth & Denver City; T. S. Walton, freight claim agent, Missouri Pacific and H. R. Grochan, freight claim agent, Chicago, St. Paul, Minneapolis & Omaha.



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There Are Some Folks Who Are Beginning to Wonder How Much Longer That Orchestra Is Hired for

Annual Convention of Fuel Association

Papers on French Fuel Conditions, Pulverized Coal and Feed Water Heaters at Opening Sessions

WITH AN ATTENDANCE of approximately 200, the International Railway Fuel Association opened its thirteenth annual convention at the Hotel Sherman, Chicago, on May 24 and adjourned after the consideration of a heavy program on May 26.

Following the usual opening exercises the meeting was addressed by Samuel O. Dunn, editor of the *Railway Age*. An abstract of Mr. Dunn's address follows.

Present Railway Situation

By Samuel O. Dunn

The fuel bill of the railroads, like all their other expenses, has increased very greatly within recent years. In the year ended on June 30, 1915, the fuel used by the Class I railroads cost them less than \$210,000,000. In the calendar year 1916 it cost them over \$250,000,000, in 1918 it cost them over \$500,000,000. There was a decline in the amount of traffic handled and in total expenditures for fuel in 1919, but in 1920, owing to increases both in the amount of fuel consumed and in the average price, the total fuel bill of the Class I roads was \$675,000,000. This was an increase since 1916 of \$423,000,000, or almost 170 per cent. This increase in the cost of fuel was partly caused by an increase in the amount consumed, due to the fact that a larger traffic was handled, but much more largely by increases in the price of fuel. A large part of the increases in price took place last year. In the last four months of 1919 the average price per ton paid by the railroads for fuel was \$3.42, while in the last four months of 1920 it was \$4.74, an increase of 39 per cent in twelve months.

Since the end of 1920 there have been substantial reductions in the prices paid by the railroads for coal. It is clear, however, that further reductions must be secured in all their operating expenses, including the cost of fuel. The cost of fuel must be further reduced both by reductions in price and by the effecting of greater economies in its use. The effecting of greater economies in its use must be brought about by securing greater efficiency in the firing of locomotives and also by continuance of the installation of devices which result in less fuel being burned in proportion to the power produced.

I have touched upon this phase of railroad operation because it is the one in which the members of your organization are most directly interested. Speaking now of the general railroad situation in this country, it is at present in some important respects the worst that it has ever been.

Passenger and freight rates are higher than for many years. There is complaint from many travelers and shippers that they are too high. In spite of these relatively high rates, the railroads as a whole never in any month since the rates were fixed have earned the net return it was expected they would. Recently most of them have not been earning enough to pay their operating expenses and taxes, and have seemed headed for bankruptcy.

There is at present a very large surplus of freight cars. It is well known, however, that the present capacity of the railroads have proved unequal, when production and commerce have been active, to all the traffic offered. How are the railroads to handle the unprecedentedly large traffic they are bound to be offered within the near future unless, meantime, their capacity is increased?

In the railroad as in other businesses, new capital is needed

for two purposes. One of these is to increase the amount of business that can be done. The other is to reduce the cost of doing the business. When new investment is wisely made in a railroad or any other enterprise, such as a manufacturing concern having a large plant, it increases the interest and dividends that must be paid. But by saving labor and in other ways it reduces the operating expenses that must be incurred more than it increases the capital charges, and, in consequence, tends to enable the concern to make larger profits, to reduce the prices it must charge, or both. The main reason why for years most of the railways of this country were able, despite steadily advancing wages and other costs, to increase their own profits while making lower and lower rates was that they were constantly investing large amounts of new capital in improvements for the express purpose of reducing or holding down operating expenses. The reduction of the net return of the railways by government regulation reduced the amount of new capital they could raise. This, in turn, reduced the improvements that could be made and greatly impaired the ability of the managements to effect operating economies.

On March 1, 1920, the railways were returned to private operation. During government control the operating expenses had continued to increase rapidly right down to the last day of government control. In the very last month of government control the railways failed at the rate of \$270,000 a day to earn enough to pay their operating expenses and taxes, leaving nothing with which to pay the government guarantees. Within a few months the Railroad Labor Board, a government body, granted the largest advance in wages ever made to a single class of working men at one time in the history of the world. The prices of fuel and materials were advancing, and within a few months attained higher levels than during the war.

The Interstate Commerce Commission granted an advance in rates late in August. Although the railways were handling a record breaking business, the rates failed from the start to yield the net return expected. In consequence, in the last four months of 1920, when the railways handled the largest traffic ever known in those months, it cost them 88 cents of each dollar they earned to pay their expenses and taxes, and the net return earned was at the annual rate of only $3\frac{1}{2}$ per cent instead of 6 per cent.

While the railways were in the precarious position financially these figures indicate there began a large slump in traffic. Not only were net earnings wiped out, but beginning in January and February the operating expenses and taxes, in spite of great retrenchments, exceeded the total earnings.

Nobody connected with the railways believes or has contended that all the reductions in the cost of operation should be made in the payroll. The railways contend, however, that the payroll is excessive, that it is the main reason why the operating expenses are excessive and that the main reasons for the excessive payroll are that, first, rules and working conditions adopted under government control have reduced the efficiency of labor and forced the railways to employ too many men, and, secondly, that the basic wages of railway employees are too high.

The Railroad Labor Board has ordered the National Agreements abrogated on July 1, subject to certain principles which it has laid down. The labor union leaders have announced that they will draft and submit to the individual

railways throughout the country a set of uniform rules and working conditions, and they undoubtedly will make a strong effort to get these adopted. No uniform set of rules and working conditions could be applied throughout the country without causing great inefficiency and waste. The benefits that will be derived from the decision in the National Agreements case are, therefore, yet to be determined.

In addition to seeking abrogation of the National Agreements, the railways have asked the Railroad Labor Board to make general reductions of wages. They base their application mainly upon the grounds that wages have been reduced in most other industries and that the cost of living has declined.

The principal answer of the labor leaders to this argument is that through mismanagement the railways are wasting about \$1,000,000,000 a year, and that all this alleged waste should be eliminated before the payroll is curtailed.

After the present wages were fixed, and when the railways were still carrying a heavy traffic, their total operating expenses were running at the rate of about \$6,000,000,000 a year, and of this amount almost \$4,000,000,000 was going to labor in wages, leaving about \$2,000,000,000 for other expenses. Since the labor leaders defend the present payroll, it follows, on their theory, that, by eliminating preventable "wastes" the managements could and should reduce all expenses except the payroll by almost 50 per cent. At least four-fifths of this other \$2,000,000,000 of railway expenses consists of expenditures for fuel and for equipment and materials and supplies—iron and steel, lumber, office appliances, stationery, etc. The labor leaders claim the railways pay excessive prices for these things because the railways are under the same financial control as the concerns from which they make purchases.

It would be easy to prove, if time permitted, that all this talk about the control of railways and the concerns from which they make purchases by the same financial interests is the wildest buncombe. But suppose they are under the same control. Where is the evidence that this causes the railways to pay excessive prices for fuel and for materials and supplies? Do they pay more for coal than other large consumers? The coal operators complain loudly that the railways use the "assigned car" rule to get coal cheaper than other concerns. Do they pay more for iron and steel? Until recently they, like other consumers, were paying the United States Steel Corporation, which is supposed to be the archetype of a concern controlled by the house of Morgan, the same prices which were fixed by a government board in 1919, and which other people were paying; and they are now paying it and other steel concerns less than these prices. Do the railways pay more than others for lumber? Every lumber manufacturer and dealer will say they are close buyers. The allegation that the railways as a whole, because of their actual or alleged financial control, waste money by intentionally paying excessive prices has never been supported by a scintilla of evidence, and it never can be, because it is absolutely baseless.

The labor leaders also criticize the railways for not having made certain important improvements in their physical properties which would enable large economies to be effected. To make large economy-producing improvements the railways must first raise large amounts of new capital to invest in them. But they cannot raise this new capital until they are enabled to earn a net return sufficient to pay reasonable interest and dividends on their present valuation. Their net return cannot be made adequate for this purpose without large reductions of their present expenses, of which the payroll constitutes two-thirds; and the labor leaders oppose all reductions of the payroll.

The Railroad Labor Board has definitely announced that reductions of wages will be made which will be effective on

July 1. It has not, however, indicated how large these reductions of wages will be.

It is very doubtful if we shall ever return to pre-war wages and other expenses, or to pre-war rates, and highly probable that it will be a long time before we even approach them. The great war has made profound changes in economic and social conditions throughout the world, and also in man's thinking and in the relations of different classes of men to one another; and until you have restored, if you ever shall restore, pre-war conditions, pre-war ways of thinking and pre-war relationships between employers and employees elsewhere, you cannot hope to restore them on the railroads of this country. What we can do and must do on the railroads is to deal more justly with labor of many classes than formerly was done with respect to both wages and working conditions and at the same time make the railroads once more an instrumentality which can and will render their service to the public with a high degree of efficiency and economy.

I have not the slightest idea that the pre-war wages of railway employees ever will be restored, nor do I think they ever should be. There were many classes of employees who, before the war, were not paid as much as they should have been in proportion to the cost of living at that time, and I hope to see their wages in future kept higher in proportion to the cost of living than they were before. And in this connection I think special reference should be made to the cases of supervisory officers. It is a fact today, as it has been for years, that many supervisory officers are paid less than the higher paid employees over whose work they exercise supervision. Indeed, the average salary of all division officers, including superintendents, master mechanics, trainmasters, road foremen of engines, etc., is less than the average wages of some employees. According to the latest available statistics the average salary of all division officers now average \$3,437 per year, while the wages of passenger locomotive engineers average \$3,450 and the wages of freight engineers \$3,586. The advances granted to divisional and supervisory officers since before the war have been relatively much less than those granted to most classes of employees, and as a matter of justice to the officers this fact, together with the fact that many of the officers were underpaid before, should be given great weight in any readjustments which may be made in future.

Bad as the situation is today, I am not pessimistic about the future of the railways. On the whole, I have no doubt that we have seen the worst we are going to see in the railroad business.

However, we should clearly recognize the fact that if the railroads are again to be put upon their feet the utmost efforts must be made by all of us who are directly interested in the business, first, to secure the utmost efficiency and economy of operation, and, second, to keep the public fully informed regarding everything that is being done to promote efficiency and economy, in order that the many unjust attacks which will continue to be made upon the managements of the railroads in the future, as they have been in the past, will not mislead public opinion regarding private management. All of us who are in close touch with railway affairs know that private management is by no means perfect, but we all have very good reason for believing it is much better than government management or Plumb plan management would be, and, therefore, it is our duty to do all we can to make sure that private management will be perpetuated.

President Hurley's Address

Following Mr. Dunn's address, J. B. Hurley delivered the presidential address, of which an abstract follows:

The occasion that bids us gather in convention at this time is indeed an important and impressive one. Many great and perplexing questions confront the mind of America to-

day and call for settlement—never probably in the history of the nation was there a time when loyal citizenship and patriotic co-operation on the part of all for the good of her institutions, for the maintenance of her business enterprises and for a respectable moral standard was more desired than at present. War with its horrors and sacrifices brought extravagance. The emergencies of the times to a great extent broke down our systems of economy and an extravagant increase in material, in production, in labor was a natural outcome of urgent necessity.

The war has ended, but it has left its impressions and its deadly influence—excessive profits and wages of war times have brought a spirit of unrest and discontent to the minds of those who in their loyalty are asked to practice economy that our business interests may prosper, that we may take our place even with keen competition, not only as the first nation of the world by our wealth, but first as an industrial and commercial nation. This is the prime object of our convention—that we may bring about a better feeling and spirit between employer and employee, that we may win the employee by interesting him in his work and making him feel that work is rather a pleasure than a crime—that we may better the employee by educating him to know and understand his work that he may do it well, and hence, be a source of satisfaction and interest to his employer.

That by so working, the employer may know and understand that the work of the employee is of first interest to the employer and that he concern himself in working for and bettering the working and home comforts of his employees when consistent. A spirit of mutual interest between employer and employee is an absolute necessity if our business is to prosper and grow.

At the close of Mr. Hurley's address the report of the secretary was read, showing a membership of 1,311 members at the close of the calendar year 1920.

Report of Committee on Pulverized Fuel

The progress of the art of burning pulverized coal by railroads on locomotives or in stationary plants the past year has, on account of well understood economic and other conditions, been practically nil, no new installations having been made.

Some few tests have been made. One of these which is of some interest was made on Lehigh Valley locomotive No. 1360 between Easton and Leighton, Pa., to determine the practicability of burning pulverized North Dakota lignite containing 15 per cent moisture and Red Lodge sludge (Montana sub-bituminous coal) without resulting in serious honeycomb formation or unusual disintegration of brick work.

The results were successful with the exception of the honeycomb formation which with either coal developed rapidly on the back flue sheet when the locomotive was worked hard and seriously hampered operation. The committee suggests that this honeycomb formation be not taken too seriously and believes that with proper research and engineering work to determine the coal characteristics and to develop proper design of boiler and firebox with particular reference to combustion area and also to drafting, that this problem can be solved. In connection with drafting the committee has in mind the elimination of pulsating draft and correctly determined air supply.

In stationary practice two new cases of pulverized coal operation have been called to the committee's attention. The Milwaukee Electric Railway & Light Company during the past year completed and put into operation a new power plant at St. Francis, near Milwaukee, Wisconsin, manifesting their confidence in the economic advantages of burning pulverized coal.

The Oklahoma City plant of Morris & Company, originally equipped with chain grates, has been modified to burn either pulverized coal or oil and has been in successful operation for a little over a year. By the use of suitable burners it is practicable to burn either pulverized coal or oil without changing furnace or boiler. The coals used are Macalaster Field having a B. t. u. value of 10,000 to 11,500; moisture, 5 to 10 per cent; volatile matter, 20 to 30 per cent; fixed carbon, 40 to 45 per cent; ash, 30 to 35 per cent; sulphur, 1 to 2 per cent, and Texas lignite having a B. t. u. value of 6,000 to 7,000; moisture, 30 to 35 per cent; volatile matter, 20 to 25 per cent; fixed carbon, 25 to 30 per cent; ash, 10 per cent.

This plant is reported as being particularly economical in cost of operation, showing an 8 to 10 per cent saving in cost of steam production based on MacAlester coal, over the stoker fired boilers burning coals of equivalent B. t. u. values. Accurate daily records of cost are maintained for purposes of comparison.

The state of the art today indicates an unquestionable field for pulverized coal and that its commercial use depends upon the economic conditions obtaining, each case requiring its own particular analysis.

The committee repeats its previous recommendation that thorough research and engineering work accompanied by conclusive tests be conducted at one of our universities adequately equipped, particularly in connection with the burning of pulverized coal on locomotives, the work to be supervised by competent men representing the railroads and the university.

The report is signed by W. J. Bohan (Nor.-Pac.), chairman; H. T. Bentley (C. & N. W.); R. R. Hibben (M. K. & T.); H. Piollet (Lehigh Valley); W. G. Squires (N. Y. N. H. & H.); J. M. Nicholson (A. T. & S. F.); L. R. Pyle (Locomotive Firebox Co.); W. L. Robinson (B. & O.), and E. C. Schmidt (North American Co.).

Discussion

Alonzo G. Kinyon (Fuller Engineering Company) expressed the opinion that it would not be many years before as high as 50 per cent of the coal burned would be in a pulverized form, this statement applying particularly to industrial and power plants. He said that the locomotive, as at present designed, was not well adapted to burn pulverized coal under all of the conditions it is called on to meet. Thus far nothing has been developed which will eliminate trouble from honeycombing, with certain coals when the locomotive is working at high capacity.

Eugene McAuliffe said that it is yet to be proved whether a kilowatt-hour is produced with fewer heat units from pulverized coal than from coal burned on grates, but laid stress on the versatility of pulverized fuel burning equipment where relative values of oil and coal call for frequent changes from one to the other.

Locomotive Feed Water Heating

The interest in feed water heaters in America is shown by the history of the past year to be growing, in that the number of roads to take up the two main types of feed water heaters for tests has increased. There are no new feed water heaters brought out this year, but progress has been made in the simplification of the design of the Locomotive Feed Water Heater Company and Worthington systems.

In 1920 there were seven roads using the Locomotive Feed Water Heater Company, Weir, Worthington, Caille, and the Simplex Blake-Knowles feed water heaters. There are now eighteen American roads with five types of heaters on order or in service; namely, the Locomotive Feed Water

Heater Company, Weir, Worthington, Caille, and the Simplex Blake-Knowles. These are as follows:

The Superheater Company's Feed Water Heater:	
Delaware & Hudson.....	2
New York Central.....	4
Delaware, Lackawanna & Western.....	1
Rt. Smith & Western.....	2
Grand Trunk.....	5
Erie Railroad.....	5
Canadian Pacific.....	5
New York, New Haven & Hartford.....	5
Atchison, Topeka & Santa Fe.....	4
Southwestern Pacific.....	4
Central Railroad, New Jersey.....	2
Central Vermont.....	2
Chicago & North Western.....	2
Lake Shore & Michigan Southern.....	1
Elgin, Joliet & Eastern.....	1
Total on order and applied.....	35
Worthington Feed Water Heater:	
Pennsylvania Railroad.....	4
Norfolk & Western.....	1
Southern Pacific.....	5
Chicago & North Western.....	2
Total on order and applied.....	12
Weir Feed Water Heater:	
Canadian Pacific.....	1
Southern Railway.....	2
Grand Trunk.....	1
Total on order and applied.....	4
Caille Feed Water Heater:	
Baltimore & Ohio.....	1
Simplex Blake-Knowles Feed Water Heater:	
Erie Railroad.....	3

The Southern Pacific is trying out some of both the open and closed types of heaters. The roads which have tested out these heaters are securing practically the same results as given in the results of tests of the two classes of heaters, a saving of between 13 and 15 per cent based on increase in evaporation of pounds of water per pound of oil. However, in bad water districts it has been found necessary to clean the closed heaters due to scaling, in order that this saving be maintained. No data are available in bad water districts of the Worthington heater. Several means have been tried for the cleaning of the closed type of heaters, and it is believed that satisfactory means at low cost have been secured using a dilute solution of hydrochloric acid, but service alone can determine the life of the feed water heaters and flues.

The question of weight on drivers has to a certain extent influenced the adoption of the feed water heaters as at the present time the railroads have this problem to contend with, and in order to keep the weights of the locomotives within the bounds prescribed by their various roads, this valuable method of saving fuel has not been universally adopted.

The report is signed by E. E. Chapman (A. T. & S. F.), chairman; E. A. Averill (The Superheater Co.); O. S. Beyer, Jr.; B. J. Farr (Gd. Tk. Wn.); F. Kerby (B. & O.); A. T. Pfeiffer (N. Y. C.); L. G. Plant (Ry. Review); L. R. Pyle (Locomotive Firebox Co.), and W. H. Winterrowd (Can. Pac.).

Discussion

Eugene McAuliffe expressed the opinion that feed water heating had proved an effective means of reducing fuel consumption and the application of such devices is now only a question of obtaining the necessary capital.

J. N. Clark (Southern Pacific) described the results of feed water heater tests which showed that in some cases the heaters, raised the temperature of the water up to 255 deg. F. He stated that the maintenance of the heater needs to be carefully considered, especially in bad water districts where it requires frequent cleaning because the savings largely disappear when scale forms on the surfaces.

E. E. Chapman stated that the saving in various tests range from 8.4 to 16.6 per cent. He pointed out that feed water heaters reduce the rate of combustion and thus lengthen the life of boiler tubes and firebox sheets. It has been found advisable on the Santa Fe to clean the heaters every two weeks with a diluted solution of muriatic acid. This operation requires about two hours and is effective in removing scale.

Report of the Committee on Storage Coal

There has been very little activity in connection with the storage of coal by railroads since the last report of the Storage Committee.

The Fairbanks, Morse Company report of the completion of three locomotive coaling stations, including yard storage of coal, built for the Erie. At Salamanca, New York, the coaling station consisted of four circular concrete bins of 1,000 tons' capacity and tributary storage for 38,000 tons. A similar plant was built at Hornell, New York, with tributary ground storage for 33,000 tons. A 300-ton coaling station was also built for the Jacksonville Terminal Company at Jacksonville, Florida, where 300 tons is stored in overhead pockets and 2,500 tons on the ground.

All of these plants were of the drag scraper type which has been largely used by the Southern Railroad and has been described in previous reports of the committee. As to cost of operation of such plants, F. P. Drinker, manager, engineering department, Fairbanks-Morse Company, says that in 1914 observations of the operation of some of the plants on the Southern Railway showed that the cost of handling coal in and out of yard storage, including power and supplies and maintenance, averaged about 2½ cents each way, or 5 cents per ton, delivered to locomotives, and that this would indicate on the same basis a handling cost of from 10 cents to 12 cents per ton at the present time.

The Roberts & Schaefer Company report the development of a new type of storage in connection with the Rand portable coaling and cinder plant.* This type of coaling and storage plant may be equipped with a large capacity hoist or a small capacity hoist. A price for the structure complete above the rails and electrically operated, is quoted as follows:

For large capacity hoist.....	\$36,670
For small capacity hoist.....	34,490

No figures are available at this time for the cost of operation of the storage portion of this plant for it is difficult to obtain separate storage figures as many of the railroads do not attempt to separate storage and coaling costs.

The Portable Machinery Company, Passaic, New Jersey, reports an installation of portable conveyors for the Atlantic Coast Electric Railway, Asbury Park, New Jersey. The pile contains about 3,000 tons and the Atlantic Coast Electric Railway reports that it can store 350 tons a day with four men unloading and attending the conveyors. The company reports that during the past two years it has built up a similar pile at four different times and later removed it to the station. At the other end of the power plant the company has a similar storage pile.

The last report of the committee† included a circular upon coal storage sent out by the Fuel Department of the Railroad Administration to all of the railroads of the United States. This was prepared under the direction of Eugene McAuliffe and a committee of railway representatives. Mr. McAuliffe reports, that "No definite information regarding the outcome of the storage circular is available. Personally I have heard but one comment, that 'Railroad officials with few exceptions paid little attention to the circular.'"

Depleted stocks of railroad fuel are particularly significant to the general consumer because they point to the probability that the railroads will have to confiscate coal or assign cars freely, measures which necessarily interfere with the regular deliveries of coal to other users. Stocks of railroad fuel were far below those held by the railroads at any time during the last four years.

The Consumers' Fuel Company, Morgantown, W. Va., built in 1920 a Thornley storage plant. A number of inquiries in regard to storage of coal at the mines have been

*This plant was described on page 607 of the March 15, 1921, issue of the *Railway Age*, Daily Edition, and illustrated on page 644 of the issue of March 16.
 †See page 1311 of the May 30, 1919, issue of the *Railway Age*.

received, but a number of companies that have investigated the subject have concluded that such storage is not advisable unless an increased car rating may be obtained by the mining company as a result of such storage facilities. The general public and the large users of coal should have impressed upon them the fact that storage at the mine is not of any particular assistance to the railroads or to the consumers of coal in providing coal under emergency conditions, but acts merely as a safety valve upon operating conditions at the mine. The proper place to store coal to relieve the railroads and the consumer is as nearly as possible to the point of consumption.

In a circular issued by the United States Geological Survey under date of March 27, 1921, entitled, "Are We Buying Coal Enough?" Doctor George Otis Smith, director, and F. G. Tryon, coal statistician, summarize the present condition as follows:

"In so far as the consumer is waiting for the price to come down, at the risk of depleting his reserves against winter requirements, the relief turns upon a question of fact, namely, whether the present market price of coal is a reasonable price, whether it is as low as can be expected later. It is to be regretted that the Federal Trade Commission has been enjoined from learning the facts and so is not able to issue a statement of present-day costs that would enlighten the public.

"But only as needed,' may prove too conservative advice at this time. The consumer waiting for low prices and the producer delaying price adjustment might be found equally responsible for the uneconomic seasonal fluctuations in coal output. 'Buy only as needed,' may result in cheaper coal in the bin, but the bin may be too nearly empty much of the time when the need is greatest."

The necessity for the storage of coal was stressed in a set of conclusions prepared by the Committee on the Stabilization of the Bituminous Coal Mining Industry of the American Institute of Mining and Metallurgical Engineers, which may be summarized as follows:

(1) The bituminous industry, by the nature of its organization, functions economically in a too inefficient manner. Employment in the industry averages less than 220 days per annum, with a minimum district average of less than 200 days.

(2) The causes are largely (a) intermittency in seasonal demand, (b) irregularity of car supply, and (c) the lack of storage facilities and incentive for their use.

(3) The cure lies in: (a) The co-operation of railroads in the establishment of seasonal differentials in rates that will induce summer demand; (b) increased transportation facilities and a more efficient and equitable distribution of cars; (c) increased use of central and inter-connected electric-power plants; (d) lower selling prices in dull seasons made possible by differentials in profits, freight rates and wages; (e) recognition by the larger consumers, that not only continuity of operation, but also the safety of the public from the stoppage of supply, demands that they provide adequate storage to be replenished in the dull season.

(4) Such storage is feasible and can be made financially remunerative by differential rates and prices.

(5) No adequate solution can be found, except through organized co-operation of operators, labor, railroads, and large consumers.

The committee feels that one of the greatest problems is to get the higher railroad authorities to thoroughly understand the importance of the storage of coal and that they may appreciate the necessity for careful and systematic storage. Spasmodic attempts to store coal have always proven unsatisfactory both to the consumer and to the producer and that storage of coal may be successful it must be conducted regularly and in a methodical manner and by the fullest co-operation of producers, carriers and consumers. The storage

proposition must be tied up with production to such an extent that it will co-ordinate properly, and when large stocks of coal have been stored the production and movement will have to be regulated in such a way that the storage coal can be used most advantageously and not become simply a high priced inventory article. The experience of the past 3 or 4 years shows conclusively that storage of coal must be more carefully considered and that only by such careful consideration can it become the stabilizing influence that it should.

If a practicable plan of storage at large distributing centers had been operating during 1919 it is probable that the November strike of that year would not have produced the condition of panic that followed during the spring and summer of 1920.

The report is signed by H. H. Stoek (University of Illinois), chairman; A. H. Davies, C. G. Hall (Walter Bledsoe & Co.); J. B. Hutchison (Texas Steel Co.); B. P. Phillippe (Penn System); R. E. Rightmire (Consolidation Coal Co.); A. P. Wells (Central of Georgia); H. Woods (Colorado & Southern); S. L. Yerkes (Grider Coal Sales Agency).

Fuel Conditions on the French Railways

By M. de Boysson, Ing.,

Chief of Locomotive Service, Paris-Orleans Railway, Paris, France

The question of locomotive fuel consumption has always been one of the greatest importance to the French railways for the cost of coal, even before the war, has been relatively high and the yearly fuel bill represents a large proportion of the total operating expenses.

In 1912 the average cost of coal used by the French railways was about 18 to 19 francs (\$3.60 to \$3.80) per ton loaded on the cars, and about 21 to 22 francs (\$4.20 to \$4.40) per ton delivered on the tender, including the cost of freight and handling. In 1914, on the eve of the war, these prices had increased some 60 or 80 cents per ton, and at that time the cost of fuel for the French railways amounted to about one-sixth of their total operating expenses.

The average price of French coal and imported coal was, in 1920, more than 250 francs (\$50) per ton. Furthermore this increase in price was accompanied by a decrease in quality. The amount of ash, which in ordinary times averaged from 8 to 10 per cent, rose to an average of nearly 17 per cent. This naturally caused an increase in fuel consumption. At the present time the French railways are, therefore, paying about fifteen times the pre-war cost for fuel and the total fuel bill now amounts to about 35 or 40 per cent of the total operating expenses as compared to about 16 per cent before the war.

Under these circumstances it has been necessary for the French railways to give careful attention to the fuel consumption and the price of fuel. They have concentrated principally on the three following points to obtain fuel economy: choice of fuel, improvements in the locomotive to improve fuel consumption, and training of the engine crew and supervision of fuel consumption.

Unfortunately, in spite of the increase in price, it has not been possible to accomplish much in the direction of economy. The reason for this is due to the scarcity of coal, the difficulty of obtaining sufficient supplies of all kinds to provide the proper mixtures, and the fact that a large number of inexperienced men have had to be employed to replace the men lost in the war.

Choice of Fuel

The destruction of the mines in the North and the Pas-de Calais districts, greatly reducing the coal resources of France, no longer permitted the railways to choose the fuel best suited for locomotive use and they have had to be satisfied with what they were able to obtain. Furthermore, the

decrease in the amount of coal carried in stock has forced them to burn the coal as it arrived without permitting them to make mixtures, as had been done in the past, which would give the best results. The situation has, however, improved a little during the past few months and the railways are gradually returning to more economical methods.

Before the war it was the practice of the railways to mix coals of various qualities in order to provide a mixture which would give the most economical results, taking into account the cost and consumption. By this means the railways were able to use a fair proportion of coal of inferior quality, containing a large proportion of dust, and fuels low in volatile which could be obtained at a comparatively low price. Such coals which would be unsatisfactory when burnt alone, gave very good results when mixed with coals of a better quality.

Another method of using this inferior coal is to combine it with a certain amount of resin to form briquettes. The French mines from which the railways draw their supplies, produce a fairly large proportion of small coal and, further, screened coal coming from abroad arrives with a large amount of coal dust caused by repeated handling. It is necessary to find a use for this small coal and dust, of which there is too large a quantity to be burned as it stands. Briquetting solves the problem and at the same time increases the supply of select coal, which is not obtained in sufficient quantities from the screened coal to meet the needs of the country. Briquettes are made by mixing 92 parts, by weight, of coal with 8 parts of resin. This mixture forms a briquette of good quality which can be used under the same conditions as the best coal, both under difficult operating conditions and for firing up. The total cost of this briquetted coal is practically the same as that of screened coal and the briquettes have the advantage in that they can be handled and stored in the open with much less deterioration than the screened coal. Furthermore, by the addition of the 8 per cent of resin, it is possible to use low volatile fuels which under ordinary conditions would be useless.

These briquettes are manufactured in special presses in which the mixture of small coal and resin, after being heated to about 250 degs. F. to give the resin a consistency of paste, is compressed at pressures of from 3,000 to 4,200 lb. per sq. in. The small coal used in the briquettes can be used just as it comes from being screened, but as a rule it is best to clean it by washing. The weight of the briquettes vary from 6 to 20 lb. The briquettes are made either at the mines or at the ports at which the foreign coal is delivered. Some railways have briquetting plants of their own.

It is the practice of the French railways to mix different grades of fuel in order to obtain the most economical combination for the locomotive service involved. These mixtures will contain more or less high grade fuel according as the service is more or less difficult. The degree of perfection obtained in these mixtures is, however, subject to the kinds and quality of coal available and the cost involved in obtaining the proper quality of coal for the ideal combination.

The amount of volatile matter contained in these coals is rather variable. The average of the mixtures have from 18 to 25 per cent volatile, but all fuel having 15 to 30 and even 32 per cent can be used. In exceptional cases even these limits have been exceeded. Coals with a fusible ash below 2,200 deg. F. are avoided as much as possible and those which produce clinkers which adhere to the grates are not used at all.

Fuel Stocks and Methods of Handling Coal

In order to obtain the proper mixtures it is necessary to have at each coaling station a fairly large stock of fuel, because regular deliveries of the different grades of fuel cannot be depended on. A large stock is still more important in districts which are supplied with imported fuel.

The normal stock allowed for the railways was about three to four weeks' supply for pit coal and six weeks' to two months' for briquettes. The latter should not be used until they are dry which takes about a month after they are manufactured. The coal coming from the ports is either mixed immediately when it arrives at the coaling stations, or is placed in separate piles, if the arrivals are too irregular, and mixed in the desired proportions when it is loaded onto the locomotive.

In order to facilitate making these mixtures, mechanical methods of handling have been devised which have the added advantage of reducing the cost of handling. A complete study of the methods of handling would exceed the scope of this paper and only a few particulars of the machinery used by the railways will be mentioned.

The coal cars at the coaling stations are unloaded by steam or electric traveling cranes. A certain amount is delivered directly to the locomotive but the most of it is placed in storage for the purpose of making the mixtures, the same cranes being used in the future handling of the fuel.

At engine houses of medium size the locomotive tender is loaded with the same apparatus that is used for unloading the coal as it arrived from the source of supply. In the larger engine terminals, however, the two operations are distinct, principally because the lack of space required that the storage ground for the fuel be placed at a considerable distance from the engine houses. When the locomotive tender is not loaded directly by the means of cranes, one of the following two methods is adopted: (a) the coal is placed in small push cars, holding about 3,000 lb., and pulled up an inclined trestle by an electric hoist, where the coal is dumped directly onto the locomotive; (b) the coal is raised, either by a crane or chain buckets, into a regular coal chute from which it is delivered directly to the locomotive.

The briquettes cannot be handled with the grab buckets. The greater part of the work is done by hand, although it is possible to load them into the push cars and deliver them to the locomotive in the same manner as is described under (a) above. They are also loaded onto the locomotive by means of ordinary buckets filled by hand.

Practically all of the coal delivered to the locomotives is weighed. This does not present any difficulties when the push cars are used but when the coal is loaded onto the locomotives by the means of buckets no attempt is made to obtain the actual weight, the practice being merely to count the buckets. However, the workmen who are accustomed to doing this work are able to fill the buckets to very nearly the same weight and there is but little appreciable error.

Purchase and Inspection

On account of the various qualities and sources of supply of the coal used, it is not possible to rely upon the analyses at the mines. The contracts are therefore made for each different grade of coal, fixing the maximum amount of ash and also quantity of water in washed coal at the point at which the fuel is received. Fines or premiums are provided for coal whose maximum is above or below these figures. In the case of briquettes there is an additional cohesion test.

A maximum proportion of small coal content is specified for both screened and run-of-mine coal. There are, also, other limits which if exceeded are grounds for rejection. The quality of the coal is checked from samples taken either at the mines or at the ports where the coal is unloaded, or even at the coaling stations. These samples were analyzed in the laboratories. This system of checking was discontinued during the war, for the first consideration was to increase production. The railways are trying gradually to put it into force again.

The ordering, inspection and handling of fuel is under the control of a special department, which may or may not be under the jurisdiction of the general supply department of the railways.

Locomotive Improvements for Economical Operation

BOILER IMPROVEMENTS

As regards the boiler, the following have been the chief improvements:

1. The use of brick arches, while at the same time protecting the tube plate, has reduced the fuel consumption by 3 or 4 per cent. At the present time all the French locomotives are equipped with them.

2. The dumping grate and the shaking grate, while not reducing the fuel consumption, have allowed the use of inferior fuel. The dumping grate is used on all engines and the shaking grate on most of the modern engines.

3. The use of a circular exhaust nozzle, with a variable opening, gives the maximum draft with the least back pressure. Great progress has already been made in the study of the best arrangement for exhaust nozzles; new ones are still being tried. Considerable economy can be obtained by the use of a well built nozzle which is kept clean, without play and which is operated in accordance with established rules. A dirty or badly centered nozzle may increase the back pressure to a considerable degree and at the same time diminish the draft.

4. Boiler lagging is not in general use as the cost of upkeep seems to equal the saving made on the fuel. However, new trials are being made taking into account the present price of coal.

COMPOUNDING AND SUPERHEATING

Compounding has realized an economy of 10 per cent compared with the ordinary engines. At first compounding was applied to two-cylinder locomotives, but they have been almost entirely given up on account of the unequal balance caused by this arrangement. All the recent compound engines have four cylinders.

The use of the superheater overcomes these difficulties and gives, in the case of powerful engines, a saving of about 12 per cent on single expansion engines and 8 per cent on compound engines of the same type. In spite of the economic advantage of compound engines with a superheater and four cylinders, the tendency at present is to return, at any rate as regards engines of average power, to simple engines with a superheater and two cylinders on account of a considerable saving in maintenance and the increased facility of operation.

FEED WATER HEATING

Feed water heaters using exhaust steam were tried before the war. More than one hundred engines are already fitted with this apparatus. These feed water heaters achieve a certain saving of fuel, but on the other hand there are maintenance difficulties and the question is deserving of thorough study.

WASHING BOILERS WITH HOT WATER

Mention should also be made regarding the development of washing and filling boilers while they are hot. Instituted at first in order to diminish the stress of metal in the boilers and to allow the engines to be used again sooner, this process also allows, in certain cases, the recovery of the heat contained in the water of the boilers which are emptied. However, this recovery required extensive apparatus which it was out of the question to install during the war. The present prices are too high for the expected saving to compensate to a sufficient degree for the cost of the apparatus.

STOKERS

Mechanical stokers have not yet been applied to French locomotives. The limitation of the weight per axle (18 tons) does not allow of boilers powerful enough to make these stokers indispensable.

PULVERIZED COAL

Neither has any use been made of pulverized coal, but the railways are following with close attention what is being done abroad and the trials undertaken in France, in order to be able eventually to adopt the practice more or less extensively.

Training of the Engine Crew and Supervision

The engine crew can have a great influence on economy in fuel. Therefore the hiring and training of locomotive engineers and firemen have always been closely watched by the railways. The employees start as workmen or laborers in the engine houses. After a theoretical and practical examination they can, after a certain time, be employed as extra firemen according to the requirements of the service; but they are not called firemen for a considerable time, which, before the war, was not less than three or four years. After acting for some time as firemen, depending on the aptitude of the employee, they have to undergo a more complete theoretical and practical examination to prove their fitness for the duties of locomotive engineer. Before the war a man was not made an engineer, except in special cases of those who had a more complete training, in less than seven or eight years, of which three years were served as fireman.

During the whole training period the employees are carefully supervised and placed under locomotive engineers who are particularly qualified to act as instructors. During their work the engineers and firemen are frequently accompanied by traveling engineers, who complete their instruction.

The necessity for increasing the strength of the staff very quickly on account of the requirements arising from the war and especially on account of the application of the eight-hour day, forced the railways to train the engine crews very hurriedly and to reduce the length of the term of probation, certainly to the detriment of the skill of the employees and the fuel consumption.

PREMIUMS FOR ECONOMY

It is not enough to train the engine crews; they must also be interested in producing results. To accomplish this the railways give the engineers and firemen a share in the fuel savings. A certain quantity of coal is allotted to each service, based either on train-miles or ton-miles and the saving made on the allotment is paid to the men at a contract price. The results obtained from this premium were very satisfactory. Recently, owing to pressure from the unions, a guaranteed minimum of premium has had to be assured to the men each month, whatever the amount of the premiums actually realized, and many of them have been content to draw this minimum without trying to obtain greater savings.

ROAD SUPERVISION

On the one hand, the traveling engineers make sure that the engineers and firemen are getting the best possible out of their locomotive; on the other hand, by means of statements of consumption on each engine, attention is drawn to the engine crews or the services which are unsatisfactory. They are carefully watched, and, as required, the management takes action. If the fault is in the engine, it is immediately sent to be repaired.

LOCOMOTIVE MAINTENANCE

The maintenance of the locomotives is also closely watched. Strict rules as to the periodical inspection of the

engines are in force at the engine houses and supplementary inspections must also be made whenever it is necessary to maintain the engines in good condition. Provision is made in particular for the piston rings to be replaced about every 20,000 miles; but the rings are replaced before this when the wear exceeds a certain amount. The cylinders are re-bored when the difference between two perpendicular diameters reaches 1.5 m.m. (.06 in.). A sharp lookout is kept in this respect at the main shops.

ASSIGNED LOCOMOTIVES

In general, each engine is assigned to an engineer who alone is to use it. This arrangement gives excellent results as regards economy in fuel consumption. Moreover, in this way more delicate and more economical machinery can be used, because it can be kept in better order. Naturally, this method requires a large number of engines. However, the difference is not so great as might be supposed at first sight, for the better care the engines receive greatly reduces the number of engines held out of service for incidental repairs. From the attempts made by the railways to pool the engines on account of the lack of engines during the war and at the time of the application of the eight-hour day, together with the observations made on the results obtained in the transport service by the American forces in France during the war, we have been able to draw the conclusion that, even in the case of two-cylinder single expansion engines the number of locomotives required for the assigned service, only slightly exceeds—less than 10 per cent—that required in the pooled service. With the more complicated compound engines, the maintenance of which requires more attention, the difference would be still less and, perhaps, even to the advantage of the assigned system.

As this latter system is much superior as regards fuel consumption and cost of maintenance, the French railways continue to use it even though the eight-hour day has increased the number of engine terminals and the number of engines themselves.

Conclusions

The efforts which the railways made to reduce fuel consumption had produced very considerable results before the war. In both passenger and freight service the fuel consumption per gross ton-mile hauled, had diminished by more than 10 per cent between the years 1900 and 1913, in spite of an appreciable increase in speeds. In 1913 the average fuel consumption was about 65 kilograms of coal per 1,000 ton-kilometers (209 lb. per 1,000 ton-mile) hauled and 18 to 19 kilograms per train-kilometers (64 lb. to 67.5 lb. per train-mile). In some services, where the engines had been replaced by more modern ones, the saving reached 40 per cent.

Unfortunately, the disorganization occasioned by the war has caused the greater part of the progress made to be lost. The railways are trying to remedy the causes of this increase, but it is certain that a considerable time will be required to get back to 1913 conditions.

On the other hand, experiments have been made for replacing coal with liquid fuel and also by the development of electric traction. Several engines have been equipped to burn oil, using the oil burning arrangements adopted in the United States. Up till now the results appear satisfactory from an operating point of view, but France does not possess any oil and has to import it. The problems of the cost of this fuel and certainty of supplies are still far from being solved.

On the other hand, the development of electric traction with hydro-electric power stations—there is abundant water power available in France—is certain. The three railways which are in mountainous districts, the Paris-Lyon-Mediterranean, the Paris-Orleans, and the Midi, have drawn up

programs including, from now onward, the electrification of a large portion of their lines. Surveys are being made, a large part of the concessions granted, and the work will commence shortly. Nevertheless, it will still be some years, especially with the present delays in construction, before an appreciable saving in coal is reached. It will be possible to make a saving of 3,000,000 tons of coal per year when the whole program is completed.

Even for parts where steam-driven electrical power stations have to be used, the substitution of electrical power for steam locomotives ought to bring about a saving in coal of about 50 per cent.

A report of the proceedings of the later sessions of the convention will appear in a later issue.

The Pennsylvania and Its Employees

GENERAL W. W. ATTERBURY, vice-president of the Pennsylvania Railroad, has announced to employees that plans are being made for conferences with representatives of employees as recommended by the Railroad Labor Board in its decision under which all national agreements are to be terminated on July 1, next. General Atterbury says:

"The aim of the Pennsylvania Railroad during the last year has been to re-establish with its own men a happy and harmonious relationship. The request of the United States Railroad Labor Board is in line with precisely what the management of the Pennsylvania has desired. The employees have the right to select their representatives from among their own number. Detailed conditions designed solely to secure an accurate expression (by secret ballot) of the desire of the employees, under which representatives will be chosen, will be announced later. The men thus selected will be recognized by the management as empowered to speak for the men by whom they are chosen. The representatives chosen by the employees may or may not be union men, as the employees themselves decide.

"As soon as the representatives are elected, the officers will seek a conference with them, in order to negotiate rules and regulations. The representatives so chosen will be protected in their position no matter what may be their attitude with reference to the provisions of such rules and regulations. They will be provided with the necessary transportation, and the company will reimburse them for time lost and for reasonable expenses while on this service.

"While the immediate emergency to be covered is the preparation of mutually satisfactory rules and regulations, it is the hope of the management that the men thus chosen as representatives may serve as the nucleus of committees which shall frequently confer with the officers on all matters, not only affecting your welfare, but also the welfare of the railroad and of the public that we all serve.

"Together we will develop a plan under which every individual employee may have a voice in the progressive efforts of the railroad itself.

"There are three 'musts' that we shall have to work out in co-operation:

"First. The public must have efficient and economical service.

"Second. The officers and the employees must be paid good wages in return for good service rendered.

"Third. We must earn a reasonable return on the capital invested in the property.

"Through the representatives of the employees to be selected in the manner mentioned we shall be able to get closer together; we shall be able to look one another in the face and mutually to understand the facts affecting our common interest. The highest interests of the Pennsylvania Railroad can only be realized in the welfare of its employees."

George R. Loyall

GEORGE R. LOYALL, who has been selected, as already noted in these pages, to succeed J. H. Young as president of the Norfolk Southern when the latter leaves to take up his new duties as president of the Denver & Rio Grande Western, is an operating man of thorough training and experience. Mr. Loyall started his railroad career as an operator and station agent on the Chesapeake & Ohio. He later served in the employ of the East Tennessee, Virginia & Georgia, which subsequently became a part of the Southern Railway and then with the Southern itself. Employed first by the Southern as a superintendent, he then was promoted to assistant general superintendent, to general superintendent and to assistant vice-president (operation) with headquarters at Washington. Mr. Loyall, in other words, has a well grounded knowledge of railroad operations in the south to assist him in his new work with the Norfolk Southern.

The Norfolk Southern is not a large road. Its total mileage is 902 miles, exclusive of 42 miles of electric lines in the vicinity of Norfolk, Va. This mileage is all in Virginia and North Carolina, the lines of the railway extending from Norfolk, southwest and west to Charlotte, N. C., with various branches. The road was built primarily to reach extensive timber areas, but in more recent years its lumber business, while it has not decreased greatly in actual volume, has decreased greatly relatively to the total traffic. In 1910, for instance, the traffic in products of forests amounted to 816,252 tons, making up 55 per cent of the total tonnage. In 1920 the tonnage of products of forests was 698,572; but the percentage of the total tonnage handled was but 24.91. As the timber has been cleared, the land has been turned over to agriculture; products of agriculture in 1910 totaled 197,725 tons or 13 per cent of the total tonnage; in 1920, 393,456 tons or 14.04 per cent of the total tonnage. Another feature of the road's development has been the great expansion in traffic in products of mines and in manufactures. In 1910, products of mines made up 139,078 tons or 9.38 per cent; in 1920, 724,993 or 25.86 per cent. Manufactures in 1910 made up 248,047 tons or 16.72 per cent in 1910; in 1920, 723,193 or 25.79 per cent. The Norfolk Southern owns all the stock of the John L. Roper Lumber Company, which owns in fee some 600,000 acres of timber land. This land as it is being cut is being turned over to agriculture and has been found to be exceedingly fertile and productive.

The Norfolk Southern up to a few years ago extended only to Raleigh, N. C.; its extension to Charlotte is of comparatively recent date. When this extension was built it served more or less as a feeder to the rest of the system. In fact, it is worthy of note that until recently something like 95 per cent of the road's traffic was originated or delivered on the line or on connecting short lines. In August, 1920, however,

this arrangement of things was changed by means of a traffic arrangement with the Southern Railway whereby through rates and divisions were established through Charlotte between points in the North and East and points to the south, southwest and southeast of Charlotte. This will give the Norfolk Southern a through traffic which it did not previously have and should have considerable effect on its earning power. To improve the line between Raleigh and Charlotte to meet the new conditions, a loan of \$200,000 has been secured from the revolving fund. The total cost of the improvements contemplated is estimated at \$400,000; they will give the road a considerably better grade and a much improved alignment.

These brief remarks about the Norfolk Southern will indicate the interesting problems which will confront Mr. Loyall when he takes up his new duties.

George R. Loyall was born in Albemarle County, Va., and was educated in the common schools. He began railway work with the Chesapeake & Ohio and served at various places as

telegraph operator and station agent. He then went to the East Tennessee, Virginia & Georgia at Knoxville, Tenn., serving consecutively as car record clerk, operator, train dispatcher, chief dispatcher and master of trains. He subsequently entered the service of the Southern Railway and served consecutively on that road as superintendent of the Louisville division, also of the Asheville division and of the Knoxville division, then as assistant general superintendent of the Middle district at Knoxville, Tenn. Mr. Loyall was then appointed general superintendent of the Eastern district with headquarters at Charlotte, N. C., and later became general superintendent of the Middle district with headquarters at Knoxville, Tenn. He leaves the position of assistant vice-president in charge of operation of the Southern Railway System with headquarters at Washington, D. C., to take up his new duties as president of the Norfolk



G. R. Loyall

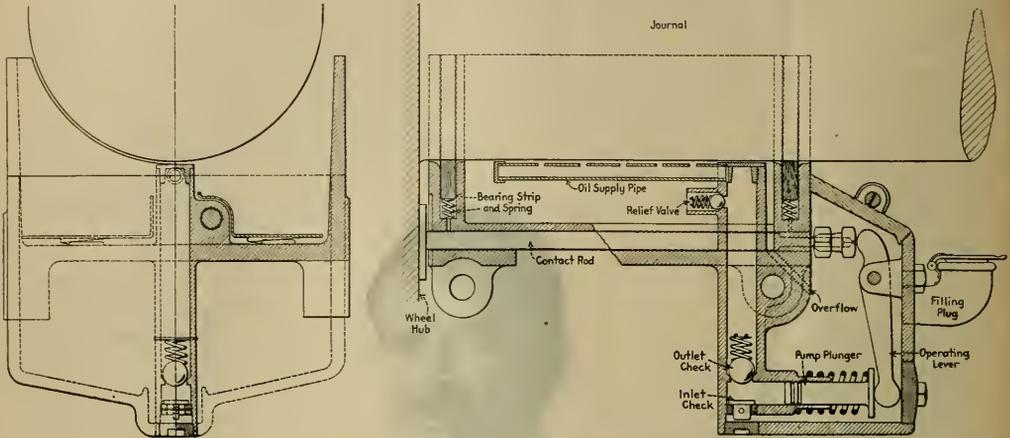
Southern. Mr. Loyall will have his headquarters at Norfolk, Va., in his new position.

NORTHERN PACIFIC CASUALTY RECORDS.—Substantial progress in safety work has been made by the Northern Pacific during the last five years as is shown by the fact that fatal accidents to both employees and non-employees have been reduced 75 per cent and casualties to employees 60 per cent. In 1916, this road had 151 fatalities, while in 1920 there were but 52. Considering only employees in service, the record of 1916 shows one injured per month per 100 employees, while in 1920 this was reduced substantially one-half (to 0.51 per month); and in the four months ending with March this year the percentage was further reduced to 0.40. F. M. Metcalfe, assistant to the general manager, says that these casualty reductions mean a large money saving for the company, its total charges to personal injury accounts actually decreasing during the war and post-war periods, as compared with pre-war times. This, he says, is remarkable in view of the increase of 70 to 100 per cent in cost of settlement.

Automatic Journal Lubrication

OWING TO INCREASED JOURNAL LOADS, speed requirements and extreme temperature variations in some parts of the country, present methods of lubricating the journals of railway equipment sometimes prove more or less inadequate. It is generally conceded that they have not kept pace with other improvements in equipment design. The amount of oil fed to high duty journals by capillary attrac-

Lubricators designed to accomplish the above results have been developed by the Hennessy Lubricator Company, New York, being made in four styles for use with locomotive trailer, driver and truck wheels; also car wheels. Advantages claimed for these lubricators are that they are cheap, fool proof, have few parts and are easily applied, displacing the regular cellars without change or addition to bearings, journals or boxes. The lubricators are packed with waste in the regular manner and can be applied in roundhouses by

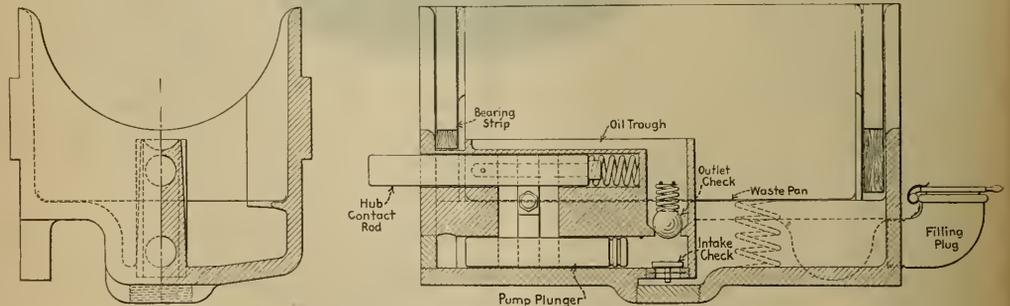


Lubricator Arrangement as Applied to the Journals of Main Driving Wheels

tion through waste is insufficient and the direct results are costly hot boxes, delays and repairs to equipment. Contrary to the usual experience with car journals, locomotive driving journals lubricated with hard grease seldom become hot (at least hot enough to cut or score). This is because main bearings receive the personal attention of enginemen, and hard grease lubricates at a high temperature. The trouble is that hard grease does not begin to lubricate effectively until the journals become warm, and there is excessive friction.

The result of lubricating journal bearings with too light

regular forces. Pumping action is obtained from lateral wheel movement which is positive and regular. The waste is kept in contact with the journals by means of loose plates and springs and oil, being pumped up through to the journals, prevents the waste from glazing. The waste, in addition to distributing oil over the faces of the journals, is also a safety feature in the event of the pump becoming inoperative for any reason. Being always saturated with oil, the waste will continue to lubricate the journals, heating gradually and finally smoking, if a hot box develops.



Cross Section Showing Operation of Hennessy Engine Truck Journal Lubricator

oil or too heavy grease is unnecessary friction, power loss, rapid wear of journals and bearings and consequent deterioration of other moving parts. Important economies in labor, material and reduced equipment delays would immediately result from delivering oil of a proper consistency (from a lubrication standpoint and not from a standpoint of its ability to feed through waste) to the journals. This oil should be delivered at all times and in a predetermined quantity regardless of atmospheric conditions by positive, reliable, mechanical means.

Tests of Hennessy lubricators on lead trucks have demonstrated that about five times the ordinary mileage is made with a given quantity of oil. While it is recommended that the lubricators be removed for inspection at intervals of about 90 days, some have been in service on the Norfolk & Western as long as 11 months without being taken down for any purpose. The only attention required is the filling or supplying of oil to the cellars about once a week, dependent upon the class of service. It is stated that oil of the consistency of vaseline can be pumped through the lubricator if necessary.

General News Department

The De Queen & Eastern has completed the construction of its extension from De Queen, Ark., to Broken Bow, Okla., and has commenced the operation of this line.

The Order of Railroad Telegraphers, in convention at Savannah, Ga., on May 20, re-elected E. J. Manion, president. L. J. Ross was chosen secretary; headquarters, St. Louis, Mo.

The Interstate Commerce Commission has announced that oral arguments will be heard at Washington on June 20 in the case involving locomotives sent by the Pennsylvania to outside shops for repairs.

Senator Watson, of Indiana, has introduced in Congress a bill to amend Section 10 of the Clayton act, by defining the term "substantial interest" as used therein as meaning a financial interest of one per cent or more.

The City of Philadelphia has adopted "summer time," to go into effect on June 6; and the railroads are preparing new time-tables so as to run suburban trains, and some others, one hour earlier than by the present time-tables.

The Association of Railway Claim Agents held its annual convention at St. Louis, Mo., May 18, 19 and 20. James B. Green, claim agent of the Chicago & Junction, Chicago, was elected president. R. H. Doolittle (C. & S.), S. J. Peterson (U. P.), and W. H. Failing (C. N. J.), were elected vice-presidents, and H. D. Morris (N. P.), St. Paul, Minn., secretary-treasurer.

The Dallas Traffic Club, which has been inactive since the war, has been reorganized and the following officers elected: President, A. L. Reed, traffic manager, Sanger Brothers; secretary-treasurer, H. C. Eargle; first vice-president, Paul Junkin; second vice-president, Ferd Hicks; third vice-president, Julian Nance; board of governors, J. B. Jones, Elbert Blair, G. S. Maxwell, P. A. Richardson, E. C. Newlien and Don Allen. The officers will hold office until the regular election in November.

The bill reported at the last session of Congress by the Senate committee on interstate commerce as a substitute for Section 10 of the Clayton Anti-trust law was reintroduced in the Senate on May 24 by Senator Cummins as S. 1876. The bill represents a modification of the bill originally introduced by Senator Frelinghuysen at the request of the Association of Railway Executives in accordance with a number of suggestions made to the Senate committee by the Interstate Commerce Commission.

A. J. County, vice-president of the Pennsylvania Railroad, in an address before the Pennsylvania Bankers' Association at Atlantic City, N. J., on May 25, declared prompt and fair settlement for the Federal control and guaranty periods to be the essential need of the railroads to enable them to weather the deflation period successfully. "Beyond clearing away the differences that prevent prompt settlements, I feel that under existing conditions suggestions looking to a new national railroad policy and a vast increase of the regulatory commissions or bureaus should be held in abeyance until the Transportation Act has had a fair trial under something approaching normal conditions. Railroad managements, railroad employees and railroad investors should stand until. . ."

American Association of Freight Traffic Officers

The American Association of Freight Traffic Officers held, at Chicago, on May 11, its first meeting since 1917, the war and federal control of the railroads having interrupted the activities of the organization. The following officers were elected: President, Fred Zimmerman (C. I. & L.), Chicago; first vice-president, C. E. Airey (C. of Ga.), Savannah, Ga.; second vice-president, R. C. Wright (Penn.), Philadelphia,

Pa.; third vice-president, W. T. Stevenson (C. C. C. & St. L.), Cincinnati, Ohio; fourth vice-president, S. D. Houghton (A. T. & S. F.), Chicago; secretary-treasurer, Grant Williams, district freight agent, Chicago, Milwaukee & St. Paul, Chicago; executive committee, Paul Wadsworth, R. Van Umerson, Archibald Fries, C. H. Stinson, Eugene Morris, W. M. Rhett, Charles Barham, L. E. Chalenor, W. A. Rambach and B. H. Stanage. The association now has 589 members.

The Labor Board's Pending Decision

The Railroad Labor Board, since its announcement of a "readjustment downward of wages" as reported in last week's *Railway Age*, has been in practically continuous executive session to determine the extent of the proposed reduction which it will announce on June 1. The necessity for these extended executive sessions is in part due to the fact that three members of the Board were seated after the wage case had been in progress for several days and partly because of the mass of evidence submitted by both the carriers and the employees.

Annual Election of New York Section of the A.S.C.E.

At the annual meeting of the New York Section of the American Society of Civil Engineers held on May 18th, 1921, the following officers were elected to serve for one year: President, Nelson P. Lewis, chief engineer, board of estimate and apportionment, New York City; secretary, J. P. J. Williams, New York; directors, Charles Gilman, C. F. Massey Company, New York and J. J. Yates, engineer of bridges, Central of New Jersey, Jersey City, N. J. The election of officers was followed by an address by Nelson P. Lewis on the New York Metropolitan District.

No Progress in Formation of Regional Boards

In none of the four regions of the country—Eastern, South-eastern, Northwestern or Southwestern—has agreement been reached between the representatives of the train and engine service brotherhoods and the managements of the various carriers for the establishment of regional boards of adjustment for the settlement of labor disputes. Negotiations with this end in view were started sometime ago at the request of the brotherhoods. It is understood that in two districts the proposal has been definitely vetoed by representatives of the railroads. In one district the employees failed to agree to the companies' proposal that the public should be represented on the board. In the Southeastern district, a conference on the proposal has been called for May 30.

Decline in Most Living Costs—Rents Rise

The Bureau of Labor Statistics' index number of wholesale prices of all commodities for April is 154. In March this figure was 162, and in April, 1920, it was 265. The total increase in living costs from the beginning of the war to March, 1921, was 68.7 per cent, according to data compiled by the National Industrial Conference Board. The rise in the cost of the major items from July, 1914, to March, 1921, is estimated as follows:

Food	56%	Fuel and light.....	87%
Shelter	71%	Sundries	85%
Clothing	74%		

The report shows that the peak of the living cost was reached in July, 1920. Since then total living cost has declined 17.5 per cent. This decrease is in food and clothing. Rents have, however, increased eight per cent, and fuel and light 13 per cent since that date. In some important cities rents have increased upwards of 100 per cent since 1914.

Pennsylvania Scheduled Freighters Make Good Record

The through freight trains of the Pennsylvania Railroad which are run on schedules as recently announced, arrived at destination on time, in April, in 79 per cent of the trips. This is the first month for which complete figures of performance are available and the record is the best ever established by this road for regularity. It includes both east and west bound freight between Chicago and St. Louis on the west, and New York, Philadelphia, Baltimore, etc., in the east. During the month 1,396 freight trains were run on these schedules and 1,104 arrived at destination on time. But those that were late made connections in every case, so that all the freight was delivered to consignees on time. All perishable freight and live-stock, with some high class non-perishable merchandise is handled in this through freight service.

Hearings on Outside Repairs

The Interstate Commerce Commission's hearings on repairs to locomotives by contract in outside shops in 1920 were re-opened May 23 at New York by Examiner Barclay of the Interstate Commerce Commission. F. H. Hardin, Chief Engineer of Motive Power and Rolling Stock of the New York Central, was the principal witness. Mr. Hardin testified that the motive power of the company was in lamentable condition at the end of Federal control and that assistance in repairing some locomotives was absolutely necessary in order for the road to be able to handle the greatly increased traffic which was required of it. He pointed out also that the cost of classified repairs in the company's own shops showed a relatively low figure because various items of overhead expenses were not included in it.

R. B. Gregg, of the Railway Employees Department of the American Federation of Labor, cross-examined Mr. Hardin. Mr. Gregg said "Our view of the situation is that all railroads have followed the uniform policy of sending railroad equipment to outside shops for repairing for several reasons. The first and most important was an attempt to discredit and disrupt, if possible, the labor organizations of the roads. . . ." The hearings are being held in the rooms of the Merchants Association, 235 Broadway.

Revenues and Expenses for March

The Interstate Commerce Commission's monthly report of railway revenues and expenses for March and three months, covering 201 class I roads is as follows:

Item.	March		Three Months	
	1921	1920	1921	1920
1 Average number of miles operated....	235,581.76	234,599.99	235,575.51	234,444.81
Revenues:				
2 Freight	\$320,694,043	\$324,598,960	\$929,644,096	\$935,377,083
3 Passenger	97,312,305	92,631,705	291,107,003	267,076,918
4 Mail	9,673,927	8,390,790	25,514,961	77,978,159
5 Express	6,980,555	11,729,993	18,883,198	37,300,721
6 All other transportation	13,038,363	11,942,232	38,203,468	33,630,569
7 Incidental	11,173,604	10,677,666	30,326,954	35,066,127
8 Joint facility—Cr.	659,099	401,084	1,972,908	1,783,604
9 Joint facility—Dr.	269,386	178,993	593,202	595,214
10 Railway operating revenues	459,262,510	460,187,437	1,335,359,386	1,385,617,967
Expenses:				
11 Maintenance of way and structures....	62,029,061	67,464,136	176,510,015	189,760,588
12 Main. of equipment	107,416,514	117,268,106	340,154,840	353,815,196
13 Traffic	7,346,699	5,076,460	21,729,507	15,028,218
14 Transportation	205,048,309	213,651,070	634,387,887	644,223,484
15 Misc. operations....	4,171,621	4,536,761	12,680,982	13,265,193
16 General	14,910,557	12,643,971	44,356,331	38,030,428
17 Transportation for investment—Cr.	493,453	190,063	1,447,765	882,565
18 Railway operating expenses	400,429,308	420,450,441	1,238,271,797	1,253,240,542
19 Net revenue from railway operations....	\$8,833,202	\$39,736,996	107,087,589	132,377,425
20 Railway tax accruals	22,641,366	21,203,542	68,098,464	61,960,924
21 Uncollectible railway revenues	85,111	79,995	234,375	298,686
22 Railway operating income	36,106,725	18,453,459	38,754,750	70,117,815
23 Equipment rents—Dr. balance	3,993,676	2,329,249	10,740,443	7,357,273
24 Joint facility rent—Dr. balance	1,417,857	1,351,304	4,542,032	4,748,691
25 Net of items 22, 23, and 24	30,695,192	14,772,906	23,472,275	58,011,851
26 Ratio of expenses to revenues (per cent)	87.19	91.37	91.98	90.45

Traffic News

The Denver Commercial Traffic Club has elected James P. Gibson, president, and Charles J. Hotchkiss, secretary-treasurer.

The Atchison, Topeka & Santa Fe will run 16 special trains, leaving Chicago and Kansas City, July 3 and 4, for the Elks' convention at Los Angeles, Cal.

Shipments of perishables from California have been greater this year than last, according to figures given out on May 13, by C. M. Secrist, vice-president of the Pacific Fruit Express Company. Fruit and vegetable shipments in 1920, for this period, originating in the territory west of Ogden, Salt Lake, and El Paso, and south of Ashland, Ore., numbered 22,574 cars, while this year the total is 24,777 cars.

The National Industrial Traffic League, at its meeting in Cleveland, Ohio, on May 25, adopted a resolution advising members to proceed in an orderly manner, as provided by the Act to Regulate Commerce, to obtain proper redress of their individual grievances: "the National Industrial Traffic League deprecates any effort toward a general downward revision of rates until the carriers have had an opportunity to adjust their expenses so as to insure proper transportation service and facilities and a reasonable return on their property under economical and efficient management." Traffic executives of the carriers, and shippers, through their respective organizations, are urged to meet in conference and endeavor to reach agreements on all questions in controversy, thus avoiding wherever possible litigation before the commission.

A conference between the traffic vice-presidents of the Eastern railroads and representatives of shippers of road-building materials for the purpose of discussing possible reductions in the rates on these materials in order to stimulate their movement has been arranged for June 2. Representatives of the shippers had previously announced that such a conference was to be held with the railroad executives at Washington on May 13, but the announcement was premature. In a letter dated May 13 to E. Guy Sutton, of the Sand & Gravel Association, Daniel Willard, president of the Baltimore & Ohio, said that the matter of a conference between the railroad executives and shippers as proposed by the shippers has been given consideration at a meeting of the railroad executives and as a result it was decided to ask G. H. Ingalls, vice-president of the New York Central, and chairman of the executive committee of the eastern traffic vice-presidents, to get in touch with the shippers and arrange for a conference for the purpose of discussing any inequalities that may have resulted from or have been emphasized by the commission's decision in Ex Parte 74. Mr. Willard said that he understood it was expected that the discussion would be confined to materials entering into the roadbuilding program, but that he was certain that the committee or the traffic official of any railroad would be willing to take up at any time any inequalities of the rate structure such as he had referred to.

Traffic Statistics for February

According to the Interstate Commerce Commission's monthly bulletin of revenue traffic statistics covering 173 steam roads, the number of ton miles of revenue freight moved during February was 22,544,000,000, as compared with 30,291,000,000 in February, 1920. The average haul shows an increase as compared with 1920, and the average revenue per ton mile shows an increase as compared with previous months, an average of 1.25 cents as compared with .985 in February, 1920. In January it was 1.21 cents. The number of revenue passengers carried was 83,474,000 as compared with 91,673,000. The average revenue per passenger mile was 3.08 cents as compared with 2.59. The number of revenue passengers per car was only 16.56 as compared with 18.49 in February, 1920.

Commission and Court News

Interstate Commerce Commission

The commission has suspended from May 27 until September 24, the operation of schedules which provide increased minimum weights and increased class and commodity rates between points in Oregon, Washington and British Columbia to the level of the rates in the same general territory not affected by water competition.

Liability for Telegraph Negligence Increased

The Interstate Commerce Commission in decision No. 11,524, reviewing also case No. 8,917, has decided that the rules of the telegraph companies limiting liability for negligence in the transmission or delivery, or for non-delivery, of interstate messages, repeated and unrepeated, are unreasonable; and has ordered that, beginning July 13 next, the universal rule must limit the liability of the company in the case of unrepeated messages to not less than \$500, and in the case of repeated messages to not less than \$5,000; and on messages on which the sender puts a value, in writing, the rate is to be one-tenth of one per cent of the amount by which such valuation shall exceed \$5,000.

The principal ground on which this extension of liability was ordered seems to be that the Western Union has for many years followed the liberal policy of allowing general superintendents to pay reasonable claims, up to \$500, without submitting them to the legal department and without reference to the contract printed on the telegram blank, to which, among other provisions, stipulates a limit of \$50. The Postal Company opposed any increase of liability on the ground that it could not stand the additional expense; but no figures were given to sustain this argument.

Commissioner Potter dissented, holding that senders of telegrams desiring insurance should pay for it and that under the rule now prescribed, the company, in paying perhaps excessive damages, would be putting a burden on all other senders of telegrams. Existing arrangements, said Mr. Potter, will amply secure those who are willing to pay for their insurance.

The majority opinion holds that the practice of the Western Union is contrary to the spirit and terms of the Interstate Commerce Act; paying a sum larger than the stipulated liability is the same as making an unlawful rebate. The Western Union also objected to having its practice written into the terms of the law, fearing impairment of revenue; but the Commission finds that notwithstanding the company's liberal practice in the past, its surplus increased from \$7,733,693 on June 30, 1910, to \$32,518,994 on December 31, 1918; that dividends in 1917 and 1918 were at the rate of seven per cent and that in eight years the company's funded debt had been reduced from forty millions to thirty-two millions.

The report in this case brings out interesting details. The Commission seems to think that fewer mistakes in transmission ought to be made now than fifty years ago, when the limitation of liability was first imposed, because of the improvement in machinery. At the present time one-half of all the messages transmitted by the Western Union, particularly between large cities, are sent by automatic apparatus. The records of the Postal Company show that messages erroneously transmitted number only one in 25,000 or 30,000. Repetition of messages is seldom ordered, one operator testifying that in 18 years he had not transmitted more than about 200 such messages. Dealers in perishable commodities say that they cannot afford the delay incident to repetition of messages. The record in this case shows only one instance where a repeated message failed to accomplish its purpose; that was a case where delivery was delayed. The valued message appears to be of no practical use in the great majority of instances; as neither the sender nor the company can make any reasonable estimate of the probable loss in case of default on the part of the telegraph company.

Foreign Railway News

Swiss Federal Railways Losing Money

The operating revenues of the Swiss State Railways for the first three months of 1921 were \$16,287,600 and the operating expenses \$17,169,600, according to information from Consul Thornwell Haynes at Berne. For the similar period of 1920, operating revenues were \$17,354,400 and operating expenses \$15,815,000.

Seek Agreement in Argentine Railway Dispute

According to a correspondent of the Evening Post (New York), conferences are now being held in Buenos Aires between the British railways, the government and representative shippers in the attempt to arrive at an amicable settlement of the disputes which have arisen over the sharp rate advances put into effect in March. These increases have been declared illegal by the government and the companies have been fined heavily. The shippers are contending, the correspondent says, that the new rates will put them at a disadvantage in competition with American, Russian and Australian producers in the European cereal markets. It is believed that the government is disposed to look favorably upon some rate increases in view of recent wage increases, but has adopted a stern policy toward the railways in order to secure the presentation of evidence on both sides of the controversy.

The earnings of these roads for the fiscal year 1920, which were reported in the *Railway Age* of May 20 (page 1190), were comparatively high, but from July 1, 1920, to April 1, 1921, it is said that the Central Argentine is the only road which shows any gain over the figures for the preceding year. The other lines show declines in revenue from seven to 22 per cent.

American Becomes Mechanical Officer

of a Manchurian Railway

Frank S. Robbins, formerly master mechanic of the Pennsylvania at Pittsburgh, has been appointed mechanical advisor to the Chinese Eastern Railway, which is a part of the Trans-Siberian System. He will serve under the direction of J. F. Stevens, president of the Inter-Allied Technical Board of the Orient. Mr. Robbins was born at Menantico, N. J., December 22, 1880, and was educated at Purdue University. Upon graduation in mechanical engineering he entered railroad work as a machinist's apprentice with the Union Railroad in New Jersey. He later entered the Altoona shops of the Pennsylvania Railroad as special apprentice and upon completion of this course was appointed motive power inspector at the West Erie shops. In 1909 he was appointed assistant master mechanic of the Monongahela division and, in 1911, assistant road foreman of engines, Renova, Pa. In 1912 he was appointed assistant general foreman of the Piteairn car shops, Piteairn, Pa., and in 1913 was promoted to master mechanic of the Pittsburgh division.

In 1917, Mr. Robbins entered military service and was commissioned a captain in the Railway Engineers, being assigned to command Company D of the 19th Engineers (Railway). While a member of the American Expeditionary Forces in France his railroad experience was of considerable assistance in constructing railway shops at Bassens and organizing the personnel for their operation. He was appointed superintendent of motive power of "D" line and as a result of his work was promoted to the rank of major of engineers. In 1919, Major Robbins was discharged from military service and was appointed assistant engineer, maintenance of equipment, in the office of the assistant to the president of the Pennsylvania at Philadelphia. In December, 1919, he was appointed master mechanic of the Pittsburgh division which position he held until the reorganization of the Pennsylvania. Upon the return of the roads to their owners, Mr. Robbins was appointed master mechanic of the new Pittsburgh Terminal division. On March 15, 1921, he resigned his position with the railroad company to serve with the Inter-Allied Technical Board. Mr. Robbins' headquarters in his new position will be at Harbin, Manchuria.

Equipment and Supplies

Car Building in 1919 and 1914

A preliminary statement of the general results of the 1919 census of manufactures with reference to the construction of steam and electric railroad cars has been issued by the Bureau of the Census, Department of Commerce.

Returns were received in 1919 from 121 establishments which manufactured 162,511 steam and electric railroad cars, valued at \$403,517,000, these figures including such cars as were built in railroad repair shops, and as subsidiary products by establishments engaged primarily in other lines of manufacture.

Of the total number of cars built in 1919, 160,159 were for use on steam railroads, and 2,352 on electric roads. Only 294 steam passenger cars were constructed during the year as compared with 3,568 in 1914, while, on the other hand, freight and other types of steam railroad cars increased from 131,292, in 1914, to 159,865 in 1919.

The statistics for 1919 and 1914 are summarized in the following table. These figures are preliminary and subject to such change and correction as may be necessary from further examination of the original reports:

	1919	1914
Total Cars Built—		
Number	162,511	137,823
Value	\$403,517,000	\$164,960,000
Steam Railroad Cars—		
Number	160,159	134,960
Value	\$389,078,000	\$154,797,000
Passenger—		
Number	294	3,568
Value	\$5,602,000	\$45,245,000
Freight and Other—		
Number	159,865	131,292
Value	\$383,476,000	\$109,552,000
Electric Railroad Cars—		
Number	2,352	2,863
Value	\$14,439,000	\$10,163,000

Locomotives

THE MISSISSIPPI CENTRAL has ordered 3 Mikado locomotives from the American Locomotive Company.

THE CALIFORNIA WESTERN RAILROAD & NAVIGATION COMPANY has ordered one Pacific locomotive from the Baldwin Locomotive Works.

THE CIA MEXICANA DE COMBUSTIBLES, Mexico City, Mexico, has ordered 4 consolidation type locomotives from the Baldwin Locomotive Works.

THE PARKLAP CONSTRUCTION CORPORATION, 84 Pine street, New York, has ordered 1, 4-wheel switching locomotive from the American Locomotive Company. This locomotive will have 14 by 22 in. cylinders and a total weight in working order of 79,000 lbs.

Freight Cars

THE SIERRA OF CALIFORNIA has renewed its inquiry for 30 to 40 ballast cars.

THE PHILADELPHIA & READING is contemplating having repairs made on 500 to 1,000 box cars.

THE BUFFALO CREEK & GAULEY has ordered 10 20-ton flat cars from the Koppel Industrial Car & Equipment Co.

THE ALABAMA, TENNESSEE & NORTHERN is inquiring for 150 gondola cars and 100 box cars, U. S. R. A. standard.

Passenger Cars

MIITSUI & Co., New York, are inquiring for 150 electric motor trucks, for use on the Tokyo Municipal Railways.

Machinery and Tools

THE HARTFORD & SPRINGFIELD STREET RAILWAY COMPANY has ordered a 200-ton car wheel press from the Niles-Bement-Pond Company.

THE CHICAGO, ROCK ISLAND & PACIFIC has ordered 1 36-in. lathe and 1 90-in. quartering machine from the Niles-Bement-Pond Co.

THE VIRGINIAN RAILWAY has ordered 4 Ryerson-Conradson engine lathes and a 5-ft. Ryerson-Conradson radial drill, from Joseph T. Ryerson & Son; 1 boring mill from the Bullard Machine Tool Company and a driving wheel lathe from William Sellers & Co., inc.

Miscellaneous

MIITSUI & Co., New York, have ordered from the Union Switch & Signal Company four sets of color light signals, for use on the Japanese Government Railways.

THE NEW YORK CENTRAL will receive bids until 12 o'clock noon June 8, for its requirements until July 1, 1921, of steel wheels for passenger car and locomotive repairs, in accordance with standard blue prints and New York Central specifications 372-C.

Signaling

THE ERIE RAILROAD has ordered from the General Railway Signal Company an electric interlocking machine, 11 working levers, with four switch machines and three signals, for a drawbridge at Newark, N. J.

Railway Construction

CHICAGO, ROCK ISLAND & PACIFIC—This company is accepting bids for the construction of a new roundhouse at Amarillo, Tex.

CHICAGO, ROCK ISLAND & PACIFIC—This company, which was noted in the *Railway Age* of May 6 (page 1093) as accepting bids for the construction of a coaling station at Morris, Ill., has awarded the contract for this work to Roberts & Schaefer, Chicago. The station will be a 500-ton, fireproof structure.

CHICAGO UNION STATION.—This company closed bids on May 26 for the completion of the filled portion of the Polk street viaduct, Chicago, and the construction of a viaduct on Van Buren street, between Canal street and the Chicago river.

DETROIT & IRONTON.—The Interstate Commerce Commission has issued a certificate authorizing the construction of a line in Wayne County, Mich., approximately 15 miles long, extending southward from Spring Wells or Fordson to a connection with the Detroit, Toledo & Ironton near Trenton or Flat Rock. The matter of the application for a certificate authorizing the acquisition by lease of the property of the Detroit, Toledo & Ironton has been assigned for argument before the commission in Washington on May 27.

ILLINOIS CENTRAL.—This company closed bids on May 23 for the construction of a subway near Earlville, Ia. The company is also accepting bids for an extension to its roundhouse at Paducah, Ky.

ILLINOIS CENTRAL.—This company which was noted in the *Railway Age* of May 20 (page 1192) as accepting bids for the construction of additions to its roundhouse at Freeport, Ill., has awarded a contract for this work to Joseph E. Nelson and Sons, Chicago.

THE PITTSBURGH & WEST VIRGINIA reported in the *Railway Age* of May 6, as asking for prices on repairs to 500, 70-ton coal cars, is now inquiring for 500 steel hopper car bodies.

THE SIERRA RAILWAY OF CALIFORNIA, is inquiring for 35 to 40 Roger ballast cars, of 40 and 50-ton capacity.

TEXAS MIDLAND.—This company has awarded a contract to Becknal Brothers, Terrel, Tex., for the construction of a line between Greenville and Commerce, Tex., at an estimated cost of \$500,000.

Supply Trade News

The Galena-Signal Oil Company will remove its New York City office on June 1, from 17 Battery Place to the Liggett Building, 41 East Forty-second street.

E. D. Wilmer, vice-president of the Steel & Tube Company of America, at Milwaukee, Wis., has been elected president of the Goodyear Tire & Rubber Company, at Akron, Ohio, succeeding F. A. Seiberling.

Clement F. Street, formerly vice-president of the Locomotive Stoker Company, has opened an office in the Smith building, Greenwich, Conn., for the purpose of placing on the market the Street locomotive starter for application to locomotive trailer trucks and tenders.

Ralph S. Cooper, vice-president and general sales manager of the Independent Pneumatic Tool Company, Chicago, has been appointed general manager in addition to his other duties. Mr. Cooper has just returned from Europe where he has been for the past eight months establishing branch offices and agencies for the company.

Harry B. Stafford, for some time general agent for the Southern Railway at Minneapolis, has become associated with the National Surety Company, 115 Broadway, New York. Mr. Stafford left the Southern Railway to enter the Construction Division of the United States Army early in the war and attained the rank of major.

Harry W. Finnell has become connected with the sales department of the Automatic Straight Air Brake Company, with headquarters at the company's general offices, 210 Eleventh avenue, New York City. Mr. Finnell served with the Chicago Railway Equipment Company from 1906 to 1909 as railway sales manager and later became assistant to president of the Carbon Steel Company, Pittsburgh, Pa. In 1914, he was appointed general manager of the Henry Giessel Company, Chicago, and during 1915 and 1916, was vice-president of Templeton, Kenley & Co., Ltd., Chicago. He was manager of the War Industries Bureau for Illinois and was also affiliated with the War Industries Board during the war, since which time he has been in the export business. His appointment with the Automatic Straight Air Brake Company became effective on May 15.

Obituary

Lawrence F. Braine, a director of the Rail Joint Company, New York, died on May 24, at his home in New York City, at the age of 64. In 1896, he went with the Continuous Rail Joint Company of America, Newark, N. J., which company was combined later with the Weber rail joint and the Wolhaupter rail joint to form the present Rail Joint Company. From 1905 to 1916, Mr. Braine served as director and vice-president of the Rail Joint Company and then retired from active service, remaining as director of the same company until his death.

Trade Publications

WATER SOFTENERS.—The Graver Corporation, East Chicago, Ind., has issued two bulletins describing the company's large continuous water softener (type K) and the small continuous water softener (type KM). Each bulletin opens with a short discussion of water softening and the choice of suitable apparatus. This is followed by descriptions of the operation of the plants which are described in detail and illustrated in numerous photographs. Drawings are shown of typical foundations and upper and lower housings, and charts are given to illustrate the loss of water storage space by converting existing storage tanks into water softeners.

Railway Financial News

ALABAMA GREAT SOUTHERN.—*Dividends Reduced.*—This company has declared semi-annual dividends of 3 per cent on the common stock of record May 31, and 3 per cent on the preferred stock, payable August 18 to stock of record July 14. The last semi-annual dividends paid by the company were 3½ per cent on both issues.

BUFFALO, ROCHESTER & PITTSBURGH.—*Authorized to Issue Bonds.*—This company has been authorized by the Interstate Commerce Commission to issue \$3,949,000 of consolidated mortgage bonds and to pledge and repledge from time to time all or part of the bonds as collateral security for short term notes.

CHESAPEAKE & OHIO.—*Dividend Deferred.*—The directors on May 20 deferred action on the usual dividend of 2 per cent for the current half year. Disbursements at the rate of 4 per cent a year were made from 1917 to 1919 inclusive.

Annual Report.—The corporate income account for the year ended December 31, 1920, compares with the previous year as follows:

	1920	1919	Increase or Decrease
†Net Income, including compensation for January and February, 1920, and net operating income of company from March to December, 1920, inclusive	\$14,878,831	\$14,588,579	\$290,252
*General expenses (corporate)	39,642	202,048	-162,407
Federal income tax accruals	580,000	319,999	260,002
	\$14,259,189	\$14,066,532	\$192,657
Other Income	1,901,583	1,215,839	685,753
Gross Income	\$16,160,772	\$15,282,362	\$878,410
Interest on Debt	\$9,953,407	\$8,773,843	\$1,179,563
Total deductions	\$10,174,314	\$9,508,193	\$666,121
Net Income	\$5,986,458	\$5,774,169	\$212,290
Dividends, 4 per cent	\$2,511,264	\$2,511,264	
Balance to credit of profit and loss December 31, 1920			\$15,341,106

†Includes \$2,700,000 amount received from the Interstate Commerce Commission as an advance under the grants provided by Section 209 of Transportation Act, 1920.

*General expenses 1920 refer to months January and February only.

The annual report of the Chesapeake & Ohio will be reviewed editorially in an early issue.

CHICAGO JUNCTION.—*Hearings on Acquisition by New York Central Closed.*—See New York Central.

CHICAGO, ROCK ISLAND & PACIFIC.—*Asks Authority to Issue Bonds.*—This company and the Burlington, Cedar Rapids & Northern have jointly applied to the Interstate Commerce Commission for authority for the issuance of \$1,905,000 of consolidated first mortgage 5 per cent bonds of the B., C. R. & N., to be used to retire another issue of bonds at maturity and to be sold to the Rock Island for cash. The Rock Island also asks authority to issue a similar amount of first and refunding mortgage gold bonds to be issued against the B., C. R. & N. bonds.

DELAWARE, LACKAWANNA & WESTERN.—*Annual Report.*—The corporate income account for the year ended December 31, 1920, compares with the previous year as follows:

	1920	1919	Increase or decrease
Net earnings coal department:			
Sales and rents	\$51,193,938	\$44,325,488	\$6,868,450
Less expenses	44,662,844	39,344,273	5,318,571
	\$6,531,094	\$4,981,215	\$1,549,879
Adjustment of value of coal on hand	27,152	8,467	-35,618
	\$6,503,942	\$4,989,682	\$1,514,261
Earnings railroad department:			
Revenues	\$70,478,816		
Less operating expenses, taxes, etc.	65,218,581		
	\$5,260,235		\$5,260,235
Income from lease of road (2 months)	13,249,379	*17,324,424	-14,075,045
Government advances on guaranty	5,124,500		5,124,500
Miscellaneous rent income	304,024	328,300	-24,276
Dividend income	386,756	413,269	-26,514
Income from funded securities	680,250	362,848	317,402
Income from unfunded securities and accounts	786,985	554,891	232,094
Depletion of coal deposits	2,018,593	1,956,616	61,977
Hire of equipment—Cr. balance	653,858		653,858
Total including other	\$25,446,520	\$25,453,407	-\$6,887

Deductions from income:			
Rentals of leased lands.....	\$6,128,996	\$6,126,908	\$2,088
Additions and betterments.....	2,509,679	869,556	1,640,123
War revenue taxes.....	1,122,917	1,710,374	—587,457
Total including other.....	\$13,675,109	\$16,072,200	—\$2,397,091
Dividends declared.....	8,444,110	8,444,455	—345
	\$5,230,999	\$7,627,745	—\$2,396,746

*Certified compensation accrued year 1919, including \$1,574,948, being 10 per cent of compensation for the year 1918 accrued in July, 1919, upon completion of the contract between the director general of railroads and the company.

†Includes adjustment of standard return for years 1918 and 1919 amounting to \$616,930.

‡Covers railroad operations for the ten months ending December 31, 1920.

The annual report of the Delaware, Lackawanna & Western will be reviewed editorially in an early issue.

DENVER & RIO GRANDE.—Another Protest from Stockholders.—Arthur M. Wickware, counsel for the stockholders' protective committee, has sent a letter to Hon. Edgar E. Clark, chairman of the Interstate Commerce Commission, in which he says, in part:

The stockholders' protective committee now desires to present a further objection, namely, that the new company, to which it is proposed to transfer the Denver & Rio Grande properties, is not organized under the laws of either Colorado, Utah or New Mexico, where the railroad is located, but under the laws of the state of Delaware, located about 2,000 miles away.

The charter of this new company—the Denver & Rio Grande Western Railroad Company—is a legal anomaly, and is what is known as a "tramp" corporation. It is not organized under the provisions of the Delaware laws governing railroads operating in Delaware; but is organized under the provisions applicable to ordinary business corporations with power to own and operate railroads only outside the state of Delaware.

Railroads organized for operation within the state of Delaware are subject to many regulations, enacted for the protection of the stockholders, the bondholders, the adjacent landholders, and the public. Not one of these safeguards is contained in the statutory provisions applicable to the charter of this new company. It cannot operate a mile of railroad in the state of Delaware; but it is authorized to exercise railroad powers anywhere outside the state of Delaware. The legislation of Delaware has been very careful to protect its own citizens with respect to all railroads within the state, but it authorizes charters for foreign use under which roads may operate without any safeguards or restrictions whatever.

GRAND TRUNK.—New Directors.—The Canadian Government has nominated the following directors in accordance with the bill recently passed by the Dominion Parliament: Sir Joseph Flavelle, Howard G. Kelley, A. J. Mitchell, E. L. Newcombe, K. C., and J. N. Dupuis.

This board will be temporary, preparatory to the bringing into force of the Canadian National Railways Act, which provides for the unified management of all government railways.

HAWKINSVILLE & FLORIDA SOUTHERN.—Asks Authority to Abandon Line.—The receiver has applied to the Interstate Commerce Commission for certificate authorizing the abandonment of its line of 96.38 miles in Georgia, on the ground that it is impossible to operate it except at a loss and that it has been operated at a loss for the past seven years.

HOCKING VALLEY.—Dividend Deferred.—The directors on May 19 deferred action on the regular semi-annual dividend of 2 per cent which is usually paid in June.

President W. J. Harahan stated that the directors had simply decided to defer action until the trend of conditions had been more clearly demonstrated.

LOS ANGELES & SALT LAKE.—Union Pacific Acquires Senator Clark's Holdings.—See Union Pacific.

MICHIGAN CENTRAL.—New Directors.—Vice-President E. D. Bronner and Henry M. Campbell, of Detroit, have been elected directors. Samuel Mather has resigned from the board.

NEW ORLEANS, TEXAS & MEXICO.—Asks Authority to Issue Bonds.—This company has applied to the Interstate Commerce Commission for authority to issue \$561,800 of first mortgage 6 per cent gold bonds to reimburse the treasury for expenditures for additions and betterments and to be used as collateral for a loan of \$500,000.

NEW YORK CENTRAL.—Hearings on Acquisition of Chicago Junction Closed.—The hearings before Examiner W. H. Colston, of the Interstate Commerce Commission, at Chicago, on the application of the New York Central to take over the Chicago Junction, were brought to a close on May 19, upon telegraphic

instructions from the Interstate Commerce Commission. This is in line with the recent policy of the commission to rush to a close important hearings after sufficient testimony has been heard in order that a prompt decision may be rendered.

On May 17, J. W. Roberts, general superintendent of transportation of the Northwestern region of the Pennsylvania, stated that a diversion of traffic from other trunk lines connecting with the neutral Junction property, as might be expected if the New York Central secured control, would greatly reduce the value of the facilities of other trunk lines, built to take care of the Junction traffic. Fifty-two per cent of the total Chicago business of the Pennsylvania System, according to Mr. Roberts, came out of the Chicago Junction district. To consent to the sale, he said, would deprive the trunk lines of some of their privileges, would hinder the flexibility of operation within the Chicago terminals and make more difficult the co-ordination of the terminals with other facilities. All of these conditions, he declared, would be against the public interest.

W. H. Scriven, superintendent of the Chicago terminal division of the Pennsylvania, stated that the Pennsylvania is not opposed to unified terminals, provided their interests in the public service are safeguarded, but it is opposed to the acquisition of a neutral switching road like the Chicago Junction, by one or two trunk lines.

O. F. Clarke, superintendent of transportation of the Grand Trunk at Chicago, testified that if the New York Central acquired the Junction road it could and probably would get all or most of the competitive business of the Junction and so deprive the Grand Trunk of about 60 per cent of its traffic out of Chicago.

On the closing day of the hearing Willis E. Gray, terminal expert, testified that if the New York Central acquired the Junction facilities ample opportunities for expansion and were more than adequate. He also said that the New York Central was negotiating for the purchase of the Chicago & Illinois Western, a 25-mile line, with 37 miles additional under construction, between Chicago and Joliet. He asserted that the acquisition of this outer Belt property by the New York Central would give it monopolistic control of the inner and outer belt lines of the Chicago Terminal.

Irving Herriott, attorney for the shippers who are objecting to the sale of the property, called several witnesses at the close of the hearing, who testified to the pressure that had been brought to bear upon them to make them withdraw their opposition.

PENNSYLVANIA.—Asks Authority to Acquire Stock.—This company has applied to the Interstate Commerce Commission for authority to purchase from the Pennsylvania company \$34,000,000 of the guaranteed special stock of the Pittsburgh, Fort Wayne & Chicago and to assume the obligation and liability of the Pennsylvania company under its guaranteed trust certificates for which the stock was deposited as collateral security. The certificates are outstanding to the amount of \$33,239,000, and the Pennsylvania is to pay the difference of \$761,000 in cash.

PENNSYLVANIA RAILROAD.—Loan from Revolving Fund Approved.—The Interstate Commerce Commission has certified to the Treasury its approval of a loan of \$5,700,000 to this company for 15 years for the purpose of assisting it in meeting maturing indebtedness to the amount of \$5,857,900, of which the company itself is to provide \$157,900.

READING.—Dissolution Plan Approved.—The United States District Court at Philadelphia, on May 21, approved the modified plan for segregating the Reading company's coal and railroad properties. The two important points decided by the court for modification from the original plan, noted in the *Railway Age* of February 18, 1921, page 425, were decided and will be embodied in a new decree to be submitted within fifteen days, or on June 6, by the Reading company to the government.

The first point was the disposition of \$8,000,000 of stock of the Reading Coal and Iron Company, which was owned by the Reading company. The court orders that this stock is to be divided proportionately between the two classes of Reading stock, the preferred sharing equally with the common. The second is regarding the sale of the stock of the New Jersey Central. The court orders that this stock be placed in the hands of a trustee until a favorable time arrives for its sale.

See editorial on another page of this issue entitled "Reading Plan Approved."

Alfred A. Cook, attorney for Henry Evans, representing the Continental Insurance Company and the Fidelity-Phenix Fire Insurance Company, will appeal to the Supreme Court against the decision. These insurance interests hold 8,400 shares of common stock in the Reading company. They object to that part of the plan which gives the same and equal rights to the preferred and common stockholders to subscribe for stock in the new coal company.

E. P. Maynard, president of the Brooklyn Trust Company, has been elected chairman to succeed Seward Prosser, president of the Bankers Trust Company, and chairman of the Reading common stockholders' committee. Frederic F. Gunnison, vice-president of the Lawyers' Title and Trust Company, has been

elected secretary to succeed B. W. Jones, also of the Bankers Trust Company.

It is understood that Mr. Prosser will remain as a member of the committee, which will be enlarged to include four other members. Mortimer N. Buckner, president of the New York Trust Company, and John H. Mason are also slated to remain on the committee.

The reorganized common stockholders' committee will cooperate with counsel for the Henry Evans group of insurance companies in carrying their fight to the United States Supreme Court.

ST. LOUIS-SAN FRANCISCO.—Annual Report.—The corporate income account for the year 1920 compares with 1919 as follows:

	1920	1919
Federal compensation (2 months of 1920).....	\$2,270,838	\$13,415,510
Government guaranty (6 months).....	\$7,518,198	.....
Additional compensation.....	1419,034	.....
Net operating income (4 months).....	5,536,517	.....
Total.....	\$15,744,587	\$13,415,510
Other income.....	597,498	524,251
Gross income.....	\$16,342,085	\$13,939,761
Interest, taxes, rentals, etc.....	14,598,854	14,091,812
Surplus.....	\$1,743,231	Def. \$152,051

*Includes \$705,684 on account of equipment allocated and purchased and additions and betterments.

†Difference between tentative standard return taken into account and standard return as finally certified January 1, 1918 to December 31, 1919.

‡Includes interest on cumulative adjustment bonds and on income bonds.

The annual report of the St. Louis-San Francisco will be reviewed editorially in an early issue.

ST. LOUIS-SAN FRANCISCO.—Asks Authority to Sell or Pledge Bonds.—This company has been authorized by the Interstate Commerce Commission to sell all or any part of \$4,232,000 of prior lien mortgage bonds now held in its treasury at not less than 90 per cent of par, or to pledge and repledge any part thereof from time to time as collateral security for short-term notes.

TENNESSEE, ALABAMA & GEORGIA.—Special Master Appointed.—D. L. Grayson has been appointed special master to assemble indebtedness of this road, which has been in the hands of receivers since December, 1920.

TENNESSEE CENTRAL.—Sale ordered.—Federal Judge E. T. Sanford has ordered this road sold on June 30 at Nashville, Tenn., for an upset price of not less than \$2,000,000, with a cash payment of not less than \$250,000. The court appointed A. Lyon Childress, of Nashville, as special master to conduct the sale. John H. Dewitt, of Nashville, was appointed to make a report on claims prior to first mortgage bonds. The receivers were directed to accept a loan of \$30,000 from the Mississippi Valley Trust Company with which to pay arrear rentals due the Nashville Terminal Company to prevent forfeiture of the Tennessee Central's lease on the bridge across the Cumberland river at Nashville.

The receivers deny that the claim of the government for \$650,000 advanced to the road during the war is just.

TENNESSEE CENTRAL.—Auction.—By decree of the Federal court at Chattanooga, Tenn., on May 22, this property, now in the hands of receivers, will be sold at public auction at Nashville, Tenn., on June 30.

UNION PACIFIC.—Acquisition of Senator Clark's Holdings in Los Angeles & Salt Lake.—The Union Pacific has purchased from Senator W. A. Clark and his friends the remaining half of the stock and bonds of the Los Angeles & Salt Lake Railroad. Judge Robert S. Lovett, chairman of the executive committee of the Union Pacific, made the following announcement on May 25 concerning the transaction:

The Union Pacific, which already owns through a subsidiary one-half the stock and bonds of the Los Angeles & Salt Lake Railroad Company, has reached an agreement with Senator Clark, who, with his friends, owns the other half, for the acquisition of his entire holdings. This gives the Union Pacific control of the property and assures the permanency of its position in southern California with its rails into Los Angeles and to the Pacific Ocean at San Pedro Harbor. The logical and natural destiny of the Los Angeles & Salt Lake ultimately as a railroad property is as a part of the Union Pacific System; and appreciation of this and not any differences led to the sale. It is a rather remarkable fact that during the 18 years of equal joint ownership and control by Senator Clark and ourselves absolutely no disagreements respecting policies, control or management have ever arisen between us. Our relations could not have been more co-operative and harmonious.

For the \$29,000,000 of the 4 per cent bonds of the Los Angeles & Salt Lake held by Senator Clark and his friends (we already owning a like amount) we are giving in exchange dollar for dollar approximately \$6,000,000 of the Southern Pacific's San Francisco Terminal 4 per cent bonds, \$8,500,000 of the Southern Pacific Railroad First Refunding 4 per cent bonds and \$14,500,000 of Oregon-Washington Railroad & Navigation First and Refunding 4 per cent bonds now in the Union Pacific treasury. The latter issue is guaranteed by the Union Pacific Railroad Company, and before they can be disposed of it is necessary to get permission of the Interstate Commerce Commission. Application for this will be made immediately and no objection is anticipated, but in the meantime, of course, the exchange of bonds will be delayed.

No change in the personnel of the staff operating the line or in their headquarters is contemplated, though, of course, the jurisdiction of our system general offices will be extended over the line and separate traffic agencies and other duplication of offices, if any, will be abolished.

In regard to the sale of his half-interest in the Los Angeles & Salt Lake to the Union Pacific, W. A. Clark said:

About twenty years ago R. C. Kerens, a prominent and distinguished western operator, called my attention to the Los Angeles Terminal Railroad Company, extending from Los Angeles to San Pedro harbor, and I and my brother, J. Ross Clark, joined him in the purchase of it, with the purpose of extending it to Salt Lake City.

Soon afterward E. H. Harriman at the head of the Union Pacific Railroad Company, which already had a line extending to the southern part of Utah, joined us in the scheme, and the line was constructed on a fifty-fifty basis, each party putting up the funds required until the road was completed. The capital stock and bonds were issued to cover expenditures and were divided equally between the Union Pacific Company and ourselves, but none of these securities by either party was ever placed on the market. All of the earnings have been applied to additions and betterments and extensions. In the near future the entire line will have been relayed with 90 lb. steel, which has been purchased and now partly laid, and the equipment of the highest character, is ample and complete.

The advantage in the unification of the great Union Pacific Company's interest amply warrants them in the purchase of our holdings of the capital stock. In effecting this arrangement the interests of all bond and stockholders have been amply protected. In making the contract I have reserved for the benefit of the holders of any of the bonds not controlled by me the right to exchange them on the same terms as obtained for myself. In the severance of our relations as joint owners of this great property with the Union Pacific officials we extend to all of them personally and officially our most cordial wishes.

WABASH.—New Director.—C. G. Edgar, of Detroit, has been elected a director to succeed Guy E. Tripp, who has resigned his position as a director to comply with the provisions of the Clayton Act.

WESTERN PACIFIC.—Authorized to Issue Bonds.—This company has been authorized by the Interstate Commerce Commission to issue and sell at not less than 85 per cent of par and accrued interest, \$4,180,000 of first mortgage 5 per cent gold bonds, due March 1, 1946, to be deposited with the trustees under the applicant's first mortgage and to be used only for capital expenditures specifically authorized. It was proposed to use the bonds for the purpose of acquiring bonds of the Sacramento Northern, but the commission's order provides that the applicant shall not expend any of the proceeds of the bonds for the purpose of acquiring the property of the Sacramento Northern or control thereof and shall not otherwise acquire the property or the control until the commission has approved such acquisition upon application duly made.

WILLIAMSPORT & NORTH BRANCH.—Asks Authority to Issue Securities.—This company has applied to the Interstate Commerce Commission for authority to issue \$200,000 of bonds, \$200,000 of 6 per cent preferred stock and \$500,000 of common stock, to be delivered to four individuals in payment for the property of the railroad.

Guaranty Certificates Issued

The Interstate Commerce Commission has certified to the Treasury Department that the following amounts are due various carriers as partial payments on account of the six months' guaranty: Chicago & North Western, \$800,000; Michigan Central, \$260,000; Nez Perce & Idaho, \$6,000; Peoria & Pekin Union, \$55,000; Louisville Bridge & Terminal, \$150,000; Peoria Railway Terminal, \$87,000; Mount Hope Terminal, \$4,000; Maryland & Pennsylvania, \$15,000; Frankfort & Cincinnati, \$12,500; Detroit & Mackinac, \$50,000; Leavenworth Terminal, \$18,000.

Dividends Declared

Mobile & Birmingham.—Preferred, 2 per cent, semi-annually, payable July 1 to holders of record June 2 to June 30.
Pittsburgh, Youngstown & Ashland.—Preferred, 1 3/4 per cent, quarterly, payable June 1 to holders of record May 20.
Reading Company.—2nd preferred, 1 per cent, quarterly, payable July 14 to holders of record June 27.

Annual Report

Buffalo, Rochester & Pittsburgh Thirty-Sixth Annual Report

The Directors of the Buffalo, Rochester and Pittsburgh Railway Company submit to the Stockholders the following report for the year ending December 31, 1920.

U. S. R. R. ADMINISTRATION.

As stated in last year's report, in accordance with a proclamation of the President of the United States issued under date of December 24th, 1919, and with the terms of the Transportation Act of 1920, Government control of railroads was terminated at 12:01 a. m. on March 1st, 1920.

A final settlement was effected on December 4, 1920, in full satisfaction of all the accounts in favor of and against the United States Railroad Administration.

GUARANTY PERIOD.

The Transportation Act of 1920 above referred to, among other things contains Section No. 209 guaranteeing to any carrier which accepts it, a return for the six months immediately following Federal Control of not less than one-half the amount named in the contract with the Director General of Railroads as annual compensation, provided a written statement is filed with the Interstate Commerce Commission accepting all the provisions of the Section, on or before March 15, 1920. As stated in last year's report, such an acceptance was authorized by your Board of Directors and duly filed on March 8, 1920.

The Section also provided for partial payments of the guaranteed amount, under certain conditions, upon applications made during the Guaranty Period. Under this authority the Secretary of the Treasury from time to time advance to your company funds to meet fixed charges and operating expenses.

The completed statement of account with the Interstate Commerce Commission has been filed, and the final settlement for the guaranty period will be progressed as rapidly as possible.

In accordance with the precedent established in the last two years, the full details of the operations under Federal Control for the first two months of this year, the subsequent six months of the Guaranty Period, the four months of corporate control, and the comparative combined results for the year are given in an appendix to this report.

	1920.	1919.	Der.
Owned	1920.	1919.	
Leased	368.31	368.31	
Trackage rights	90.30	90.30	
	131.11	131.11	
Total length of road operated	589.72	589.72	
Second track	212.59	212.59	
Sidings	455.13	456.21	1.08
Total miles of all tracks, all steel rails.....	1,257.44	1,258.52	1.08

	1920	1919.	INCREASE OR DECREASE.
OPERATING INCOME:			
Revenues	\$9,145,766.08	\$9,145,766.08	
Expenses	7,126,122.02	\$91,544.84	
Net revenue	\$2,019,644.06 (Def.)	\$91,544.84	\$2,111,188.90
Tax accruals	407,000.00	99,108.52	407,891.48
Uncollectible revenues.....	46.63		46.63
	\$507,046.63	\$99,108.52	\$407,938.11
Total operating income.....	\$1,512,597.43 (Def.)	\$190,653.36	\$1,703,250.79

	1920	1919	1918
NON-OPERATING INCOME:			
Rental—U. S. R. R. Admin.	557,935.43	3,276,410.42	—2,718,474.99
Rental—Guaranty Period	1,759,612.97		1,759,612.97
Other items	731,439.71	385,222.30	346,217.41
	\$3,048,988.11	\$3,661,632.72	—\$612,644.61
Gross income	\$4,561,585.54	\$3,470,979.36	\$1,090,606.18
DEDUCTIONS:			
Rentals of leased lines, interest, etc.	\$2,235,825.18	\$2,407,012.07	—\$171,186.89
Net income	\$2,325,760.36	\$1,063,967.29	\$1,261,793.07
APPROPRIATIONS:			
Pension and Fire Insurance Funds	30,710.95	28,601.63	2,109.32
Surplus available for dividends	\$2,295,049.41	\$1,035,365.66	\$1,259,683.75
Return on capital stock.....	13.91%	6.27%	7.64%

The increase of \$407,891.48 in tax accruals is chiefly due to the income and excess profit tax.

On account of the irregular periods and conditions affecting the operations of this year, no further analysis is made of the comparative results with the preceding year.

DIVIDENDS.

	1920	1919
Dividends in cash were paid on:		
Preferred Stock	\$6,000,000 6%	\$360,000 6%
Common Stock	10,500,000 4%	420,000 4%
Total	\$16,500,000	\$780,000

Since the close of the fiscal year, your Board of Directors has declared semi-annual dividends of three per cent. on the preferred stock and three per cent. on the common stock, payable February 15, 1921.

CAPITAL STOCK.

There has been no change during the year in this account. The total outstanding Capital Stock of the Company amounts to \$16,500,000, and consists of \$6,000,000 preferred stock and of \$10,500,000 common stock.

FUNDED DEBT.

In accordance with the provisions of the Consolidated Mortgage of 1907, the Trustee delivered to the Company \$1,059,000 4 1/2% Bonds, representing the entire issue of Equipment Bonds, Series B, amounting to \$1,000,000, and 50% of Equipment Bonds Series E retired during the year.

These bonds, added to those in the Treasury of the Company, make a total of \$4,081,000 held in reserve.

To provide for the rolling stock allocated by the United States Railroad Administration and delivered to your Company in 1918, an issue of \$2,004,000 six per cent Equipment Gold Notes was authorized, secured by 800 fifty-five ton capacity steel coal cars, costing a minimum sum of \$2,004,000. The final cost figures, still under determination by the Government, will slightly exceed this minimum.

These notes were issued under an Agreement with the Director General of Railroads, known as "Equipment Trust No. 10" dated January 15, 1920, and were all taken by the Government at par. They mature in annual installments of \$133,500.00, commencing January 15, 1921, and ending January 15, 1935.

Bonds issued during the year:
 Equipment 6% Gold Notes..... \$2,004,000
 Bonds retired during the year:

Series B (Balance of issue).....	\$892,000	
" C	66,000	
" E	119,000	
" F	181,000	
" G	184,000	
" H	125,000	
" I	100,000	
" K	80,000	
Rochester & Pittsburgh Railroad Co. First Mortgage 6% Bonds	15,000	
	\$1,762,000	
Less reduction of amount of bonds held in funds.....	102,000	1,660,000
Net increase in bonded debt of the Company held by the public on December 31, 1920.....		\$344,000

LOANS.

The floating debt of the Company was extinguished during the year by the payment of the outstanding notes, amounting to \$1,865,000.00.

COST OF ROAD.

Capital account has been charged during the year with \$407,640.22 for investment in road, as follows:	
Terminal facilities, Buffalo Creek, N. Y.....	\$67,833.21
Roadway machines	13,265.82
Highway bridge, C. & M. Junction, Pa.....	17,717.78
Subway, Brown St., Rochester, N. Y.....	17,320.74
Increased weight of rail, etc.....	134,318.37
Stone and slag ballast.....	71,994.93
Additional sidings, yard extensions, etc.....	65,189.37
Total	\$407,640.22

The terminal improvements at Buffalo, N. Y., referred to in last year's report, are completed.

The work on the subway, Brown St., Rochester, N. Y., undertaken jointly by the City, the New York Central Railroad Company and your Company, is now in progress and will be finished this coming year.

The general program of strengthening the road with stone ballast and heavier type of rail was continued.

COST OF EQUIPMENT.

Expenditures were made for additions to equipment as follows:	
Sundry locomotive betterments.....	\$20,262.46
Eight hundred steel gondola cars, purchased per allocation of U. S. R. R. Administration.....	2,004,000.00
Four gondola cars purchased.....	2,180.30
Four work equipment cars purchased.....	1,832.19
Sundry car betterments.....	11,906.65
	\$2,040,181.60

There was credited for equipment sold, transferred or destroyed, the following book values, on which the accrued depreciation to January 1, 1918, and subsequent to February 29, 1920, was charged to Accrued Depreciation Account, and the balance to the U. S. R. R. Administration:

Twenty-four locomotives	\$300,608.94
Four hundred and ninety-six freight train cars	387,543.06
Seven work equipment cars	2,091.18
Three miscellaneous equipment cars.....	1,424.47
	\$691,667.65
Making a net increase of.....	\$1,348,513.95

The use of heavy modern power purchased in recent years enabled us to spare twenty-one of the lighter type locomotives, which were sold at favorable prices. Also, owing to the high cost of repairs, three hundred and six gondola cars were disposed of at market values. The rolling stock statistics are affented as follows:

The total tractive power of engines aggregates 14,281,845 pounds, a decrease of 1,064,985 pounds during the past year.

The average tractive power of each engine increased 1,530 pounds, being 45,630 pounds as against 44,100 pounds on December 31, 1919.

The total carrying capacity of cars in freight service now amounts to 748,215 net tons, a decrease of 23,326.

The average carrying capacity or efficiency of each freight car increased .15 ton, being 44.12 tons as against 43.97 tons.

Of the cars in passenger service, 47.31 per cent are of steel construction; and in the freight service 94.60 per cent of the cars are all-steel, or are equipped with steel underframes.

FIRE INSURANCE FUND.

The assets of this fund were increased \$42,116.30 and now amount to \$429,805.53 in interest bearing securities and cash.

PENSION FUND.

The assets of this fund, created July 1, 1903, were increased \$4,677.57, and now amount to \$257,375.30 in interest bearing securities and cash. There were 80 pensioners upon the roll on December 31, 1920, a net increase of 8 during the year.

GENERAL REMARKS.

The increased rates for the transportation of mail, fixed by the Interstate Commerce Commission, became effective November 1, 1916, when the space basis was put into operation. The back amount for the period prior to Federal Control, amounting to \$23,008.07, was credited to Profit and Loss Account.

A new agreement uniform in its application over all rail lines was made with the American Railway Express Company, effective on September 1, 1920, for a period of five years, and to continue thereafter until a four months' notice in writing is given by either party.

The valuation of your lines by the Interstate Commerce Commission began July 1, 1917, and is about 80% completed. The amount expended to date on this account has reached \$161,259.44.

The officers in charge of the operations of the road prior to Federal Control, were reinstated on March 1, 1920, the date on which the corporation resumed its active management.

The acknowledgments of the Board are renewed to its officers and employees for their faithful and efficient service.

By order of the Board,

WILLIAM T. NOONAN, President.

Rochester, N. Y.
March 7, 1921.

PROFIT AND LOSS ACCOUNT.

December 31, 1920.

Balance Surplus December 31, 1919.....	\$3,895,785.30
Credit Balance transferred from Income Account (page 19).....	2,295,049.41
Delayed income credits—	
Adjustment of investment accounts authorized by Interstate Commerce Commission.....	\$17,168.27

Back mail pay.....	23,008.07	40,176.34
Unrefundable overcharges.....		6,812.67
Donations.....		48.00
MISCELLANEOUS CREDITS—		
Discount on framed debt retired.....	\$11,348.75	
Profit on material sold.....	31,841.83	
Unclaimed wages, etc.....	7,011.54	
Sundry items.....	9,286.96	59,489.08
Total.....		\$6,297,360.80

DEBIT.

Dividend appropriation of surplus—		
Preferred stock—		
(No. 53) 3% on \$6,000,000, payable February 15, 1920.....	\$180,000.00	
(No. 54) 3% on \$6,000,000, payable August 15, 1920.....	180,000.00	
Common stock—		
(No. 40) 2% on \$10,500,000, payable February 15, 1920.....	210,000.00	
(No. 41) 2% on \$10,500,000, payable August 15, 1920.....	210,000.00	
	\$780,000.00	
Surplus appropriated for investment in physical property.....	4,010.94	
Debt discount extinguished through surplus.....	2,537.00	
Loss on retired road and equipment.....	70,001.75	
Miscellaneous debits—sundry items.....	6,218.44	
862,818.13		
Balance Surplus December 31, 1920 (page 11).....		\$5,434,542.67

ASSETS

COMPARATIVE GENERAL BALANCE SHEET.

LIABILITIES.

DECEMBER 31, 1920.

DECEMBER 31, 1920.

INVESTMENTS.		
Investment in road (page 15).....	\$36,881,955.12	
Investment in equipment (page 16).....	24,498,774.05	
General expenditures (page 15).....	16,825.85	\$61,397,555.02
Improvements on leased railway property (page 14):		
Allegheny & Western Railway Co.....	\$313,892.05	
Clearfield & Mahoning Railway Company.....	283,117.37	
Credit.....	\$597,009.62	
Mahoning Valley Railroad Company.....	180,707.59	416,302.03
Sinking Funds—Equipment Agreements.....		2,497.96
Deposits in lieu of mortgaged property sold.....		
Miscellaneous physical property.....	\$8,531.27	
Investments in affiliated companies (page 13):		
Stocks.....	363,107.54	
Bonds.....	295,006.00	
Advances.....	331,000.00	989,107.54
Other investments (page 13):		
Liberty Loan Bonds.....	6,050.00	
U. S. Certificates.....	368,276.89	
Mortgage—Real Estate.....	990.00	
		375,416.89
Total investments.....		\$63,189,410.71
CURRENT ASSETS.		
Cash.....	\$447,713.31	
Demand loans and deposits.....	1,809,912.48	
Special deposits.....	12,617.50	
Loans and bills receivable.....	5,108.80	
Traffic and car-service balances receivable.....	1,363,538.93	
Net balance receivable from agents and contractors.....	153,573.95	
Miscellaneous accounts receivable.....	736,673.97	
Material and supplies.....	2,577,735.23	
Interest and dividends receivable.....	11,092.52	
Rents receivable.....	66,976.01	
U. S. R. R. Adm.—Rental.....		
Total current assets.....		7,184,942.80
DEFERRED ASSETS.		
Working fund advances.....	\$10,947.00	
Insurance and other funds:		
Fire insurance fund (page 22).....	\$429,805.53	
Pension fund (page 23).....	257,375.30	
New York State Industrial Commission.....	28,481.25	
	\$715,662.08	
Less—Buffalo, Rochester & Pittsburgh Ry. Co. obligations.....	27,000.00	
	688,662.08	
Other deferred assets.....	1,373.82	
Total deferred assets.....		700,982.90
UNADJUSTED DEBITS.		
Rents and insurance premiums paid in advance.....	\$2,570.02	
Other unadjusted debits.....	825,955.15	
Total unadjusted debits.....		828,525.17
Securities issued		
Mortgage bonds—consolidated mortgage B. R. & P. Ry.		
Unpledged held in treasury.....	\$4,081,000.00	
GRAND TOTAL.....		\$71,903,861.58

CAPITAL STOCK—Common.....		\$10,500,000.00
Preferred.....		6,000,000.00
Total Stock.....		\$16,500,000.00
LONG-TERM DEBT (page 28)		
Funded Debt Unmatured:		
Mortgage bonds—First mortgage, R. & P. R. R.....		\$1,285,000.00
Consolidated mortgage, R. & P. R. R.....		3,920,000.00
General mortgage, B. R. & P. Ry.....		4,427,000.00
Consolidated mortgage, B. R. & P. Ry.....		\$18,210,000.00
Less—Held in Treasury.....		4,081,000.00
First mortgage, L. P. & C. R. R.....		350,000.00
Equipment trust obligations.....		\$8,990,000.00
Less—Held in funds.....		27,000.00
Non-negotiable debt to affiliated companies.....		8,963,000.00
Avonmore & Northern R. R.....		7,610.21
33,081,610.21		
CURRENT LIABILITIES.		
Loans and bills payable.....	\$9,600.00	
Traffic and car service balances payable.....	397,538.44	
Arrears accounts and wages payable.....	1,519,742.87	
Miscellaneous accounts payable.....	1,438.77	
Interest matured unpaid.....	12,397.50	
Funded debt matured unpaid.....	1,000.00	
Unmatured interest accrued.....	360,845.87	
Unmatured rents accrued.....	67,533.73	
Total current liabilities.....		2,370,101.18
DEFERRED LIABILITIES		
Other deferred liabilities.....		\$16,823.09
Total deferred liabilities.....		16,823.09
UNADJUSTED CREDITS.		
Tax liability.....	\$502,104.35	
Premium on funded debt.....	6,079.71	
Insurance and casualty reserves.....	429,763.87	
Accrued depreciation—Road (page 20).....	383,303.23	
Accrued depreciation—Equipment (page 20).....	5,221,660.71	
Other unadjusted credits:		
Accrued depreciation—Leased equipment:		
Allegheny & Western Ry. Co. (page 21).....	\$236,102.47	
Clearfield & Mahoning Ry. Co. (page 21).....	35,849.99	
Mahoning Valley R. R. Co. (page 21).....	2,290.18	
Other items.....	2,722,107.78	
	2,996,350.42	
Total unadjusted credits.....		9,539,262.29
CORPORATE SECURITIES.		
Additions to property through income and surplus:		
Road.....	\$7,842.17	
Equipment.....	908,053.06	
Long term debt retired.....		
Equipment trust obligations.....	3,788,251.61	
Miscellaneous fund reserves.....	\$4,704,146.94	
	257,375.30	
Total appropriated surplus.....	\$4,961,522.14	
Profit and loss (page 12).....	5,434,542.67	
Total corporate surplus.....		10,396,064.81
GRAND TOTAL.....		\$71,903,861.58

NOTE.—For contingent liabilities representing bonds of leased lines, the payment of principal and interest of which is guaranteed by the Buffalo, Rochester and Pittsburgh Railway Company, see page 29 of report.

Railway Officers

Financial, Legal and Accounting

R. A. McNaughton has been appointed general accountant of the Lake Erie & Northern with headquarters at Galt, Ont., effective May 5, succeeding A. McL. Campbell, transferred.

William A. Northcutt, whose promotion to general solicitor of the Louisville & Nashville, with headquarters at Louisville, Ky., was announced in the *Railway Age* of May 20 (page 1195), was born in Grant County, Ky., on February 5, 1876. He was educated in the public and private schools of Williams-town, Ky., and in the law department of the University of Louisville. He entered railroad service on October 11, 1900, as a stenographer in the law department of the Louisville & Nashville, and has served that company continuously since then. In 1902, he was made chief clerk in the law department, and served in that position until 1910, when he was promoted to commerce attorney, with headquarters at Louisville. In 1918, when Federal control went into effect, Mr. Northcutt was promoted to general attorney. His promotion was confirmed in March, 1920, following the return of the roads to private management, and he was serving in that position at the time of his recent promotion.



W. A. Northcutt

Operating

J. M. Doyle, assistant general superintendent of the Great Northern, with headquarters at Everett, Wash., has been appointed superintendent of the Spokane and Marcus divisions, with headquarters at Spokane, Wash., effective May 20.

B. W. Proctor, assistant to the general manager of the International & Great Northern, with headquarters at Palestine, Tex., has been promoted to assistant general manager, with the same headquarters, succeeding E. G. Goforth, whose promotion to general manager was announced in the *Railway Age* of May 13 (page 1149).

Traffic

J. D. Noriega has been appointed Mexican traffic representative of the Missouri, Kansas & Texas, with headquarters at Mexico City.

Engineering, Maintenance of Way and Signaling

Col. C. N. Monsarrat has been appointed consulting engineer of bridges of the Canadian National with headquarters at Toronto, effective May 1.

P. G. Lang, Jr., assistant engineer of bridges of the Baltimore & Ohio, with headquarters at Baltimore, Md., has been promoted to engineer of bridges, succeeding W. S. Bouton, who has retired on account of ill health.

I. H. Schram, superintendent terminals of the Erie, with headquarters at Marion, Ohio, has been appointed division engineer, with the same headquarters, succeeding H. S.

Elliott, who has resigned. The position of superintendent of terminals at Marion has been abolished.

F. L. Wheaton, division engineer of the Delaware, Lackawanna & Western with headquarters at Binghamton, N. Y., has been transferred to Buffalo, succeeding G. E. Boyd. Mr. Wheaton will have jurisdiction over both the Buffalo and the Scranton divisions, the office of division engineer at Binghamton having been abolished.

Purchasing and Stores

W. J. Sidey, general storekeeper of the Buffalo, Rochester & Pittsburgh, has been assigned other duties and the position of general storekeeper has been abolished, effective May 20. Officers and employees heretofore reporting to the general storekeeper will report to the chief engineer.

Obituary

Henry B. Ledyard, chairman of the board of directors and former president of the Michigan Central, died in his home in Detroit on May 25.

E. C. D. Marshall, general freight and passenger agent of the Louisiana Railway & Navigation, with headquarters at Shreveport, La., died at Baltimore, Md., on May 10.

Edward L. Brown, former president of the Minneapolis & St. Louis and the Denver & Rio Grande, died at St. Paul, Minn. on May 22, after an illness of several months. He was born at Pella, Iowa, in 1864, and entered railroad service in 1875, as a messenger on the Chicago, Rock Island & Pacific. From 1877 to 1890, he served successively as telegraph operator, station agent, and train dispatcher on the Rock Island. In 1883, in addition to his other duties he was made joint agent of the Rock Island and the Wabash & Iowa Central. In August, 1890, he was appointed general agent of the St. Paul & Duluth, with headquarters at West Superior, Wis., and in April, 1891, he was transferred to St. Paul, Minn. In December of the same year, he was appointed master of transportation, being promoted to superintendent in March, 1896. In June, 1900, he left the St. Paul & Duluth to become superintendent of the Lake Superior division of the Northern Pacific, with headquarters at Duluth, Minn. From February, 1902 to April, 1903, he served as general superintendent of the Montana Central, and on the latter date was appointed general superintendent of the Eastern district of the Great Northern. In October, 1907, he was transferred to the Western district, with headquarters at Seattle and Tacoma, Wash., serving in this position until February, 1912, when he was elected vice-president of the Denver & Rio Grande. In July, 1913, he was elected vice-president of the Western Pacific in addition to his duties with the Denver & Rio Grande, but resigned in September, 1916, to accept the presidency of the Minneapolis & St. Louis. He was compelled to give up this position in March, 1917, on account of ill-health. In October, 1917, Mr. Brown was elected president of the Denver & Rio Grande, and at the advent of federal control, was appointed federal manager of that road. He resigned on account of ill-health in November, 1918. During the latter part of federal control, Mr. Brown served as assistant to the regional director of the Southwestern region, with headquarters at Dallas, Tex. He was not engaged in active railroad service at the time of his death.



E. L. Brown

EDITORIAL

Railway Age

EDITORIAL

The Table of Contents Will Be Found on Page 5 of the Advertising Section

Railroad grade crossing accidents and deaths resulting therefrom are increasing from year to year at an appalling rate.

"Arouse the Public"

Statistics of the Interstate Commerce Commission for 1919 show that 6,400 people were killed or injured in such accidents during that year and that of this number 4,790, or about 75 per cent, resulted from collisions between trains and automobiles. On the Atchison, Topeka & Santa Fe lines east of Albuquerque, N. M., the number of crossing accidents in 1920 was a little over 20 per cent greater than in 1919. The Baltimore & Ohio, in a check made during the month of April, 1921, at its crossings in Chicago, found 550 instances where drivers of automobiles, in crossing the tracks, failed entirely to either look, listen, or take any other precautions to avoid being struck by a train. Such is the condition over the entire country. The problem confronting the railroads is to devise some way to arouse the public to this situation. The Chicago, Burlington & Quincy, Illinois Central and other roads have inaugurated campaigns to eliminate crossing accidents in which they have gone direct to the newspapers in the territory served by their lines, supplying them with data and articles which the papers are carrying to their readers. This is the most effective method that can be used to give the public the education on the subject that it needs.

One of the most serious blows at efficiency of operation for which the Railroad Administration is responsible was the abolition of piece work. By this step

Restoration of the Incentive

all labor was reduced to a level and incentive for special effort was removed. While piece work had received its widest application in the mechanical department, it was also receiving serious consideration from maintenance officers when the roads were taken over by the government. It had long been maintained by many maintenance of way officers that their work did not lend itself to standardization of operations to such an extent that standard schedules could be prepared. They pointed out the differences in local conditions, the variations due to interference from traffic, etc., which affected the output of their gangs. However, as pointed out in an article in another column, these objections have been found to be more imaginary than real on at least two railways which had adopted piece work systems for maintenance of way work on an extensive scale, on one of which it was in effect for upward of six years. It was found from extended experience that there was surprising uniformity in the performance of gangs in different territories and that the effect of local conditions was far less than had been supposed. It was also found that from 75 per cent to 90 per cent of all of the work ordinarily done by maintenance forces could be scheduled. Records for an extended period demonstrated that the men can earn bonuses and that bonuses did afford an incentive for many of the gangs, the bonus payment on one road averaging over \$15,000 per month or about five per cent of the total payroll of the force concerned. The maintenance of way department has long suffered from the flat rate paid to experienced and inexperienced employees alike

which in effect denies recognition of the value of experience and skill. The bonus system offered a means of rewarding special industry, skill and experience and thereby creates an incentive for the men to exert themselves and to remain in the service as they become more proficient. Some incentive of this character is necessary if the railways are to increase the efficiency of their operations.

A British correspondent at Valparaiso, Chile, has written in exulting terms in an important London weekly telling of the offer of credit by an English financial house for the construction of a new railway line, better than the present one, from Valparaiso, Chile, to Santiago. The financiers stipulate, he says,

Britain Scores in Chile

that the work of construction must be done by a British firm. The correspondent indicates, furthermore, that the terms of this offer, which will run upwards of \$15,000,000, are much more liberal as to security and interest than American bankers are generally disposed to grant. This is the most important evidence thus far that Britain is making progress in regaining her old supremacy in South American railway markets and the spectacle is not one which indicates any particular competitive strength of Americans in that field. A long term credit overcomes the temporary barrier of adverse exchange rates. There is no good reason why British investment funds should be more readily available for such purposes than our own—in fact the contrary might well be expected. At any rate, there is slight chance of a return to normal in our world trade until American investors are attracted in important numbers to foreign credits. In March last year, our exports were valued at almost a billion dollars. In March of this year they had fallen to \$384,000,000. When these figures are understood it is not necessary to go much farther to find one of the primary causes for business depression in this country.

In the minds of a goodly proportion of the people, public utilities commissions can have but one function—to reduce rates. As long as the regulatory bodies

Regulation Is Dead, Long Live Regulation

fulfilled this prerogative in good measure they were popular, but when, as a consequence of the decreased value of the dollar, it became necessary to raise rates, the popular acclaim for the state commission was overwhelmed by the cry for "home rule." As a consequence, bills have been introduced in many of the legislatures calling for the abolition of the commission or providing for the tinkering of public utility laws which promise to do serious harm, unless the resultant reduction in the effectiveness of state regulation will serve to strengthen the arm of the Interstate Commerce Commission. As an illustration of present tendencies, House Bill No. 741 now before the Illinois legislature proposes to wipe the slate clean and provide an entirely new commission, completely under the control of the party in power. It provides definitely for independent utility regulation by any city or "transportation district" which may desire "home rule", such regulation to be exercised by the city council or any other body designated. That the framers

of this bill have been prompted entirely by political expediency is plain in every line of the act as drawn. It is politics from start to finish. Even the pass privilege to state officers, which died so hard in Illinois, would be restored under this act, while arrangements for complete circumvention of civil service, and for a larger personnel, increased salaries and a tenure of service for commissioners coincident with the gubernatorial term would provide fat picking for the politicians in power. All that has been done in many years to reduce the politics and increase the fairness and efficiency in regulation of public utilities would speedily be undone.

In a period like that of the past few years and which will probably continue for a time, operating, engineering and maintenance officers have an opportunity to realize the advantages of farsightedness in permanent roadway construction. The roads which adopted the policy of securing permanency in

Permanence in Railway Construction

bridges, buildings and other structures in the more prosperous days previous to the war and at the same time attempted to follow, as nearly as possible, the same standards in their track, now have much to be thankful for. While such roads may now show deterioration when compared to their own previous standards, they are still well above the general average just as they have been in the past and just as they will be no doubt in the future. Lines of dense traffic which were laid with heavy rail on tie-plates and cross-ties are now reaping the benefit of their efforts, for such tracks can still be maintained to fair standards at an expenditure, small compared with that which would be necessary if it were not for those improvements. Roads with concrete and other types of permanent structures are worrying little about where the money for renewals or reconstruction can be found because there is little or none to be done. Roads that have made similar expenditures for permanent track construction are not spending anywhere near the amount of money for this class of work that must be expended on other roads because of the lack of permanence in their construction methods. Permanent construction pays in both good and bad times, but is most appreciated in the latter. It is a policy which cannot be carried out all at once, but the benefits of which will assume considerable proportions in a short time if a little toward that end is done each year. The saying "Do well what you do" may be trite but it is still good advice nevertheless.

Since there is a wide diversity of opinion among railroad men regarding many questions of engine terminal design and operation, it is not surprising to find

Engine Truck and Tender Wheel Drop Pits

a lack of agreement on the proper location and construction of engine truck and tender wheel drop pits. The need for such pits, however, is acknowledged by a large majority of railroad men who admit that the number now installed is entirely inadequate. Some of the roads reporting to the American Railway Association Committee on Engine Terminals recommended the installation of separate drop pits to handle tender wheels, while others felt that a single pit should serve for both engine truck and tender wheels. Whatever the decision as to number and location, these drop pits should now be installed to suit local conditions and in accordance with the best judgment of mechanical officers in charge. The advantages of auxiliary drop pits are numerous. Heavy locomotive front ends will not have to be jacked up to remove the trucks and change defective wheels. If a pair of tender wheels develops flat spots or chipped

flanges, if a journal is cut or a journal box broken, the wheels can be readily changed without jacking up the tender. If the defective wheels happen to be in the front truck, the drop pit eliminates cutting the tender, disconnecting the drawbar, safety bars, air and steam lines and automatic stoker connections when the locomotive is stoker fired. A large amount of manual work is thus saved and the locomotive is returned to service quickly. The installation of suitable drop pits to facilitate the ready changing of engine truck and tender wheels will pay large returns on the comparatively small investment involved due to three facts. First, and most important, the locomotive will be held out of service a shorter length of time; second, the actual cost of changing the wheels will be reduced due to the shorter time and less manual work involved; and third, if wheels can be changed easily, minor defects will be immediately repaired and the general standard of engine truck and tender wheel maintenance raised.

The Reduction in Railway Wages

THE ANNOUNCEMENT of the Railroad Labor Board on June 1 regarding reductions in wages to be put in effect on July 1 shows what the board intends to do regarding the entire subject of wages. In the cases of the railways that are technically before it, it has granted reductions averaging about 12 per cent. It intends to make corresponding reductions on all other railways as they apply for them. The largest reduction is in the wages of section men, who are unskilled workers, and who are reduced 18 per cent, or from a daily basis of \$3.70 to \$3.02. This puts section labor back where it was before the wage award on July 20, 1920, but leaves its wages averaging almost 38 cents an hour, which is more than is being paid in most other industries.

Most of the reductions in wages amount to about nine per cent, including those of employees performing such widely varying duties as machinists, carmen, switchmen and yard foremen. The reduction in the wages of passenger locomotive engineers is only about seven per cent. The advance in wages granted by the Labor Board last July ran at the rate of almost \$775,000,000 a year, or an average of 22 per cent, while on the basis of the same number of men who were employed in 1920 the reductions now announced amount to something over \$400,000,000, or an average of about 12 per cent.

The decision should be satisfactory to the employees. It cannot be received with satisfaction by the railways. The reductions which have occurred in the cost of living and in the wages paid in other industries since the present wages were fixed would have justified a larger reduction in railway wages. The decision leaves the railways and the Interstate Commerce Commission in an unhappy position. The public believes that a large reduction in railway expenses will result from the decision of the Labor Board announcing the abrogation of the national agreements. It has given little consideration to the fact that the Labor Board specifically recognized the principle of the eight-hour day, thereby rendering impracticable a large part of the savings the railways estimated could be made by abrogation of the national agreements. Furthermore, the public does not understand that all the remaining points involved in the national agreements controversy are still unsettled. Although the Labor Board has ordered abrogation of the national agreements, the representatives of the labor unions on individual railways, under instructions from their national officers, are demanding the retention of practically every rule in the national agreements. Their purpose apparently is to throw the entire controversy back into the hands of the Labor Board. At any rate, the Labor Board's decision regarding national agreements has thus far settled nothing and there-

fore nobody knows what savings, if any, it finally will cause. Not only, however, does the public apparently believe that large reductions in expenses have been made certain by the national agreements decision, but in addition it now receives news of a reduction in wages which to it seems large, but which really will reduce the excessive operating expenses of the railways only by about seven per cent.

With the public being led to believe that very large reductions in operating expenses are in sight there is going on an extensive agitation for large reductions in freight rates. The reductions in operating expenses that are in sight are not sufficient to justify substantial reductions in rates. Even when the railways in the last four months of 1920 were handling a large business they were failing at the rate of about \$500,000,000 a year to earn an annual net return at the rate of six per cent on their valuation. Since the big slump in business began they have been earning almost no net return at all. In the face of these facts it is plain that if the railways are to be set upon their feet financially, and enabled to put their properties in good shape again and increase their facilities sufficiently to handle the country's traffic when business revives, substantial reductions of rates must be indefinitely postponed. A general reduction of even eight and one half per cent in freight rates alone would reduce the earnings of the railways as much as the entire reduction in wages granted will reduce their expenses. This would leave them as badly off as they would be without any reduction of wages, and would not satisfy any of those who are agitating for a large reduction in rates.

The things the country will need most from the railways in the immediate future are, first, improvements in the physical properties which will enable the roads to handle the traffic that will be offered when business revives, and, secondly, readjustments in rates which will eliminate discriminations and inconsistencies resulting from the horizontal advances which have been made and the reduction of such rates as can be shown to be actually hindering or preventing the movement of traffic. The rehabilitation and expansion of the properties necessary to enable the roads to give good and adequate service cannot be secured unless the roads are allowed to earn larger net returns, and they cannot do this if any considerable general reductions in rates are to be made in the near future. As to the readjustments needed, testimony presented to the Senate Committee on Interstate Commerce shows that these are in process of being made now. The general tendency of rates should be, and will be, downward in future, but the decision of the Labor Board precludes any substantial general reductions in the near future.

A Bad Freight Car Situation

IN 1917 there were in service on the Class I railways of the United States 2,479,500 freight cars, the largest number owned in the history of the railroads. Since that time each succeeding year has seen a decline in the number of freight cars. There were 81,600 less in service in 1918 than in 1917 and 36,800 less in 1919 than in 1918. In 1920 there was a further decrease of 8,200 cars. In 1918 and 1919 the average capacity increased from 41.5 tons to 41.6 and 41.9 tons respectively. Each year, therefore, marked a decrease over the preceding year in the aggregate tonnage capacity as well as in the number of cars. In 1920 the average capacity had increased to 43 tons so that in spite of a decrease of over 8,000 in the number of cars, there was a material increase in the aggregate tonnage capacity, which, however, was still considerably less than in 1917.

From these facts two conclusions are inevitable: First, that the cars ordered by the Railroad Administration in 1918 and 1919 were entirely inadequate, both in number

and in aggregate capacity, to replace those retired during those two years, and second, that the railroad companies have vigorously attacked the problem of restoring the country's freight car resources during the short period since the properties were returned to them for management.

But, notwithstanding the manner in which the tide of depression has been stemmed, the condition of the equipment at the present time is a matter of grave concern to railway managements and the shipping public alike. Of the 2,479,500 freight cars in service in 1917, about 5.7 per cent, or 141,300, were in bad order when the railroads entered the period of federal control on January 1, 1918, leaving 2,338,200 freight cars in condition for actual service. On May 1 of this year, according to the semi-monthly report of the Car Service Division, there were 310,000 freight cars in bad order out of a total of 2,352,900 cars, leaving 2,042,900 freight cars in serviceable condition. At present, therefore, the Class I roads have over 295,000 less cars fit for actual service than they had at the beginning of government control. Furthermore, during 1918 the number of bad order cars requiring heavy repairs varied from 85,000 to 96,000 and constituted from 50 to 60 per cent of the total number of bad order cars. Of the 310,000 cars now in bad order, 228,200, or 74 per cent, are in need of heavy repairs.

In 1917 the railroads handled the largest volume of traffic in their history up to that time, but under conditions which clearly indicated the need for more cars. The year 1920 again broke all records for the volume of traffic and this business was handled with about 160,000 less cars actually in condition for service than were available in 1917. This accomplishment marked the highest effectiveness ever attained in the utilization of freight cars, but it was attained by the adoption of some methods to the permanency of which the shipping public could hardly be expected to agree. It is improbable that equal effectiveness, not to mention a further increase, can be maintained indefinitely.

The railroads now face a revival of business. Since the last week in March, when car loadings reached their lowest point with the exception of one other full week during the year, there has been a steady increase in car loadings, which increase for the week ending May 14, amounted to 12.5 per cent in a period of six weeks. The movement of coal is increasing and must continue to do so if the country is to catch up on the winter's supply. With the grain harvest approaching, there is an unusually large amount of last year's crop still to be moved and already in some localities it is becoming difficult to meet the demand for grain carrying cars.

With prospects of an accelerating business revival the railroads have about 134,000 fewer cars immediately fit for service than were available during the period of heavy traffic last year. To handle a volume of traffic approaching that of the late summer and early fall of last year under these conditions would require a new record in car mileage and car loading, which would be accompanied by car shortages, forced car distribution and embargoes—expensive alike to the railroad and the shipper.

In order to restore the number of cars fit for service to last year's figure, the number of bad order cars must be reduced by 134,000 and this reduction must come very largely from the 228,000 cars requiring heavy repairs. Under normal conditions the daily output of repaired cars will probably average 10 per cent heavy repairs and 90 per cent light repairs and it is evident that if no move is made to clear up the present abnormal accumulation of heavy repair work until there is again a demand for cars, the accumulation will be reduced with difficulty and only at the expense of inadequate attention to much of the equipment. This accumulation of bad order cars is one of the results of the bitter struggle for corporate existence that railway managements have ever had to face and for many of them the end of the

period of stress is not yet in sight. Others, however, are in a position to anticipate a reasonably certain improvement in business conditions and such roads should immediately bend every effort to the task of restoring their idle equipment to a fit condition for effective service.

But the burden of meeting the demands of reviving business does not rest with the railroads alone. Shippers must in a measure share the responsibility. It is a practical impossibility to provide a supply of freight cars or of other essential facilities large enough to handle all of the business offered when a year's requirements of the country are crowded into a few months. Like any other machine the capacity of the railroads is limited and output can best be secured by steady operation. For his own advantage, therefore, every shipper and every receiver of freight in a position to anticipate the revival of normal business activities should make the fullest possible immediate use of the railroads, thus saving himself delay and uncertainty later. At the same time he will assist in relieving the congestion at the inevitable peak of traffic which is to come, besides supplying the revenues so essential for the immediate adoption of a vigorous policy of equipment rehabilitation by the railroads as a whole.

Chicago, St. Paul, Minneapolis & Omaha

THE CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA operates 1,749 miles of railway, of which it owns all but 70 miles operated under trackage rights. This mileage lies principally in Wisconsin, Minnesota and Nebraska, but the lines extend also into Iowa and South Dakota. The property is controlled by the Chicago & North Western through majority stock ownership of the preferred and common stock. Inasmuch as it is related to the North Western, although operated separately, our discussion of the annual report can be brief, for much that has been said about the North Western applies also to the Omaha.

Taking into consideration the standard return for January and February, the guaranty for the guaranty period and the net railway operating income for the remaining four months of the year, the operations of the Omaha in 1920 permitted that road to earn a surplus, after the payment of 7 per cent on the preferred stock and 5 per cent on the common stock, of \$871,684. This compares with \$660,732 in 1919, when the property was under federal control. It was considerably in excess of the surplus earned in 1917, the last year prior to federal control, when after the payment of the same dividends the surplus was \$402,603. It by no means rivaled, however, the figure for 1916, when there was a surplus of \$1,627,754 after the payment of 7 per cent dividends on both the common and preferred stocks.

The business done by the Omaha in 1920 was in excess of that in 1919. The traffic handled in the first eight months of the year was in excess of that handled in the corresponding months of 1919. In the last four months, however, the traffic handled was less than in the corresponding months of 1919. October, 1920, was the best month of the year, but there was not as much traffic handled in that month as in October, 1919. After October the traffic fell off rapidly and the December, 1920, and January, 1921, figures were the lowest for some time. It was presumably the large amount of traffic handled in October and the fairly high average for September that gave the road a net railway operating income sufficient for it to better its 1919 earnings. The falling off in traffic after these months is the familiar example of a railroad being unable to realize on the increases in rates established in August to compensate for increases in labor costs.

In the review of the Chicago & North Western's report, which appears in these columns this week, there was extended

comment on the fact that the operations of the North Western and Omaha were characterized by train loads and figures of car utilization below the averages for neighbor roads. It is hardly necessary to repeat what has already been said about the North Western in these brief comments concerning the Omaha. Nevertheless, it is of interest to observe that although the Omaha had in 1920 an average of net tons per train—revenue and non-revenue freight—of 448, it has been making steady increases in its train load over a period of years. The average of net tons per train in 1920, that is 448, compared with 459 in 1919, but it represented increases over the figures of 429 in 1917; 414 in 1916; 360 in 1915; 331 in 1914, etc.

It would appear, nevertheless, that the Omaha has not gone after heavy train loading in quite the fashion which has characterized the operations of many other roads. The Omaha succeeded in 1920 in getting an average load per loaded car of 23.9 tons; the average car miles per day were 22.2 and the ton-miles daily per car were 393. The first of these three figures was the same as in 1919, the latter two represented increases over 1919.

The following gives the figures for operation in 1920 as compared with those for 1919:

	1920	1919
Mileage operated	1,749	1,749
Freight revenue	\$20,845,238	\$18,335,828
Passenger revenue	8,272,351	7,589,842
Total operating revenue	31,911,606	27,732,018
Maintenance of way expenses	4,907,551	3,838,174
Maintenance of equipment	6,273,265	5,230,102
Traffic expenses	350,648	265,361
Transportation expenses	15,251,523	13,079,739
Total operating expenses	27,957,338	23,316,464
Net from railway operations	3,954,267	4,415,553
Taxes	1,568,349	1,309,002
Net railway operating income	2,385,918	2,677,245

The foregoing figures are not given in the report, but are taken from the December, 1920, monthly report to the Interstate Commerce Commission.

The corporate income account is given in brief as follows:

	1920	1919
Standard return		\$4,934,790
Compensation, January and February	\$815,603	.....
Net railway operating income, March 1 to December 31	1,335,388	.....
Due on guaranty	2,749,197	.....
Gross income	5,075,879	5,031,160
Net income	2,587,670	2,376,718
Dividends—		
Preferred, 7 per cent	788,151	788,151
Common, 5 per cent	927,835	927,835
Balance income for year	\$871,684	\$660,732

Chicago & North Western

THE CHICAGO & NORTH WESTERN is another of that large number of railroads which in 1920 did a record business but which were unable, because of increased costs of operation, to reflect that fact in net earnings. The corporate income account for 1920 showed gross income amounting to \$23,811,563 after the accrual of dividend income, etc.; the compensation for the first two months of the year while the property was still under federal control, and the guaranty for the following six months, as compared with gross income in 1919 amounted to \$24,140,709. The net income after the payment of interest, etc., was \$12,545,856 in 1920 and in 1919, \$14,088,104. In June, 1920, because of the uncertainties in the railway situation at the time, the company reduced its dividend on the preferred stock from 8 to 7 per cent and on the common stock from 7 to 5 per cent, thereby reducing the dividend payments in the amount of \$3,127,000 as between the two years. The net for 1920, therefore, was \$3,633,979 as compared with \$2,030,307 in 1919.

The trend of the amount of traffic handled on the North Western in 1920 was fairly typical of that on the railways of the country as a whole. The road did more business in every month of 1920 than in the corresponding months of 1919 with the single exception of April, when the outlaw strikes

cut down the ton-miles handled about one half from March. The month of September was the best for the entire year, but after that month the traffic decreased rapidly, thereby preventing the road from realizing on the increases in rates which were granted to offset the increases in labor and other costs.

Another interesting feature of the year's developments was a rather marked change in the traffic handled. This change is shown in the following table:

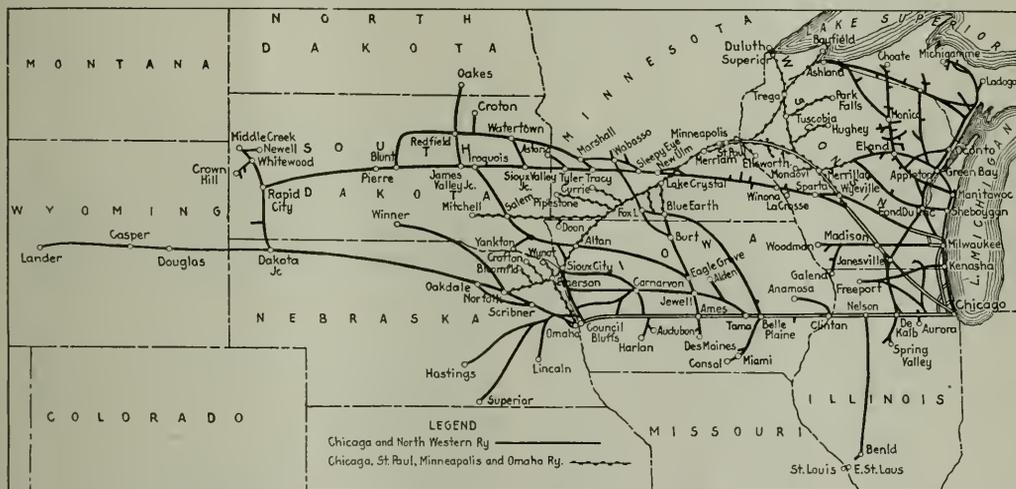
	1920 Revenue tons	1920 Per cent of total	1919 Per cent of total	Per cent increase or decrease in number of tons
Products of agriculture.....	\$7,744,549	12.85	16.36	-8.94
Products of animals.....	2,333,186	3.87	5.69	-21.15
Products of mines.....	29,598,508	49.10	41.49	37.24
Products of forests.....	6,883,662	11.42	12.62	4.96
Manufactures.....	10,650,551	17.67	16.91	21.20

Total, including misc. and l. c. l.....	100.00	100.00	15.96
Bituminous coal.....	60,275,207	17.01	13.03
Ores.....	14,338,669	23.79	18.99

The total tons of revenue freight carried in 1920 were 60,275,207, as compared with 51,981,263 in 1919, an in-

crease of 15.96 per cent. The increase in mileage is not due to any extension of the system; it is due to the acquiring last April by the parent company of various proprietary companies which formerly were controlled by entire ownership of capital stock and, in some cases, also leased. The lines acquired were 11 in number, the more important of which were: The Wyoming & Northwestern from Casper, Wyo., to Lander, 148 miles; the Pierre, Rapid City & North Western, Fort Pierre, S. Dak., to Rapid City, 164 miles; the Belle Fourche Valley, Belle Fourche, S. Dak., to Newell, 24 miles, and the James River Valley & North Western, Blunt, S. Dak., to Gettysburg, 40 miles. The result of these changes is that the North Western is now a completely knit system consisting entirely of mileage which it owns. The savings in the way of accounting and records from this change will probably be considerable.

The North Western's lines traverse a prosperous territory, from which it derives a traffic of large volume and varied character. The property is characterized by high standards



The Chicago & North Western and the Chicago, St. Paul, Minneapolis & Omaha

crease of 15.96 per cent. The table points out that this increase was made up principally from increases in the tonnage of bituminous coal and ores, whereas there was a decided decrease in farm products. The tonnage of bituminous coal increased as between the two years in the amount of 51 per cent, that of ores 45 per cent and in products of mines in general 37 per cent. There was also an increase in manufactures of 21 per cent. With the decrease in products of agriculture, amounting to 8.94 per cent, and in products of animals amounting to 21 per cent, the final result was that products of mines, which in 1919 made up but 41.49 per cent of the total traffic, in 1920 made up 49.10 per cent. The manner in which the wheat growers held back their wheat for higher prices during the latter part of 1920 received no small amount of attention at the time. The rather striking result of holding back the farm products on the traffic of an important system is, nevertheless, of more than passing interest.

The Chicago & North Western now operates 8,402 miles of line extending over nine states. Of this total mileage it owns 8,329 and operates 73 under trackage rights. This figure of miles operated is a considerable increase over that

of maintenance and construction. It is well regarded by shippers and the service given is generally recognized as satisfactory. The company is rather noted for its conservatism. This was shown in 1920 in the decision to reduce the dividend on both the common and preferred stock. Other writers have also called the North Western conservative because it has not sought to build or obtain a connection to the Pacific Coast, such as the Chicago, Milwaukee & St. Paul obtained by building its Puget Sound extension, or the Chicago, Burlington & Quincy was given by its being acquired by the Hill lines. However, this view does not appear to have much weight, particularly in view of the relationships of the North Western with the Union Pacific.

Nevertheless, it will have to be admitted that the North Western has apparently been a bit more conservative in matters of operation than some of its neighbors. With a tonnage of coal aggregating 13 to 17 per cent of the total tonnage, ores 19 to 24 per cent, or, of products of mines as a whole, 41 to 49 per cent, it might be expected that the revenue train load would have reached a high average. This, however, is not the case. It should be clearly recognized in comparing the average train load of the North Western with that

of other roads in the same territory that the comparatively small increases in its train load have been due to the policy consistently followed by the management in developing the property and based upon the belief that the public is better served by operating comparatively light trains at relatively high speeds than by operating tonnage trains at low speeds. The North Western is well equipped in the way of motive power as far as the number of locomotives and their condition is concerned. It has not, however, gone in for heavy power. For example, it received from the Railroad Administration 35 six-wheel switching locomotives, but no heavy freight engines. In 1920 it placed orders for 40 heavy freight locomotives; these were Mikado locomotives with a total weight in working order of 302,000 lb. and similar to those which were ordered in 1917. By way of comparison, it should be noted that the U. S. R. A. standard heavy Mikado has a total weight of 322,000 lb. The average revenue train load on the North Western in 1920 was 452 tons. For purposes of comparison, however, one must use the figure of net tons per train—revenue and non-revenue combined. In 1920 this was 552 tons. This compared with 530 tons in 1919, but 1919 was a low year in this respect, for in 1917 the net tons per train were 544. The figure for 1917 represented, it is true, an increase over 1915 and 1916, but it is nevertheless significant that there should have been an increase of but eight tons in the net tons per train as between the averages of 1917 and 1920.

Further than that, it also develops that despite its opportunities for heavy train loading, the North Western, besides not having made much progress in the past three years, is operating with train loads that are considerably below those of its neighbors in the same or adjoining territory. Thus, the net tons per train in 1920 were for the Burlington, 766; Great Western, 629; St. Paul, 631.

Other figures that are usually regarded as indicating the efficiency of a road's operations are the tons per loaded car, the car miles per day and the ton-miles daily per car. The North Western in 1920 had a figure of tons per loaded car of 26.3 as compared with 24.0 in 1919. This is a good figure and rather better than the average for the roads whose train loads were mentioned above. The figure of car miles per day, averaged in 1920 only 21.5.

Despite what may be said about the North Western's failure or lack of desire to secure a heavy train load, it is still a fact that the North Western has adopted a progressive policy as to the matter of keeping the amount of equipment up to the mark. As has been noted, there were received from the Railroad Administration 35 six-wheel switching locomotives. The North Western was also allocated 3,250 cars, including 1,000 50-ton box, 1,250 40-ton box and 1,000 50-ton composite gondola cars. During 1920 the road placed orders for 40 Mikado and 20 Pacific type locomotives, 500 ore, 500 stock, 250 refrigerator and 50 caboose cars and for 62 passenger train cars. The equipment allocated by the U. S. R. A. was financed through the equipment trust agreement made by the Guaranty Trust Company and the Director General. An application is pending for a loan from the revolving fund to assist in financing the equipment mentioned as ordered in 1920.

The total tons of revenue freight carried by the North Western in 1920, as has already been mentioned, were 60,275,207, an increase of 16 per cent over 1919. The total revenue ton-mileage was 9,559,269,662, an increase of 15 per cent over the figure of 8,294,482,641 in 1919. The average haul was 159 miles. The total number of passengers carried in 1920 was 40,692,627 and the passenger mileage 1,444,559,205, an increase of 2.26 per cent over 1919. The average journey per passenger was 35 miles.

The following gives the figures for operation in 1920 as compared with 1919:

	1920	1919
Mileage operated.....	8,298	8,090
Freight revenue.....	\$110,500,758	\$92,084,614
Passenger revenue.....	37,386,603	35,213,606
Total operating revenue.....	165,692,399	139,589,915
Maintenance of way expenses.....	*25,084,856	20,696,215
Maintenance of equipment.....	*2,889,502	29,687,410
Traffic expenses.....	*1,303,661	879,110
Transportation expenses.....	*65,898,448	64,202,497
Total operating expenses.....	157,110,200	119,579,387
Net from railway operations.....	8,582,199	20,010,528

*Only ten months' figures are given.

The corporate income account is as follows:

	1920	1919
Accrued compensation.....		\$23,201,016
Compensation, January and February.....	\$3,803,000	
Guaranty March 1 to August 31.....	16,509,185	
Net railway operating income, September 1 to December 31.....	669,652	
Gross income.....	23,811,563	24,140,709
Net income.....	12,545,857	14,088,105
Dividends—		
Preferred (8 per cent in 1919; 7 per cent in 1920).....	1,567,560	1,791,600
Common (7 per cent in 1919; 5 per cent in 1920).....	7,257,625	10,160,675
Balance income.....	3,633,979	2,030,307

New Books

Economic Development of the United States. By Isaac Lippincott, 5½ in. by 8¼ in., 691 pages. Published by D. Appleton & Co., New York.

This work brings the economic history of the United States through the war and up to date. In addition it has the advantage of being a rather thorough treatment confined within the limits of one volume which is not ponderous enough to be the source of much discouragement to the casual reader. The author has endeavored, as he announces in the preface, to give not only the bare economic aspects of American history but to develop the successive events and correlate them as causes and effects—"to present a complete and continuous picture of growing industrial society." Novelty is not a characteristic of economic phenomena. Each situation which arises has, of course, certain aspects which are novel but, in the main, almost any problem in economics which ever presents itself for solution is essentially analogous to one which has arisen and been solved before. True, the study of economic history does not always tell us just how we should solve our present problems, but, if it does not do this, it will generally tell us how *not* to attempt a solution, which is quite important. The facts which this work deals with are explained in terms which will present no difficulties to the reader not trained in the terminology of economics.

This work begins, as it should, with an explanation of the relation of economic history to the study of economics. A rather detailed explanation of the natural resources of the country is next given and then the history proper, beginning with the earliest colonization of the country by Europeans. The nationality of the colonists, their occupations and habits of living and the goods produced at that time are dealt with in considerable detail. The history of government finance and price inflation following wars, the history of the tariff and the industrial revolution are subjects treated especially well by Professor Lippincott in this work—which is fortunate since an understanding of these subjects is of particular importance in a time of post-bellum readjustment like the present when our chief economic ills are so strongly accentuated. The author traces carefully the development of practically every important American industry. Railroad history, of course, is not omitted and the growth of the railways, their financial history and the development of government regulation are outlined in the essential details. For a reader whose main interest lies in the railway industry, the work is not, unfortunately, as complete in its consideration of this phase of our economic development as could be wished. The book, however, does not purport to be a railroad history simply, and a broad knowledge of our industrial history is quite as important for railroad men as it is for anyone.

Labor Board Announces Wage Reductions for July 1

Decreases Approximately 12 Per Cent Estimated to Save Class I Carriers \$400,000,000 Yearly

WAGE REDUCTIONS approximating 12 per cent were ordered by the Railroad Labor Board in a blanket decision made public on June 1. The effect of this decision if applied to all employees of all Class I roads, it riers approximating \$400,000,000 annually. The decreases range from 18 per cent for unskilled maintenance of way labor to 7 per cent for road passenger engineers.

As a result of wage orders issued by the Director General during the period of government control, the wages of railway employees were increased from an average of \$78 in December, 1917, to \$116 in January, 1920, or about 49 per cent. The Railroad Labor Board handed down a decision effective May 1, 1920, which increased the wages approximately 22 per cent, or to an average of \$141 per month. After this latter increase the railway workers were receiving an average increase of 81 per cent more than they were re-

ceiving prior to federal control, and about 10 per cent of them, chiefly the lower paid, unskilled workers, had received increases in excess of 100 per cent. General reductions in wages as outlined in the present decision would mean an average monthly wage of about \$125 for all employees.

The present decision applies to the various cases which were filed with the Board prior to April 18. On June 6 the Board will hear the arguments on the cases submitted subsequent to April 18 and the decision in these cases will also become effective July 1.

The Labor Board's findings are officially designated as Decision No. 147, New York Central Railroad Company et al. vs. Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station Employees, et al. An abstract of the decision follows:

Abstract of Decision No. 147

The United States Railroad Labor Board, acting under authority of the Transportation Act, 1920, and in furtherance of the purpose of said Act, hereby renders a decision upon a series of controversies between the carriers and the representatives of certain employees of the carriers, involving the question of what shall constitute just and reasonable wages. The various controversies were considered in conference between representatives designated and authorized by the parties, and not having been decided in such conference were referred to the Labor Board for hearing and decision.

History of the Controversy

Immediately after the organization of this Board and on April 16, 1920, it received and took over for hearing a dispute that had been pending before what was known as the Bi-partisan Board, between a large number of carriers which had been under government control, including most, if not all, of those now before the Board in these cases, and their employees, which dispute, among other things, involved the question of wages.

After a full hearing and as careful consideration as the time and conditions would allow, the Board in that case (Dockets 1, 2 and 3) rendered its Decision No. 2, awarding certain increases and fixing what it deemed just and reasonable wages at that time for all the classes of employees of all the carriers then before the Board. The Board did not then undertake to, and under the law could not, make that decision a permanent award or standard. That decision or award was accepted in good faith and acted on both by the carriers and their employees parties to that decision; and certain other carriers not formerly parties to that case voluntarily applied and put in force the standard of wages fixed by this Board in its Decision No. 2. That decision was rendered at a period of inflation, rising prices and high costs of living. Since then changes, and in some respects very decided changes, have taken place in business, industrial and financial conditions in the United States, and in a varying measure have affected all industries and the entire public.

We now find ourselves in a period of readjustment to which all interests sooner or later must conform.

Following the raise in wages granted by this Board in Decision No. 2, and to some extent based on that, the Interstate Commerce Commission granted an increase of rates to the carriers which was put in force, but after this there came the inevitable pause in the rising tide of prices and business followed by the like inevitable recession, and in some lines a disastrous fall in prices, and the resulting cutting down of production. This has affected all lines of industrial life all over the United States and produced conditions which have to be met and in whose burdens all have to share.

Confronted by these conditions, the carriers before us, after conferences with the representatives of the different classes of their employees as to a reduction of wages, at which conference there was a failure to reach an agreement, have filed their several complaints and brought their disputes before this Board for a

decision as provided by law. The disputes were separately brought; the first being filed by the New York Central Railroad Company on March 19, 1921, followed by numerous other carriers.

Some of the carriers presented disputes applicable only to a few of the classes of their employees; others applicable to nearly all classes of employees.

The Board, appreciating and knowing the general financial and industrial conditions of the country, considered the appeals of some of the carriers for immediate action, and believing that the applications already filed would soon be followed by numerous others, took cognizance of the fact that most of the evidence offered or to be offered in one case would be material and common to all, and that it would be impracticable to reach an early decision in the time at the disposal of the Board if the cases were heard and considered separately, the Board at that time being engaged in hearing other pressing matters, on April 6, 1921, passed a resolution reciting in substance these facts, and that it was desirable that the Board hear at one time and decide in one decision so far as may be possible the question as to what may constitute just and reasonable wages for all the classes of employees of the carriers parties to Decision No. 2, as to whose wages there might be a dispute, and ordered and directed that Monday, April 18, 1921, be set as a date for hearing, at which time the Board would hear representatives of the parties to disputes where applications had been filed, and of other disputes filed at that time between carriers and employees of carriers parties to Decision No. 2, if ready for presentation, and the Board consolidated all the cases for the purpose of hearing and decision so far as practicable.

On the date set the carriers herein named had filed the applications for hearing of disputes with the classes of their employees herein named and set out. The time was limited for the oral hearings to five days for the carriers and five days for the representatives of the employees, but the Board afterwards gave the employees further time to prepare their cases for hearing, and slightly extended the time. Both parties were also allowed to file certain documents in evidence bearing upon the matters in dispute.

The hearings in these cases were completed on May 16, 1921, and the Board has since had the cases before it under consideration.

Pending the hearing which commenced on April 18, and since, a considerable number of the carriers before the Board in that hearing have filed with the Board numerous other cases of disputes with other classes of their employees, and other carriers which had no cases pending before the Board on April 18, have filed cases of disputes, and such cases are still being received. The Board has been impressed with the belief that a reduction of rates of pay on any road applying to some class or classes and not to others, and thus producing inequalities of treatment and a reduction of wages from the standards fixed by and in Decision No. 2 on some roads, without a corresponding reduction on others operating in the same section and under substantially the same conditions, would possibly be productive of unrest, dissatisfaction and

other unfortunate results. It therefore deemed it desirable to render its decision in as many cases and applying to all or as many classes as might come before it at one and the same time and make it effective as of and on the same date. It also deemed it desirable to fix and announce that date in advance so that all parties could in a measure adjust their affairs with that information before them.

With all these things in view, after having considered the evidence heard in the cases before it, the Board on May 17 passed and made public a resolution to the effect that it would announce its decision in these cases on June 1, 1921, to become effective July 1, 1921; and it further decided and announced that it set June 6, 1921, as the date for hearing all other like disputes filed, docketed and ready for hearing at that time, it being the purpose of the Board to make its decision of those disputes then heard effective as of July 1, 1921.

In pursuance of this policy and these orders, it now announces its decision in these consolidated cases already heard.

In the hearing and consideration of these cases there has been available to the Board all the evidence taken and now on file adduced in the hearings of the cases heretofore brought before the Board, information gathered by the Board and its forces under the directions of the statute, including reports of the Interstate Commerce Commission and various other governmental agencies, state and national, in addition to the very voluminous mass of evidence submitted at these hearings by the respective parties, as well as matters of general and universal public knowledge.

As in Decision No. 2, granting increases in wages, the Board found it necessary to assume a known and recognized base and adopted as such base the rates of wages in effect March 1, the date of the termination of federal control; so in this decision the Board assumes as its base the rates fixed and in effect under and by its Decision No. 2.

Except as modified by changed conditions, the preliminary statement set out in and as a part of its Decision No. 2 might well be here repeated, but that is not deemed necessary. Practically the same methods of procedure there outlined were followed in these cases. The Board has been governed by the same principles and the directions of the law as there outlined, and has endeavored to give due consideration to every element of the problem before it.

The decision of the Board is the result of the action of the Board, composed of nine members acting as a body, under the usual parliamentary methods of procedure and its own rules. Each and every separate question was considered and voted upon—each and every rate for each class was voted upon and adopted by a majority vote of the Board, and in every instance one or more of the public good, as the law requires, voted in the affirmative on any classification or rate adopted.

In a problem so complex and involving the inter-relationship of the wages of so many different classes of employees it is obvious that there could not be unanimous agreement among all the members of the Board on all decreases fixed by this decision; but the several decreases hereinafter set forth represent, in each instance, the best judgment of the majority of the Board. This statement is made in order that it may not be inferred that the decision, in all its details, states the precise decrease which any one of the members hereof might have stated if he had the sole power and responsibility for fixing such decrease.

The Board proceeding under the methods outlined, while not attempting to set out all the findings in detail, for the information of the public and those directly interested, may here briefly outline some of its findings which have been considered in reaching the results herein announced.

It finds that since the rendition of its Decision No. 2 there has been a decrease in the cost of living. What that decrease has been it is impossible to state with mathematical accuracy or even what the general average for the United States has been up to and on any given date. The machinery for procuring and stating with accuracy the data to fix this is by no means perfect. The decreases vary greatly according to the locality, and affect different people in different degrees. In some localities the general decrease has been greater than in others. In the cities the general decreases in some lines have been offset to some extent by the high rents. In some of the items or products that enter into the costs of living the fall in prices has been great; in others, much less.

The Board also finds that the scale of wages for similar kinds of work in other industries has in general been decreased. The same conditions are also found as to this element. It is practically impossible to find any exact average line of decrease for the entire country. The decreases vary in different industries and in different localities, and in some instances with different industries, individuals or corporations. In some places and classes the decrease has been heavy; in others, not so great. There has been a decrease, and the tendency is at present downward.

But the most unfortunate condition is that in many localities large numbers are out of employment on account of the prevailing depression, and hence without wages.

On these elements and the others prescribed by statute to be considered, the Board has looked to the general conditions existing and brought to its attention, as well as the evidence offered as to particular localities and carriers.

In a decision of this character it is not practical to fix rates applying with exact ratio to each individual employee and each separate locality, for the reason that necessity compels the Board to accept certain standardizations of pay for railroad employees. But these standards are now somewhat different in different regions, and so the decreases will have relatively the same general effect.

The Board believes that based on these elements shown, i. e., the decreased costs of living and the general decrease in the scale of wages in other industries, that the decreases herein fixed are justified and required.

But the Board is required by the Transportation Act to consider not one, but all of the seven elements especially mentioned in the act, and other relevant circumstances, and this it has endeavored to do in reaching the results herein announced.

It has endeavored to consider as it should all the elements that enter into this complex problem. There are certain facts and conditions known to all and which can neither be disputed nor ignored. Whatever may be said as to the origin or contributing causes, there has been and is a marked, and to some extent distressing and disastrous, depression in business and industry affecting the entire country and some lines of production most seriously. As a result heavy financial losses have been suffered and many hundreds of thousands thrown out of employment and deprived of all wages, and this loss of purchasing power by them has in turn accelerated the general depression by reducing the demand for the products they would otherwise have purchased. While it has been argued that the fall in prices has not reached to any large extent the consumer, it has without question most disastrously reached and affected the producers, especially some lines of manufacture and the agricultural classes.

It should be recognized by all that the problem before us is chiefly an economic one, and we are all confronted by adverse and troublesome conditions which everyone must help to solve. It should not be looked upon as a struggle between capital and labor, or the managements and the employees.

Decision

The Labor Board decides:

1. That the rates of wages heretofore established by the authority of the United States Railroad Labor Board, shall be decreased as hereinafter specified, and that such decreases shall be effective as of July 1, 1921.

2. That the scope of this decision is limited to the carriers named under Article I herein, to such carriers as may be included hereafter by addenda, and to the specific classes of employees named or referred to under each particular carrier.

3. That the reduction in wages hereby authorized shall be made in accordance with the following articles which prescribe the regulations, designate the employees affected, and establish the schedules of decreases.

Article I—Carriers and Employees Affected

Each of the following carriers shall make deductions from the rates of wages heretofore established by the authority of the United States Railroad Labor Board, for the specific classes of its employees named or referred to in this article, in amounts hereinafter specified for such classes in the schedules of decreases; apply the rates of wages established in Section 3 (b) of Article II, and Sections 1, 2, 3 and 4 of Article X; and make effective the rates of wages fixed by differentials provided in Section 4 of Article IV.

The article and section numbers used in connection with a carrier refer to the corresponding article and section numbers in the schedules of decreases, and in determining the classes of employees affected on each carrier the following rules shall govern:

(a) When section numbers are used in connection with a carrier without naming the classes, all classes of employees named in the corresponding section numbers of the schedules of decreases are affected.

(b) When section numbers are used in connection with a carrier and specific classes of employees are named, only the same classes of employees named in the corresponding section numbers of the schedules of decreases are affected.

(c) Where section numbers are omitted in connection with a carrier, the classes of employees named in the corresponding section number of the schedules of decreases are not affected.

[Herewith follows a list arranged alphabetically by railroads, giving the articles and sections of these articles of the decision which apply to the individual roads.]

Article II.—Clerical and Station Forces

For the specific classes of employees listed herein and named or referred to in connection with a carrier affected by this decision.

use the following schedule of decreases per hour in wage rates.

(Note—For clerks without previous experience hereafter entering the service of a carrier, rates of wages specified in Sec. 3 (b), this article, are hereby established.)

Sec. 1. Storekeepers, assistant storekeepers, chief clerks, foremen, subforemen, and other clerical supervisory forces.....6 cents.

Sec. 2. (a) Clerks with an experience of two (2) or more years in railroad clerical work, or clerical work of a similar nature in other industries, or where their cumulative experience in such clerical work is not less than two (2) years.....6 cents.

(b) Clerks with an experience of one (1) year and less than two (2) years in railroad clerical work, or clerical work of a similar nature in other industries, or where their cumulative experience in such clerical work is not less than one (1) year.....13 cents.

Sec. 3. (a) Clerks whose experience as above defined is less than one (1) year.....6½ cents.

(b) Clerks without previous experience hereafter entering the service will be paid a monthly salary at the rate of sixty-seven dollars and fifty cents (\$67.50) per month for the first six (6) months, and seventy-seven dollars and fifty cents (\$77.50) per month for the second six (6) months.

Sec. 4. Train and engine crew callers, assistant station masters, train announcers, gatemen and baggage and parcel room employees (other than clerks).....10 cents.

Sec. 5. Janitors, elevator and telephone switchboard operators, office, station and warehouse watchmen and employees engaged in assorting way bills and tickets, operating appliances or machines for perforating, addressing envelopes, numbering claims and other papers, gathering and distributing mail, adjusting diesel-horse cylinders and other similar work.....10 cents.

Sec. 6. Office boys, messengers, chore boys and other employees under eighteen years of age, filling similar positions and station attendants.....5 cents.

Sec. 7. Station, platform, warehouse, transfer, dock, pier, store room, stock room and team track freight handlers or truckers and others similarly employed.....6 cents.

Sec. 8. The following differentials shall be maintained between truckers and the classes named below: Fruit and perishable inspectors, one (1) cent per hour above truckers' rates as established under Section 7.

(a) Sealers, scalers and fruit and perishable inspectors, one (1) cent per hour above truckers' rates as established under Section 7.

(b) Stowers or stevedores, callers or loaders, locators and coopers, two (2) cents per hour above truckers' rates as established under Section 7.

The above shall not operate to decrease any existing higher differentials.

Sec. 9. All common laborers in and around stations, storehouses and warehouses, not otherwise provided for.....8½ cents.

Article III.—Maintenance of Way and Structural and Unskilled Forces Specified

For the specific classes of employees listed herein and named or referred to in connection with a carrier affected by this decision, use the following schedules of decreases per hour:

Sec. 1. Bridge, building, painter, construction, mason and concrete, water supply, and plumber foremen (except water supply and plumber foremen coming under the provisions of Section 1 of Article IV, this decision).....10 cents.

Sec. 2. Assistant bridge, building, painter, construction, mason and concrete, water supply, and plumber foremen, and for coal wharf, coal chute, and fence gang foremen, pile driver, ditching and hoisting engineers and bridge inspectors (except assistant water supply and plumber foremen coming under the provisions of Section 1 of Article IV, this decision).....10 cents.

Sec. 3. Section, track and maintenance foremen, and assistant section track and maintenance foremen.....10 cents.

Sec. 4. Mechanics in the maintenance of way and bridge and building departments (except those that come under the provisions of the national agreement with the Federated Shop Trades).....10 cents.

Sec. 5. Mechanics' helpers in the maintenance of way and bridge and building departments (except those that come under the provisions of the national agreement with the Federated Shop Trades).....7½ cents.

Sec. 6. Track laborers, and all common laborers in the maintenance of way department and in and around shops and roundhouses, not otherwise provided for herein.....8½ cents.

Sec. 7. Drawbridge tenders and assistants, pile-driver, ditching and hoisting foremen, pumper engineers and pumpers, crossing watchmen or flagmen, and lamp lighters and tenders.....8½ cents.

Sec. 8. Laborers employed in and around shops and roundhouses, such as engine watchmen and water, fire, builders, ash-pit men, flue borers, coal passers (except those coming under the provisions of Section 3 of Article VIII, this decision), coal chute men, etc.....10 cents.

Article IV.—Shop Employees

For the specific classes of employees listed herein and named or referred to in connection with a carrier affected by this decision, use the following schedules of decreases per hour:

(Note—For car cleaners rates of wages fixed by a differential shown in Section 4, this article, are hereby established.)

Sec. 1. Supervisory forces.....8 cents

Sec. 2. Machinists, boilermakers, blacksmiths, sheet metal workers, electrical workers, carmen, moulders, cupola tenders and coremakers, including those with less than four years' experience, all crafts.....8 cents.

Sec. 3. Regular and helper apprentices and helpers, all classes.....8 cents.

Sec. 4. Car cleaners shall be paid a rate of two (2) cents per hour above the rate established in Section 6 of Article III, this decision, for regular track laborers at points where car cleaners are employed.

Article V.—Telegraphers, Telephoners and Agents

For the specific classes of employees listed herein and named or referred to in connection with a carrier affected by this decision, use the following schedules of decreases per hour:

Sec. 1. Telegraphers, telephone operators (except switchboard operators), agents (except agents at small non-telegraph stations as referred to in Supplement No. 13 to General Order No. 27, Article IV, Section c), agent telegraphers, agent telephoners, towermen, lever men, tower and train directors, block operators and stationmen.....6 cents.

Sec. 2. Agents at small non-telegraph stations as referred to in Supplement No. 13 to General Order No. 27, Article IV, Section (c).....5 cents.

Article VI.—Engine Service Employees

For the specific classes of employees listed herein and named or referred to in connection with a carrier affected by this decision, use the following schedules of decreases per mile, per hour, or per day, as the case may be:

SEC. 1.—PASSENGER SERVICE

Table with 3 columns: Class, Per mile cents, Per day dollars. Rows include Engineers and motormen, Firemen (coal or oil), and Helpers (electric).

SEC. 2.—FREIGHT SERVICE

Table with 3 columns: Class, Per mile cents, Per day dollars. Rows include Engineers (steam, electric, or other power), Firemen (coal or oil), and Helpers (electric).

SEC. 3.—YARD SERVICE

Table with 3 columns: Class, Per hour cents. Rows include Engineers, Firemen (coal or oil), and Helpers (electric).

SEC. 4.—HOSTLER SERVICE

Table with 3 columns: Class, Per day dollars. Rows include Outside hostlers, Inside hostlers, and Helpers.

Article VII.—Train Service Employees

For the specific classes of employees listed herein and named or referred to in connection with a carrier affected by this decision, use the following schedules of decreases per mile, per day, or per month, as the case may be:

SEC. 1.—PASSENGER SERVICE

Table with 4 columns: Class, Per mile cents, Per day dollars, Per month dollars. Rows include Conductors, Assistant conductors or ticket collectors, Baggage handlers, Baggage operators, and Flagmen and brakemen.

SEC. 2.—SUBURBAN SERVICE (EXCLUSIVE)

Table with 4 columns: Class, Per mile cents, Per day dollars, Per month dollars. Rows include Conductors, Ticket collectors, and Guards performing duties of brakemen or flagmen.

SEC. 3.—FREIGHT SERVICE

Table with 3 columns: Class, Per mile cents, Per day dollars. Rows include Conductors (through), Flagmen and brakemen (through), Conductors (local or way freight), and Flagmen and brakemen (local or way freight).

SEC. 4.—YARD SERVICE

Table with 3 columns: Class, Per day dollars. Rows include Foremen, Helpers and roundhouses, and Switchtenders.

Article VIII.—Stationary Engine (Steam) and Boiler Room Employees

For the specific classes of employees listed herein and named or referred to in connection with a carrier affected by this decision, use the following schedules of decreases per hour:

Sec. 1. Stationary engineers (steam).....8 cents.

Sec. 2. Stationary firemen and engine room oilers.....8 cents.

Sec. 3. Boiler room water tenders and coal passers.....6 cents.

Article IX.—Signal Department Employees

For the specific classes of employees listed herein and named or referred to in connection with a carrier affected by this decision, use the following schedules of decreases per hour:

Sec. 1. Signal foremen, assistant signal foremen, and signal inspectors.....8 cents.

Sec. 2. Leading maintainers, gang foremen, and leading signalmen.....8 cents.

Sec. 3. Signalmen, assistant signalmen, signal maintainers, and assistant signal maintainers.....	8 cents.
Sec. 4. Helpers.....	6 cents.

Article X.—Floating Equipment Employees

For the specific classes of employees listed herein and named or referred to in connection with a carrier affected by this decision, the following schedules of decreased rates of pay are established:

SEC. 1.—FERRIES

Class	Per month
Captains.....	\$200.00
Engineers.....	190.00
Firemen and oilers (licensed).....	140.00
Firemen and oilers (unlicensed).....	140.00
Deckhands.....	125.00
Porters.....	100.00

SEC. 2.—TUGS AND STEAM LIGHTERS

Captains.....	\$200.00
Mates and first deckhands (licensed).....	130.00
First deckhands (unlicensed).....	130.00
Second deckhands.....	125.00
Flatmen and float watchmen.....	125.00
Engineers.....	190.00
Firemen and oilers (licensed).....	140.00
Firemen and oilers (unlicensed).....	140.00
Bridgemen.....	125.00

SEC. 3.—LIGHTERS AND BARGES

Captains, steam hoist—single drum.....	\$135.00
Captains, steam hoist—single drum.....	145.00
Captains, steam hoist—double drum.....	140.00
Engineers, steam hoist—double drum.....	150.00
Captains, derricks—under 30-ton hoist.....	140.00
Engineers, derricks—under 30-ton hoist.....	150.00
Captains, derricks—30-ton hoist and over.....	150.00
Engineers, derricks—30-ton hoist and over.....	160.00
Mates, derricks.....	100.00
Captains, hand winch lighters and covered barges.....	130.00

SEC. 4.—LIGHTERS AND BARGES

Captains, hand hoist barges—covered lighters.....	\$120.00
Captains, steam hoist—single drum.....	125.00
Captains, steam hoist—double drum.....	130.00
Engineers, steam hoist—single drum.....	135.00
Engineers, steam hoist—double drum.....	140.00

Article XI.—Other Supervisory Forces

For the specific classes of employees listed herein and named or referred to in connection with a carrier affected by this decision, use the following schedules of decreases per hour:

Sec. 1. Train dispatchers.....	8 cents
Sec. 2. Yard masters and assistant yard masters.....	8 cents

Article XII.—Miscellaneous Employees

For the miscellaneous classes of supervisors and employees not specifically listed under any article, named in connection with a carrier affected by this decision, use the following rule for making decreases:

Sec. 1. For miscellaneous classes of supervisors and employees in the hereinbefore named departments properly before the Labor Board and named in connection with a carrier affected by this decision, deduct an amount equal to the decreases made for the respective classes to which the miscellaneous classes herein referred to are analogous.

Sec. 2. The intent of this article is to extend this decision to certain miscellaneous classes of supervisors and employees submitted by the carriers, not specifically listed under any section in the classified schedules of decreases, and authorize decreases for such employees in the same amounts as provided in the schedules of decreases for analogous service.

Article XIII.—General Application

The general regulations governing the application of this decision are as follows:

Sec. 1. The provisions of this decision will not apply in cases where amounts less than thirty dollars (\$30.00) per month are paid to individuals for special service which takes only a part of their time from outside employment or business.

Sec. 2. Decreases specified in this decision are to be deducted on the following basis:

(a) For employees paid by the hour, deduct the hourly decrease from the hourly rate.

(b) For employees paid by the day, deduct eight times the hourly decrease from the daily rate.

(c) For employees paid by the month, deduct two hundred four (204) times the hourly decrease from the monthly rate.

Sec. 3. The decreases in wages and the rates hereby established shall be incorporated in and become a part of existing agreements or schedules, or future negotiated agreements or schedules, and shall remain in effect until or unless changed in the manner provided by the Transportation Act, 1920.

Sec. 4. It is not intended in this decision to include or make decreases in wages for any officials of the carriers affected except that class designated in the Transportation Act, 1920, as "Subordinate Officials," and who are included in the Act as within the jurisdiction of this Board. The Act provides that the term "Subordinate Officials" includes officials of carriers of such class or rank as the Interstate Commerce Commission shall designate by regulation duly formulated and issued. Hence, whenever in this decision words are used, such as "foremen," "supervisors," etc., which may apply to officials, such words are intended to apply to only such classes of subordinate officials as are now or may hereafter be defined and classified by the Interstate Commerce Commission as "subordinate officials" within the meaning of the Transportation Act, 1920.

Article XIV.—Interpretation of This Decision

Should a dispute arise between the management and the employees of any of the carriers as to the meaning or intent of this decision, which cannot be decided in conference between the parties directly interested, such dispute shall be referred to the United States Railroad Labor Board in the manner provided by the Transportation Act, 1920.

Sec. 1. All such disputes shall be presented in a concrete and joint signed statement setting forth:

- The article of this decision involved.
- The facts in the case.
- The position of the employees.
- The position of the management thereon.

Where supporting documentary evidence is used, it shall be attached to the application for decision in the form of exhibits.

Sec. 2. Such presentations shall be transmitted to the Secretary of the United States Railroad Labor Board, who shall place same before the Labor Board for final disposition.

Representatives of the various labor organizations involved in the wage cut order of the Labor Board will meet at Chicago on June 27 and 28, to decide on the employees' attitude regarding the lower wage scales. Union officers have consistently refused to comment on the decision and will probably have nothing to say until after this meeting.

A table showing the percentages of these decreases will be found on page 1278 of this issue.

President Confers With I. C. C.

WASHINGTON, D. C.

PRESIDENT HARDING is again interesting himself in the railroad situation and incidentally is making some progress in his education on the subject. Following the cabinet meeting on Tuesday he told the newspaper men that the cabinet had discussed the evidence presented at the railroad hearings before the Senate Committee and indicated that the administration is not quite willing to accept the position taken by railroad executives against reductions in rates. He did not indicate, however, his own position as to how general a reduction would meet the wishes of the administration. Later he held a conference at luncheon with Senator Cummins and J. C. Davis, director general of railroads, and on Wednesday morning he caused some mild consternation by putting on his hat and walking down to the Interstate Commerce Commission offices unannounced. It is reported that he asked for the chief examiner but he was shown to Chairman Clark's office and Mr. Clark called in the other commissioners.

After the President's return to the White House, it was given out informally that he had called upon Chairman Clark and requested the opportunity to meet the commissioners. He said he had called very informally because he recognized that the commission is the rate-making agency of Congress and inasmuch as he had the right to communicate directly with Congress he wanted to communicate informally with the agency. He made inquiry regarding the progress being made in revising numerous rates where the horizontal increase is regarded as having put a burden on some commodities greater than the traffic would bear and he was gratified to learn that the commission has been working on revisions by the process of securing concerted action on the part of carriers and shippers. The specific thing he had in mind was the possibility of a modification of the fruit rates as to which there has been so much complaint from the West.

The conference with Senator Cummins and Director General Davis was for the purpose of considering the possibility of expediting the settlements between the railroads and the Railroad Administration arising from the period of federal control and of funding a greater part of the carriers' indebtedness to the government so as to release the amounts withheld by the Railroad Administration from the compensation guaranteed to the roads as offsets against the capital expenditures along lines suggested by President Rea of the Pennsylvania in his testimony before the Senate committee.

Piece-Work, Bonus Systems and Higher Efficiency

Educational Measures and Systematic Planning Productive of Economy and Stabilized Labor

By C. C. Cook

Maintenance Engineer, Baltimore & Ohio, Baltimore, Md.

THE EFFICIENCY of railroad labor in all departments has been retrograding since 1915. During 1916 and 1917 there was a progressive decline which became accentuated by reason of certain well known causes shortly after our entry into the war. During the war adequate transportation was secured only by extraordinary increases in the number of employees and by the superlative efforts of the more loyal officers and employees. Since the armistice, there has been a fluctuating condition with a tendency toward improvement during the past season, though a conservative estimate of the average condition of the country as a whole would give an efficiency not to exceed 70 per cent as compared to the pre-war period. There are few who would claim the efficiency of forces during 1916 to have been more than 80 per cent of a normal standard. The deduction, therefore, is that efficiency during last season was not in excess of 56 per cent of a normal standard. This conclusion, though startling, is no surprise to those who have analyzed the records.

Innumerable causes for such a condition are known to exist. Generally there has been a lowering of the morale due to the suspicion of intentions of both employers and organized labor. Further, the operation of the National Agreements and the abolition of piece-work and bonus systems have intensified the impression that the interests of the railroads and their employees are divergent.

That impression, it now appears, will be eliminated by the educational influences of the various governmental investigations now in progress and through the beneficial effects already appearing as a result of the operations of the Transportation Act. The co-operation between employer and employee so urgently advocated by all agencies interesting themselves in the transportation question is evidently essential to honest, efficient and economic operation of the railroads.

The Fiasco of the Abolishment of Piece-Work

The morale of railroad forces was progressively broken down; it must be progressively rebuilt. Piece-work and bonus systems, though only in their infancy on railroads, have proven conclusively that both the company and the employee benefited by their application. Freight car repair forces on piece-work earned as much as 50 per cent to 70 per cent in excess of the day rates; forces engaged in steam locomotive repairs in various shops frequently averaged on piece-work earnings from 60 to 70 per cent in excess of day rate earnings. In track work a bonus system in effect on one road resulted in earnings by efficient gangs of 25 and 30 per cent in excess of the day rate.

These are facts not realized any more fully by all operating officers than they are by all workmen, but they are facts substantiated by every officer who had any extended experience with those systems. There is no hesitancy on the part of those officers in proclaiming the abolishment of the piece-work system to be the one definite act which resulted in the greatest of all decreases in the efficiency of any of the crafts. Piece-workers formerly inspired with the knowledge of commendable performance and pecuniary reward were shorn of their incentive. Many of them, realizing that no further additional compensation would be forthcoming as a

result of extra effort, relapsed into that group (always present to some extent), who do as little as they can for the wages they are paid.

Can any sound reason be advanced why piece-work and bonus systems, properly supervised, should not be restored? Is it not most desirable to have such restoration or original installation accomplished through open dealings which shall command the complete confidence of all employees? Why should not employee and employer, as individuals, or by gangs, by crafts, by divisions, by systems or within any practical geographical or political limitations mutually agree to do the thing which benefits them both as well as the public they serve?

These plans were never in such general use that any national restoration or establishment of them can take place. In fact, there are but few railroad systems that can make them effective for any one or more groups of workers on the system as a whole.

Their establishment and their restoration must necessarily have limited and humble beginnings, but it should not be delayed. Conceivably the employee is in a poor position to make the advances. These must come from progressive managements. The earlier those plans are made effective and the more general their application to all systems and to all classes of labor to which they may be applied, the sooner will the operations of the railroads in their present quasi-public functioning be a success.

A Piece-Work Plan Applied to

Maintenance of Way Labor

It is the intent of this article merely to suggest for one group of workmen whose duties are seldom considered to be subject to standardization, a plan which, in principle, is but a modified piece-work plan, and to note briefly the benefits to be anticipated therefrom. I refer to the track forces and to the standard track work system which had been in successful operation for seven years to a limited, though growing extent, prior to government control of the roads.

Track work has long been thought to consist of such diverse operations as to prohibit development of any extended list of standards for measurements of performance. It is accordingly surprising to have it stated and substantiated by authoritative records that as much as 90 per cent of all track work on a typical railroad division has been measured by standard schedules. This is a greater percentage than has ever been reached by any piece-work plan in any other department of railroad work coming under my observation, and is but an indication of the possibilities of development.

Track laborers have been looked upon as the lowest class of railroad workmen and the most inefficient in performance. Their lot is considered to be the least attractive on the railroad. There is absolutely no reason for that opinion other than failure to measure all angles of the work. Certainly a large proportion of trackmen carry responsibilities of greater weight than those which constitute any part of the duties of most other groups of common labor in railroad work. Trackmen engaged in most operations require skill born of experience in order to do work economically. They have been inefficient but they have not shown the great loss in inefficiency

registered by others of the skilled crafts during the past few years. The work has been unattractive and recorded an excessive percentage of labor turn-over, but the attempts in the past to remedy that condition have oftentimes been lacking in vision and in many cases ludicrous in their repetition in the face of their futility.

During the past few years, the wages of trackmen have so advanced that they are now more nearly on a parity with other similar labor. Notwithstanding this fact, we are still confronted with their continued inefficiency and instability in their occupations.

Improved living quarters are advocated to render them more stable, but it is safe to say that the best quarters that were ever available for their comfort are now existent, partly as a by-product of the war effort to draw men into railroad service, yet, during the past season, the migration and the unproductiveness continued.

The problem of the trackman is no different from that of any other railroad worker. He will respond to enlightened and sympathetic measures for enlisting his co-operation in making his service to the railroad as much a service to the public as any other unit of the organization. Enlist that response intelligently. Establish a system of standard track work which carries with it increased pay for increased effort and there will develop for the company the productiveness which is now so essential and, within the workman, the consciousness of work well done which only will permanently stabilize a man in any position he may hold.

The Standard Track Work System

The standard track work system, referred to, had developed excellent printed methods and forms which were used by the engineers, supervisors and their assistants in the direction of their work. The rather universal progressive improvement in the efficiency of forces on every division where it was installed is evidence of its value.

The leading benefits obtained may be briefly outlined by a chronology of the development and operation of the system: Early in the season a program of work is prepared and outlined monthly upon a chart which indicates the location, amount, character and relative order of work to be done. The quantity of labor involved is computed from the standard schedules and the required force allotted.

For the current direction of the work the supervisor uses a work order or dispatch sheet which indicates to each of his foremen in detail the character, location and amount of work and standard time for its performance. Work orders are issued consecutively and preferably limited to a quantity of work which will enable constant live direction of gangs through their use. Carbon copies of all work orders are retained on visible file in the supervisor's office and are always available for ready inspection by any officer associated with the work. The advantage of this feature in avoidance of duplication and interference of orders to forces is obvious. When completed, the work order is returned by the foreman, properly dated and signed.

Foremen report their work upon daily time sheets, distributing the time of their gang in accordance with printed instructions so as to conform to the standard schedule descriptions of work.

A "Daily Record of Track Work Performance" form for each gang is maintained by the assistant supervisor. The actual time, reported daily for each operation by the foremen and the standard time therefor, recorded by the assistant supervisor, is used in computing the per cent efficiency of the day. This form enables the supervisor, at any time to compare the performance of one gang with another, the performance of the same gang one day with another or the performance of various gangs on identical operations with each other. There is apparently the distinctively advantageous

position in which the supervisor is placed with such current data always on hand.

A form "Monthly Record of Track Work Efficiency" which summarizes the information on the daily record is compiled at the end of each month and there is then data available for comparison of the gangs or of sub-divisions or divisions as a whole. It is used particularly in computing the average efficiency for each gang, upon which the bonus payments are based. These are worked out according to a "bonus table" which guarantees the established hourly rate and pays a bonus according to an increasing ratio of the excess above 67 per cent efficiency. For instance, at 100 per cent efficiency there is a bonus of 20 per cent of the wages at hourly rate for actual time worked; above 100 per cent the bonus increases 1 per cent for each 1 per cent increase in efficiency. It should be understood that the basic 67 per cent efficiency represents the normal performance of an average competent group of workmen as developed by time studies of a number of performances prior to the establishment of a schedule. An efficiency of 100 per cent is the standard schedule and represents the accomplishment of workmen who are performing according to standard practice and with a rapidity and continuity of movement within their power but such as not to impair their physical well-being.

After the system had been in operation two years it was common for sub-divisions to show 80 per cent to 90 per cent efficiency, and not uncommon for the more efficient gangs frequently to exceed 100 per cent. It is evident that the corresponding increased pay made a most striking appeal to the employees affected. It acted as a constant reminder of the interest of the management in the welfare of the employees and could not fail to raise the morale, not alone of those who earned their bonus directly but also of their co-workers and associates.

There were numerous other features developed by this system such as a "Track and Roadbed Feature" form, and a "Track Condition" sheet which were prepared or re-stated monthly for the purpose of an equitable distribution of force; also a permanent system of educating the foremen in the preparation of accurate reports, and other beneficial developments which came as by-products of this methodical conduct of the operations of the department. It is sufficient to state that the fundamentals essential to co-operation of management and employee, to methodical conduct of a large and ever expanding organization, and to the consummation of 100 per cent efficiency and economy in maintenance of track are embodied therein.

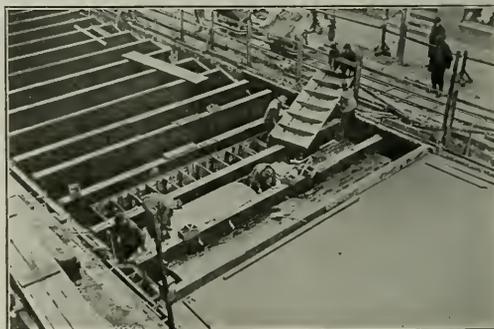


Photo by Keystone

Building a New Subway Through the Streets of Berlin

Railways in War Ridden Regions Greatly Improved

Details of Improvement of Lille Freight Terminal and Yards, Shops and Station at Dunkirk

By Oliver F. Allen

Formerly Major of Engineers, American Expeditionary Forces

BECAUSE of the great property damage in many French and Belgian cities during the war, the railways, in embarking upon their reconstruction program, were enabled to secure additional land and provide increased facilities which otherwise would have necessitated expenditures so high as to be practically prohibitive. One undertaking

trains to depart in any direction. At the lower, or southern, end of this yard is a gridiron of 36 tracks for the making up of southbound trains. Between this gridiron and the main line from Sequedin to Lomme is another of 24 tracks for making up northbound and local trains, with six more available for various emergency demands and for freight transfers between cars.

All tracks in these gridirons have a minimum working length of about 2,000 ft. Engine sheds of modern design, replacing old roundhouses, and new, modern and extensive locomotive repair shops are included, as shown in the map. A large car repair shop is also provided for and there is a wye for turning locomotives. The loops and crossovers necessary for free circulation through these yards include some special lines to be used exclusively for locomotives. Intersections are brought through at different levels, bridges being

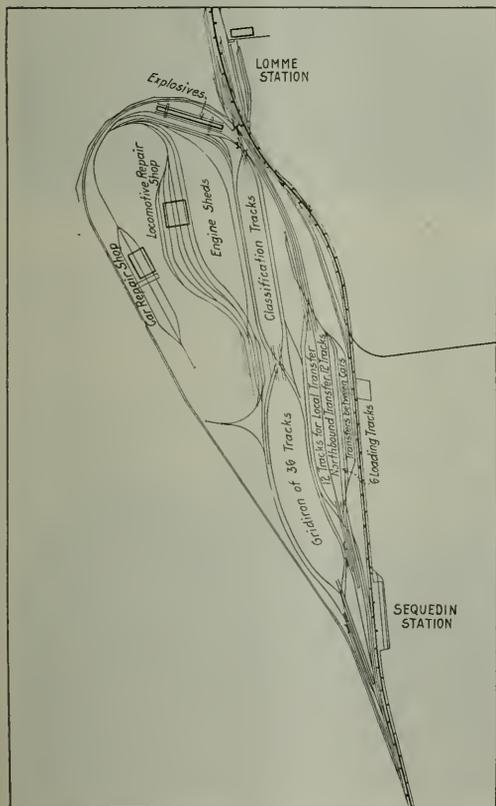


Fig. 1—Classification Yards and Repair Shops at Lille-la-Deliverance, a Part of the Improvement Program at Lille

which is typical of many thus made possible is the construction of a modern freight terminal at Lille-la-Deliverance, forming a part of the general improvement of the Lille loop which was described in the *Railway Age* of April 29 (page 1020).

The classification yard installed at this point is of the gravity type and loops are provided so that a train approaching the yard from any direction will enter the elevated end of the yard. At the other end tracks are provided to allow



Fig. 2—A Typical Military Hut Used as a Passenger Station During and Immediately After the War

used to avoid grade crossings and to assure the greatest safety and ease of circulation. Work on the Lille project was started in the spring of 1920, and is now well under way.

Just as the Lille improvements are typical of the interior cities, the betterments at Dunkirk are typical of what is being done at the ports. The capacity with the pre-war facilities of the incoming lines from Lille to the south, the Belgian industrial centers to the east, and Calais and Boulogne to the west, was only about 2,000 average French freight cars per day; that is, about 20,000 tons of freight. The development of the harbor facilities, largely as a military necessity during the war, by the French and British makes it possible to handle 40,000 tons of freight per day, or about twice the capacity of the railroad facilities. Freight traffic has of late grown much faster at Dunkirk than at the other channel ports—Calais, Boulogne, Graveliers and Le Trepont. In order to take care of this increased traffic a comprehensive terminal system, shown in Fig. 3, is being built. The old transfer gridiron, near Pier 5, while retained for use in connection with the older piers, will be supplemented at its western end by a large gravity classification yard and the

necessary additional tracks for trains entering and leaving the yard.

An outbound yard is being built, as shown in the map, just west of the classification yard. This yard consists of 30 tracks for both transfer and assembling purposes and two groups of eight tracks each for the storage of completed trains awaiting dispatching orders. Parallel to this yard is a gridiron of 46 tracks for incoming trains with the necessary connections to enable freight cars to be classified, grouped and forwarded to the proper piers. The tracks in both of these gridirons have a minimum working length of about 2,300 ft. Adjacent to these yards there will be a modern car repair shop. The locomotive repair and storage facilities at Couderkerque, southeast of Dunkirk on the Lille line, were inadequate. It was decided, therefore, that the shops

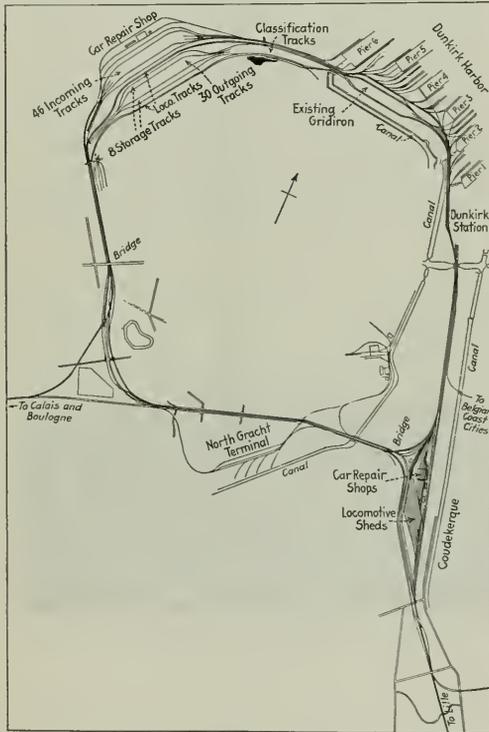


Fig. 3—Improvements at Dunkirk, Showing Enlarged Freight Facilities to Take Care of Increased Harbor Capacity

remaining after the war should be entirely abandoned and replaced by a new large locomotive repair and storage plant. There will be provided here a group of 12 parallel sheds, each with three tracks long enough to take care of three locomotives so that the total covered area will have a capacity of 108 locomotives. To avoid the necessity of installing a turntable, wye connections will be provided. There will also be adequate shops, store houses, etc. An extensive military terminal adjacent to the Bourbourg canal at North Gracht with a double track line, known as the Yser connection, running south between the lines to Lille and Calais, has been incorporated into the lines of the Northern Railway and has become an integral part of the system.

The belt around Dunkirk will consist of seven tracks from

the large transfer yards adjacent to the piers around to the Lille lines at Couderkerque. Four of these are primarily for freight traffic—two each for the Calais and Lille lines. The other three are reserved for locomotives—two for the incoming and one for the outgoing. There will be adequate connections on the eastern side of the loop for the Dunkirk passenger station and passenger service to the docks, together with provision for freight traffic on the line toward Belgium. Here, as at Lille and other places, grade crossings are



Fig. 4—Valenciennes Station Before the War

eliminated where tracks intersect and bridges are employed to facilitate quick and easy movement. This Dunkirk improvement will cost about \$20,000,000 (francs to dollars at par). The railroad company started this work early in 1920, and the project is now well advanced.

A preceding article in this series dealt with the reconstruction of bridges and viaducts and referred to the final phase of railway rehabilitation as including not only the



Fig. 5—Valenciennes Station After the German Evacuation

extension of terminal facilities described above, but the restoration of passenger stations and the return to the more luxurious features of travel. The Northern Railway was very proud of its pre-war passenger stations, that at Valenciennes, Fig. 4, being typical. In the preceding article the condition in which the war left the bridges and canals was shown as indicating the problems confronting the engineers in charge of the reconstruction. The illustrations, Figs. 5-6, of the Valenciennes station are typical of the condition in

which the railway company found its stations following the enemy's evacuation, and Fig. 2 shows a temporary railway station of which hundreds were built and many are still in use. Fig. 7 is a typical view of the condition of the roadbed and adjacent buildings as the Boches left them.

It has been shown how the railways have taken advantage of the general destruction to relocate yards and stations. The



Fig. 6—Interior of Valenciennes Station After the Germans Evacuated

same condition is also affording an opportunity to build larger and better passenger stations. In some places, where eminent architects have made comprehensive plans for the rebuilding of entire communities with designs harmoniously blended, the new stations will fit into the general landscape much more artistically than the old ones did. Where towns were de-



Fig. 7—Laon Station on the Soissons-Hirson Line—Typical Conditions Following German Evacuation

stroyed to the extent of Estaires, Lens or many others which might be mentioned, both freight and passenger stations can be relocated to suit the existing and anticipated demands. Inasmuch as the restoration of damaged stations and the building of new permanent structures is one of the last phases of railway reconstruction, photographs of the accomplishments in this direction are not now available.

THE CHICAGO, MILWAUKEE & ST. PAUL is converting a number of sleeping and parlor cars into open top observation cars to be operated in the Rocky and Cascade mountains.

N. E. L. A. Electrification Committee Denounces Government Operation

GOVERNMENT OPERATION of railroads was spoken of as a "dread palsy" and recommendations for the future were made in the report of the Committee on Electrification of Steam Railroads at the annual convention of the National Electric Light Association in Chicago on June 3. The first part of the report was given over to a history of the development of electric traction for railroad trains and the summary consisted of recommendations for the future affecting both the railroads and the people who are served by them. The following is the summary of the report:

"The transportation problem is of vital interest to all of the people, and it is important that it should have the loyal support and interest of all classes of citizens and their active co-operation, so as to obtain the most rapid transportation of freight and passengers in the most efficient manner and at the least cost. This can be accomplished by the constructive support of the legislative bodies and the investing public and by the support of the engineering talent of the country. The time is here when the railroads need the united support of all the people, so as to make use of the improved methods of utilizing the advances in the sciences and the arts, in order to give the people the best transportation facilities. This can only be accomplished, first, by legislation which will remove the objectionable restrictions in the management and operation of the railroads; and secondly by the financial support of investors, so that additional capital will be attracted to the railroads, to enable them to add to their facilities such plant and equipment as is necessary to take care of the increasing traffic and to handle this traffic in the most economical way.

"We believe that at this time much good can be accomplished by studies and investigations conducted by engineers of the railroad management who are well qualified by their training and experience to make these studies. They should have the active co-operation and assistance of the engineers representing other utilities and the large industries, and of consulting engineers who are specialists on this subject, so as to bring to bear upon this question the best minds available, in order to effect improvements in the terminal facilities, rights-of-way, motive power, and in the traffic of the railroads. The power companies of the country stand ready to co-operate in these studies, and to be prepared to offer electrical energy at low cost in most cases where it may be utilized to the railroads' advantage.

"Although the railroad situation is one of interest, and the railroads have had their large part in the development of the American nation, the situation in regard to their future is one of compelling importance. It is unthinkable that American transportation should be subjected to the dread palsy of government operation. We have just about reached the point (disregarding the present recession in business as temporary) where possible restriction to traffic movement in its limitations of industry, has become a matter of the greatest concern to large sections of the United States. There is probably no district or community which is willing to admit that its growth in industry should halt or be limited. For the country as a whole, the growth of industry and population has called for an increase in traffic movement of 100 per cent during each interval of approximately 12 years. While it is not certain that the same rate of growth will be followed during the next 12 years, the situation of the future is sufficiently grave to prove the necessity for provision of transportation facilities necessary to care for the vast increase in business.

While it is not our purpose to point the way out, there must, somehow, some way be developed to care for this situation. Undoubtedly, great good could come from education.

The credit of the railroads must be established to provide the large amounts of capital necessary to develop the transportation machine. To that end, all practices, criticisms, legislative action, both national and local, which operate to affect the credit of the railroads, should, through education of the critics, be eliminated. In its stead, should take place discussion of the burdens of expense imposed upon the railroads by class legislation, unproductive improvements, unreasonable demands of one class of labor to profit at the expense of all other classes, along with the obvious education of the shipping and traveling public as to more economical practices in the movement of traffic and other subjects which will prove of value.

The net result of these would be a sufficient margin between reasonable rates and cost of operation to secure a return which would attract additional capital necessary for the expansion of the railroad machine. There is no stronger force under our form of government than public opinion, and American public opinion in the final analysis has been proven to be reasonable. With the support of public opinion, therefore, upon such a program, the timidity of the investing public as to railroad securities would be removed and there should be available the necessary capital at reasonable rates of interest.

The National Electric Light Association, comprising in its elements a large and far-reaching body of intelligent men, should, prompted by their own interest in the expansion of all industry, accept and undertake as a real responsibility, the intelligent discussion and understanding of the needs of the railroads. Even if this view, which is a broad one, should be limited to self-interest, this should be prompted by the unquestionable fact that for the greater expansion of our railroad service, railroad electrification will, as time goes on, come increasingly into use for regular main line passenger and freight service.

Freight Car Loading

WASHINGTON, D. C.

FREIGHT CAR LOADING continued to increase during the week ending May 21, according to the weekly report of the Car Service Division of the American Railway Association. The total for the week was 768,330, an increase of 18,000 in a week. This compares with 862,074 in 1920 and 777,324 in 1919. There was an increase as compared with last year in the loading of grain and grain products, but a decrease in the loading of other commodities. There was an increase as compared with last year in the loading in the Pochontas district.

The freight car surplus continued to decrease during the week ending May 23 when the average number of surplus freight cars was 422,823. This represents a decrease as compared with the previous week of nearly 27,000. Of the total, 176,442 were coal cars, as compared with 202,348 the week before, and 168,272 were box cars, as compared with 170,595 the week before.

The percentage of bad order cars continued to increase. On May 15 it was 14.2 per cent of the total, or 324,969 cars. Of the total, 4.1 per cent required light repairs and 10.1 per cent required heavy repairs.

Intensive Preparation Urged for Grain Handling

The Car Service Division has issued a bulletin to the railroads stating that intensive preparation is necessary to meet the prospective demands for cars of a grade suitable for grain, flour, cement and other high class commodities. The bulletin points out that on March 1 there were 2,500,000 bushels of grain on farms, an increase over each of the two preceding years of 50 per cent, and including 26 per cent more wheat, 50 per cent more corn and 65 per cent more

oats than in 1920. The condition of winter wheat on May 1 indicated an increased production of 15,524,000 bushels, or 9 per cent. While later reports indicate a somewhat lower yield, the prospects are declared to be good for a yield in excess of 1920 and in excess of the five-year average. It is also stated that preliminary unofficial estimates indicate the spring acreage of all grains to be equal if not greater than in 1920. The box car situation on 20 of the principal grain loading roads as of May 15 shows 92 per cent of total cars on line to ownership and 71.9 per cent of home cars on line, but 13.4 per cent of the cars were in bad order. Particular attention is directed to the percentage of cars on line. Although this is 4.4 per cent better than last year, it is stated that the heavy return of home cars in unserviceable condition has so greatly increased the bad order cars that these roads actually have available for surplus only 78.6 per cent of their ownership as compared with 82 per cent a year ago, a reduction of 3.4 per cent, representing approximately 15,000 serviceable cars. The beginning of the wheat harvest in North Texas and Oklahoma begins very shortly with indications pointing to the immediate marketing of a larger proportion of the crop than usual.

The Car Service Division urges the importance of:

1. Closer supervision over loading to insure proper selection of cars, particularly a more adequate observance of Car Service Rule 1. The latter applies with special force to the grain loading roads which must build up and conserve their supply of home cars.
2. Heaviest practicable car repair program, specializing on producing grain-fit cars.
3. Withdrawal from service and storage in grain loading territory of cars suitable for grain loading.
4. Prompt return to owning roads, loaded if possible or empty if necessary, of cars belonging to grain loading roads.
5. As far as practicable, loading grain-fit cars into grain territory, and confining the loading of rough freight for other territories to non-fit cars.

The bulletin also says:

"With the present heavy percentage of home cars on line (highest for 13 years) and the light traffic demands, each road should take such local measures as may be necessary to provide for prospective loading requirements. It should be possible under such conditions to protect the situation with minimum assistance from the Car Service Division. It will be our purpose to interfere as little as possible with the normal functioning of the Car Service Rules and to encourage the roads to work out their local exchange of equipment problems in accordance with existing rules and agreements."



Photo by Keystone

Why Upper Silesia Voted to Remain German—Germans Leaving Berlin to Arrive in Silesia in Time for the Plebiscite

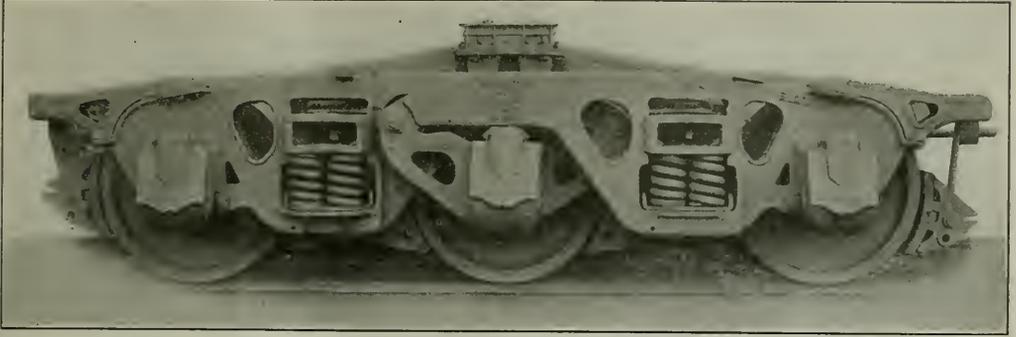


Fig. 1—A Side View of the Buckeye Six-Wheel Truck

New Designs of Buckeye Six-Wheel Trucks

Advantages of Four-Wheel Trucks Retained—Construction Facilitates Inspection and Maintenance

IN THE DESCRIPTION of the Virginian 120-ton coal cars published in the issue of February 18, brief reference was made to the six-wheel truck manufactured by the Buckeye Steel Castings Company, Columbus, Ohio. The new design which was used on 500 of these cars differs in several respects from the earlier form of this truck as described in the *Railway Age Gazette* of August 31, 1917.

These trucks are of much interest, not only as a new development in high capacity freight truck design, but especially because they are designed to retain practically all of the fundamental advantages which have contributed to the recognized success of the present type of A. R. A. four-wheel cast steel truck.

Generally speaking, this latter type of truck owes its popularity principally to the following: (1) Perfect equalization of load regardless of condition of springs or tracks. (2) Accessibility of parts for maintenance and inspection. (3) Flexibility and short wheel base, facilitating operation over uneven tracks, inclines and sharp curves. (4) Brake suspension arranged from parts independent of spring travel. (5) Safety of the detail structures by avoiding having any part carrying load subjected to direct tension.

Method of Equalization

The equalization of the load in the Buckeye six-wheel truck is accomplished by the use of the equalizer casting which engages the center journal as shown in Fig. 1. The side frame castings are so designed that two-thirds of each spring load is supported by the adjacent outside axle and one-third by one arm of the equalizer. Each journal of a given side of a truck, therefore, receives one-third of the total spring load on that side and furthermore the equalizer precludes the possibility of the springs receiving unequal loads on the same side of the truck. This feature affords extreme flexibility in the side members.

Maintenance and Inspection

In former designs of six-wheel trucks replacement of axles, particularly the middle axles, has been accomplished only by the use of special facilities such as drop pits, or overhead cranes. Replacement of bolsters required cutting away rivets and complete dismantling of the truck.

Where large numbers of cars with six-wheel trucks must be maintained in constant service, facilitating the routine

work of upkeep is of great importance. The Buckeye truck in its present form is a remarkable advance in this respect. All the parts are of such size and are so disposed with relation to each other that light repairs such as changing bolsters, axles and springs are readily accomplished even in places where no special facilities are at hand.

The simple method employed in the removal of the middle pair of wheels is deserving of special mention. The two consecutive steps are shown in Fig. 2. After removing the bolts, *A*, Fig. 2, from the ends of the equalizer arm and the brake pins, *B*, the two longitudinal bolsters are disengaged from one transverse bolster by tilting them upward so that the truck may be separated as in Fig. 3. Then by placing jacks under the spring seats at *D*, Fig. 3, and removing the equalizer bolts at *F*, the center axle is relieved entirely of its load and can be rolled clear as shown in the illustration.

To facilitate replacement of the transverse bolster, the bolster opening in the frame is designed similar to that of a four-wheel truck frame. The spring seat casting, which carries the brake brackets for the inside brake beams, is separate from the frame. Hence, by jacking up the longitudinal bolsters and removing springs and spring seat castings, the transverse bolster may be replaced in a manner similar to that used with four-wheel trucks.

As will be noted from the illustrations, the use of a separately constructed spring seat and brake hanger casting introduces another advantage, namely, that it permits of making all side frame castings identically alike. This is a distinct advantage, both in the manufacture of the trucks and in the upkeep of repair parts stocks. As an aid to inspection, it is to be observed that all springs in the Buckeye truck are visible and arranged in groups of four in the bolster opening of the side frames as in four-wheel trucks.

Comparing the truck construction shown in the drawing with that shown in the photographs, it will be noted that the former illustrates the use of A. R. A. type journal boxes, also a different construction of end brake hanger. Trucks with these modifications are used only experimentally, the Virginian standard design in all other respects being as shown in the photographs.

By reason of the side frame and bolster construction, the Buckeye truck retains all of the flexibility of the four-wheel truck. Besides providing vertical flexibility, the Buckeye

type of equalizer makes possible the extremely short wheel base of 8 ft. 2 in. Due to the necessity of making the brake parts interchangeable with those of another type of truck of a longer wheel base, the wheel base on the Buckeye trucks

The design conditions specified that the cars should operate successfully over tracks having a horizontal curvature of 20 deg. and a vertical curvature of 350 ft. radius. These conditions have been met with a safe margin as evidenced by

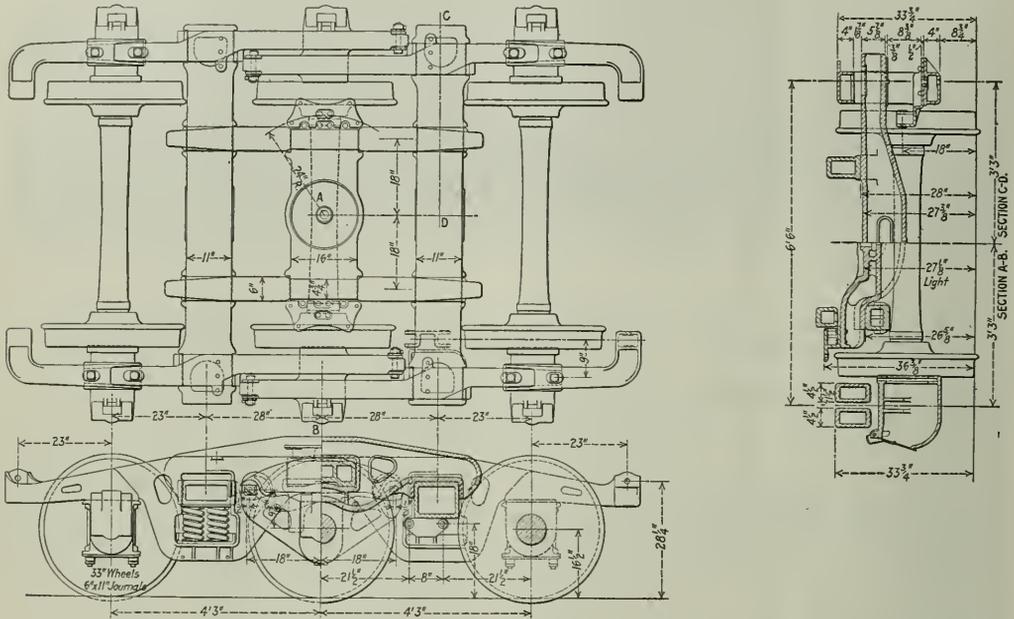


Fig. 2—Assembly of the Buckeye Six-Wheel Truck

on the Virginian cars was increased four inches and is therefore 8 ft. 6 in. as shown in the drawing. The clasp brake rigging used in the Buckeye trucks is suspended entirely from parts independent of the spring travel.

A notable accomplishment in the Buckeye truck design is the avoidance of load carrying members subjected solely to

experimental tests where cars negotiated curves of more than 30 deg. curvature.

The general specifications of the trucks are as follows:

- Wheel base 8 ft. 6 in.
- Center plate height (light car body).....27 1/2 in.
- Side bearing height (light car body)....42 11/16 in.
- Center to center of side bearings.....48 in.



Fig. 3—Center Wheels Ready for Removal

tension. In the Buckeye trucks, the parts that carry the loads are so designed and assembled with relation to each other that they are not subjected to direct tension stresses: i. e., the parts perform the function of beams rather than that of hangers. From the foregoing it will be noted that practically all of the important fundamentals of the four-wheel truck have been observed in this six-wheel truck design.

The Buckeye trucks as used on the Virginian were designed for use with car bodies having either 12 7/8 in. or 18 1/2 in. center sill spacing and with truck centers of 36 ft. 1 3/4 in.

- Axles—A. R. A. 6 in. by 11 in.
- Wheels Rolled steel
- Brake equipment Clasp brake with vertical levers
- Springs Virginian No. 28 (Same as A. R. A. Class D except 1 5/16 and 1 1/16 in. bars)
- Free height of springs including caps.... 8 3/4 in.
- Solid height of springs..... 7 in.
- Side bearings Stueckl
- Brasses and wedges A. R. A. standard.

The total weight of the trucks per car is 37,000 lb., distributed as follows: cast steel parts, 14,500 lb.; brake material, 3,800 lb.; springs, 1,100 lb.; wheels and axles, 15,200 lb., and other material, 2,400 lb.

The Railway Fuel Association Convention

Subjects Include Fuel Preparation and Distribution, Fuel Organization, and Enginemen's Records

FOLLOWING the first day's sessions of the thirteenth annual convention of the International Railway Fuel Association, a report of which appeared on page 1233 of last week's issue, other reports and papers were presented on a wide range of subjects pertaining to the production, purchase, distribution and methods of supervising the use of railway fuel. Abstracts of the more important of these papers follow.

Preparation and Distribution of Fuel

P. E. Bast

Fuel Engineer, Delaware & Hudson

The railroads of this country use annually about 150,000,000 tons of coal. It was not at all improbable that five per cent more ash was included in railroad coal shipped during 1920 than in normal times. If this is true, 7,500,000 tons of additional ash was handled and hauled. But this tells only a part of the story. It has been authoritatively stated that there is a decrease of about $1\frac{1}{2}$ per cent in efficiency for each additional one per cent ash content in the coal. The addition of the 5 per cent of ash means a reduction in efficiency of the good coal of about $7\frac{1}{2}$ per cent, which together with the 5 per cent of ash makes a total reduction in efficiency $12\frac{1}{2}$ per cent. Therefore, if five per cent more ash was included in the coal used by the railroads in 1920 than during normal times, it would be equivalent to 18,750,000 tons of coal with a money value of \$75,000,000. Each one per cent reduction in extraneous ash would result in a saving of \$15,000,000. To this must be added the waste in car mileage, the additional handling of ashes, delays to traffic, etc., the total of which is no inconsiderable amount. It would, therefore, appear that the preparation of railroad coal should command the careful attention of every railroad operating official.

It would seem reasonable that any railroad consuming an annual minimum of say 100,000 tons could well afford a mine inspection service, the expense of which would be negligible compared with the results possible to obtain.

Preparation of coal in the mine is the very foundation of fuel economy. The operator should feel his sense of responsibility in living up to the true intent of the railroad's contract or specifications, impressing upon his miners and other employees the necessity for clean coal, the railroads co-operating to the fullest extent through their mine inspectors.

The extraneous or free impurities in coal usually consist of slate, shale, mud seams, mother coal, sulphur balls or lenses, sand rock from the mine roof and clay from the mine floor. Sulphur, in the form of pyrites, shale, mother coal and thin slate partings are the most difficult to eliminate because they are more or less broken and intermingled with the coal when it is shot down, but with special care on the part of the miner during shooting and loading in the mine cars, these impurities can be thrown out and consigned to the dump pile. There should be no excuse for the loading of roof slate, sand rock, clay from the mine floor, thick slate band, sulphur balls and lenses, inasmuch as any one of these last mentioned impurities can be detected in the mine and on railroad cars during loading.

Some coal seams have a distinct strata of bony coal. Preparation should be taken to eliminate this bony structure to a minimum. It could be used at mine power plants or disposed of locally.

Preparation of coal has so many varying angles that it

would be difficult and unwise to set down any ironclad rules, yet it is believed that if the following few suggestions were carried out it would result in reducing the ash content of railroad fuel and would relieve the railroads of the burden and expense of transporting superfluous waste.

1. Periodical inspection of mine working places by proper mine authorities to see that coal is mined and prepared according to instructions.
2. Check system to determine the responsibility for loading dirty coal; discipline or docking, if law and agreements permit.
3. Shooting down coal so as to keep the percentage of slack down to a minimum.
4. Installation of picking tables where the nature of the coal requires extra precaution in preparation.
5. Proper and adequate drainage facilities.
6. Inspectors on railroad cars during loading to throw out removable impurities.

Consideration should be given co-operation of the railroad mine inspector and operator so that coals normally classified as undesirable can be made to meet the requirements of the railroads. This applies where coals least commercially salable are used by the coal bearing roads from a traffic development standpoint.

Expensive controversies and rejection of coal could be reduced to a minimum if the railroad would first obtain a complete inspection of the mines, showing all details of their methods of working, as well as of the coals offered before purchasing or making contracts.

DISTRIBUTION

Distribution of coal is another important step in fuel economy. Like preparation, it is subject to many varying conditions such as irregularity of mine shipments, weather and traffic conditions, shortage of labor, power and car equipment, etc.

During the past three years distribution has been more or less demoralized due to motive power and car shortages, traffic congestion, labor disturbances, etc., and until these conditions have become stabilized for a reasonable period distribution will continue to be subject to necessity.

It would be rather difficult to estimate or even approximate the annual loss to the railroads on account of poor distribution, such, for instance, as the placing of improper equipment under load at coaling platforms, stations, chutes and storage systems; overstocking, causing extra handling and per diem charges on foreign cars; the loss from a shortage of coal which necessitates holding back revenue tonnage in order to rush coal to some particular point, also in many cases, much to the displeasure of the shipper and inconvenience of the consumer, making it necessary to confiscate commercial shipments, which must be paid for at a high price; and last but not least, cross-hauling.

There seems to be a difference of opinion among railway officers as to the department to handle the distribution. This is evident from a survey of thirty railroads covering practically every section of the country. The distribution by departments was as follows: transportation, 16; fuel, 9; mechanical, 2; purchasing, 2; by committees, composed of representatives of different departments, 1.

When we consider the variations in the different coals used by the railroads it can readily be seen how important it is that the coal distributor be familiar with the product that he is distributing. However, on many railroads this is not the case, and the lack of this knowledge has resulted in

the slowing up of transportation by the distribution of coals to certain districts where the crews were not familiar with them or the power conditioned for their use.

Every railroad should have a distribution schedule based on the location of mines and characteristics of the coal so far as grade and quality are concerned. Since contract coal for any particular railroad using a large tonnage is bound to be of varying qualities, it would seem preferable to select the most desirable coal contracted for as a standard, the other coals then being compared and computed in terms of the standard. Distribution would then be simplified, so far as supplying to each district and class of service a uniform grade and quality of coal, which is a very important item from a standpoint of fuel conservation.

Distribution in a general sense is not a one department problem, it requires the closest co-operation of the several departments and with this in view the following suggestions are made regarding the distribution of supply coal:

1. A consumption schedule for all points, frequently revised and kept up to date to meet the demands of traffic, etc.
2. A distribution schedule showing coals contracted for, grading of coals to a fixed standard, showing grades and qualities most suitable for each district and class of service.
3. A schedule showing coal consigned from mines to be shipped preferably to point of consumption with a view of eliminating extra handling and cross-haulage.
4. Daily telegraphic report showing coal on hand under load at each coaling station.
5. Daily telegraphic report covering shipments of coal and receipts at junction points, in order to keep the loads up to a reasonable degree of safety and down to a minimum with reference to transportation needs.
6. Storage of coal during summer months, relieving the road from transporting company coal in the winter months during the season of peak load. This has special reference to railroads located beyond a reasonable distance from coal fields.
7. From a purchasing standpoint, the most economical grade and quality of coal for each district with consideration to price, freight rates, mine locations, etc.

Discussion

Most of the discussion dealt with the problem of preparation of coal at the mine, C. F. Richardson (West Kentucky Coal Company) very frankly discussed the usual relations between the railroad and the mine and stated emphatically that in order to get clean coal the railroads must be ready to pay a price that will make it possible for the operator to pay the men required on the picking table. He suggested that the railroad purchasing agent might well pay a premium for 100 per cent coal, rather than to buy 70 per cent coal and 30 per cent rock, on a price basis only. He also stated that the demand for tonnage by the railroad is not an incentive for the operator to clean his coal properly, since thoroughly cleaned coal reduces the tonnage output of the mine.

Eugene McAuliffe pointed out that while the B.t.u. basis of purchasing coal is probably the best available, it is not an accurate standard, because variations in ash produce a disproportionate effect on the heating value of the coal beyond the direct effect on the B.t.u. content.

The importance of having a coal distributor was pointed out by W. L. Robertson (B. & O.), in order to avoid the necessity for confiscating commercial coal for railroad use to meet immediate requirements of some stations. Such coal frequently costs as high as \$16 a ton.

Standards of Fuel Economy

D. C. Buell, director, Railway Educational Bureau, presented a paper on this subject, in which he gave a comprehensive outline of the steps which must be taken before ideal results can be secured in any campaign for the economical use of railway fuel.

Starting with the executive, Mr. Buell took up the essential requirements of a fuel conservation policy, and outlined the

matters for executive attention in the purchasing, operating and mechanical departments. The conditions which require the attention of the supervisory forces were then enumerated for all departments concerned, including fuel inspection, operating requirements, the important points for attention in the shops and roundhouse and the points requiring special attention by the road foreman.

In all, the paper enumerated 78 points, of which he said in closing:

"There is hardly an item in this entire list which has not been a subject for a paper or for discussion at some of the conventions of the International Railway Fuel Association. Those who have been members of this Association for a number of years have their file copies of proceedings which can be referred to in order to check the methods presented to this Association by practical fuel men, which have proven successful in dealing with these numerous problems.

"Those who have only recently become members of the Association can obtain back copies of the proceedings of the last few years from the secretary for a nominal sum.

"The problem of fuel economy is just as much a science as any other of the engineering problems, and it is only through a careful study and analysis of individual problems that an officer whose duties involve a responsibility for fuel economy may hope to obtain satisfactory results. Therefore it is urged upon the members of this Association that our proceedings be used as a scientific or engineering reference library to be referred to and studied, in order that they may become more proficient in this branch or specialty of our great American transportation problem."

Discussion

Harrington Emmerson briefly sketched the history of the development of the use of steam power from the first crude steam engine when there was no quantitative measure of the energy in the coal at one end or of the work performed at the other, through the steps that finally led to the present knowledge of steam engineering which makes possible a definite determination of the efficiency of the application of fuel to the production of work. He concluded that what was necessary in the efforts of the railways in fuel conservation were similarly definite standards of fuel consumption in relation to ton-mile output so that the success of fuel economy programs could be definitely measured.

In closing the discussion Mr. Buell stated that in developing and correlating the various factors in a complete plan for fuel economy, he had followed the principle of dependent sequences developed by Harrington Emmerson in his paper presented before the association at the 1915 convention. Mr. Buell also acknowledged the importance of definite standards under present conditions, since the public has a right to inquire as to the efficiency with which the railroads are managed and operated and the railroads cannot afford to be without some such standards, the absence of which will indicate to the public a lack of knowledge of the fundamentals of their own business.

Fuel Department Organization

By L. G. Plant

Associate Editor, Railway Review

Fuel economy is eminently a problem of organization. The acquisition of new locomotives, the erection of new terminals and shops, the purchase of better coal, do not alone constitute fuel economy. This is largely dependent upon consistent and persistent individual effort organized in accord with a well defined plan of action.

If a locomotive is to pull tonnage each part must be designed for a purpose and assembled in its proper place. Yet, when we assemble an organization to supervise the

operation of this locomotive, each man's objective is often obscured and his relation to superior officers and subordinate employees sometimes confused.

On how many roads has the organization of fuel economy been carefully planned to accomplish a well defined aim? More often this organization represents merely a man added here and there to fill a very obvious void.

THE PRESENT STATUS OF ORGANIZATION FOR FUEL ECONOMY

This critical appraisal of fuel department activities is suggested by the result of inquiry into the status of fuel organization on 50 railways, representing 183,884 miles of line and 42,854 locomotives owned. This does not include all of the largest railways nor many small roads. It is

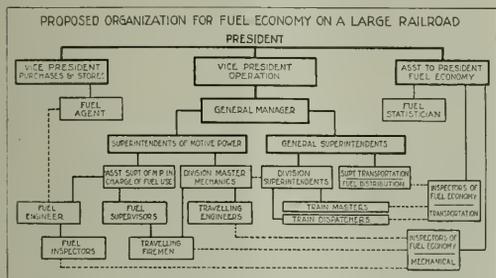


Fig. 1

confined to Class I railways owning an average of more than 800 locomotives each, but does not, for instance, include either the Pennsylvania or the Baltimore & Ohio railroads. It may be said to be fairly representative of the situation throughout the country.

On 40 per cent of these roads we find no semblance of an organization devoted wholly to the supervision of fuel use. On 68 per cent of these railways the mechanical department is held responsible.

What are the most salient points suggested by this analysis of the situation on 50 railways? First, the totally inadequate provision for enforcing fuel economy on many railways must indicate either lack of appreciation for the full importance of fuel economy or failure to comprehend the real nature and scope of the fuel problem. Even where supervision plainly show that there is no common understanding of what does and what does not constitute a real fuel department. The following tabulation demonstrates a wide divergence of opinion as to what is adequate supervision:

Number of railways in group	Number of Locomotives in active service to:			
	One traveling engineer	One traveling fireman	One fuel supervisor	One fuel inspector
20	64	114	none	164
14	58	90	150	236
7	64	99	639	258
4	83	110	161	674
5	78	88	114	241

But with respect to those railways upon which substantial provision has been made for enforcing economy in fuel use, does not the absence of any uniform plan of action suggest the lack of a well defined objective?

WELL DEFINED OBJECTIVE ESSENTIAL TO EFFECTIVE FUEL SUPERVISION

Since the absence of uniformity in the manner of fuel supervision suggests the lack of a well recognized objective, it is of the utmost importance that the real objective be clearly comprehended before consideration is given to the

organization of fuel economy. The objective of this organization may be concisely defined as the determination and procurement of the least expensive fuel available, service as well as price considered; and the most productive utilization of this fuel.

Traffic considerations which influence the revenues of the railway may also be a factor in the selection of fuel, but it is contended that where traffic considerations are permitted to influence the selection of railway fuel, an effort should be made to appraise the true value of this traffic. Too often are traffic considerations of the vaguest value permitted to determine the selection of a fuel that will cause the railway a quite definite loss.

Therefore, it is the function of an organization devoted to fuel economy to determine, in advance, the most economical fuel, all factors considered, and to undertake the procurement of this fuel. This involves not only preliminary investigation and tests, but subsequent inspection to enforce delivery of fuel that conforms closely to the grade purchased.

Also, it is the function of an organization devoted to fuel economy to enforce efficiency in the distribution and use of this fuel. This involves distribution in accordance with a well arranged plan, expeditious handling at fueling stations, skillful firing and intelligent locomotive operation, efficient motive power and effective operation of the railroad as a whole.

From the foregoing it must be apparent that the scope of fuel economy embraces many departments, but principally, it is the function of the mechanical, the operating and the purchasing departments. Fuel economy can only be attained through the organized effort of each one of these departments. It is idle to talk of a separate department that can assume all the responsibilities of fuel economy. Are there not too many departments at present? To relieve the mechanical, the operating or the purchasing department of a fraction of its individual responsibility would be disastrous. Rather, the effort should be to make each of these departments appreciate its full responsibility for fuel economy and to organize its activities accordingly.

The only possible excuse for shifting these activities lies in the failure or inability of one department to assume a responsibility that properly belongs to it. Where this situ-

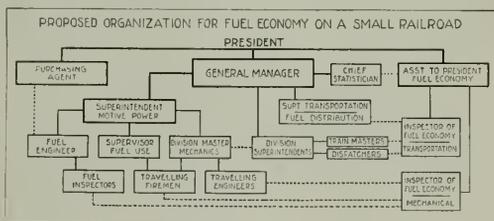


Fig. 2

ation necessitates the formation of an individual department, the purpose of this department should be to assume as few rather than as many routine functions as possible. It is well to bear in mind that fuel economy can never be comprehended within the activities of a single department.

IMPORTANCE OF CONTINUITY OF EFFORT

The organization of fuel economy might be completed with the proper organization of these activities within each department if we were sure of two facts: first, that the activities of each department are being properly co-ordinated, and second, that an adequate supervisory organization is continuously maintained and is functioning to the best advantage.

We may have the most ample and competent organization

for the enforcement of fuel economy within each department, but if this is not continuously maintained it may prove more harmful than helpful. There is no more disorganizing or discouraging factor in the pursuit of fuel economy than the intermittent establishment and abolishment of large organizations for supervising fuel use. The most meagre permanent organization is preferable to the most elaborate temporary organization. Is it possible that the management of a railway on which fuel supervision is allowed to vary with each fluctuation in monthly earnings can realize that eternal vigilance is the price of fuel economy?

PROPOSED ORGANIZATION FOR LARGE AND SMALL RAILWAYS

The proposed organization for a large railway is illustrated in Fig. 1, and the proposed organization for a smaller road is shown in Fig. 2. Fundamentally, these plans are the same because, fundamentally, the problem of fuel economy does not change with the size of the road. Both of these diagrams are intended to depict an ample supervisory organization within the mechanical department for adequate supervision over fuel use and the procurement of fuel.

The diagrams referred to in Figs. 1 and 2 are also intended to indicate an operating and purchasing department organization that, so far as the conduct of these departments is concerned, is fully capable of enforcing economy in fuel use. The distribution of fuel is assigned to the superintendent of transportation as a proper function of the operating department. Fuel purchases must be entrusted to the purchasing department, or to a branch of this department, but these diagrams are purposely constructed to suggest an intimate relation between the fuel engineer and the fuel agent, since it is highly essential that there be the closest cooperation between the department that buys and the department that must use the fuel.

There is nothing new in the proposal that a superintendent of fuel service, reporting to the superintendent of motive power, direct the activities of several fuel supervisors toward the enforcement of economy in fuel use. In fact, this appears to be the most popular form of fuel supervision now in effect. Preferably, however, he should be an assistant superintendent of motive power, on account of the real importance as well as the breadth of his task.

Success in the administration of fuel supervision by an assistant superintendent of motive power is dependable upon two factors: first, concentration upon the enforcement of fuel economy, and second, an adequate ratio of supervision, since no possible variation in the structure of an organization can take the place of intimate personal supervision.

The successful supervision of fuel use by the mechanical department is plainly contingent upon the employment of an organization that represents a genuine addition to the supervisory force. To merely alter the title of a traveling engineer to that of fuel supervisor does not constitute a real advance toward fuel economy; there must be a net addition to the supervisory force that will bring the ratio of supervision over locomotive performance to at least one to each 40 locomotives in active service.

HEAD FUEL ORGANIZATION WITH AN ASSISTANT TO THE PRESIDENT

But it is upon the establishment of a direct connection between the chief executive and the administration of fuel economy that the successful operation of the proposed organization is chiefly dependent. Otherwise this organization would have no fundamental advantage over organizations that are already in operation and would be subject to the same defects.

To establish this direct connection between the chief executive and the administration of fuel economy, the appointment of an assistant to the president is proposed. It is not the purpose of this appointment to further complicate super-

vision over fuel use. The position conveys no direct authority. He may advise and consult; and, in this impartial way, insure co-ordination in the activities of all departments toward fuel economy. But he will not exercise executive authority except in the conduct of his own very limited staff. His duties require that he know at all times whether each unit of the organization is or is not contributing its best efforts toward fuel economy. He should be able to state with assurance what net savings may be expected from additional supervision over fuel use or where this organization might be curtailed without entailing a net loss to the railway.

The measure of fuel economy lies only in statistics that reflect each phase of operation. These must be interpreted with the utmost discretion and it is entirely consistent that such statistics be compiled under the jurisdiction of an impartial judge in the person of the proposed assistant to the president. Therefore, it is suggested that a fuel statistician be attached to the staff of the proposed assistant to the president or, on small railways, the services of the chief statistician be available to this office.

The position of inspector of fuel service is even a more necessary adjunct to this plan. The number of these inspectors would be proportioned to the size of the railway and density of traffic, but it is contended that on even the smaller roads there should be at least one inspector of fuel economy who would devote attention to the conduct of the operating department, and another inspector who would observe and report upon the activities of the mechanical department toward fuel economy.

But it is the chief function of the proposed plan to perpetuate a broad fixed policy toward fuel economy. In fact, the position of an assistant to the president, and subordinate inspectors acting in the capacities which have been described may truly be said to embody the policy of fuel economy.

Discussion

W. L. Robinson (B. & O.) briefly described the form of organization on the Baltimore & Ohio. This is a staff organization, the head of which reports directly to the chief of motive power and the vice-president in charge of operation and maintenance, to whom in turn reports the chief of motive power. The staff organization has supervision over the use of the fuel, the purchase being handled by a fuel agent, and the inspection by the engineer of tests, both of whom report to the operating vice-president. The staff organization includes six district supervisors, three inspectors of fuel service, a fuel statistician and a fuel distributor who is in effect a general superintendent of transportation for railway fuel. The organization includes no traveling firemen, the direct supervision being handled by the road foreman or his assistants under the staff supervision of the district fuel supervisor. In this connection Mr. Robinson stated that on the Baltimore & Ohio the ratio of traveling engineers and assistant traveling engineers to the number of locomotives in service is 1 to 38. Accounting for the fuel is handled in the accounting department under the jurisdiction of another vice-president.

Two principles of a successful fuel organization were particularly emphasized in the discussion. The first is the adoption of a fixed policy on the part of the management and the second, that the authority for the execution of this policy remain in the departments whose regular routine duties include some phase of the fuel problem, thus making the fuel organization advisory rather than executive. Speaking of the first principle, Eugene McAuliffe recalled two cases where railway managements had made records for themselves by the much advertised results of their fuel organizations, both of which at a later date discontinued these organizations, thus securing no permanent benefit. The difficulty of effectively working out the second principle lies in the tendency for the supervisors in the operating organization to think that they know all there is to be known about the problem,

while on the other hand the staff organization, the business of which is to know, too frequently attempts to assume the authority properly belonging to the operating organizations.

Value of Individual Fuel Performance Records

By Robert Collett

Superintendent Fuel and Locomotive Performance, New York Central

There have been presented before this Association several papers outlining the practice on various railroads where individual fuel records have proved valuable and which in some instances continue in force. A reasonably thorough canvass, however, discloses that such records are by no means standard practice on American railroads, chiefly, it seems, for the reason that the general method of determining individual coal charges to locomotives is largely guesswork. The value of any record lies in what we get from it and depends on the good or bad opinion of those who live with it. Mr. McAuliffe once aptly said: "I have been connected with a dozen different kinds of fuel performance records not one of which was absolutely correct, but the worst was better than none at all."

Railroad officers fully appreciate the need of knowing, first, about how much fuel is required for a given service, and secondly, how much is being used. How best to get this information depends chiefly on local conditions. With present day facilities on the average railroad it is not possible to present to an engineman or fireman a bill, so to speak, for a certain amount of fuel burned for which he is responsible, since all of the old handicaps of delays, light mileage, etc., over which he has no control, are still with us and added thereto are a number of other complications such as changing firemen, pooled engines, no means of measuring coal, and so on.

The engine record seems the best as a rule, save for oil-burners under certain favorable operating conditions, and this plan now predominates. The average cost of compiling such a record proves to be from one-half to one cent per ton of coal used. It is not usually intended as a check against the total fuel consumed, but to keep interest aroused. Grouping selected runs and showing only representative trips and not necessarily the total mileage or total fuel consumption for the month, has met with success on certain roads. The value of a fuel record also depends on how it is handled with the engine crews and the various departments responsible.

There are individual records which may be of value, although not elaborate. On the New York Central Lines East, we have made a great many trip records of fuel consumption and given considerable publicity on the road to these reports in an effort to apprise all concerned what is considered good performance. Also, through various records of observations we attempt to check conditions affecting fuel costs, which include locomotive operation, quality and distribution of fuel, locomotive conditions, transportation matters, and lubrication. One reason for including the latter is the claim so often made that oil is often saved at the expense of fuel. These individual observations are made in company with a division officer and matters are handled on the ground, in preference to writing letters. The idea is not so much to improve the individual waste as to have conditions right on the division and the railroad as a whole.

We give each division officer, including traveling firemen, what we call a bill of expense each month for the fuel burned in each class of service, the unit consumption, and the total cost. We also show this in "Cost per 1,000 Locomotive Miles." One reason for this is to compare the relative cost of fuel with other items which may have received no more attention than they deserved, but relatively far more attention than the fuel costs. On the enginemen's bulletin

boards we post a statement of miles run per ton of coal in each class of service, with a foot-note showing the number of scoops used per mile and what a small saving would amount to. We find the men like this even better than the gross ton-mile statements, although we post them also. Recently, we have been posting at some of our terminals the coal charges as shown by our daily report of disbursements, which shows the engine number, to which we have added the train number. Of course, it gives the crews an opportunity to criticize our coal estimates, but it creates interest and makes us careful in our estimating.

If we get individual effort collectively applied and concentrated on ways and means to encourage pride in having our railroad the best in fuel performance, it matters not so much what kind of records we have. If our records give individuals credit and commendation where due, and point out to all departments and individuals in a co-operative spirit what we are doing, what it is possible to do and in some small way at least how to do it, we will have two fuel supervisors on every engine and one in every officer.

I believe in an individual record and a daily check of the coal burned, so far as practicable, against the ton miles or passenger car miles for the education and interest it affords to those who follow fuel economy and who use fuel. But no record ever taught a man how to fire or run an engine more skillfully than he already knew. We certainly need and in time will have better and more fuel records on American railroads, but where successful, under present coaling arrangements, they will not attempt to stress individual liability so much as they will the possibilities of concerted effort.

Discussion

J. G. Crawford (C. B. & Q.), presented a written discussion from which the following is taken:

In 1917 a committee consisting of an assistant auditor, fuel distributor, inspector of stores, traveling accountant, engineer of tests and myself were appointed to investigate fuel accounting. The accounting necessary in connection with the "Daily and Monthly Enginemen's Fuel Performance Statements" influenced the fuel accounting to a considerable degree, and the first work of this committee was to find out what use was made of and to estimate the value of the "Daily and Monthly Enginemen's Fuel Performance Statements."

The committee assumed that the reports were for the following purposes:

(1) To create interest among enginemen which would result in a more economical use of locomotive fuel.

(2) To give master mechanics and road foremen a statement which they can use to determine the relative standing of the enginemen so that they can urge, require and demand improvement of those whose performance is below what it should be.

(3) To give superintendents of motive power and other general officers a summary of the effects of fuel economy efforts.

Twelve division points and two important terminals were visited. Master mechanics, road foremen, engineers and firemen were interviewed. Bulletin boards and bulletin books were examined to ascertain the manner and date of posting these statements. About one-half of the eighteen divisions were found to be making out the daily statement, but all divisions were compiling the monthly statement. The cost was about \$1,200 per month as statements were being made out and would have been about \$1,800 per month had statements been made out as originally intended.

All divisions compiled the monthly statement. This could not be avoided, because the monthly statements from each division were consolidated into a system statement. Of the twelve division points visited only eight had the monthly

reports posted. Some of these had not been sent to round-houses for posting for over a year and one was being put in the waste basket by the roundhouse clerk. Only five division points had made out and posted the daily reports. One division did not figure the pounds of coal per switch hour, per passenger car mile or pounds per hundred ton miles or the average speed. In some cases the daily reports were carbon copies, made with pencil instead of typewriter, and were not readable.

The daily reports were posted too late to be of any value. It was originally intended to post these within 48 hours after the day covered by the report. The monthly reports were posted about three weeks after the end of the month. At one point where there are ten bulletin files the four last monthly reports were on three different files. Some bulletin boards are so constructed that it is next to impossible to examine this statement.

Of 122 engineers and firemen interviewed, 51 stated they did not examine the statements and 66 said they did occasionally, but as they could not tell their approximate standing on the current statement it showed that their examination consisted in glancing at the report at occasions a good way apart. Five men knew their approximate standing but there is a possibility that three of these were informed in advance that we were making an investigation.

Of nine master mechanics interviewed eight did not use the reports and recommended discontinuance, one said it was one of the most important reports.

Eight road foremen were interviewed, of whom six did not use the reports and recommended their discontinuance, while one used and recommended discontinuance, and one used and made no recommendation as to discontinuance.

These reports were discontinued.

On any railroad there are a large number of engineers who are as conscientious and as capable as the officials who supervise them. This class does not need much supervision and an inaccurate individual fuel performance record is of no value in bringing about greater fuel economy in their case. There is a second group of men who are as conscientious, but not as capable and could be appealed to through an accurate statement, but not through one which is inaccurate. The third class as I see it is not conscientious; is subdivided between both capable and incapable. This class, though small in number, requires an excessive percentage of the road firemen's time. Something could be done with this group if an accurate individual fuel performance record were available, but an inaccurate record is of no value.

It seems to me that the smallest unit on which to base a fuel performance record, is the division until such time as an accurate record of the coal used by each engineman is obtainable. The statement using the individual engine as the unit is slightly more accurate than the statement using the engineer or the fireman as the unit, as there are a lesser number of engines than engineers or firemen. However, the principal advantage of making an individual engine fuel performance record in place of an individual engineman's fuel performance record is that the engines cannot talk back and tell you how inaccurate is the statement.

Nothing herein should be construed as not advocating working on the individual engineer and individual fireman to obtain the greatest fuel economy, but working through the medium of an inaccurate individual engineman's performance record is not advocated and should be discouraged.

Report on Fuel Accounting

If we are to form a proper basis for checking fuel, and if we are to measure economy in its use, we must know that our fuel is purchased, distributed and accounted for under well defined methods. At the present time many roads are paying at least a 400 per cent increase in the price of their

coal or oil based on 1915 prices, which further emphasizes the importance of accurate accounting.

At the outset it is the recommendation of the committee that fuel accounting be handled by the auditing department. This does not affect separate organizations or departments which handle the purchase, inspection, nor use of fuel. Every railroad engaged in interstate commerce is guided in its final accounts by certain rules and regulations laid down by the Interstate Commerce Commission. The accounting department of every railroad understands these regulations and knows how to meet the requirements with regard to the allocation of fuel charges to operating expenses. Therefore, all forms used in connection with fuel accounting, are designed to meet these ends.

After the general purchasing agent has arranged contracts for delivery of coal, a mine manifest should be rendered daily to cover all coal shipped, showing destination, waybill reference, kind of coal, car number and initial, and gross, tare and net weights, one copy going to the fuel supervisor and one to car service department or the party handling the distribution of coal. The coal contractor should forward to general purchasing agent an invoice for all coal shipped, who will approve as to price, etc., and pass to the accounting department.

After arriving at distributing or junction point, a diversion report is compiled for the party handling distribution, showing car number and initial, original waybill reference, point to which diverted, shipper, and to whom and why diverted.

After the coal has arrived at the unloading station, the coal dock foreman must inform the fuelkeeper of the amount of coal received and unloaded so that he can render a daily report to the accounting department, with copy to the fuel supervisor; the accounting department to check receipt against invoice before passing for payment. The coal tickets covering issues to locomotives are handled by the coal dock foreman and passed to the fuelkeeper each day. The form for reporting coal received and unloaded provides for showing the waybill reference, the weight of the coal, and the amount unloaded is carried forward from day to day so that the report at the end of the month will show the total amount of coal delivered to locomotives, or otherwise charged out at the station where unloaded. There should be a place provided on the reverse side of the daily unloading report for showing all cars on hand not unloaded. From this and the diversion reports information to locate every car is available.

As coal is generally put through chutes with no weighing device and as estimates of issues to individual locomotives necessarily follow, some adjustments will be required to balance with the inventory. A ten day or shorter period trial balance is therefore the solution in order to correct discrepancies before they become thirty days old, rendering the adjustments so heavy that the accuracy of charges to the individual locomotives and classes of service might be questioned.

Coal spilled at chutes should be picked up every day, if possible, and put back into the chute. If it is not possible to do this with some type of chutes, it should be done at least as often as trial or regular balance is taken, so that the report at the end of the month would show a balance requiring minimum adjustments.

A careful record should be kept of coal issued, and to do this it is necessary to keep before the fuelkeeper a working sheet on which the days of the month are shown, with headings covering every known use of fuel, on which fuelkeeper should be required to show distribution every day, so that at the end of the month the various items may be added and made ready for the balance sheet.

The balance sheet should provide a place for showing inventory and coal received and disbursed for all purposes. This report, with the tickets supporting the issues to loco-

motives, should be forwarded to the auditing department promptly after the close of each month, but only after the fuelkeeper has checked the agent's record to see that he has accounted for every car of coal reported by the agent to the auditor of freight accounts as being unloaded at his station.

To avoid omitting in the report of fuel received the cars under load at the closing period, it is essential that a record be maintained of cars received but not unloaded.

For distribution of fuel to locomotives, a separate form should be used which will show allocation of fuel to each individual locomotive, subdivided as between various classes of service in which the locomotive may make mileage. The form should accompany the balance sheet and will permit the auditing department to make proper charge of fuel to every locomotive.

Fuel oil, which is in general use on many of the western and southwestern roads, should be accounted for under the same basic principles as outlined above.

The report is signed by J. N. Clark (Sou. Pac.), Chairman; R. R. Hibben (M. K. & T.); R. E. Jones (D. & I. R.); C. F. Ludington (Crescent Coal Co.); Joseph McCabe, (N. Y., N. H. & H.); Hugh McVeagh (Big Four); C. F. Needham (Grand Trunk); H. E. Ray (A., T. & S. F.), and W. J. Tapp (D. & R. G. W.).

Address by Eugene McAuliffe

Eugene McAuliffe, president and general manager, the Union Colliery Company, in an address before the Association spoke of the effect on the quality of railway fuel of the purchasing practices of the more discriminating users, such as public utilities and large industries, the result being an increasing volume of inferior coals which are dumped on the railroads. In this connection Mr. McAuliffe said:

"Whatever progress the coal industry is making toward better coal is almost wholly due to the industrial, utility and domestic demand and the inferior product is flowing in a growing stream toward the railroad bunkers. Is there a railroad in the United States that has ever attempted to weigh the result of an excessive ash content on its total train mile costs? Does any railroad know in what ratio a growing ash content runs against fuel economy? Most of the large utilities do; . . ."

In discussing the effect of the "peaks and valleys" of business on the load factor of the mines and the railroads, Mr. McAuliffe spoke in part as follows:

The load factor of a man, a machine, a factory, a mine, a railroad, is the ratio of the average output (in the case of a railroad expressed in gross ton and passenger miles) to the potential capacity. Do we not as a nation ignore this important factor, with the result that our stand-by losses are tremendous? It is the stand-by losses that are killing the railroads today, yet nothing is done to level the peaks and the valleys of the industrial curve; one year we fight and struggle for output at the expense of quality, building up a tremendous machine that largely stands idle during a subsequent period of depression, only to repeat the operation at recurring periods.

There is a lack of co-ordination between the carriers and the coal industry, although the traffic relation approximating 37 per cent of the gross freight ton-miles, and the purchase relation totaling from 25 to 28 per cent of the bituminous coal production, would seem to warrant a complete entente cordiale. What are the railroads doing to regain and accelerate the upward trend of the fuel economy curve? The application of brick arches, superheaters and perhaps feed water heaters is of necessity moving slowly. These instrumentalities call for capital investment. On the other hand, a broader study of the whole coal problem and a serious attempt to improve the load factor on the mines, on mine labor and on that portion of the railroad equipment and facilities that is devoted to the transportation of coal would

save millions of dollars annually and would reduce capital investment millions of dollars. The load factor on the railroads is at present running from 65 to 70 per cent, on the bituminous mines 50 per cent and on mine labor 40 per cent. This situation insofar as the actual cost of producing coal is concerned is costing at the present moment not less than one dollar per ton or one-half billion dollars annually; the carriers' loss in load factor is expressed in idle cars and locomotives, decimated work forces and an operating cost approaching 100 per cent of gross earnings; the coal miners' and coal operators' loss is expressed in terms of idle men and mines, offset in part by a rate of wage and a selling price far above what they should be, while the collection of profits is deferred.

In support of the statement that a greater community of interest between the railroads and the coal industry is essential, the study of the relative weight of coal produced in 1918 and the other heavy commodities handled by the railroads, is shown in the table.

RATIO OF THE VOLUME OF OTHER PRODUCTS HANDLED BY THE RAILROADS TO COAL

	Net tons	Ratio in per cent
Coal Production—		
Anthracite	98,826,084	14.6
Bituminous	579,385,820	85.4
Total	678,211,904	100.0
Other commodities compared with coal—		
Farm products: wheat, corn, oats, rye, barley, potatoes	163,176,298	24.0
Lumber, all grades	63,780,989	9.4
Basic metals: steel, copper, lead, zinc	51,829,281	7.6
Total	278,786,567	41.0

Coal, because of its immense demand on the carriers for transportation occupies a position that not only merits but demands serious study, and the fullest measure of co-operation.

The load factor on the coal mines, on coal labor and on the carriers can be improved by the simple process of paying the public for the service rendered through the simple medium of lower freight rates on coal in the summer months, with a corresponding increase in the winter months; this principle can be further extended to our common advantage, by granting seasonal rates on all building material such as sand, gravel, rock, tile, lumber, etc., that enter into the construction of buildings and highways.

Business decries government regulation and control—I am unalterably opposed to both—but are not our reactionary tendencies forcing the public to "build a fire under the mule."

Other Papers

A number of other papers and reports were also presented. These were Fuel Economy—A Few Essentials, by Carl Eduard Uddenberg (State Railways of Sweden); Oil Shale as a Source of Oil Supply, by Martin J. Gavin (Bureau of Mines); Cost of Production of Coal, by Mont B. Morrow (Canmore Coal Company, Ltd.); Report on Briquettes and Sub-Normal Fuels, E. E. Ramey (B. & O.), chairman; and Report on Firing Practice, M. A. Daly (Nor. Pac.), chairman.

Other Business

One of the features of the meeting which received favorable comment on several occasions was the presence of eight engine crews, one from each division of the Atlantic System of the Southern Pacific. These men, who have had the best fuel records on their respective divisions during the past three months were sent to the convention by the management as a mark of recognition for the results they have obtained in their efforts to save fuel. This is a part of the newly developed plan of division fuel committee organization on the Southern Pacific System.

During the convention Harrington Emmerson distributed to the members copies of a summary of the Interstate Commerce Commission railway fuel report for 1920 which he had pre-

pared showing the costs of the various kinds of fuel on an equated heat unit basis.

On recommendation of the Committee on Constitution and By-Laws, the annual dues of the association were raised \$1 a year.

The following officers were elected for the coming year: President, W. L. Robinson (B. & O.); vice-presidents, J. N. Clark (Southern Pacific), M. A. Daly (Northern Pacific),

Percentage of Wage Reductions Ordered by Labor Board

THE PERCENTAGES of the decreases in wage rates which were ordered by the Railroad Labor Board on June 1 show varying amounts ranging from as low as 7 to as high as 20 per cent. The following table shows former rates, present rates, and amount and percentage of decrease:

DECREASES ORDERED BY THE RAILROAD LABOR BOARD													
1	Average daily rates				5	6	1	Average daily rates				5	6
	2	3	4	Decreases by Board				2	3	4	Decreases by Board			P. c. of decrease in basic wages
Class of employee	Dec., 1917	U. S. Railroad Administration	Present rates	Decreases by Board	P. c. of decrease in basic wages	Class of employee	Dec., 1917	U. S. Railroad Administration	Present rates	Decreases by Board	P. c. of decrease in basic wages		
Superintendents Forces—													
Yardmasters	\$151.12	\$239.38	\$269.98	*\$16.32	*6.1	Molders (less 4 years' experience)	3.14	4.58	5.62	.64	11.3		
Yardmasters' assistants	143.45	203.65	239.25	16.32	6.8	Helpers—all crafts	2.85	3.96	5.00	.64	12.8		
Train dispatchers and directors	149.76	236.32	262.84	16.32	6.2	Helper apprentices	3.11	4.06	5.10	.64	12.5		
Clerical and Station Forces—													
Clerks (2 years or more experience)	2.89	4.21	5.25	.48	9.3	Regular apprentices	1.84	2.76	3.80	.64	16.9		
Clerks (1 year or more experience)	2.89	4.21	5.25	1.04	19.8	Car cleaners	3.60	4.00	4.00	.82	20.5		
Clerks (less than 1 year's experience)	2.89	4.21	4.73	.52	11.0	Telegraphers, Telephoners and Agents—							
Train and engine crew callers, train announcers, gate-men and baggage and parcel room employees	1.95	3.05	4.09	.80	19.5	Telegraphers, telephoners and block operators	2.78	4.50	5.36	.48	9.5		
Office boys, messengers, chore boys and others under 18 years of age filling similar positions	1.41	2.57	2.97	.40	15.4	Telegraphers—telephoners operating interlockers	2.91	4.67	5.47	.48	8.7		
Janitors, elevator and telephone switchboard operators, watchmen, employes assuring way bills, etc.	2.23	3.33	4.13	.80	19.3	Levermen telephoners	2.35	4.16	4.96	.48	9.7		
Freight handlers and truckers	2.23	3.33	4.29	.48	11.2	Telegrapher-clerks	2.40	4.39	5.19	.48	9.2		
Sealers, sealers and fruit and perishable inspectors	2.23	3.33	4.37	.48	11.0	Agent-telegraphers	2.50	4.61	5.41	.48	8.8		
Stowers or stevedores, callers or loaders, locators or coopers	2.23	3.33	4.45	.48	10.7	Station agent-non telegraphers	2.81	4.67	5.47	.48	8.7		
M. of W. and Unskilled Labor Forces—													
M. W. and S. foremen	3.44	5.33	6.53	.80	12.3	Station agents (small non-telegraph station)	2.81	4.67	5.07	.40	7.9		
Section foremen	2.53	3.94	5.14	.80	15.6	Engine Service Employes—							
Masons and bricklayers	3.25	4.75	5.95	.80	13.4	Passenger engineers and motormen	4.39	5.68	6.48	.48	7.4		
Masons' and bricklayers' helpers	2.24	3.44	4.12	.60	14.6	Passenger firemen and helpers	2.68	4.18	4.98	.48	9.6		
Painters	3.47	4.93	6.13	.80	13.0	Freight engineers and motormen—through	5.18	6.65	7.69	.64	8.3		
Carpenters	3.22	4.63	5.83	.80	13.7	Freight engineers and motormen—local	5.38	7.04	8.08	.64	7.9		
Structural iron workers	3.58	5.44	6.64	.80	10.0	Freight firemen and helpers—through	3.38	4.85	5.89	.64	10.8		
Section men	1.93	3.02	3.70	.68	18.4	Freight firemen and helpers—local	3.36	4.98	6.02	.64	10.6		
Other unskilled laborers	2.24	3.27	3.95	.80	20.3	Yard engineers and motormen	4.27	5.71	7.15	.64	8.9		
Foremen construction gang and work trains	3.09	4.50	5.70	.80	14.0	Yard firemen and helpers	2.66	4.23	5.67	.64	11.3		
Other employes, construction gang and work trains	2.06	3.17	3.85	.80	20.8	Hostlers	2.65	4.35	5.79	.64	11.0		
Crossing flagmen and ratemen	1.64	2.65	3.33	.68	20.4	Hostler helpers	2.50	3.60	5.04	.64	12.7		
Drawbridge operators	1.95	3.24	3.92	.68	17.3	Train Service Employes—							
Enginehousemen	2.18	3.36	4.16	.80	19.2	Passenger conductors	4.45	6.00	7.00	.60	8.6		
Shop Employes—													
Gang and other foremen:						Passenger baggage men	2.75	4.16	5.16	.60	11.6		
Hourly	4.05	5.97	7.01	.64	9.1	Passenger flagmen and brakemen	2.59	4.00	5.00	.60	12.0		
Monthly	4.97	8.73	9.77	.64	9.1	Freight conductors—through	4.08	5.40	6.44	.64	10.0		
Machinists (journeymen)	4.80	5.78	6.82	.64	9.4	Freight conductors—local	4.47	5.92	6.96	.64	9.2		
Machinists (less 4 years' experience)	3.33	4.60	5.64	.64	11.3	Freight brakemen and flagmen—through	2.75	4.08	5.12	.64	12.5		
Boilermakers (journeymen)	4.71	5.85	6.89	.64	9.3	Freight brakemen and flagmen—local	3.00	4.48	5.52	.64	11.6		
Boilermakers (less 4 years' experience)	3.46	4.62	5.66	.64	11.3	Yard foremen	3.77	5.34	6.96	.64	9.2		
Blacksmiths (journeymen)	4.95	5.88	6.92	.64	9.2	Yard helpers	3.42	5.01	6.48	.64	9.8		
Blacksmiths (less 4 years' experience)	3.63	4.64	5.68	.64	11.2	Switchtenders	2.62	4.00	5.04	.64	12.7		
Sheet metal workers (journeymen)	4.40	5.77	6.81	.64	9.4	Stationary Engineers, Firemen, Etc.—							
Sheet metal workers (less 4 years' experience)	3.19	4.67	5.71	.64	11.2	Stationary engineers (stm)	2.18	4.51	5.55	.64	11.5		
Electrical workers (journeymen)	4.15	5.71	6.75	.64	9.5	Stationary firemen (steam)	2.18	3.73	4.77	.64	13.4		
Electrical workers (less 4 years' experience)	3.22	4.53	5.57	.64	11.5	Boiler room water tenders	2.18	3.36	4.16	.48	11.5		
Carmen	3.58	5.44	6.48	.64	12.0	Boiler room oilers	2.18	3.73	4.77	.64	13.4		
Carmen (less 4 years' experience)	2.68	4.30	5.34	.64	11.9	Coal passers, boiler room	2.18	3.36	4.16	.48	11.5		
Molders (journeymen)	4.88	5.76	6.80	.64	9.4	Signal Department Employes—							
						Signal foremen—signal inspectors	4.20	6.00	7.04	.64	9.1		
						Assistant foremen	4.00	6.00	7.04	.64	9.1		
						Leading maintainers—gang foremen and leading signalmen	4.00	6.00	7.04	.64	9.1		
						Signalmen—signal maintainers	3.36	5.34	6.38	.64	10.0		
						Assistant signal maintainers	3.00	4.40	5.44	.64	11.8		
						Helpers	2.50	3.92	4.72	.48	10.1		
						Marine Department Employes—							
						Masters or captains	*149.62	*186.50	*215.47	*15.47	*7.1		
						Mates or first officers	82.30	124.40	151.56	21.50	14.2		
						Pilots	131.05	164.38	194.38	....	....

*Monthly basis. C. items 1, 2, 3 and 4 are from "Wage Report No. 1," prepared by the Railroad Labor Board.

and W. J. Bohan (Northern Pacific); members of the Executive Committee: H. T. Bentley (C. & N. W.); D. I. Bergin (Wabash), C. M. Butler (A. C. L.), J. W. Dodge (Illinois Central), Joseph Keller (Lehigh Valley), and Hugh McVeagh (Big Four).

Chicago was unanimously chosen as the place for the next convention.

RAIL WAGE COST TO THE PUBLIC.—What the Adamson law and government operation did to the American public, then, in plain arithmetic, was to increase the average American family's assessment for railway wages from \$75 a year to \$200 a year. They took an extra \$125 a year out of every family in the United States to put into the pay envelopes of the railway workers. That is cost of living for you!—N. Y. Herald.

Railroad Hearings Before Senate Committee

Testimony of Edward Chambers, H. E. Byram and Samuel Rea—
Many Classes of Freight Show Increased Shipments

WASHINGTON, D. C.

TESTIMONY ON BEHALF of the railroads has been presented before the Senate Committee on Interstate Commerce during the past week by H. E. Byram, president of the Chicago, Milwaukee & St. Paul; Edward Chambers, vice-president of the Atchison, Topeka & Santa Fe, and Samuel Rea, president of the Pennsylvania.

Mr. Chambers testified before the committee on May 26, 27 and 31. He discussed the traffic and rate phases of the

railroad problem in more detail than they had been developed by the executives who had preceded him and rather surprised the committee by outlining the extent of the readjustments in rates already made. Members of the committee also were especially interested in the facts which he produced regarding the causes for the business depression and the comparatively minor effect of the increase in rates. An abstract of Mr. Chambers' prepared statement follows:

Diminished Traffic Not Result of Increased Rates

Statement by Edward Chambers, Vice-President, Atchison, Topeka & Santa Fe

An examination of the facts shows, to my mind, two things: 1. That "the diminished volume of traffic" mentioned in Point 3 of the Senate Resolution has not resulted from the Interstate Commerce Commission's order in Ex Parte 74, in which the commission undertook to provide the adequate revenue for carriers required by the Transportation Act.

2. That, therefore, "the best means.... of reducing freight and passenger rates" mentioned in Point 5 should not be considered at this time as the subject of general action by either Congress or the Interstate Commerce Commission. The present rates as a whole are not excessive under existing conditions. Until operating costs are reduced or business revives sufficiently to produce the net revenue which the carriers should have under the Transportation Act no general reduction in rates can be made. From my knowledge of the causes of the business stagnation which became marked at the beginning of the present calendar year no reduction of rates that could be made now would stimulate traffic sufficiently to produce the revenue which is needed.

Thousands of Rates Already Reduced

Reductions in rates to bring about necessary readjustments are going on daily throughout the country by dealings directly between the shipper and the railroad traffic man. While many complaints and statements of a general character have been issued regarding the effect of the higher freight rates, those, however, are very insignificant in number compared with the number of adjustments made effective as a result of direct negotiations between carriers and shippers. The records of the Interstate Commerce Commission show that approximately 10,000 freight tariffs are filed each month, many covering a number of rate changes. Contained in those tariffs are many voluntary changes made by carriers filing direct with the commission and by bureaus established by carriers to publish competitive rates. Late reports from those bureaus show results of cooperation between carriers and shippers in restoring relationship and removing discriminations or inequalities and providing rates for new industries. The reports show:

Western Trunk Line Committee (Chicago).—Twelve hundred subjects considered since June, 1920, and 1,000 acted upon; over 90 per cent were reductions and nearly all affect rates under Ex Parte 74. Two hundred applications are still pending, 209 public hearings held; most of the reductions are on raw materials, such as crushed rock, gravel and other building materials, and grain, coal and lumber.

Southwestern Freight Bureau (St. Louis).—September 1, 1920, to May 1, 1921, number of subjects considered, 812; number of conferences held, 34; number of subjects considered at public conferences, 112. Subjects on the docket pending consideration which propose reductions, 491; subjects which propose advances, 48; total number of subjects for consideration, 539. Number of subjects pending presented by shippers, 363; number of subjects presented by carriers, 176. The changes are principally reductions and apply upon stone, lumber, sand and gravel, brick, cement, fresh fruits and vegetables, and various other commodities.

Pacific Freight Tariff Bureau (San Francisco).—Approximately 16,000 rate changes, of which 11,000 are reductions, balance increases, made by this bureau since Ex Parte 74 decision. Most of these are reductions caused by extending all rates in certain tariffs to apply from new points of origin. The majority of increases are in state rates awaiting approval of state commissions.

Trans-Continental Freight Bureau (Chicago).—Number of changes made through this bureau since Ex Parte 74, approximately 236, which includes 63 changes awaiting publication.

During that time 150 conferences with shippers on rate matters were held. Where there is a change in rate involving more than one tariff we have called it one change; likewise changes in number rates have been considered one change. If we should count each rate changed it would run up to many thousands. In other words, we have considered each adjustment of rates one change regardless of the number of rates involved or the number of tariffs affected.

Trunk Line Association (New York).—Have received since September 1 last, 2,472 rate proposals and have issued 2,266 recommendation advices, each representing approval of from one to several hundred changes in specific rates, all proposals being published in public docket and conferences with shippers arranged if requested. Only 20 public hearings have been called for.

Central Freight Association (Chicago).—Since August 25, 1920, have had approximately 60 conferences with shippers on rate matters; commodity rate changes comprise approximately 3,500 origin point changes and 7,500 destination point changes.

New England Freight Association (Boston).—Have considered 619 freight rate proposals and have issued recommendation advices on approximately 500. All proposals initiated by New England members have been published in public docket and trade journals, and on request of shippers 15 public hearings have been held in addition to innumerable informal conferences with individual shippers. It is impossible to make any estimate of number of rate changes involved.

Southern Freight Rate Association (Atlanta).—Since Ex Parte 74 our committee has published 1,835 rate advices authorizing changes in rates. Some of those involve change in only one rate, though frequently each rate advice involves a considerable number of changes. We hold conferences with shippers one day out of every week.

The railroads should be allowed to work out traffic problems by dealing directly with shippers or their organizations, aided where necessary by the Interstate Commerce Commission. In every case of disagreement the commission has ample authority under the Transportation Act to dispose of the question promptly. The railroad traffic man is always ready to hear from and confer with the shipper. He is just as anxious to have commodities moving as the shipper is, and can be relied upon to give proper consideration to the commercial conditions surrounding the situation.

When the commission authorized in Ex Parte 74 the present rate adjustment it requested the carriers to give consideration to any disturbances of recognized relationships which might follow and to take immediate steps to correct them. That injunction has been promptly followed wherever variations of former recognized relationships resulted from the application of the percentages prescribed, or where it appeared that the rate was prohibitory, as has just been shown by reports from freight tariff publishing bureaus; the commission, at the request of carriers, retaining jurisdiction over Ex Parte 74 for the purpose of cooperating in and approving of the adjustments agreed to between the carriers and the shippers. Many adjustments have been satisfactorily worked out between shippers and carriers, and conferences are going along in different sections of the country and good results are being obtained. Wherever it is desirable to have the informal help of the Interstate Commerce Commission in adjusting these matters, it is promptly extended.

Class Rates

The less-than-carload tonnage moving under class rates is about 4 per cent of the total freight tonnage of the country,

and yields about 13 per cent of the total freight revenue. The average haul is about 200 miles. The longer haul of less-than-carload freight is on articles of the higher class, such as drygoods, boots and shoes, and clothing. The shorter less-than-carload haul is of the heavier freight or lower grades, which moves an average distance of about 100 miles, such as canned goods, sugar, and salt.

The increase of less-than-carload rates has not disturbed the sources of distribution. The amount of the increase applied to the unit purchased by the individual cannot fairly be claimed to be an undue burden, and certainly not prohibitory. As illustrative of the small factor which rates are in the cost of staple goods to the consumer, it may be mentioned that the American Stores Company, dealing in groceries and family supplies, on gross sales of \$103,059,000, paid in 1920 in freight and express charges, \$637,000, or 6 cents on each \$10 of sales.

The less-than-carload traffic is the most expensive handled by carriers. Its car loading is light, the average throughout the country being only about 7 tons. The movement usually calls for transfers en route as well as handling at points of origin and destination, all at the expense of the carrier, and the commodities are exposed to theft and damage to a greater extent than any other traffic.

Carload traffic under carload class rates constitutes only a small part of the total carload movement, being of the high-grade manufactured articles where the rate is not an important factor in the selling price. There has been little or no complaint from the shippers using the class rates, either carload or less-than-carload.

The class rate adjustment, both carload and less-than-carload, throughout the country is in no way uniform. For example, in Trunk Line territory there are 59 different class rate scales; the scale on no one railroad is uniform, and no two railroad scales are alike. It may appear in certain sections that the long-haul rates are rather high, but many of the lower rates as they stand today are unreasonably low, particularly for short hauls, and do not bear a fair share of the transportation burdens. The Interstate Commerce Commission, since the passage of the Transportation Act, which gives it power to fix the minimum as well as the maximum rate, is correcting many of those situations and bringing about reasonable, uniform rates and in time will, I assume, correct them all.

Commodity Rates

Approximately 85 per cent of the commercial tonnage of the railroads of the United States moves under commodity rates made to fit commercial conditions on the basis of what the commodity can reasonably and fairly bear in distribution, that is to say, on the value of the service to shippers. The great staples, such as grain, lumber, fruits and vegetables, live stock, and coal, move to market almost entirely under commodity rates. These rates are the most important. While distance is an important factor, it cannot always be controlling if we are to continue the development of the country as a whole. Adjustment of commodity rates to extend sources of supply and develop markets often requires the same rate from the more distant producing point to market as is charged from a nearer source of supply. In fixing a rate on a commodity so that it may reach certain markets often consideration must be given to what that source of supply can afford to pay in the way of freight rate in excess of the rate paid by the nearer source of supply shipping to the same market. For example, the fruit and vegetable growers in California, shipping 3,000 miles to the New York market, must compete with Florida and Texas in the same market, the distance from Florida being 1,100 miles and from Texas 2,000 miles to New York. If these rates were not thus made eastern and central markets, now depending upon Florida, Texas and California, would still be obliged to draw many food products from foreign countries, as they did before the railroad rate adjustments, constructed on theory of what the traffic could bear (rather than what would be required fairly to compensate the carriers for the service), drove out of American markets foreign food products by directly contributing to the development at home of oranges, lemons, grapes, raisins, olives, nuts, dried fruit, figs and canned goods. Without this method of commodity rate adjustment the far western section of the United States, in particular, would not have been changed from an isolated grazing region into one of the most richly productive and highly populated agricultural areas on the continent.

I come now to the particular commodity rates of which there has been some complaint in the press and elsewhere, and shall speak of coal, lumber, grain, fruits and vegetables, live stock, road material, iron ore and some others. Passenger fares also will be discussed. I have already mentioned that 85 per cent of the commercial tonnage is moved under commodity rates, and of this more than three-fourths consists of comparatively few commodity groups. This is mentioned to impress upon the committee the fact that any general reduction in the rates on the

important commodities moving would mean a considerable volume of revenue taken from the carriers.

Coal

Coal and coke, in round figures, furnish 40 per cent of the commercial tonnage moved by the railroads. I have seen no direct statement that the movement has been prevented by the increased rates. In complying with the order of the commission in Ex Parte 74, carriers preserved the recognized relationships which had existed as to point of production. This was about all the shippers asked for at that time. The greater production is in the territory east of the Mississippi and north of the Ohio river. In this Eastern section is also located approximately 85 per cent of the manufacturing of this country. It also contains one-half or more of the country's population. The manufacturing plants that are the greatest consumers of fuel are usually located close to the source of supply and therefore pay the minimum fuel rate.

The movement of coal and coke for each quarter of 1920, during the last of which quarters the higher rates were in effect, was as follows:

	1st Quarter, tons	2d Quarter, tons	3d Quarter, tons	4th Quarter, tons
Bituminous	90,622,867	83,152,797	100,369,875	110,522,083
Anthracite	17,304,993	19,300,597	19,148,533	21,224,244
Coke	7,073,275	6,032,255	6,905,008	6,871,501

The freight rate does not show any unreasonable relation to the delivered price, and it cannot be shown that in any of the territories it is preventing the resumption of industrial operations or otherwise prohibiting movement. While the rates on coal as well as the price thereof are low in comparison with those on many other commodities, the percentage relation of the rate on coal to the delivered price must necessarily be greater than with respect to articles of higher value. Fluctuations in the price of bituminous coal during the past two or three years have ranged greater than the entire freight rate. The cartage charged and the charge from the pavement to the cellar in the principal cities in the eastern section are frequently as great as the average freight charge.

Lumber

The principal sources of supply of lumber are the Southern and Gulf states and the Pacific Coast states. The rates as increased by Ex Parte 74 from Pacific Coast territory to Chicago and West were recently, after several conferences between shippers and carriers, readjusted to fit competitive commercial conditions by reducing the rate to Chicago and to the Mississippi river from 80 cents per 100th to 73 cents, and to Kansas City and Omaha from 73 cents to 66½ cents, the rate to St. Paul and Minneapolis remaining unchanged at 66½ cents. From the producing territory intermediate to the Pacific Coast the recognized relationships which had been thrown out of line by the percentage increase were restored. This adjustment is reasonably satisfactory to the interested shippers, and lumber is moving under the rates to the extent the markets will take. The reports received indicate that the Pacific Coast lumber shippers are rather disappointed in the effect the reduced rate had upon the movement. It is no better now than it was before the rates were reduced. The Southern and Gulf lumber shippers advise of a slight improvement in the demand, but generally the conditions in the common markets are the same in respect to the Southern and Gulf lumber as prevail on the Pacific Coast lumber.

There was also complaint from the Pacific Coast and interior lumber manufacturers with respect to the disadvantage at which they claimed to be placed in seeking business in the eastern territory. Their complaint was largely confined to the advance of rates to markets east of the Mississippi river and north of the Ohio. The advance in rates on a percentage basis disturbed the relationships that had prevailed. Conferences between traffic representatives of interested railroads and the lumber shippers have been held looking to a satisfactory rate adjustment to their territory.

After rates from the Pacific Coast states were readjusted the Southern and Gulf states asked for similar action to territory Chicago and West, or for an adjustment that would leave their rates in cents per hundred pounds below the rates from the Pacific Coast to the extent that they were lower as a result of the Ex Parte 74 percentage increases. This request is now under consideration by the interested railroads. Several conferences have already been had with shippers, and while no conclusion has yet been reached, it is safe to say that some readjustments will be made. The Southern and Gulf states lumber shippers reach the Chicago market today at a rate of 44 cents per hundred, Mississippi river at 36 cents per hundred, Kansas City 39 cents per hundred, and Omaha 42.5 cents. No claim has been made by these southern shippers that the increased rates prohibit the movement of lumber. Their request is for a readjustment of their rates based on what they consider competitive commercial conditions.

The average revenue per ton from lumber for the United States

as a whole is at present about \$5.20. The movement in tons of forest products for each quarter of 1920, during the last of which quarters the higher rates were in effect, was as follows:

1st Quarter, tons	2d Quarter, tons	3d Quarter, tons	4th Quarter, tons
25,575,364	26,448,627	26,585,525	23,003,693

Figures for the month of April so far received indicate that the lumber business in all sections is improving.

The foregoing consideration of the facts shows that the advance in Ex Parte 74 did not prohibit the movement of lumber, and this view is confirmed by recent editorials in the American Lumberman and the Mississippi Valley Lumberman, representing the lumber interests.

Grain

Knowing that on account of the delicacy of the grain-rate adjustment the percentage advance allowed in Ex Parte 74 would disrupt some recognized relationships, the Interstate Commerce Commission directed that any such disarrangements be corrected by the carriers in the first supplements after their publication of the advance. This direction was carefully and promptly followed.

We have about completed the readjustment of the grain and grain-products rates at the different primary markets and at the Gulf and Atlantic ports for export. In this readjustment some reductions had to be made. To afford the grain and its products the widest benefit of the competition of markets, freight rates are so adjusted that in moving the grain forward from the field to the primary markets and from one market to another, or from intermediate mills to ultimate destination of the grain products, the through rate from point of origin to final destination is protected. This arrangement permits the millers at intermediate points to purchase grain, stop it at their mills, grind it and ship the product thereof, not on the sum of the rates in and the rates out, but on the through rate from point of origin of the grain to the ultimate destination of the product, provided this transaction takes place within one year following the date of the initial movement. This is a very valuable privilege in marketing grain, and although the rates were advanced on August 26, 1920, these advances have not been applied on any grain which was in transit prior to that date.

The average haul and the average charge per hundred for the country as a whole are as follows:

Country as a whole	Average haul		Average rate	
	Grain, miles	Flour, miles	Grain, per 100 lbs.	Flour, per 100 lbs.
.....	498	630	24.8 cts.	29.25 cts.

That table shows a freight rate of 15 cents per bushel on wheat. The movement in tons of grain and grain products for each quarter of 1920, during the last of which quarters the higher rates were in effect, was as follows:

1st Quarter, tons	2d Quarter, tons	3d Quarter, tons	4th Quarter, tons
18,425,211	14,284,051	19,251,813	18,043,760

The exports and imports of wheat in bushels for three years, ending with 1920, during the last quarter of 1920 the higher rates being in effect, were as follows:

	1918, Bushels	1919, Bushels	1920, Bushels
Exports	11,177,103	148,086,479	218,280,231
Imports	17,035,986	7,910,701	35,848,648

Comparing December, 1919, with December, 1920, the exports and imports of wheat were as follows:

	1919, Bushels	1920, Bushels
Exports	9,519,706	25,896,270
Imports	309,182	11,275,104

The average fluctuation weekly in the price of wheat at Chicago in 1919 and 1920 was nearly 10 cents per hundred. The monthly and yearly fluctuations in price of grains, of course, amounts to many times the increase in freight rates. All irregularities of recognized rate relation have been worked out by the carriers to the satisfaction of shippers; and the experience shows that the thing to do is to leave any remaining adjustments to be worked out by the co-operation of the carriers, the shippers, and the Interstate Commerce Commission. My consideration of the grain subject convinces me that the freight rate has not impeded the movement.

Fruct and Vegetable Shipments

Increased Under Higher Rates

The markets of the common vegetables, such as potatoes, onions and cabbage, are well established and the distribution usually follows normal and well-understood trade channels. Potatoes, onions and cabbage make up the greater proportion of the total vegetable tonnage of the country and are produced everywhere. The government market reports show all markets well stocked with these vegetables and at times over-stocked. Potatoes, onions

and cabbage carry the lower vegetable rates. This traffic shows a substantial increase in movement over last season under the higher freight rates this season.

The winter producing sections for higher class vegetables are Florida, California and Texas. These sections go to markets largely east of the Mississippi river and north of the Ohio. The extreme eastern markets of New York, Boston and Philadelphia take a very considerable part of these vegetables. California and Florida, for example, ship celery, cauliflower, asparagus and lettuce to all the large markets in the Middle-West and Eastern territory. These high-grade vegetables require the very highest class of service. The movement shows about the same average of increase as in the case of the lower class of vegetables. These vegetable shippers have complained to the carriers and the Interstate Commerce Commission that the rates applied are excessive. The commission has given some informal consideration to the complaint. The carriers also have held conference with the shippers and the matter is now under consideration for final disposition.

Florida and California citrus fruit shippers have complained to the carriers and the Interstate Commerce Commission that prices received at destinations are not equal to cost of production and cost of transportation combined. The interested carriers have had several conferences with the citrus fruit shippers in regard to the volume of the rate now charged, but as yet no definite action has been taken. The commission, however, has lately instituted a very far-reaching informal investigation of the conditions in the citrus fruit, deciduous fruit, and vegetable industry of the entire Pacific Coast, which is welcomed by the carriers and which will elicit facts upon which final disposition will be made. The commission has already given informal consideration to the rates on fruits and vegetables out of Texas and Florida.

The following, taken from the records of the United States Bureau of Markets, shows the movement of fruits and vegetables from the three winter producing sections (California, Florida, and Texas), for the months October, 1920, to March, 1921, inclusive, as compared with the same period 1919-1920:

	California		Florida		Texas	
	1920 1921	1919 1920	1920 1921	1919 1920	1920 1921	1919 1920
Number of carloads	1920 1921	1919 1920	1920 1921	1919 1920	1920 1921	1919 1920
Lemons	2,700	2,429	.....	.....	.....	.....
Oranges and grapefruits	12,269	12,650	22,364	18,195	.....	.....
Deciduous fruits	11,896	10,252	.....	.....	.....	.....
Vegetables	22,190	19,630	9,020	9,954	4,029	3,815
Total	49,045	44,961	31,384	28,149	4,029	3,815

All of the foregoing movement in 1920-1921 was under the advanced rates.

Practically all of the apples from the northwestern states have been marketed, with the exception of some small apples which cannot find a ready sale in the East. While it is true that the freight rate has considerably advanced, yet the advance in freight rates has not kept pace with the increase in the farm values of the apples, according to government reports. Although the crop in the West in 1920 was much smaller than in 1919, the total production of commercial apples of the United States in 1920 was probably the largest ever known, or 36,272,000 barrels, compared with 26,223,000 barrels in 1919. As most of the Western apples must find their markets in the East, largely in the states where there is the greatest local production of apples, it will be seen that the Western apples have been able to find a ready market at good prices, notwithstanding the immense crop in the territory where they are marketed and the advance in freight rate.

The movement in tons of fresh fruits and vegetables for each quarter of 1920, during the last of which quarters the higher rates were in effect, was as follows:

1st Quarter, tons	2d Quarter, tons	3d Quarter, tons	4th Quarter, tons
2,301,651	2,248,547	3,553,533	4,902,455

Sand, Gravel and Crushed Rock

The movement of these commodities may properly be classed as local, or they are hauled but short distances and at very low rates, comparatively, and are produced everywhere. In the later years, and since drayage charges have increased so much, the cost of distribution in the city of destination is often greater than the freight charge for the main-line haul. The hauls are usually over a single line. The general conditions surrounding the production and distribution compel minimum rates. There are two terminal services to each shipment, and often one is in a large city where the switching is expensive and must be absorbed out of the main-line rate.

Modifications in Ex Parte 74 rates are being made daily throughout the country for one reason or another, the shipper dealing directly with the carrier. While we hear some complaints of excessive rates, when you consider that the annual movement of these commodities is approximately 100 million tons, scattered all over the country, the complaints we hear are insignificant com-

pared to the tonnage moving, and there must be thousands of transactions daily throughout the country where these commodities are involved. As these commodities cannot be moved at the class rates, a commodity rate must be provided for every carload movement, and new commodity rates are therefore, as a result of negotiations between shipper and carrier, being constantly published.

A conference between carriers and shippers of sand, gravel and crushed rock, or road material, will be held in Washington on June 2 at the request of the shippers, that request being the first coming to the carriers from those shippers for any general modification of the existing rate adjustment.

The average haul in the different sections and the average charge are as follows:

	Average haul	Average rate
Eastern District.....	65 miles	73 cents per ton
Southern District.....	68 miles	90 cents per ton
Western District.....	60 miles	74 cents per ton

The number of tons of clay, sand, gravel and crushed rock hauled in each quarter of 1920, during the last of which quarters the advanced rates were in effect, were as follows:

1st Quarter, tons	2d Quarter, tons	3d Quarter, tons	4th Quarter, tons
15,766,002	25,967,455	30,548,043	26,232,054

The drayage charge at Washington for hauling sand, gravel and crushed rock within the city limits is 50 cents per ton for the first mile or less and 10 cents per ton for each additional quarter of a mile, the drayage charge for a mile and a half being as high as the freight rate for the average rail haul in the eastern district.

Cement, Brick and Plaster

These commodities move in large volume and generally for comparatively short distances. Manufacturing plants are scattered throughout the whole country; many are close to large consuming markets. There is a substantial movement now and has been right along. The movement in tons of cement, brick, lime and plaster for each quarter of 1920, during the last of which quarters the higher rates were in effect, was as follows:

1st Quarter, tons	2d Quarter, tons	3d Quarter, tons	4th Quarter, tons
6,517,819	9,119,590	10,843,710	8,242,843

Livestock

Shippers have complained about the rates, particularly those on the long hauls on range cattle from the southwestern ranges to the northwest pastures. At a recent conference between the Interstate Commerce Commission, livestock shippers, and interested carriers an understanding was reached to modify the rates upon these range cattle, and the agreement has been carried out and the reduced rates are now in effect. It was an emergency proposition, but by the co-operation of the Interstate Commerce Commission the rates were quickly made effective.

The livestock movement in tons for each quarter of 1920, during the last of which quarters the higher rates were in effect was as follows:

CATTLE AND CALVES, HOGS, SHEEP AND GOATS				
1st Quarter, tons	2d Quarter, tons	3d Quarter, tons	4th Quarter, tons	
4,189,653	3,859,101	3,906,899	4,612,508	

Reduction in Building Operations

Due to Other Causes Than Rates

The conditions in the building industry throughout the country are practically uniform. In the cities on the Pacific Coast and throughout the west, south, and east conditions appear to be about the same. The general report is that a comparatively small amount of building is being done. At San Francisco, Seattle and Portland, where lumber is at the door, conditions are the same as at Kansas City, Omaha, Chicago or Cleveland. For example, Chicago has plants within its city limits which produce all kinds of structural iron and steel, likewise cement, brick, lime, sand, gravel and crushed rock, and building conditions are no different in Chicago than in the other places mentioned.

As an illustration of the relation of freight rates to building enterprises a careful study recently made of the materials going into a typical brick house of six rooms and bath in Philadelphia with the freight charges from the usual sources of supply of materials shows that the freight charges amount to approximately \$70 on a house costing \$8,300 to build in 1920.

In St. Paul the estimated freight charge on all material entering into the construction of a frame dwelling-house costing \$5,000 or \$6,000 would aggregate about \$80. In making this estimate the points of shipment used are those where such materials are produced in large volume, and where the selling price is based.

Road-Making Material

Complaint has been made in a general way that the present freight rates are prohibiting road construction. The costs of a

standard concrete highway, in accordance with the published requirements of the Minnesota Highway Department, and according to figures published by the Northwestern Association of General Contractors, taking as an example the Itasca County, Minnesota, Road, are as follows:

Grading, average cost per mile.....	\$16,000.00
Freight on grading equipment, and from job.....	2.4%
Freight on culvert pipe, bridge material, etc.....	1.5%
Total.....	3.9%
Concrete pavement to be put in later will cost, per mile.....	37,000.00
Freight charges on pavement material, etc.....	1.9%
Total cost of road per mile.....	53,000.00
Total freight cost.....	2.5%
	1,327.00

The same published report shows that the cost of laying one course concrete pavement, using railway track for haulage, is \$3.61 per square yard, of which materials represent \$1.73 per square yard or 47.8 per cent, labor 63 cents or 17.5 per cent, depreciation 8.6 per cent, contingencies 5.6 per cent, interest 3.6 per cent, taxes 0.2 per cent, general expense 2.9 per cent, storage 1.5 per cent, insurance 0.5 per cent, bond 1.7 per cent, freight 1.9 per cent, camp site, etc., .08 per cent, repairs 5.3 per cent, fuel and oil 2.1 per cent.

These bids are made on 21 miles of pavement, no part of which will be farther than 3 1/2 miles from the railway site. The source of supply of material, except steel, shall be at such distance from the unloading plant that a 5-cent per hundred freight rate will apply on sand and rock.

To take an example in the East, the figures given by the Highway Commission of Pennsylvania for roads in that state are as follows:

Total cost of reinforced concrete road with hill-side brick on grades, built with light grading and local materials, \$58,000 per mile, made up of the following items:

Freight charges.....	\$6,000 per mile, or 10 per cent
Materials.....	13,000 per mile, or 26 per cent
Grading.....	9,000 per mile, or 15 per cent
Labor.....	13,500 per mile, or 24 per cent
Profit, insurance, etc., etc.....	14,500 per mile, or 25 per cent

It can readily be seen that the freight rate is not an undue proportion of the total cost of the road. These roads do not always pay freight charges. Often the materials, except cement, are close to the work and hauled by trucks. When the railroad is used the volume is usually large and is moved by rail close to the work. The very conditions surrounding the operation compel the minimum rates on most of the materials.

Iron Ore

The rates on iron ore from the heaviest shipping ranges, the Mesabi, Vermilion and Cuyuna, in Minnesota and Wisconsin and Michigan, were not advanced August 26, 1920, under Ex Parte 74, to the upper lake ports, but they did receive an advance in 1918 under General Order 28 of the Railroad Administration.

The rates from Wisconsin and Michigan ranges were advanced this spring and there were also advances under Ex Parte 74 from the Lake Erie ports to the furnaces. Ore is sold delivered at Lake Erie ports, and the statement showing the price at Lake Erie of Bessemer and non-Bessemer ores for the years 1893 to 1920 inclusive, with the rail rates to Lake Superior and the vessel rates from Lake Superior to Lake Erie indicate that, after deducting the present rail rate to Lake Superior and the lake rate to Lake Erie, the producer receives a much higher net price for his ore than in former years.

The shipments of ore, of course, are greatly affected by the prevailing industrial conditions, especially with the steel production. For several years past shipments were as follows, in tons:

STATEMENT OF IRON ORE IN TONS OF 2,240 LBS. SHIPPED FROM RANGES IN MINNESOTA, WISCONSIN AND MICHIGAN (UPPER PENNSYLVANIA) DURING CALENDAR YEARS 1916 TO 1920, INCLUSIVE

Range	1916	1917	1918	1919	1920
Marquette.....	5,396,007	4,874,150	4,354,207	2,992,212	4,608,323
Menominee.....	6,464,363	6,045,750	6,378,698	4,444,868	6,562,106
Gogebic.....	8,489,658	7,981,684	7,936,701	6,230,839	8,763,332
Vermilion.....	1,947,200	1,530,692	1,192,908	929,049	1,007,435
Mesabi.....	42,525,612	41,445,211	40,396,711	31,997,699	37,149,277
Miscellaneous.....	219,381	136,632	98,037	159,990	129,571
Cuyuna.....	1,716,818	2,422,884	2,478,800	1,859,865	2,191,528
Total all Ranges.....	66,658,466	64,437,003	62,836,082	48,812,532	60,411,572

The movement, in tons, of iron ore and other ores for the entire United States for each of the quarters of 1920, during the last quarter of which the higher rates were in effect, was as follows:

	1st Quarter	2d Quarter	3d Quarter	4th Quarter
Iron ore.....	3,215,109	24,183,287	37,487,357	20,605,039
Other ores.....	5,219,500	6,355,047	6,283,422	3,843,791
Total.....	8,434,609	30,538,334	43,770,779	24,448,830
Total for year.....				107,192,552

Those figures show that of the total iron ore movement over 60 per cent is produced in the northwest.

The foregoing shows that freight rates had no effect upon the movement of iron ore. At the present time there is a very light

movement of ore, due to the very large quantity moved last year, a large portion of which is still on the docks at the Lake Erie ports, mainly caused by the decline in steel production, a very small proportion of the furnaces being in operation at this time.

Passenger Travel Not Seriously Affected

While there has been considerable complaint about the increased passenger fares, the increase has not seriously affected passenger travel. Undoubtedly the increased fares have caused some letup in travel, but a reduction of the fares at this time would not increase the travel sufficiently to offset what would be lost by the reduction. The falling off has been as great in the short hauls as in the longer hauls. The present policy of the railroads to make special fares for excursions and to summer and winter tourist resorts is satisfactory, both to the public and the railroads.

The number of passengers carried for the last four months of 1920, when the higher fares were in effect, in comparison with the last four months of 1919, was as follows:

Last four months, 1919.....	398,576,087 passengers
Last four months, 1920.....	399,435,875 passengers

As showing the trend of passenger business the following earnings are given for the first two months of 1921 in comparison with the same months of 1920:

	January	February
1920.....	\$91,874,146	\$82,571,063
1921.....	105,295,673	88,492,533

There has been considerable objection raised to the so-called Pullman surcharge, principally because of the fact that it is a new application in this country of a theory of passenger fare-making which prevails in other countries and is applied on steamships as well as railroads. The passenger earnings of a Pullman car are practically limited to 32 passenger fares, while a coach costing one-half the price of a Pullman and weighing a third less will accommodate from 70 to 80 persons. In other words, the carrier must haul 2½ Pullman cars to accommodate the load of a passenger coach. The surcharge of 50 per cent of the cost of the Pullman ticket is a comparatively small charge for the additional space occupied and the comfort given to the passenger, and it has not lessened to any considerable extent passenger travel.

Panama Canal Traffic

Domestic freight tonnage moving between Atlantic and Pacific ports through the Panama Canal in vessels controlled by the United States Shipping Board and independent concerns is increasing rapidly. The rates have been going down steadily for the past three or four months, and there is very active and rather severe competition between the independent carriers and the vessels operated by the United States Shipping Board. This traffic, in both directions, is largely taken away from the all-rail lines. For many years past (except during the war) there has been active competition for this traffic between the all-rail lines and the steamship lines operating between the Atlantic and Pacific ports. The sailings now are entirely by the Panama Canal, which avoids transfer enroute and gives the shortest distance; therefore the water service today is more valuable than ever before. Competition between water carriers themselves has already brought rates down to an unremunerative basis, and unless something be done to stabilize the water rates it is certain that competition will force them still lower and make an unprofitable and consequently less dependable water service. And such competition will be unfair to the rail lines.

The rail lines, especially in the West, have been a necessity for the development of the country. The water carriers have not developed any considerable traffic between the Atlantic and Pacific ports in their years of operation. The business secured in the past and the traffic they are securing today is what has been developed by the all-rail lines. Necessarily, we expect this water service to continue and to take a share of the traffic adjacent to the coast, especially of the heavier commodities, that move more readily by water; but it would seem in the public interest, as well as in the interest of the competing rail lines, that the water rates be stabilized and that the Interstate Commerce Commission be given jurisdiction over them.

We also feel that for the use of the Panama Canal such charges should be made as would pay the interest on the investment and the expenses of operation. While it is true that the principal reason for the construction of the canal was for war or defensive purposes, and it was a necessity which we all recognize for the protection of our country, its use by commercial vessels, especially in domestic traffic between the two coasts, and in competition with the transcontinental lines, should pay a fair proportion of the expense of maintenance and interest on the investment in this waterway. The rail lines pay millions of dollars in taxes on their right-of-way, and it would hardly be considered fair to permit the water lines competing with them to make use of this costly right-of-way by water without paying any portion of the cost of it.

While the manufacturer on the Atlantic and Pacific coasts should be given every benefit of his water location, his advantage should not be increased by still further reducing his cost of distribution at the expense of the interior manufacturer, who will have to pay his share of taxation necessary in case the canal is not made self-supporting.

The water lines should not be restricted as to rate competition between ports in this country and foreign countries where they are in active competition with the vessels of foreign nations. But between ports of the United States, where they are privileged to handle business without competition of foreign carriers, there is no logical reason why their rates should not be under the jurisdiction of the Interstate Commerce Commission, as are those of the rail carriers with whom they compete. Reasonable rates for service on the water would then be prescribed by the commission. Such rates would yield a profit and support a regular, dependable service. This would be far preferable to spasmodic reductions in the water rates, which would result in embarrassment to competing water and rail carriers and make the service far less reliable and less satisfactory, and which would allow tramp steamers to come in for a brief period and take away desirable water business and more or less demoralize the rates and (as has been the practice in the past) leave the coast-to-coast business when they found better paying tonnage elsewhere.

Depressed Business and Railroad Rates

The present depression in business, while distressing, is no different from depressions in the past. We had one in a smaller degree in 1907. There was a great depression in 1893. None of those depressions were preceded by any general advance of freight rates and passenger fares. We had been warned to expect the present period of liquidation and the consequent depression as an aftermath of the World War. In 1914, just prior to the commencement of the war, there was a depression in business in this country of several months' duration, which had become very severe, especially in the industrial sections in the East, and promised to be of long duration and great severity, but it was cut short and turned into a period of prosperity by the heavy purchases from this country by France, England, Italy and the other allies. A very severe depression followed the armistice in November, 1918, during which the tonnage of the carriers fell off considerably. It lasted until the following June.

I feel that what I have presented sustains the claims with which I started—that is, that the advance of rates authorized by the Interstate Commerce Commission in Ex Parte 74 did not operate seriously to impede the traffic of the country, referred to in Point 3 of the Senate Resolution, and that therefore no occasion exists for any general action, as indicated in Point 5, toward reducing rates by either the Congress or the Commission.

Indeed, as before mentioned, it is not practicable to make any general reduction in rates until the railroads of the country have been put in a going condition, either by a reduction of expenses, or by an increase of tonnage, or by both.

Senator Kellogg asked if Pacific Coast lumber companies had not been making arrangements to ship their lumber to Eastern points by the Panama Canal. Mr. Chambers said they started to make such arrangements before the rates were increased and that they were trying to do more business in the Eastern territory. There is a proposition before the railroads now to reduce the rail rate to compete with the water rates to points inland from the Seaboard. He said the railroads did not expect to meet the water rates at Baltimore and New York, but had expected to adjust the rates so that a certain proportion of the lumber going into trunk line territory will move by railroad. This led to a lengthy discussion of the theory of making the water competitive rates, during which Mr. Chambers pointed out that in some cases the railroads can afford to make very low rates to get loading for cars that move one way empty. Senator Cummins remarked that his statements were rather contrary to the general understanding that the markets have not been supplied with fruits and vegetables during the period of higher rates. Mr. Chambers said the markets had been fully supplied ever since the season opened.

"It may be," said Senator Cummins, "that the larger supply that is indicated by the movement will account for the low prices received by the producers. I wanted to call attention to that because there is a very general misapprehension with regard to the moving of these fruits and vegetables during the period of high freight rates."

Mr. Chambers said that the difficulties of fruit and vege-

table producers lie largely in marketing conditions, but that the shippers say that in many cases they are not receiving in the markets enough to pay the actual cost of production plus the freight and that if this continues the amount of planting for the future will be reduced. The railroads do not want the acreage to be reduced and if the situation is as bad as the producers say something may be done about it, but the fruit and vegetable shippers must bear their reasonable share of the effects of the readjustment period and if they are getting cost the rates ought not to be reduced to a point that will transfer the loss to the railroads. He said he had known of similar cases of the same kind for many years that had very little to do with the freight rates. Sen-

ator Stanley said that if the railroads were not making money out of the rates from Florida to the Eastern markets, they must be losing still more money on the rates on the longer haul from the Pacific Coast and he thought the committee ought to investigate it. Senator Kellogg remarked that the Interstate Commerce Commission has been investigating it for 20 years. Mr. Chambers added that the present rates are based on the Interstate Commerce Commission's investigation. Referring to the recent emergency reduction in the rates on stocker and feeder cattle from the Southwestern ranges, Mr. Chambers read a telegram from one of his representatives in Texas pointing out that movement of cattle was very little increased by the reduction.

Results on the Chicago, Milwaukee & St. Paul

Statement by H. E. Byram, President, C. M. & St. P.

H. E. Byram, president of the Chicago, Milwaukee & St. Paul, appeared before the Committee on May 26 and presented a statement confined to the situation in the western and northwestern part of the country as reflected in the operations of the Chicago, Milwaukee & St. Paul. He said in part:

Unusual efforts have been made since federal control terminated to curtail expenses in every way possible, and it will be the purpose of this statement to illustrate in various ways that these efforts have been productive of results.

It is regretted that the attitude of some of those who speak for railroad employees of the country does not tend to promote good service. For some time past efforts have apparently been made to develop a belief on the part of the public as well as railroad employees that the responsible officers of the railroads were not operating them efficiently and economically and it is greatly to the credit of the rank and file of employees of the railroads of the country that they have not been misled by these false doctrines, as is shown by the general willingness to co-operate with the management of the railroads in bringing about the necessary efficiency and economy in their operation which prevails at the present time, as has been repeatedly stated by the railroad executives at this hearing.

I shall endeavor to show that the charges frequently and recently made by those critics, that the railroad managers are not alert in endeavoring to prevent wasteful practice and install economical methods, are not correct.

As a part of this testimony I submit for the record a statement showing various statistics concerning the operation of the Chicago, Milwaukee and St. Paul Railway for the years 1916 to 1920 inclusive. The total operating expenses show an increase in 1920 over 1916 of \$90,932,069.93, while the net operating revenue decreased from \$36,844,637.81 to \$3,461,613.17. The total payroll in 1920 over 1916 increased \$61,305,417.43. The average number of employees increased in 1920 over 1916 approximately 11,000 or 21.56 per cent. The per cent of payroll to total operating revenue increased from 44.49 in 1916 to 65.72 in 1920.

The total freight ton miles increased in 1920 over 1916 only 3.96 per cent. These figures indicate that although approximately the same freight ton miles were moved in both of these years 11,000 more men were required to perform the service and it cost approximately \$60,000,000 more on the payroll to pay them.

The items of labor and fuel constitute 80.044 per cent of the cost of operating the railroad, these two items absorbing approximately \$135,000,000 of the total of \$164,000,000 operating expenses for the year 1920, and the next part of the exhibit is designed to show the enormous increase in the cost of fuel, which increased from \$11,797,880.72 in 1916 to \$23,796,922.14, although approximately 250,000 tons less were used in 1920. If we had been able to buy the coal used in 1920 at the price of coal in 1916 we would have saved \$11,999,031.42.

The balance of the figures are designed to show that the usual measures of efficiency, viz., increased train load, increased carload, decreased locomotive miles, revenue ton miles per ton of fuel used, etc., were present in 1920 but by reason of the increased cost of labor and material and the failure to increase freight and passenger rates as operating costs increased, defeated the efforts of the operating department, and instead of producing increased net revenue, which efficient operation ought to produce, the opposite result developed, and, as shown above, the net operating revenue actually decreased from \$36,844,637 in 1916 to \$3,461,613 in 1920.

Taking up the details, we find that the loaded car miles de-

creased 83,322,054 miles, while the empty car miles increased 4,101,925 miles; but the average number of tons in each loaded car per mile increased from 20.667 in 1916 to 25.485 in 1920, or 23.31 per cent, an item of efficiency that should have produced net revenue. The total passenger locomotive miles decreased from 18,186,754 in 1916 to 16,897,163 in 1920, notwithstanding the fact that the total passengers moved one mile shows an increase of 128,527,180. The total freight locomotive miles shows a decrease of 4,105,857 in 1920 over 1916. This reduction in freight locomotive miles is reflected in the increase in train load from 503.23 in 1916 to 620.04 in 1920, or 23.28 per cent.

I believe these figures show conclusively that the measures of efficiency which usually are applied to the operation of railroads and which normally tend to produce net operating revenue, failed of their usual result because of conditions which were beyond the control of the operating staff because of the abnormally increased cost and inadequate addition to the revenue by means of increased freight and passenger rates.

Co-operation Between the Managements of Railroads and Their Employees for Producing Efficiency

The following quotation was taken from the introduction of the testimony of W. Jett Lauck before the United States Railroad Labor Board:

No far reaching improvements in railroad efficiency are possible without close co-operation between the managements of the railroads and their employees. Without the good will of their men, without a high level of morale and enthusiasm devoted to a common end, the improvements of service and the reduction of cost cannot be achieved. If the two great elements of railroad operation, management and workers, are to be forever at loggerheads, each pulling against the other, each mistrusting and condemning the other, each trying to wring concessions which the other is reluctant to grant, the outlook for eliminating the many wastes revealed in the foregoing pages is dark indeed.

We agree with the principle advocated because the officers and employees of the Chicago, Milwaukee & St. Paul for several years, and particularly of late, have been carrying out the principle of co-operation and study, mutually, in finding and practicing economies and improved practices. Committees have been formed of officers and employees on every division, and at the larger stations and terminals, with regular dates for meeting, usually monthly, to study the details of operation in each particular locality and the situation as a whole for the purpose of eliminating waste and generally promoting efficiency, and it is a pleasure to state that the various campaigns inaugurated to save fuel and supplies and to avoid wasteful practices have been promptly, intelligently and earnestly supported by the employees generally in all classes of service, indicating that the officers and employees of this company are having no difficulty in working out a program in co-operation and harmony.

During the summer of 1920, while business was good and cars in demand, a drive to increase the mileage or freight cars brought very satisfactory results. The miles per day which had been running about 22 were brought up to about 35 in September and October when the demands were heaviest. Since then the great slump in business has made it impracticable to continue this mileage as cars have been plentiful.

Notwithstanding that the number of locomotives has not materially been increased the total capacity of all locomotives has steadily and substantially increased. This is due to the fact that the locomotives that were retired were obsolete and of small capacity.

Freight cars are constantly being retired on account of decay and obsolescence. The cars retired usually are of small capacity

and are replaced with modern steel-frame cars of large capacity. Although 2427 more freight cars were retired than replaced the total capacity of all cars has increased and the average capacity per car has increased from 35.17 to 39.10 tons.

In addition to the new freight cars purchased more than 5,000 cars were overhauled during 1919 and 1920 and improved draft members, roofs, ends, etc., were applied at an average expense of approximately \$1,000.00 per car, or a total of \$5,000,000. This was done to bring this equipment up to traffic requirements, reduce the maintenance cost, and eliminate, so far as possible, the days lost on repair tracks, and loss and damage to loading.

Even with so large an expense for this heavy work the benefits were immediate as the 1920 repair charges were less than those for 1919, reflecting the improved condition of the freight equipment, caused by retiring old cars of small capacity and replacing them with new cars of greater capacity and the rebuilding and strengthening of cars suitable for such improvements.

Financial Results

I have gone over the various tests of efficiency which are usually applied to management of railroads except one, and have shown, by the operations of this railroad, that it meets successfully every one of these tests except the one I have so far omitted. The omitted test is the test of net financial results. It is obvious from our reports and from the foregoing statement that the net financial results of our operations have been most disappointing. As the operations of the road have measured up to the usual tests of efficiency, it is a great disappointment to find that this efficiency of management has not been reflected in satisfactory financial results, and the facts, I submit, fully justify us in seeking the cause in forces beyond our control. It is not far to seek. We find it in the expense account, which is, to a very large extent, determined by the government, and not by the company, and to a substantial extent also by economic conditions fixing the prices of materials and supplies, and thus also beyond the control of the company.

The railroad problem is, in my opinion, comparatively simple, and its solution is not difficult or at least would not be if it were possible to apply ordinary business methods to its solution. But, unlike other businesses, a railroad cannot shut up shop when business is bad, and there are certain fixed expenditures for maintenance and operation which cannot be reduced to correspond with the decreased traffic, as well as various other needs of the public which must be served whether at a loss or not. At the present time it is costing the railroads more to produce transportation than they can sell it for. Therefore, we must either increase the selling price or reduce the cost. It is obviously impossible at this time to increase the selling price of transportation above the present general level; therefore, we must reduce the cost. There are two ways of doing this, one is to increase efficiency and the other is to reduce expenses.

It has been shown by various statistics presented here that while there is always room for improvement the railroads of this country are functioning effectively and efficiently. Immense opportunity is available for further increasing economy of operation by large investments in reducing grades, double track, improving and increasing terminal facilities, additional cars and locomotives, modernizing and improving existing equipment, installation of automatic signals and safety devices, enlarging shops and engine houses, purchase of new and improved shop tools and machinery, and in many other ways, all of which require the investment of immense sums of new capital, which cannot be obtained unless the net earnings of the railroads are such as to satisfy investors that such investments in railroad securities would be safe and productive.

At the present time, because of the disappearing net earnings of the railroads generally, money for improvements cannot be borrowed except at rates considerably above the rate permitted by the Transportation Act to be earned on the value of the improvement.

Therefore, it would seem that the need of the immediate situation requires a reduction in operating costs, and that fuel and labor, which absorb 80 per cent of the total operating costs, should bear the larger portion of the reduction. Fuel and other supplies already are coming down and the United States Railroad Labor

Board has announced that in the near future it will order an adjustment of wages downward. These two features of the situation are encouraging and with the return of the normal volume of traffic of the country the financial condition of the railroads should be materially improved, depending largely upon the extent of reduction made by the Labor Board in the war-time wages of railroad employees.

Freight Rates

Much has been said about reducing freight rates recently and the prevailing impression seems to be that they are generally too high, but when it is considered that the average gross earnings of the railroads of the United States as a whole for hauling a ton of freight one mile since September, 1920, when the last raise in freight rates took effect, has been only 1.217 cents per ton per mile, it will be seen that freight transportation probably is the cheapest commodity in the country, notwithstanding the large shrinkage which has taken place in other commodities. But the vast volume of traffic, the large units in which it is carried and the immense distances it is transported in this great country have caused many of our citizens to lose sight of the astonishingly low price which the railroads receive for their freight service when reduced to the unit of moving a ton of freight one mile instead of the usual figures of billions of ton miles and millions of dollars.

Since the earnings of the railroads of the country on the present rate basis are inadequate to meet their requirements it is obvious that no general reduction in rates can be considered until the cost of operation can be reduced sufficiently to assure the railroads at least the net return authorized by the Transportation Act.

Mr. Byram said that of 100,000 cars bought by the Railroad Administration the Chicago, Milwaukee & St. Paul took 4,000, agreeing to pay a maximum of \$3,050 apiece, but under the sliding scale contract under which the cars were purchased it looks as though they were going to cost between \$2,700 and \$2,800 apiece. In reply to a question as to the price at the present time, Mr. Byram said there are no accurate figures because nobody is buying any cars now, but he should think it ought to be possible to buy these cars at somewhere around \$2,000 apiece now.

Mr. Byram said that his road has not been earning operating expenses and taxes since the first of January and is about \$4,000,000 behind, while the volume of business is about 50 per cent less than that of a year ago. A large part of this, he said, is due to the cessation of the buying of lumber and partly because the copper activities are almost at a standstill. Senator Kellogg asked whether the building of the western extension was an advantage or a disadvantage. Mr. Byram said he thought it had been an advantage and that it has not been any disadvantage at least. One of the first things he did when he came to the property in 1917 was to take up that question, and it seemed to him the general impression is wrong. For the year 1917, he said, the western extension was producing 25 per cent of the gross earnings and 40 per cent of the net earnings. Mr. Byram said that arrangements had been made for taking care of the immediate future as to interest and taxes, but, of course, it would be necessary to have more net revenues before long. Asked whether a decrease in wages of 15 to 20 per cent would place his road on an earning basis, Mr. Byram said the wage award of last year added to the expenses of his road approximately \$20,000,000 a year, whereas the interest on the bonds is about \$17,000,000. If the wage decrease is less than 15 per cent, he said, it will be a little more than half enough, although the actual result would depend on the rates and the volume of business.

Urges Prompt Payment of Federal Control Accounts

Statement by Samuel Rea, President, Pennsylvania Railroad

The government could materially assist the railroads in their present difficult situation, Samuel Rea, president of the Pennsylvania Railroad, told the Senate committee, by completing at once payments still due the roads from the federal control period. If this were done and the roads were allowed

to issue 15 year obligations for the amounts spent by the government for permanent improvements, as would have been done if the roads had themselves spent the money, their present position would be greatly improved, Mr. Rea said. An abstract of his statement follows:

I feel that this inquiry would not be complete without drawing your attention to some important questions which directly affect the present condition of the railroads and their immediate outlook. Your committee very properly examined the results of recent years, for it is clear that if the net returns of the carriers had been ample during the past decade they would now be able to go through the existing depression without serious detriment to their own credit and to the country.

The returns earned from operations for the years 1918 to 1920 cannot be taken as indicative, for the reason that the traffic rates were not adjusted to meet the current costs. In those years the railroad companies had the benefit of the rental under the federal control contract, and the guaranty under the transportation act, provided they realize, such rental and guaranty by actual payment. So far there are serious unsettled questions as to actual settlements for both periods. Unless a fair interpretation is given to the federal control and transportation acts, and the federal control contract, and of the conditions under which the railroads were taken over by the President, the amounts of federal control and guaranty period compensation will prove theories and not actualities, because they will not be paid to the railroads, and the cost either in whole or in part of restoring the properties and the disorganized organizations will be placed on the corporations, which would be an injustice and would endanger their financial condition.

Present General Condition of the Railroads

In many particulars the present position of the railroad companies and their lack of traffic, is due to world-wide conditions, which prevail also in the other industries as well as in the railroad business. But the difference between these industries and the railroads in meeting those conditions is that the industries had the advantage of sharing in the high prices and profits of the war period, and at present the industries have the power to fix their prices and wages, and to shut down their plant if the business, or profits, do not warrant their operation. The railroads, however, were in the war period restricted to the returns of the test period, and even under the transportation act are not allowed to retain the profits made under reasonable rates if in excess of 6 per cent. Although the railroads were granted higher rates effective August 20, 1920, yet since that date they have proven to be insufficient to cover their costs, and yield a fair return. Though many railroads are facing financial difficulties, they cannot promptly reduce wages nor change the wasteful working conditions, to the level of the going wages and working conditions of the industries, through the territory they serve. That must be done by the Labor Board. By federal law the rates were to be fixed to produce a fair return, yet the railroads are apparently unable to insist upon compliance with that law so long as supply and demand restrict production and consumption, and reduce the volume of traffic.

The railroads, therefore, must get the requisite financial results to allow them to exist, by postponing all capital expenditures, by curtailing employment, by shutting down all possible activities on the road and in the shops and offices, by stopping the purchase and use of supplies, by postponing for the present, even though they will cost more later, all maintenance or replacement expenditures except those requisite for safety.

The return earned by all the railroads of the country for the six months ended February 28, 1921, was only at the rate of about 2½ per cent. per annum, on the value of the property devoted to public use, against a mandatory minimum return of 5½ per cent., but the transportation act alone can scarcely be blamed for the deficiencies of return which reflect a world-wide business depression—for one-half of this period very severe. It will be found by experience that, compared with war conditions, when we supplied all the world, our production is materially in excess of average consumption, so that production, price and consumption all need adjustment, and the railroads are bearing part of the costly loss of traffic incidental to these conditions.

The railroads are not earning fixed charges and fully maintaining their properties. They are short of working capital and are still in a business depression—one of the worst in their experience. While we hope that the bottom has been reached, I would point out that there can be no resumption of railroad prosperity until there has been an increase in the movement of coal, coke, iron, steel and other building construction materials and heavy products. The mines, industries and farms of the country must rise and fall together; one cannot be made prosperous or continue prosperous at the expense of another. Manifestly in view of these conditions as to operating expenses, and the necessity to pay taxes, fixed charges and sustain the credit of the railroads, it became an imperative necessity to reduce labor costs and enforce the serious retrenchments to which I have referred.

Therefore, the real railroad problem at present is to put the carriers in a position to meet their obligations, and support their investment during the period of depression. To save many of them from bankruptcy, a prompt and adequate reduction of

wages is essential, as well as the abolition of the wasteful national agreements, and the substitution thereof of agreements with the employees that will promote greater efficiency and provide reasonable working conditions, so that the wages and working conditions will correspond generally to present conditions. It is not a question of any controversy with employees or labor unions, and it originates from no desire to see that railroad men are not paid adequate wages, because that would be hurtful to the railroad business and cause the better men to go into other industries, but it is clearly a condition where the dollars earned are not sufficient to pay the wages, maintain the property, and also enable the companies to meet their obligations.

The property investment return for the calendar year 1916 enabled the railroads to exist and meet their obligations. It showed a return of 6.17 per cent. and a large volume of traffic was carried with great efficiency and economy. In that year out of every dollar of revenue earned 40.8 cents were paid to labor, but in 1920 59.9 cents out of every dollar were so paid. In 1916, after paying for materials, taxes and rents for equipment and joint facilities, 28.9 cents were left out of every dollar earned to pay fixed charges and a return upon the investment, but in 1920 only one cent was left. Therefore the fixed compensation for the first eight months of the year saved most of the roads from bankruptcy. Taking the last quarter of 1920, when rates as well as wages had been adjusted, it required 55.1 cents out of every dollar of revenue to meet the payrolls. The total payroll compensation rose from \$1,468,576,000 in 1916 to \$3,698,216,000 in 1920.

General Rate Reductions Impossible

Under the conditions outlined it is clear that no horizontal or general reduction in rates can be granted, until such time as the net railway operating income of the railroads shows a very substantial improvement over the results now obtaining, which are at present insufficient to meet their fixed charges and usual dividends, and also until the railroads have restored any inadequacy of maintenance. Further, until the foregoing economies are effected, a general rate reduction would not be in the public interest, as it would force the railroads to produce and sell transportation for less than cost, and it is extremely doubtful if it would stimulate production, or increase purchases, of goods by the public. In addition, so long as the railroads cannot earn a fair return, and are much below the 5½ per cent. return, and have no cash surplus from the previous years, there must be a deficiency in transportation facilities, equipment and service, and the cost of that deficiency to the public is much greater than the continuation of transportation rates that give some fair measure of profits. Under such conditions it is evident that no steps should be left untaken which will strengthen the financial position of the railroads, as it is evident that while rates should not be reduced, it is equally evident that they cannot be increased under existing conditions.

Funding of Capital Expenditures

During Federal Control

There has never been a doubt in my mind of the intention of Congress to authorize prompt and fair compensation settlements with the railroads for the federal control period, and for the guaranty period. The government assumed the possession, use and control of the railroads, and used them as if it owned them, during the war period. It also made large capital expenditures thereon, amounting to about \$1,200,000,000. These expenditures must be assumed and paid by the railroads with interest. Almost \$400,000,000 was for equipment, and was funded through the national equipment trusts, which require the railroads to pay back to the government these capital expenditures for equipment during a period of 15 years. This left about \$800,000,000 of capital expenditures, chiefly for road and facilities, to be funded by the carriers. Under the terms of the transportation act discretion was conferred upon the President to fund all these expenditures, but the right was conferred upon him with certain limitations to offset against such expenditures, amounts due by the Railroad Administration to the carriers on other accounts for the federal control period, and this right will, by an understanding with individual carriers and under the terms of the act, be exercised by the administration. However, under the different conditions that now exist, these arrangements should be altered if the carriers cannot meet them, as it is impossible for the railroads to sell securities and pay off all these capital expenditures at present, and they have a shortage of working capital and practically no surplus earnings.

In view of the present situation of the railroad companies, and having regard to the emergency which now exists, I suggest that the President should, in the public interest, exercise his discretion so as to permit the funding of the entire expenditures of the character referred to which were made during the period of the federal control. Expenditures for additions and betterments are capital expenditures and should not consequently be

taken care of even in part by the application thereto of current funds, or by withholding any part of the amounts due to the carriers for the federal control period. The railroads themselves would have been obligated to raise the capital in advance of making such addition and betterment expenditures, or else the work would not have been done, and the government—without loss to itself and receiving a good interest return—should be willing to fund these expenditures, instead of withholding the cash that the railroads need badly to meet current requirements, and help them to surmount this difficult period. I, therefore, respectfully suggest, unless the President will so exercise that discretion, your consideration of an amendment of the transportation act which will direct the funding of all expenditures for additions and betterments made during the period of federal control.

Federal Control Act and Contract

Differences Should Be Decided

I also suggest, as further relief, an amendment which will assure the observance of the recommendations made by the President at the time he took the railroads over, viz., that the railway properties will be maintained during the period of federal control in as good repair and as complete equipment as when taken over by the government, and further that investors in railway securities might rest assured that their rights and interests would be scrupulously looked after by the government as they could be by the directors of the several railway systems, which in effect means a full observance of the similar provisions of the federal control act. The seriousness of that situation is indicated in the recent statement by the director general, as of May 1, 1921, of the condition of the Railroad Administration in the matter of liquidating questions in dispute arising out of, or incident to, federal control.

The attitude of the director general is not complained of, and he aptly describes the matter when he says: "This adjustment and straightening out of this wonderful adventure on the part of the government presents for solution novel, complex and important questions wholly without precedent." But we may well ask what is to be the financial condition of the railroads while final conclusions are being reached.

The committee may recall, in this connection, the extensive negotiations over the standard contract, and the differences of opinion which have since arisen, to which the director general refers in his statement, as to the meaning to be placed upon the words "cost of labor" in the maintenance provisions of this contract. The railroads believe that it can be shown that the same amount of physical reparation was not produced by the dollars expended in the federal control period as in the test period, and therefore the pledge of the President and of Congress had not been made good. The Railroad Administration, however, holds the view, if I correctly understand their position, that the test of the performance of the pledge is the number of dollars spent for labor, taken in conjunction, of course, with the material applied, in the two periods for maintenance purposes. The carriers contend that the "cost of labor" is the cost to do the same amount of physical maintenance or reparation in the federal control period as compared with the cost to do the same work in the test period.

It cannot be too strongly pointed out that the view of the director general results in theoretical maintenance only—that is, in materials not applied to or in place on the property—while both the President and the act of Congress promised and required that the property should be actually and not theoretically maintained.

If, however, the contract can be said to justify the view of the Railroad Administration, notwithstanding it specifically requires that the cost of labor must be dealt with, and also requires physical reparation, and not merely a dollar test covering only the price of labor, then in the interest of right and justice Congress should clarify the federal control contract provisions as to maintenance, which the director general points out as the chief cause for difference of opinion between the Railroad Administration and the carriers, and which he intimates can only be finally determined by the Supreme Court. This, I feel, could, if necessary, be covered by an amendment to the transportation act to the effect that the extent of the physical reparation should be the measure of the performance of the President's pledge, but even here I am advised that no amendment is required, as the President's authority is already ample under the transportation act.

Further, I suggest this because, based on the director general's report, as to settlements, it may take about 3½ years more to review all claims, and if appeal must be made to the Supreme Court to decide the meaning of the federal control act and contract as they may apply to the different conditions and questions on each road, it may take many more years. The essence of that situation is that many of the roads will be forced to accept much less than they are entitled to, and accept the burden, hoping to

work it off in succeeding years. In making this suggestion I am at the serious disadvantage of not knowing the actual condition of the claims made by the railroads, both those having federal control contracts and those not having federal control contracts; nor the physical reparation in ties, rails, ballast, stations, shops, and other structures, or in locomotive, passenger cars and freight cars, which they will claim as due to them; but the director general's figures, based on the claims already presented, state it is probable that the under-maintenance claims will run between \$700,000,000, and \$800,000,000. I am convinced from talks with other railroad executives that this question of under-maintenance is a live one, combined with the failure to fund all capital expenditures, and the delay in settlements to be made for the guaranty period to which I will refer, is at the root of the weakness of railroad credit because all of these questions deprive the railroads of the ready cash to meet current requirements and to place their property in efficient condition. The main point to my mind is that the situation will not be met merely by legal argument but that substantial justice should be done to the railroads through the fulfillment of the President's recommendations and the act of Congress by ensuring the return to the owners of their property and equipment in substantially as good condition as when they were taken over by the government, and as that has not been done they should be properly compensated. Unless this is done, then I want to make it clear that, for the federal control period and the guaranty period, they will not receive what was promised them by the President and Congress. I am asking for a fulfillment of the promises, and nothing more.

Settlements for the Guaranty Period

The transportation act seemed to give the broadest power to the Interstate Commerce Commission to make settlements for the guaranty period, and also to determine the expenses. Unfortunately this section of the act, in authorizing compensation to the railroads and in dealing with maintenance, made reference to the terms of the federal control contract, and leads us into practically the same difficulties of interpretation as in the federal control settlements, and that while the Railroad Administration hesitates to settle, the commission may be discouraged in using the broader powers of settlement for the guaranty period conferred on it by the transportation act. I hope I am mistaken in this view as to the guaranty period settlement. The final result means that the conditions prevailing during the guaranty period are not to be fully taken into account. In addition to the maintenance expenses, other expenses should be viewed with a full consideration of the conditions existing in the guaranty period. I have reference particularly to the extra items of cost such as the unauthorized strike of April, 1920, which affected railroad traffic for several months before the congestion eased off; the return of large numbers of cars scattered all through the country to the home railroads; and other causes of increased costs in that period which should be recognized. Despite all these conditions the public service rendered showed improvement and greater efficiency, and, while the business lasted, each month was showing a betterment of operating conditions compared with the preceding period of federal control.

Here was a transition period from war to peace designedly selected by Congress to assist the railroads in adjusting their conditions at the end of federal control, and in re-establishing their working organizations and credit on a peace basis, and yet the net result of the act, if interpreted as suggested, will not enable the railroads to secure the result intended to be realized. Instead the result will be that the railroads shall not be fully compensated for their expenses during this period, but that when they receive the guaranty for six months, as established by what I regard as a misconception of the transportation act, they must at their own cost pay a portion of the expenses of operation and maintenance during the guaranty period, because the expenses are out of line when an attempt is made to adjust such expenses with one-half of the average annual expenses of the test period. If such an interpretation is allowed to stand it will be seen that the intention of Congress would be negated, and the benefits that it intended to confer would not be realized, and that provisions of the act by which all surplus operating earnings were to be turned over to the government for the guaranty period, and the deficits were to be paid by the government for that period, would be rendered null and void. As this is so far from the intention of those who insisted upon the passage of the transportation act, and its consequences are so widespread to the country at large and to the railroads themselves, then, if the Interstate Commerce Commission cannot so exercise the discretion given them by what I regard as the true intention of that act, the passage of an amendment which would enable the real purpose of the transportation act to be made effective seems imperatively necessary and just. It is estimated that this would repay to the railroads several hundreds of millions of money actually expended for operating

and maintenance purposes in the guaranty period, which they believe are at present not being paid because of a clear misinterpretation of the law.

In offering these various suggestions of relief to the railroads, relative to the funding of the war capital expenditures and the removal of differences of opinion that prevent prompt and fair settlements for the federal control and guaranty periods, I do not think that I have suggested anything which is not in the public interest, and which ought not to be willingly acquiesced in. If the present conditions had been anticipated I cannot doubt that Congress would have dealt even more liberally with the railroad companies than has been done in the transportation act. I would be negligent of what I conceive to be to the real interest of the country in this difficult transportation situation, and to the investors in the railroads, if I did not bring this situation, without criticism of any government officer or department but because of real force of existing conditions, to your attention.

Wage Orders Result in Inequalities

Inequalities in the treatment of railroad employees resulting from the application of the wage standardization policy of the Railroad Administration to diversified conditions of employment were described before the committee on June 1 by J. G. Walber, secretary of the Bureau of Information of the Eastern Railroads, in a review of the numerous wage orders, reclassifications and other adjustments made during the war period. Mr. Walber ascribed much of the loss of morale of railroad employees during the war period to their dissatisfaction with the disparities resulting from the wage orders.

"The reclassification of employees in the shop and telegraph service and the rigid application of the bases of pay and rules throughout the United States in disregard of the diversified conditions encountered have produced some very remarkable and in fact grotesque results," said Mr. Walber, after giving an estimate that the wage scales of approximately 73 per cent of the railroad employees were standardized during the period of federal control. "It will be apparent to this committee that even the general description of these wage orders shows that disparities were bound to result and inequalities must have been the natural consequence, with the resultant effects upon the morale of the employees, who, it can be relied upon, are familiar with what other employees receive and who may, perhaps not deliberately, reflect their dissatisfaction in the character of the service they render.

"The practical effects of the national agreements were presented to the United States Railroad Labor Board and under their Decision 119, they are to be cancelled July 1. Just what relief will result will depend upon the ability of the managements and the representatives of the employees to negotiate new agreements, and in the event of their failure to reach complete settlements, what rules the Labor Board will decide shall be adopted. The question is far from being settled. From the newspaper accounts it appears that it is generally assumed that the decision of the Labor Board will relieve the railroads of the entire expense of these rules. This is purely speculative and in the present situation I cannot see how anyone can calculate what will be saved to the railroads.

"It also appears that when Congress was considering the legislation which culminated in the transportation act it must have been aware of at least some of the conditions attaching to the standardization of railroad wages and working conditions, and that relief therefrom would result from the requirement that in fixing just and reasonable wages and working conditions the United States Railroad Labor Board must take into consideration among other relevant circumstances.

"(1) The scales of wages paid for similar kinds of work in other industries.

"(2) The relation between wages and the cost of living.

"In our opinion, Congress must have had in mind that these elements would be given the most direct and specific application permissible under the circumstances in order to fix just and reasonable wages and working conditions, as it

is obvious that, with the diversified conditions in a country so large as the United States, the establishment of rigid and inflexible rules which cannot take into consideration these diversified conditions, must to a large extent fall far short of meeting the requirements of justness and reasonableness." No standardization of wages was recommended by the Railroad Wage Commission, Mr. Walber said, but dissatisfaction with the award on the part of numerous classes of employees led to reconsiderations by the Railroad Administration of various phases of the award and reclassifications of employees in numerous supplements, interpretations and addenda to the original wage order, and the Railroad Administration decided to standardize the rates for all the skilled crafts for the entire country.

Supplement No. 4 to General Order 27 was the beginning of the reclassification of employees in the mechanical department, which in addition to putting into effect the eight-hour day with time and one-half for overtime, effective August 1, 1918, also provided minute designations of the work to be performed by the respective classes and required that work which had ordinarily been performed by laborers at the laborer's rate be performed by mechanic's helpers at a higher rate.

"The uniform application of the eight-hour day to all these different classes of employees working under different conditions produced very pronounced distortions in the monthly earnings of these different classes of employees themselves and also in comparison with other classes of employees, resulting in outspoken dissatisfaction," said Mr. Walber. In the case of car inspectors, he said, it resulted in an increase of 226.5 per cent in 1918 as compared with 1916 and in the case of car repairers in an increase of 208 per cent.

Great disparities also resulted, Mr. Walber said, from the application of minimum rates to large numbers of employees who had previously received different rates in accordance with different conditions, and also from the methods used in converting former monthly rates to new hourly rates. For example, he said, six employees in telegraph and station service, each paid \$75 a month, because of the difference in the number of hours and days they worked received hourly averages ranging from 20.55 cents to 35.94 cents. Under Supplement No. 13 to General Order 27, their rates were changed to an hourly basis of 51¾ cents each, which produced increases ranging from 43.99 to 151.82 per cent.

"It must also be recognized," he said, "that for the different kinds of positions covered by the supplement it had been the general practice to have different rates, and the introduction of the minimum rate, with the formulae for conversion, practically destroyed the relations between the different kinds of positions, which naturally must have affected the morale of the service." As approximately 50 per cent of the railroad employees of the United States are on the Eastern railroads, the increases resulting from these orders, Mr. Walber said, could not be distributed with any degree of uniformity upon all the railroads and while the increase in the average annual compensation per employee in train service in the United States from 1916 to 1920 was 84.6 per cent, in the Eastern territory it was 94.23 per cent.

Mr. Walber said he was not criticizing what was done by the Railroad Administration because he realized the difficult conditions which it faced, but that it had to adopt many short cuts to accomplish results under pressure which prevented the consideration which should have been given.

NEW SLEEPING CAR LINES on trains already in service between Memphis and Asheville on the "Memphis Special"; between Nashville and Asheville (via the N. C. & St. L. to Chattanooga) between New Orleans and Asheville via Mobile; between Norfolk and Asheville on trains 3 and 4 to Danville and beyond on trains 11 and 12.

General News Department

The Chicago, Milwaukee & St. Paul is converting a number of sleeping and parlor cars into open top observation cars to be used on the company's electrically operated lines in the Rocky and Cascade Mountains.

A wage reduction of 15 per cent has been accepted by masters, mates, pilots, and engineers of railway ferries operated on Lake Michigan, Lake St. Clair and the Detroit river. Non-licensed employees agreed to a similar reduction in April.

The American Association of Traveling Passenger Agents will hold its annual meeting at Hotel Utah, Salt Lake City, on September 12, 13 and 14. The president of the association is Gordon Noble, of Philadelphia, and the secretary is H. K. McEvoy, Chicago.

Representatives of the railroads in the Southeastern district and the executives of the four brotherhoods of train service employees began a conference at Washington on May 31 to consider the request of the brotherhoods for the organization of a regional board of adjustment.

Fifty persons were injured when a freight train on the Pennsylvania crashed into an electric car on the Indianapolis & Southern at Edinburg, Ind., on the night of May 30. The accident occurred in the center of the town on the main street. The cause has not been determined.

The Chicago Chapter of the American Society for Steel Treating has elected the following officers: Chairman, H. M. Wood, Ingalls-Shepard division, Wyman Gordon Company, Harvey, Ill.; vice-chairman, T. A. Lovegren, Standard Forging Company, Indiana Harbor, Ind.; secretary-treasurer, Harry Blumberg, Illinois Steel Company.

The Mississippi Central has nearly or quite completed negotiations for trackage rights by which it will run trains through to Mobile, Ala., over the Gulf, Mobile & Northern. The eastern terminus of the Mississippi Central is at Hattiesburg, Miss., the western terminus of the Hattiesburg branch of the Gulf, Mobile & Northern, whence the distance south-east to Mobile is 96 miles.

The Traffic Club of New York, endorsing an address given before the club on May 31 by Howard Elliott, of California, has adopted resolutions urging repeal of all full-crew laws. Mr. Elliott called attention to the fact that laws of this kind are still in effect in 19 states, including New York and New Jersey; and proposed campaigns of education such as were employed in Missouri to defeat a proposed full-crew law.

Colonel John F. Stevens, president of the Interallied Technical Board, which operates the Chinese-Eastern railroad, together with about 2,700 miles of the Trans-Siberian road, sailed for China on May 28, to resume his duties. The Interallied Technical Board was formerly composed of representatives of England, France, Italy, China, Japan, Russia, Czechoslovakia and the United States. At the present time, however, the Italians and the Czechoslovaks have withdrawn, leaving the remaining nations to carry on the work.

Brooks Morgan, president of the Biscuit & Cracker Manufacturers' Association of America, in his address at the annual convention of the association in Atlantic City, N. J., on May 31, declared that railroad rates at present are stifling industry; but he added that, in spite of high rates, manufacturers must co-operate with the government authorities and with the railroads "for the elimination of hundreds of unnecessary employees and for a reduction of wages;" for all must realize that the present earnings of the railroads are not sufficient for their support.

The Missouri-Illinois Railroad on June 1 opened its entire line for business. The line of this company, which is the successor of the Illinois Southern, extends from Salem, Ill., southwest to Kellogg, on the Mississippi River, and from St. Genevieve, Mo., southwest to Bismarck, a total distance of 127 miles, with a branch from Collins, Ill., south, to Chester, 11 miles. Regular passenger trains will be run between Salem and Chester and mixed trains between St. Genevieve and Bismarck. The river is crossed by a transfer boat. Freight service will be operated, as required, from Salem to Chester and Kellogg.

Railway Returns for April

Preliminary returns for the month of April for 171 roads operating 199,929 miles, show total operating revenues of \$382,409,000, an increase of 8.4 per cent over April, 1920. The operating expenses were \$329,911,000, a decrease of 6.4 per cent from April, 1920, and the net operating income was \$27,566,000, as compared with a deficit in April, 1920, of \$21,210,000.

Protective Section—A. R. A.

The Protective Section of the American Railway Association, formerly the Railway Special Agents and Police, will hold its first annual meeting at Hotel Pennsylvania, New York City, on Thursday and Friday, July 14 and 15. Secretary J. C. Caviston, in his announcement, gives the rates not only of the Pennsylvania but of six other hotels, and suggests that members should order rooms at once by wire, telegraphing directly to the hotel. The subjects to be considered at the meeting will be announced later.

Proposed Changes in Car Service Rules

J. E. Fairbanks, general secretary of the American Railway Association, has issued circular No. 2161 calling for a letter ballot, ordered by the board of directors and to be canvassed on June 23, on proposed changes in car service rules numbers 1, 2, 3, 4 and 5. The proposed changes provide for improved practice in the return of empty cars to owners and for a more favorable operation with respect to empty car mileage (rule 3, paragraphs d and e). It is proposed that a road unable to dispose of empty cars belonging to indirect connections by loading them to or in the direction of home, may return them to the road from which they were received, on the basis of record rights.

Proposed Revision of Per Diem Rules

The board of directors of the American Railway Association, through a circular issued by General Secretary J. E. Fairbanks, and endorsing a resolution of the transportation division, has called for a letter ballot, to be canvassed on June 20, proposing amendments to per diem rules numbers 1, 11, 13, 14 and 15. The proposed changes aim to provide more economical accounting; to avoid opportunity for dispute in settlements of per diem, and to secure prompt action in the case of cars detained because of railroad errors. A progressive penalty would be provided to lessen the number of delays in reporting; and rule 15 would prescribe the punishment for a road failing to receive promptly its own empty cars.

Electrical Hazards and Their Safeguards

Protective devices for electrical apparatus used on the New York Central Railroad entering New York City were described by H. S. Balliet, signal engineer, New York Central, in a paper presented before the American Society of Safety Engineers in New York on May 27. Mr. Balliet, with the use of lantern slides, showed how many safety devices were used in the reconstruction of the New York terminal district when it was

electrified, and described methods and apparatus which expedite the movement of traffic into the Grand Central Terminal and make for safe operation. He pointed out the need for screens and fences as a protection around such devices as transformers and bridges and stated that all high-tension poles should be stenciled to warn against the danger of anyone climbing them. He advocated protection to workmen on all electrical circuits of 220 volts or over, and said that the "safety first" slogan is probably the greatest of safeguards.

Overcharge Claims on the Nashville, Chattanooga & St. Louis

The Nashville, Chattanooga & St. Louis, in a statement covering the handling and settlement of overcharge claims for the month of April, 1921, presents following table:

	Unpaid	Paid	Total
(1) Number of overcharge claims on hand at beginning of month.....	313	383	696
(2) Number of overcharge claims presented by claimants during month.....	916	...	1,479
(2)a Number of claims charged in by connection.....	...	473	...
(2)b Number of claims paid in suspense.....	...	90	...
(3) Number of claims on hand at end of month.....	360	428	788
(4) Number of claims unpaid which were 90 days old (included in item 3).....	16	...	16

From the above table it will be seen that the month closed with only 360 claims on hand unpaid. Further, there were only 16 claims on hand unpaid which had been in the possession of the road more than 90 days and these claims involved track scale weights, demurrage, storage, etc., making it necessary for the road to refer the papers to outside bureaus for information which was required before the payment of the claims could be arranged.

Merchants' Association Discusses Port of New York

Various plans and ideas relative to the development of the port of New York were discussed recently at a luncheon given by the Merchants' Association of New York at the Hotel Astor on May 27. The talks were not confined to the plans submitted by the commission representing the two states of New York and New Jersey, but dealt also with the problems of the vehicular tunnel and the advocated bridge across the Hudson river. E. H. Outerbridge, chairman of the Port Authority, stated that it was the belief of the Port Authority that remedial results could be obtained more quickly by the inauguration of some system, such as voluntary store door delivery, the consolidation of marine services and equipment and the establishment of inland terminals in Manhattan. In equipping itself to carry on its work, the Port Authority has retained the engineering staff which served the joint commission, and, in addition, has secured the services of Major E. C. Church, transportation engineer on General Pershing's staff in France. A technical advisory board has been created consisting of Francis L. Stuart, consulting engineer, New York, and formerly vice-president and chief engineer of the Baltimore & Ohio; Morris Sherrard, consulting engineer, Newark, N. J., and Nelson P. Lewis, consulting engineer, New York.

J. J. Mantell, regional manager, Erie Railroad, described the shortcomings of the port and suggested, as a big step forward in the solution of its problems, the use of tractors and trailers to deliver freight from the New Jersey yards. General George R. Dyer explained some of the reasons for the hold-up in the work of the vehicular tunnel, while George A. Post discussed the needs for a large bridge at about Fifty-ninth street. The bridge would be double deck and would have about 16 lines of highway traffic on the upper and about 10 standard railway tracks on the lower deck.

Meetings and Conventions

The following list gives names of secretaries, dates of next or regular meetings and places of meetings:

- AIR BRAKE ASSOCIATION.**—F. M. Nellis, 163 Broadway, New York City. Exhibit by Air Brake Appliance Association.
- AIR BRAKE APPLIANCE ASSOCIATION.**—Fred W. Venton, 836 So. Michigan Ave., Chicago. Meeting with Air Brake Association.
- AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.**—F. A. Penatous, Supervisor of Demurrage and Storage, C. & N. W. Ry., Chicago.
- AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.**—S. W. Derr, Philadelphia & Reading, Philadelphia, Pa. Next meeting, July 12, Chicago.
- AMERICAN ASSOCIATION OF ENGINEERS.**—C. E. Drayer, 29 S. La Salle St., E. I. R. R., 332 South Michigan Ave., Chicago.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York. Annual meeting, November 21 and 22, Pinehurst, N. C.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—J. Rothschild, Room 400, Union Station, St. Louis, Mo. Next convention, August 24-26, 1921, Kansas City, Mo.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Burritt, 8 W. 40th St., New York. Next convention, October 3, Atlantic City. Exhibits this year will be omitted.

AMERICAN RAILROAD MASTER TINNERS', COPERSMITHS' AND PIPE FITTERS' ASSOCIATION.—C. Borchardt, 202 North Hamlin Ave., Chicago, Ill. Next convention, September 12-14, Hotel Sherman, Chicago.

AMERICAN RAILWAY ASSOCIATION.—J. E. Fairbanks, General Secretary, 75 Church St., New York, N. Y. Next regular meeting, November 16, 1921.

Division I—Operating, Freight Station Section (including former activities of American Association of Freight Agents). R. O. Wells, Freight Agent, Illinois Central Railroad, Chicago, Ill.

Medical and Surgical Section. J. C. Caviston, 75 Church Street, New York. Annual meeting, June 3 and 4, Hotel Westminster, Boston.

Protective Section (including former activities of the American Railway Chief Special Agents and Chiefs of Police Association), J. C. Caviston, 75 Church St., New York, N. Y.

Telephone Section (including former activities of the Association of Railway Telegraph Superintendents). W. A. Fairbanks, 75 Church St., New York, N. Y.

Division II—Transportation (including former activities of the Association of Transportation and Car Accounting Officers). G. W. Covert, 431 South Dearborn St., Chicago, Ill.

Division III—Traffic. J. Gottschalk, 143 Liberty St., New York.

Division IV—Engineering. E. H. Fritch, 431 South Dearborn St., Chicago, Ill.

Construction and Maintenance Section. E. H. Fritch.

Electrical Section. E. H. Fritch.

Signal Section (including former activities of the Railway Signal Association), F. Pfeleging (Chairman); H. S. Ballou, 75 Church St., New York, N. Y. Annual meeting, June 6-8, Hotel Drake, Chicago.

Division V—Mechanical (including former activities of the Master Car Builders' Association and the American Railway Master Mechanics' Association). V. R. Hawthorne, 431 South Dearborn St., Chicago, Ill. Meeting, June 15 and 16, Hotel Drake, Chicago.

Equipment Painting Section (including former activities of the Master Car and Locomotive Painters' Association). V. R. Hawthorne, 431 South Dearborn St., Chicago, Ill.

Division VI—Purchases and Stores (including former activities of the Railway Storekeepers' Association). J. P. Murphy, General Storekeeper, New York Central, Collinwood, Ohio. Second annual meeting, June 9-11, Hotel Blackstone, Chicago.

Division VII—Freight Claims (including former activities of the Freight Claim Association). Lewis Pilcher, 431 South Dearborn St., Chicago, Ill.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichtig, C. & N. W. Ry., 319 Bay Ave., Austin Station, Chicago. Next convention, October 18-20, 1921, New York City. Exhibit by Bridge and Building Supply Men's Association.

AMERICAN RAILWAY DEVELOPMENT ASSOCIATION.—J. F. Jackson, Central of Georgia, Savannah, Ga. Next meeting, November, 1921, Chicago.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—(Works in co-operation with the American Railway Association, Division IV.) E. H. Fritch, 431 South Dearborn St., Chicago. Exhibit by National Railway Appliances Association.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—(See American Railway Association, Division 5.)

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—R. D. Fletcher, 1145 East Marquette Road, Chicago. Next convention, August 9-11, Hotel Sherman, Chicago. Exhibit by Supply Association of the American Railway Tool Foremen's Association.

AMERICAN SHORT LINE RAILROAD ASSOCIATION.—T. F. Whitteley, Union Trust Bldg., Washington, D. C.

AMERICAN SOCIETY FOR STEEL TREATING.—W. H. Eiseman, 4600 Prospect Ave., Cleveland, Ohio. Next convention, September 19-24, Indianapolis, Ind.

AMERICAN SOCIETY FOR TESTING MATERIALS.—C. L. Warwick, University of Pennsylvania, Philadelphia, Pa. Annual meeting, June 20-24, New Monterey Hotel, Ashbury Park, N. J.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—E. M. Chandler (acting secretary), 33 W. 39th St., New York. Regular meetings, 1st and 3d Wednesdays in month, except July and August, 33 W. 39th St., New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.

AMERICAN TRAIN DISPATCHERS' ASSOCIATION.—C. L. Darling, Northern Pacific Ry., Spokane, Wash. Next convention, June 20, 1921, Kansas City, Mo.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—George M. Hunt, Chemist, Forest Products Laboratory, Madison, Wis.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—H. D. Morris, Northern Pacific R. R., St. Paul, Minn. Next annual meeting, May 19, 1922, Montreal.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucci, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Next convention, October 18-21, Hotel La Salle, Chicago. Exhibit by Railway Electrical Supply Manufacturers' Association.

ASSOCIATION OF RAILWAY EXECUTIVES.—Thomas De Witt Cuyler (chairman), 61 Broadway, New York, N. Y.

ASSOCIATION OF RAILWAY SUPPLY MEN.—A. W. Clokey, 1658 McCormick Bldg., Chicago. Meeting with International Railway General Foremen's Association.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—(See American Railway Association, Division 1.)

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—(See American Railway Association, Division 2.)

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—A. J. Filkins, Paul Dickenson Company, Chicago. Meeting 3rd convention of American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—W. A. Booth, 131 Charton St., Montreal, Que.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aron Kline, 626 North Pine Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, New Morrison Hotel, Chicago.

CAR FOREMEN'S ASSOCIATION OF ST. LOUIS, MO.—Thomas B. Koencke, St. Louis, Mo. Meetings, first Tuesday in month at the American Hotel Annex, St. Louis.

CENTRAL RAILWAY CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 2d Thursday in November and 2d Friday in January, March, May and September, Hotel Statler, Buffalo, N. Y.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S ASSOCIATION.—W. P. Elliott, Terminal Railroad Association of St. Louis, East St. Louis, Ill.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S SUPPLY MEN'S ASSOCIATION.—D. B. Wright, 34th St. and Artesia Ave., Chicago, Ill. Meeting with Chief Interchange Car Inspectors' and Car Foremen's Association.

CINCINNATI RAILWAY CLUB.—W. C. Cooder, Union Central Bldg., Cincinnati, Ohio.

EASTERN RAILROAD ASSOCIATION.—E. N. Bessling, 614 F St., N. W., Washington, D. C.

FREIGHT CLAIM ASSOCIATION.—(See American Railway Association, Division 7.)

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 321 Grand Central Sta., Chicago. Regular meetings, Wednesday preceding 3d Friday in month, Room 856, Insurance Exchange Bldg., Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—W. J. Mayer, Michigan Central R. R., Detroit, Mich. Next convention, August 16, 18, 1921, Hotel Sherman, Chicago.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—J. G. Crawford, 702 E. 51st St., Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 1061 W. Wabasha Ave., Wiroona, Minn. Next convention, September 12-15, Hotel Sherman, Chicago. Exhibit by Association of Railway Supply Men.

MAINTENANCE OF WAY MASTER PAINTERS' ASSOCIATION.—E. E. Martin, Union Pacific R. R., Room No. 19, Union Pacific Bldg., Kansas City, Mo. Next convention, October 4-6, 1921, Buffalo, N. Y.

MASTER HOTLER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION.—(See A. R. A., Division 5.)

MASTER CAR BUILDERS' ASSOCIATION.—(See A. R. A., Division 5.)

NATIONAL ASSOCIATION OF RAILROAD TIE PRODUCERS.—E. E. Pershall, T. J. Moss Tie Company, 720 Security Bldg., St. Louis, Mo.

NATIONAL ASSOCIATION OF RAILWAY AND UTILITIES COMMISSIONERS.—James B. Walker, 49 Lafayette St., New York.

NATIONAL FOREIGN TRADE COUNCIL.—O. K. Davis, 1 Hanover Square, New York.

NATIONAL RAILWAY APPLIANCE ASSOCIATION.—C. W. Kelly, Peoples Gas Bldg., Chicago. Meeting with American Railway Engineering Association.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., Boston, Mass. Regular meetings, 2d Tuesday in month, excepting June, July, August and September.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meeting, 3d Friday in month, except June, July and August, at 29 W. 39th St., New York.

PACIFIC RAILWAY CLUB.—W. S. Wollner, 64 Pine St., San Francisco, Cal. Regular meeting, 2d Thursday in month, alternately in San Francisco and Oakland.

RAILWAY ACCOUNTING OFFICERS' ASSOCIATION.—E. R. Woodson, 1116 Woodward Building, Washington, D. C. Next annual meeting, June 8, 1921, Hotel Traymore, Atlantic City, N. J.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Nokon, 600 Liberty Bldg., Broad and Chestnut Sts., Philadelphia, Pa.

RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, 515 Grandview Ave., Pittsburgh, Pa. Regular meetings, 4th Thursday in month, except June, July and August, American Club House, Pittsburgh, Pa.

RAILWAY DEVELOPMENT ASSOCIATION.—(See Am. Ry. Development Assn.)

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, General Electric Co., Chicago. Annual meeting with Association of Railway Electrical Engineers.

RAILWAY EQUIPMENT MANUFACTURERS' ASSOCIATION.—R. J. Himmelright, 17 East 42nd St., New York. Meeting with Traveling Engineers' Association.

RAILWAY FIRE PROTECTION ASSOCIATION.—R. R. Hackett, Baltimore & Ohio R. R., Baltimore, Md.

RAILWAY REAL ESTATE ASSOCIATION.—R. H. Morrison, C. & O. Ry., Richmond, Va.

RAILWAY SIGNAL ASSOCIATION.—(See A. R. A., Division 4, Signal Section.)

RAILWAY STOCK SHIPPERS' ASSOCIATION.—(See A. R. A., Division 6.)

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 184 Oliver Bldg., Pittsburgh, Pa. Exhibit at June convention of American Railway Association, has been cancelled.

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 30 Church St., New York.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—P. J. McAndrews, C. & N. W. Ry., Sterling, Ill. Next annual convention, September 20-22, 1921, Exhibit by Track Supply Association.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, Schroeder Headlight & Generator Co., New York City. Meeting with American Railway Association, Signal Section.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—L. W. Cox, Commercial Trust Bldg., Philadelphia, Pa.

SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, P. O. Box 1205, Atlanta, Ga. Regular meetings, 3d Thursday in January, March, May, July, September and November, Piedmont Hotel, Atlanta.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, Westcott Ry., Ala., Atlanta, Ga.

SUPPLY ASSOCIATION OF AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—C. N. Thulin, 935 Peoples' Gas Bldg., Chicago.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Meets with Roadmasters' and Maintenance of Way Association.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, 117 East 98th St., Cleveland, Ohio. Exhibit by Railway Equipment Manufacturers' Association.

WESTERN RAILWAY CLUB.—Bruce V. Crandall, 14 E. Jackson Boulevard, Chicago. Meeting third Monday each month except June, July and August.

Traffic News

Production of soft coal dropped back slightly during the week ended May 21, according to the weekly bulletin of the Geological Survey. The total output is estimated at 7,957,000 net tons, a decrease of 46,000 tons when compared with the preceding week. Preliminary reports of the loading on the following Monday and Tuesday indicate a resumption of the upward trend of production. The movement of soft coal from the lower lake ports increased.

The Southern Railway announces the establishment of new sleeping car lines between Macon, Ga., and Asheville, N. C.; between Charleston, S. C., and Asheville; between New Orleans and Asheville via Mobile and between Winston-Salem, N. C., and Beaufort, N. C. These arrangements are temporary. On June 26 new night trains and additional sleeping car lines are announced for the summer season as follows: New trains between Columbia, S. C., and Asheville, with sleeping cars to and from Charleston, Wilmington and Savannah. Between Atlanta and Asheville, with sleeping cars to and from Macon. Between Chattanooga and Asheville, with sleeping cars to and from New Orleans.

Coal Production Increases

The increase in production of soft coal which has marked the past month was accelerated during the week ended May 14, according to the weekly bulletin of the Geological Survey. The output for the week is estimated at 7,937,000 net tons, an increase of 7½ per cent over the preceding week. The largest elements in the change are believed to be the increasing shipments to the lakes and to tidewater for export. In spite of the difficulties experienced in securing boats for the lake coal trade the total dumpings of bituminous coal for the season up to April 30 were greater than for any of the four years preceding. The cumulative total to the end of April was 1,289,160 tons. Complete statistics show that the carry-over from last year at the head of the lakes on April 1 was 2,053,000 net tons.

In a letter to Senator Edge, George Otis Smith, director of the Geological Survey, discusses the situation in anthracite coal, in which he says that a factor undoubtedly contributing to the reluctance of consumers to purchase is the expectation of a downward revision in freight rates. Whatever may happen to freight rates, he says, it is unlikely that any general revision of them can be made quickly, and what may be gained by a purchaser in the shape of a prospective cut in freight is likely to be more than lost in a prospective premium price for coal. The anthracite miners' wage contract runs to April 1, 1922.

A Big Shippers' Convention

Traffic representatives of manufacturing companies which distribute their products through public merchandise warehouses are to hold a convention at the William Penn Hotel, Pittsburgh, Pa., on June 16 and 17.

The convention will be held under the auspices of the Shippers' Warehousing and Distributing Association, which was organized at Chicago a year ago for the general purpose of effecting standardization and simplification of forms, documents, practices, rules and regulations in the business relationship between the manufacturers and the public warehouse industry. Uniformity, overages and shortages, taxation on stocks in warehouses, methods of billing and systems of reporting of stocks are among the subjects which will be discussed. Details regarding the convention may be obtained from the secretary, Kent B. Stiles, 239 West Thirty-ninth street, New York. Members of the association include the American Sugar Refining Company, Chicago; Bon Ami Company, New York; Furniture Manufacturers' Association, Grand Rapids, Mich.; Jiffy Dessert Company, Waukesha, Wis.; Kellogg Toasted Corn Flake Company, Battle Creek, Mich.; Procter & Gamble Distributing Company, Cincinnati, Ohio, and the Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa.

Improved Express Service

Robert E. M. Cowie, vice-president of the American Railway Express Company, New York city, speaking at a recent meeting of the Traffic Group of the National Retail Dry Goods Association, said that express service had been brought up to an efficiency equal to the conditions prevailing before the war. The express company is ready to stand or fall on its future service. It has taken a longer time to get into the normal stride than had been anticipated. President Harding is said to hold that the cost of transportation must come down, believing, apparently, as many others do, that high transportation rates have put a stop to the free interchange of business. "I hope he is right," said Mr. Cowie, "but I am doubtful enough to say that I do not think he is. The express company has dismissed lazy and incompetent men and since September we have had a campaign of improvement. By this the American Express has reduced its operating cost, without reducing wages, by something over \$35,000,000 a year. Our labor problem was a much more difficult one than that of the railroads because our service extends from one end of the United States to the other. We have 38,000 offices and ship 1,200,000 packages a day. New York turns out about one-fifteenth of the lighter merchandise shipped in the whole United States. To move that light merchandise requires twenty-four special express trains leaving every night.

"Fifth-morning delivery in San Francisco is now a regular thing. The best possible time from New York is the morning of the fourth day, when everything works with clocklike procedure, but hair-trigger connections are not aimed at, so delivery on the fifth morning was decided upon.

"In the matter of claims the company is nearer up to date than it has ever been. But just because we are so improved in this respect is no reason for sending us claims without merit. There is one concern that sends us claims for everything, whether there is any merit in them or not. We have turned down over 500 claims a month of this one concern. Our office boy could tell that 500 of the 550 claims entered should not have been made. Now, of course, we are easy and try to keep a smile all the while, but we do not want that kind of claims. . . ."

Proposed Bills in Congress

Bills have been introduced in Congress by Senator New and Representative Burdick to make unlawful the present surcharge collected by railroads from Pullman passengers under the last increase in passenger fares.

The Senate Committee on Interstate Commerce has favorably reported to the Senate, with some modifications, the bill introduced by Senator Fletcher, of Florida, to amend Section 206-c of the transportation act, relative to complaints praying for reparation on account of damage claimed to have been caused by reason of the collector; of unreasonable or otherwise unlawful rates during the period of federal control. The bill provides that such claims may be filed with the Interstate Commerce Commission within two years after the termination of federal control, or against the agent designated by the President for such purpose, who is the director general of railroads. The Railroad Administration had issued a ruling that such complaints should be filed by March 1 this year, but later extended the time to September 1. The bill as amended, however, applies only to claims for overcharges above the legal tariff charge. The report, by Senator Kellogg, says the bill was referred to the legislative committee of the Interstate Commerce Commission, which recommended the passage of the bill with the amendments adopted by the committee. Chairman Clark, of the commission, in a letter, said that the commission feels there is warrant for extending the period of limitation for an additional year as to overcharge claims, but that such extension should not be made as to other claims of different character.

A bill has been introduced in the House of Representatives by Representative Connolly, of Texas, to repeal Section 15-a of the Interstate Commerce Act as amended by Section 422 of the Transportation Act. This is the section that provides the 5/2 per cent rule of rate-making. Representative Sweet, of Iowa, has also announced his intention of introducing a similar bill, on the ground that "it is impossible for prosperity to return under the present railroad freight rates" and that the relief desired cannot be had until Section 15-a is repealed.

Commission and Court News

Interstate Commerce Commission

The commission has suspended from June 1 and later dates to September 29, the operation of certain schedules which propose to increase rates on lumber and other commodities between El Paso, Texas, and points in Oregon, Washington, Utah and Idaho.

The commission has further suspended until July 25 the operation of schedules published in W. K. Kelly's and F. A. Leland's tariffs, which provide increased commodity rates on iron or steel bolts, 1 c. l. from Kansas City, Mo., to Galveston and Beaumont, Tex.

The commission has further suspended until July 20 the operation of certain schedules shown in E. B. Boyd's tariff, which provide increased rates on pig iron from points in Alabama, Georgia, Kentucky, Louisiana, Tennessee and Virginia to Ogden and Salt Lake City.

The commission has further suspended until July 29 the operation of items, shown in a Kansas City Southern tariff, proposing the cancellation by the Texarkana & Fort Smith of the rule providing for the switching of lumber to and from the track of the Texas & New Orleans at Port Arthur.

The commission has issued a decision in which it finds that the proposal of the Pennsylvania and the Baltimore & Ohio to discontinue the interchangeable use of their 60-trip commutation tickets between Baltimore and Washington, which practice was introduced during the period of federal control, is justified, and the order of suspension is vacated.

The commission in its decision in the case of the Northern Potato Traffic Association was against the railroads, and the director general finds that the relationship of rates on potatoes in carloads from points in Minnesota and Wisconsin to destinations in trunk line territory are unduly prejudicial, and the rates to northeast Texas points from the same territory are found unreasonable. The commission prescribes new maximum rates. The commission also finds that the assessment of a rental charge of \$5 a car during the winter, in addition to the freight rate, is not unreasonable.

The Interstate Commerce Commission has ordered a proceeding of investigation involving the failure of the Oklahoma Corporation Commission to allow the railroads of the state to apply increases in intrastate rates corresponding to those allowed by the federal commission for interstate traffic. A petition had been filed with the commission on behalf of the railroads averring that the state commission by orders on September 4, March 9 and April 11 had ordered them to establish rates within the state which are less in many instances than those which are permitted to be established by the federal commission for interstate traffic.

Regulations for Transportation of Explosives, Etc.

Because of altered conditions certain modifications in the regulations for the transportation of explosives, inflammables and other dangerous articles by freight and express are desirable, and the commission has ordered a hearing on June 22 at Washington, before Examiner F. E. Brown, to consider suggested amendments which have been proposed by the Bureau of Explosives, after conferences with shippers and carriers, and "attendance upon the hearing does not seem important except for the purpose of presenting objections."

Under the provisions of the act of March 4, 1921, the commission is authorized to avail itself of the services of the Bureau of Explosives; and the bureau has arranged to hold conferences with interested shippers and others on the two days preceding the hearing, June 20 and 21 at Washington; and at these conferences an opportunity will be afforded all parties interested to discuss, and if possible agree upon, the amendments proposed in the regulations.

Personnel of Commissions

W. R. Williams, secretary of the California State Railroad Commission, has been appointed examiner for the commission and executive of its Los Angeles office, and has been succeeded as secretary by H. G. Mathewson, assistant secretary, effective June 1.

United States Supreme Court

Texas state authorities have filed a motion in the United States Supreme Court asking permission to file an original bill attaching the Interstate Commerce Commission's order advancing intrastate rates in Texas on the ground of the unconstitutionality of the transportation act.

Federal Employers' Liability Act

The Supreme Court of the United States last week handed down a decision under the Federal Employers' Liability Act which it regards as important beyond the interest of the parties to it because it formulates a test by which future cases may be assigned to intrastate or interstate commerce.

An award had been made by the Pennsylvania Workmen's Compensation Board for the death of a flagman at a high-way crossing, which was affirmed by the state courts. The flagman was employed to signal both intrastate and interstate trains, without distinction between them or character of service, and in the course of his employment he was killed by a train whose character is not disclosed.

The Supreme Court holds that the case falls within *Pedersen v. D. L. & W.*, 229 U. S. 146, where the court said: "True, a track or bridge may be used in both interstate and intrastate commerce, but when it is used in intrastate it is none the less an instrumentality of the former; nor does its double use prevent the employment of those who are engaged in its repair being employment in interstate commerce."

"The service of a flagman concerns the safety of both commerces and to separate his duties by moments of time or particular incidents of its exertion would be to destroy its unity and commit it to confusing controversies.

"And besides, Di Donato's duty had other purposes than the prevention of a disaster to a particular train. It had purpose as well to the condition of the tracks and their preservation from disorder and obstructions. This service and the other service cannot be separated; and behind them are the respective powers that may have ordained them."

Deducing from the duty of Di Donato that his employment was in interstate commerce, the judgment of the state Supreme Court was reversed, Mr. Justice Clarke dissenting. *Philadelphia & Reading v. Di Donato*. Decided May 16, 1921. Opinion by Mr. Justice McKenna.

Another case, also from the Pennsylvania court, was decided in the same way as being within the rule of the above case. Here one of the crew of a freight train was caught between two cars, sustaining injuries from which he died. Some of the cars of the train were in interstate commerce. The referee did not find definitely as a fact that the deceased was engaged in intrastate commerce at the time of his injury, but assumed that the fact might be so, and therefore regarded it as so, because in his opinion the burden of proving the contrary, that is, that the deceased "was actually engaged in work incident to interstate commerce," was upon the company, and the company had "not met the burden required of it"; and further that the company "offered no testimony whatever to show what work John M. Polk was performing at the time he was injured."

The Supreme Court holds that here, as in the Di Donato case, "the employment concerned both kinds of commerces and was to be exercised as much on one as on the other.

"Besides, we cannot concede to the view that there is a presumption that duties performed on a train constituted of interstate and intrastate commerce were performed in the latter commerce. The presumption, indeed, might be the other way." Judgment affirming the award reversed, Mr. Justice Clarke dissenting.—*Philadelphia & Reading v. Polk*. Decided May 16, 1921. Opinion by Mr. Justice McKenna.

Foreign Railway News

Electrification in Philippines

The Manila Railroad Company is planning the electrification of its lines, according to information made public by the Philippine Government Commercial Agency. The power is to be developed from the Agno river in Central Luzon and a thorough topographical survey of the power site is being made under the direction of the company.

Pilfering Source of Great Loss to French Roads

Pilfering on French railways cost the companies approximately \$48,200,000 in 1920, or more than 14 times the 1913 figure, which was approximately \$3,400,000, according to a Paris dispatch to the *New York Times*. It was pointed out that increased costs of stolen property caused some of the increase, but that it was largely due to the increase in theft which has been great on all roads with the exception of the State Railway.

British Railway Employees Agree to Handle Coal

Henceforth the employees of the British railways will handle all coal offered for shipment, according to press dispatches from London. Since the beginning of the miners' strike until the present union railway employees had refused to handle "blackleg" coal produced by strike breakers and, in some instances, coal imported from abroad. This refusal resulted in the suspension of a number of employees and threatened to cause trouble between the railway unions and the managements of the carriers. It was stated that the decision of the railway unions to resume the handling of coal was based on the fact that their refusal did not help the miners and not because of any lack of sympathy with the aspirations of the miners' union.

Rolling Stock Situation in Poland

LONDON.

It is reported that Poland has only 50 per cent of the railway rolling stock that would be necessary to put the railways in normal condition, but that the situation will improve as soon as it receives the 480 locomotives and 12,900 cars, assigned to it by the Reparations Committee. In order to encourage the development of national industry the Polish government has ordered locomotives and cars from Polish manufacturers to be delivered within ten years. These manufacturers it is certain will require foreign capital to enable them to supply the required rolling stock. For the first deliveries the manufacturers have been authorized to purchase abroad various parts such as wheels, axles, and similar material, but they must produce these parts in Poland as soon as possible. A commission of Government officials, it is stated, has left for Italy in order to approach Italian capitalists with regard to their participation in this enterprise.

Britain Scores in Chilean Competition

English financiers are reported to have arranged for a loan of upwards of \$15,000,000 for the construction of a short line railway from Valparaiso to Santiago, Chile, through Casablanca, according to correspondence of the *Times* (London) Trade Supplement. The bankers stipulate, according to the report, that the line must be constructed by a British firm. It is pointed out that the English financiers were able to offer lower interest rates and were satisfied with less security than American houses which were interested in the project. The new line, it is said, will shorten the distance between the two cities and, by providing better grades, reduce the running time from the present schedule of three and one-half hours to approximately two and one-half hours. In the meantime, the government is going on with its plans to electrify the present line between these two cities and bids will be opened on June 30 for the construction of the first section of this electrification.

April Car Exports

Further declines are noted in the shipments of cars in April when compared with the March figures. The freight car shipments totaled 572, valued at \$808,982, as compared with 707, valued at \$1,311,447, for the previous month. Six passenger cars were exported as compared with 10 in March. The detailed figures by countries, as compiled by the Bureau of Foreign and Domestic Commerce, follow:

Countries	Passenger		Freight and other		Parts of cars
	Number	Value	Number	Value	
Finland					836
France					238
Germany					5,590
Greece					1,858
Italy					369
Sweden					1,872
England					32,482
Canada			66	\$86,798	1372
Guatemala					40,573
Honduras					1,223
Panama					75
Salvador					27,243
Mexico	3	\$22,098	79		1,152
Newfoundland and Labrador					297
Jamaica					122,704
Trinidad and Tobago					1,587
Cuba			244	274,159	16,729
Virgin Islands of U. S.					221,232
Dominican Republic					299,591
Argentina					263
Brazil	3	20,200			4,374
Chile					27,740
Colombia					317
Ecuador					328,190
Peru			20	11,283	1,906
Venezuela					777
China					61
Kwantung, leased territory					6,4251
Dutch East Indies					57
Taiwan					187,664
Australia			2	11,200	13,915
New Zealand					41,120
Philippine Islands					3,413
Portuguese Africa					880
Total	6	\$42,298	572	\$808,982	\$1,227,696

Transportation a Major Subject at

International Commerce Convention

Among the American contributions to the conferences of the International Chamber of Commerce to be held at London, England, during the week of June 27, will be a comprehensive summary of American railroad practices in making international shipments to Canada and Mexico. This report will be submitted with the hope that business men of Europe, where national boundaries clog and impede commerce, may benefit by experience on this continent. Other American contributions to these conferences will be a trial balance sheet of the world's financial condition, a survey of world communications, a review of economic conditions in the United States, reports on ocean transportation, fabricated production, distribution, raw material production and port facilities.

Delegates to the conference will be organized into five groups, each group taking up one of the five main subjects into which the program has been divided. Each of the five "foundation" countries—Great Britain, France, Italy, Belgium and the United States—has been given the chairmanship of one of these groups. The chairmanship of the transportation and communication group has been assigned to this country and Walker D. Hines, formerly Director General of Railroads, has been appointed chairman. Chairmen of the other groups are: Walter Leaf, Great Britain, for finance; Eugene Schneider, France, for production; M. Cassin, Italy, for production; M. Verwilghen, Belgium, for devastated regions.

Among the 200 delegates from this country will be some prominent railroad men and financiers. M. ter Muelen, of Holland, originator of the "ter Muelen plan" for credit extension, will attend the finance group sessions. Chairmen of the various American committees are: Alba B. Johnson, president, Philadelphia Chamber of Commerce, fabricated production; S. M. Felton, president, Chicago Great Western, land transportation; L. B. Stilwell, consulting engineer, New York, port facilities; W. H. Booth, vice president, Guaranty Trust Company, finance; W. E. Kugeman, vice president, American Radiator Company, distribution; E. J. Cornish, president, National Lead Company, production of raw materials; and J. J. Carty, vice president, American Telephone and Telegraph Company, communication.

Equipment and Supplies

Car Deliveries in April

The number of freight cars delivered in April by the 27 car building companies reporting to the Railway Car Manufacturers' Association totaled 4,455 for domestic service and 871 for export. The passenger train cars delivered totaled 116 for domestic service. On April 30 the companies had on hand undelivered orders for 17,513 freight and 565 passenger cars for domestic service and 3,312 freight and 24 passenger cars for export. The detailed figures for the month follow:

New Cars Delivered			
	Domestic	Foreign	Total
Freight	4,455	871	5,326
Passenger	116	0	116
On Order and Undelivered			
	Domestic	Foreign	Total
Freight	17,513	3,312	20,825
Passenger	365	24	389
Car Repairs			
Delivered—April			3,898
On order and undelivered April 30			11,884

Locomotives

THE MEXICAN RAILWAY has ordered 11 consolidation type locomotives from the Baldwin Locomotive Works.

Freight Cars

THE WABASH RAILWAY is contemplating having repairs made to 500 hopper cars.

THE VIRGINIAN RAILWAY is contemplating having repairs made to a large number of freight cars.

THE FLEISCHMANN TRANSPORTATION COMPANY, Chicago, is inquiring for from 10 to 100 steel underframes for tank cars.

THE GREAT NORTHERN reported in the *Railway Age* of April 8, as inquiring for 500 refrigerator cars, has ordered this equipment from the General American Car Company. These cars are to have wooden underframes.

THE UNITED FRUIT COMPANY, New York, reported in the *Railway Age* of May 20, as inquiring for 50 cane cars, has ordered this equipment from the Magor Car Company. These cars are to be used on the Truxillo Railway, Honduras.

Machinery and Tools

THE NEW LONDON SHIP & ENGINE COMPANY, Groton, Conn., has ordered four 60-in. engine lathes from the Niles-Bement-Pond Company.

Miscellaneous

THE NORFOLK & WESTERN will receive bids at Roanoke, Va., until 12 o'clock noon, June 8, for parts for electrical apparatus; 100,000 tie dating nails; 1,000 pairs of angle bars and 800 D bevel steel bars, 25/64 in. by 3 11/64 in. by 20 ft.

THE ILLINOIS CENTRAL is inquiring for a 90-in. driving wheel lathe, a 48-in. by 48-in. by 30-ft. planer, two 24-in. by 14-ft. engine lathes, one 20-in. by 12-ft. lathe, one 18-in. by 10-ft. lathe, one 28-in. shaper, one 24-in. shaper, one 20-in. shaper, one universal grinder, six 18-in. wheel electric double grinders and two bolt cutters, all motor driven.

A WAGE REDUCTION of 15 per cent has been accepted by masters, mates, pilots and engineers of railway ferries operating on Lake Michigan, Lake St. Clair and through the Detroit river.

Supply Trade News

The R. W. Benson Company removed its offices on June 1, from 50 Church street, to the Liggett building, Madison avenue and Forty-second street, New York City.

The American Flexible Bolt Company removed its sales offices on June 1 from 50 Church street to the Liggett building, corner of Forty-second street and Madison avenue, New York City.

The Steel Fabricating Corporation recently completed its new works and general offices at Michigan City, Ind., and has removed its executive headquarters from Harvey, Ill., to Michigan City.

Max Grant, manager of technical railway sales of the Glidden Company, Cleveland, Ohio, has left the service of that company to become manager of the railway paint department of the Acorn Refining Company, Cleveland.

The Dressel Manufacturing Corporation, New York, has established an office in the Railway Exchange, Chicago, under the supervision of De F. Lillis, who for many years was connected with the motive power department.

The Combustion Engineering Corporation, 43 Broad street, New York, has removed its Philadelphia, Pa. branch office from 1112 Lincoln building to the tenth floor of the Finance building. This territory is under the management of W. C. Strips.

The Vacuum Oil Company, 61 Broadway, New York City, has opened new branch offices at Buffalo, N. Y., and Dallas, Texas. The Buffalo office will cover New York State west of the Hudson river and the Dallas office the states of Texas and Oklahoma.

The Master Tool Company, 20 East St. Clair avenue, Cleveland, Ohio, has been organized under the laws of Ohio to manufacture a new line of pneumatic tools, and will specialize in the reclaiming of all types and makes of same. The officers of the company are: J. Nightingale, president; Charles F. Overly, vice-president, and general manager; Wm. Eckert, secretary-treasurer. C. F. Overly is manager of sales.

Obituary

Karl G. Roebing, president of John A. Roebing's Sons Company, Trenton, N. J., died at Springlake, N. J., on May 29, while playing golf. He was born at Trenton in 1873. Mr. Roebing was graduated from Lawrenceville school and from Princeton University in the class of 1894. He went with the Roebing Company immediately after graduation and in 1918 was elected president of the company.

Alexis I. du Pont, secretary and director of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., died on May 30, at Wilmington after an illness of ten days. He was born in Wilmington in 1869, and graduated from Harvard in 1892. After graduation he took up work with the du Pont Company, and had long been associated with the other members of his family in many of the large undertakings connected with their name.

Trade Publications

WATER SOFTENING EQUIPMENT.—The Graver Corporation, Chicago, has prepared three publications on water purification equipment which are of interest to railroads, Bulletins 507 and 2C being respectively a 12-page and 2-page illustrated description of the company's continuous type, cold water softening systems for small water stations and its line of quartz sand pressure filters, while Bulletin 506 is a 24-page illustrated description of its continuous softeners for large railroad stations. The latter bulletin also gives information on the conversion of existing water tanks into softeners and demonstrates and illustrates the adaptability of this system to the conical bottom steel roadside tanks.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company which was noted in the *Railway Age* of April 29 (page 1052) as accepting bids in co-operation with the railroad Y. M. C. A. for the construction of an addition to the Y. M. C. A. building at Topeka, Kansas, to cost approximately \$25,000, has awarded a contract for this work to Jerome Moss, Chicago.

CHICAGO, BURLINGTON & QUINCY.—This company is accepting bids for the remodeling of its railway mail terminal building at Omaha, Nebr.

CHICAGO UNION STATION.—This company, which was noted in the *Railway Age* of May 27 (page 1246) as having closed bids on May 26 for the completion of the filled portion of the Polk street viaduct, Chicago, and the construction of a viaduct on Van Buren street, between Canal street and the Chicago river, has awarded contracts for this work to the Underground Construction Company, Chicago.

DETROIT-TOLEDO SHORE LINE.—This company has awarded a contract to the Ogle Construction Company, Chicago, for the construction of a 70-ton steel coaling station at Dearoad, Michigan.

ILLINOIS CENTRAL.—This company, which was noted in the *Railway Age* of May 13 (page 1144) as accepting bids for the construction of the substructure for its bridge over the tracks of the Chicago, Milwaukee & St. Paul, at Genoa, Ill., to cost approximately \$30,000, has awarded the contract for this work to Joseph E. Nelson & Sons, Chicago. This company has also awarded a contract for concrete culvert work in connection with the improvements to the yards at Clinton, Ill., to Bates & Rogers, Chicago, at a cost of about \$25,000.

ILLINOIS CENTRAL.—This company has awarded a contract to the Joseph E. Nelson & Sons for the construction of the substructure of a new overcrossing of the Illinois Central over the Chicago, Milwaukee & St. Paul at Genoa, Ill. The work will consist of the building of two concrete abutments at an estimated cost of \$40,000.

MISSOURI PACIFIC.—This road has awarded a contract to Joseph E. Nelson & Sons for the construction of pumping stations at Guion, Ark., Cotter, Comal and Myrtle, and Branson, Mo., at an estimated cost of \$80,000.

NASHVILLE, TENN.—The Board of Transportation of this city has awarded a contract to Foster, Creighton & Company, Nashville, for the construction of a rail and river terminal building in that city to cost about \$300,000. The structure will be a five-story reinforced concrete dock and warehouse, 140 ft. by 300 ft., and will be equipped with elevators and cranes for handling package freight.

UNION PACIFIC.—This road has awarded a contract to Joseph E. Nelson & Sons for the construction of a concrete and brick interlocking tower at Council Bluffs, Iowa.

WABASH.—This company is accepting bids for the construction of a new 100 ft. turntable with a concrete base at Tilton, Illinois.

WABASH.—This company, which was noted in the *Railway Age* of May 20, as accepting bids for the construction of a brick or stucco passenger station at Macon, Mo., with dimensions of 122 ft. by 24 ft., has awarded the contract for this work to the Unit Construction Company, St. Louis, Mo.

The MISSISSIPPI CENTRAL has nearly or quite completed negotiations for trackage rights by which it will run trains through to Mobile, Ala., over the Gulf, Mobile & Northern. The eastern terminus of the Mississippi Central is at Hattiesburg, Miss., the western terminus of the Hattiesburg branch of the Gulf, Mobile & Northern, whence the distance southeast to Mobile is 96 miles.

Railway Financial News

ALASKA ANTHRACITE RAILROAD.—Authorized to Issue Bonds.—This company has been authorized by the Interstate Commerce Commission to issue and sell at not less than 90 per cent of par and accrued interest \$1,500,000 of first mortgage 6 per cent, 20-year gold bonds, the proceeds to be used to pay for construction and equipment and to discharge bonds and other indebtedness. The company's railroad is to extend from a point on Controller Bay, Alaska, northwardly to the Bering river coal fields or branches. Twenty-two miles of the line had been constructed when work was suspended in 1917.

BALTIMORE & OHIO.—Authorized to Assume Liability.—This company has been authorized by the Interstate Commerce Commission to assume obligation or liability to the extent of 68.64 per cent in respect of \$640,000 of equipment trust certificates issued under an equipment trust of the Seaboard Air Line. The Baltimore & Ohio desires to purchase the leasehold interest of the Seaboard Air Line in 16 Mallet locomotives purchased under this trust and to pay among other things, as rental, amounts equal to 68.64 per cent of the remaining half-yearly payments and other amounts.

BALTIMORE & OHIO.—Asks Authority to Issue Bonds.—This company and various subsidiaries have applied to the Interstate Commerce Commission for authority to nominally issue \$1,624,000 of collateral and refunding 6 per cent mortgage bonds to be used as collateral.

BOSTON, CAPE COD & NEW YORK CANAL COMPANY.—Referees Report on Compensation.—A board of referees appointed by the Interstate Commerce Commission to report on the just compensation for the use of this property by the government during the period of federal control has reported that the period of federal control of the property extended from July 25, 1918, to March 1, 1920, but that it is unable on the evidence submitted to find and report any sum of money as the just compensation calculated on an annual basis to be paid by the United States for the use of the property. It is unable to find that the property had an actual rental value which can be determined. The board reported on the cost of certain items of deferred maintenance and the cost of dredging the approach to the channel, but did not allocate it as between current and deferred maintenance. The board also reported a sum as the cost of additions and betterments properly chargeable to capital account and as the value of personal property taken under federal control.

CHICAGO & NORTH WESTERN.—Annual Report.—A review of this company's annual report for 1920 appears on another page of this issue.

CHICAGO & WESTERN INDIANA.—Authorized to Issue Bonds.—This company has been authorized by the Interstate Commerce Commission to issue \$584,000 of consolidated 50-year gold bonds and to deliver them to the company's tenants in accordance with certain leases and the mortgage under which they are issued. The commission ordered the dismissal of part of the company's application, requesting authority covering the issue of \$130,000 of such bonds on September 1, 1920, and requesting approval of the action of the officers in delivering the bonds to tenant companies.

CHICAGO, BURLINGTON & QUINCY.—Annual Report.—The corporate income account for the year ended December 31, 1920, compares with the previous year, as follows:

	1920	1919
Standard return (January and February, 1920; full year 1919).....	\$5,560,114	\$33,360,683
Operating revenues (ten months):		
Freight	110,385,624	.....
Passenger	31,445,172	.....
Total operating revenues, inc. other.....	\$155,483,805	.....
Operating expenses (ten months):		
Maintenance of ways and structures.....	\$28,367,933	.....
Maintenance of equipment.....	36,353,037	.....
Traffic	1,580,803	.....
Transportation	69,529,775	.....

General	4,557,894	284,839*
Total operating expenses.....	\$142,017,420	\$284,839
Net	\$19,026,499	\$33,075,844
Railway tax accruals.....	\$7,707,713	\$2,340,838†
Railway operating income and standard return.....	\$11,230,951	\$30,735,006
Total non-operating income.....	\$19,476,939	\$1,146,124
Gross income	\$30,706,991	\$31,881,131
Interest on funded debt.....	\$6,816,006	\$6,669,587
Total deductions from gross income.....	\$7,782,627	\$8,338,660
Net income	\$22,924,364	\$23,542,471
Sinking funds	\$231,078	\$502,255
Dividends	8,867,128	8,867,128
Income balance transferred to profit and loss	\$13,826,158	\$14,173,088

*Corporate. †War tax only.

The annual report of the Chicago, Burlington & Quincy will be reviewed editorially in an early issue.

CHICAGO, BURLINGTON & QUINCY.—Dividend Increased.—The directors on May 26 declared a dividend of 5 per cent, payable June 25 to holders of record June 20. President Hale Holden stated, after the meeting of the board, that the payment was not voted on a regular basis and that, although the question of continuing the old 8 per cent rate had been discussed, it was decided that it would be best to simply declare a 5 per cent dividend without reference to the annual rate.

The indication is, according to the Wall Street Journal, that the directors contemplate placing the Burlington stock on a 10 per cent annual basis. The Burlington's outstanding capital stock now amounts to approximately \$170,000,000. A 10 per cent dividend would amount to \$17,000,000, compared with former 8 per cent dividend on the \$110,000,000 capital stock, previously outstanding amounting to \$8,800,000. It is known that the owning lines, the Northern Pacific and the Great Northern, favor an increase in the amount received from the Burlington's dividend sufficient to cover the additional interest charges on the new joint 6½ per cent bonds. A 10 per cent dividend on the Burlington's increased capital stock would cover this additional charge with a small margin to spare.

CHICAGO, ROCK ISLAND & PACIFIC.—Authorized to Issue Bonds.—This company has been authorized by the Interstate Commerce Commission to issue \$1,000,000 of general mortgage gold bonds to be delivered to the trustee under its first and refunding mortgage and to issue \$1,000,000 of first and refunding mortgage bonds to be pledged as collateral security for its short term notes.

CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA.—A review of this company's annual report for 1920 appears on another page of this issue.

CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA.—Equipment Trusts Offered.—White, Weld & Co., New York, are offering \$760,000 7 per cent equipment trust gold certificates at prices to yield from 6.50 per cent to 6.40 per cent, according to maturity. They are dated January 1, 1921, and due, \$95,000 annually, January 1, 1924 to 1931, inclusive. The equipment against which these certificates are to be issued cost approximately \$962,800, of which amount 20 per cent is paid in cash by the railway company. It is all new and consists of six Mikado locomotives, four switch engines and 125 stock cars.

CHICAGO UNION STATION COMPANY.—Bonds Sold.—Kuhn, Loeb & Co., Lee, Higginson & Co., the National City Company, the First National Bank of New York and the Illinois Trust & Savings Bank of Chicago have sold \$6,000,000 first mortgage 6½ per cent bonds, due July 1, 1963, at 101 and accrued interest. The principal and interest are guaranteed jointly and severally by the Chicago, Burlington & Quincy, the Chicago, Milwaukee & St. Paul, the Pittsburgh, Cincinnati, Chicago & St. Louis Railroads, and the Pennsylvania Company.

COLORADO & SOUTHERN.—Dividend Declared.—This company has declared the regular dividend of 2 per cent on the first preferred stock, payable June 30, 1921, to holders of record June 18, 1921.

The dividend will be paid out of surplus income of the calendar year 1921. As has been the custom for several years past, no action was taken at this time on the second preferred. Dividends on the second preferred stock are payable only after the first preferred dividend had

been paid. If the regular semi-annual dividend on the second preferred were paid at this time, and it was found in the second half of the year that earnings were not sufficient to cover the second half year's 2 per cent dividend on the first preferred, the company would declare a dividend on the second preferred before full payment had been made on the first preferred.

CUMBERLAND & MANCHESTER.—Loan Approved.—The Interstate Commerce Commission has approved a loan to this company of \$375,000 from the revolving fund to assist the company in meeting maturing indebtedness consisting largely of short term notes.

DENVER & RIO GRANDE.—Transfer Date Postponed.—The date for completing the transfer of this road, sold November 20 at a foreclosure sale to representatives of the Western Pacific, has been extended to June 30 by an order signed by Federal Judges Lewis and Sanborn. The transfer was to have been completed May 30.

DENVER & RIO GRANDE WESTERN.—Hearing on No-Par-Value Stock.—See El Paso & Southwestern.

EL PASO & SOUTHWESTERN.—Hearing on No-Par-Value Stock.—The Interstate Commerce Commission on May 26 held a hearing on the applications of the El Paso & Southwestern, the Denver & Rio Grande Western, the Western Pacific and the Fort Smith & Western for authority to issue capital stock certificates having no par value. There was no opposition at the hearing, but the commissioners asked numerous questions. Frederick Strauss, who was a member of the Railroad Securities Commission which recommended the use of stock certificates of no par value, discussed the subject from the economic standpoint without reference to the particular applications of the roads. He said that the most important principle of sound finance is that the superstructure of credit shall rest on an adequately firm base of capital, without which the stability of the financial structure is impaired by an ever-growing debt with ever-growing fixed charges. It is difficult to sell stock at less than par, and a railroad whose stock is below par finds its condition becoming worse because of the necessity for financing by increasing its debt. He also pointed out that there is no such thing as constant value; all value fluctuates with use, depending upon various factors, and the fact that a share states that \$100 has been paid to the company is of historic interest only.

W. C. Osborn, representing the El Paso & Southwestern, said that his company desired to get away from any statement of the value of its stock, particularly prior to a valuation of the property by the Interstate Commerce Commission.

A. C. Dustin, representing the Fort Smith & Western, said his company is not authorized to issue anything other than no-par stock.

John J. Bowie, representing the Denver & Rio Grande Western and the Western Pacific, explained the intricacies of the reorganization of those companies, which is now being carried out, and he warned the commission against undertaking to assume the exercise of business judgment of executive committees or boards of directors in connection with railroad financing.

FORT SMITH & WESTERN.—Hearing on No-Par-Value Stock.—See El Paso & Southwestern.

HUNTINGTON & BROAD TOP MOUNTAIN.—Asks Authority to Issue Car Trust Certificates.—This company has applied to the Interstate Commerce Commission for authority to issue car trust certificates to the amount of \$300,000 for the purchase of four locomotives and ten passenger cars, which cost \$411,393. Arrangements have been made for the sale of the certificates at 88.61 per cent of par.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—Annual Report.—The income account for the year ended December 31, 1920, compares with the previous year, as follows:

	1920	1919
Operating income.....	\$826,246	
Income from lease of road.....		\$10,619,875*
U. S. Government standard return for operation of Soo Line and Wisconsin Central for January and February, 1920.....	1,763,163	
Estimated amount of guaranteed compensation for period March 1, 1920, to August 31, 1920.....	5,289,489	
Due from U. S. Government under guaranty of Sec. 209, Transportation Act of 1920, for deficit incurred in operation of road March 1, 1920, to August 31, 1920.....	269,815	
Gross income.....	\$9,749,769	\$11,469,772

Rent for leased roads.....	\$2,303,924	\$3,487,435
(Wisconsin Central's proportion of government compensation)		
Interest on mortgage bonds.....	2,913,850	2,913,921
Total deductions from gross income.....	\$6,665,156	\$7,649,994
Net income transferred to profit and loss.....	\$3,084,613	\$3,819,779

Dividends:		
Preferred stock, 7 per cent.....	\$882,238	\$882,238
Common stock, 7 per cent.....	1,764,476	1,764,476
Balance carried December 31.....	22,290,308	21,593,335

*From U. S. Government, account standard return.....		\$10,619,875
Account M., St. P. & S. Ste. M.....	7,123,091	
Account Wisconsin Central.....	3,487,434	
From Minn. Northwestern Electric Railway Company.....		9,350
		\$10,619,875

*The annual report of the Minneapolis, St. Paul and Sault Ste. Marie will be reviewed editorially in an early issue.

MISSOURI-ILLINOIS.—Authorized to Issue Securities.—This company has been authorized by the Interstate Commerce Commission to issue at par, for cash and in payment for certain property, \$1,500,000 of capital stock and to issue and sell at par \$300,000 of first mortgage 7 per cent bonds.

READING COMPANY.—Prosser Committee to Join in Appeal.—Seward Prosser, president of the Bankers' Trust Company, denies that he has resigned as president of the Reading common stockholders' committee. According to Mr. Prosser, a sub-committee, representing the larger holders in the committee, has been formed, with E. P. Maynard, president of the Brooklyn Trust Company, as chairman, and Frederic F. Gunnison, vice-president of the Lawyers' Title & Trust Company, as secretary, to co-operate with the Henry Evans insurance companies in appealing from the decision of the Federal Court in Philadelphia. An initial assessment of \$25,000 will be levied to defray legal expenses.

UNION PACIFIC.—Asks Authority to Guarantee Bonds.—This company and the Oregon-Washington Railway & Navigation Company have filed a joint application with the Interstate Commerce Commission for authority to guarantee \$14,755,500 of O. W. R. & N. first and refunding mortgage 4 per cent bonds now held in the Union Pacific treasury, which are part of the purchase price to be paid by the Union Pacific to W. A. Clark for his half-interest in the Los Angeles & Salt Lake. The application also provides for a modification of the tax provision in the bonds relating to the deduction of federal income taxes.

WESTERN PACIFIC.—Hearing on No-Par-Value Stock.—See El Paso & Southwestern.

Closing of D. & R. G. Sale Delayed—See Denver & Rio Grande.

Guaranty Certificates Issued

The Interstate Commerce Commission has issued certificates for partial payments on account of the six-months' guaranty for 1920 to:

Chicago, Milwaukee & St. Paul.....	3,000,000
Grand Trunk as lessee of Atlantic & St. Lawrence.....	\$425,000
Grand Trunk of Canada.....	22,000
Grand Trunk Western.....	1,000,000
Kanawha & Michigan.....	163,000
Lake Charles & Northern.....	21,000
Louisiana & Texas Railroad & Steamship Company.....	85,000
Minneapolis & St. Louis.....	390,000
Rutland.....	225,000
Southern Pacific.....	4,200,000

Dividends Declared

Boston & Albany.—2½ per cent, quarterly, payable June 30, to holders of record May 31.

Buffalo & Susquehanna.—Common, 1¼ per cent, quarterly; preferred, 2 per cent, semi-annually; both payable June 30, to holders of record June 15.

Chicago, Burlington & Quincy.—5 per cent, payable June 25 to holders of record June 20.

Chicago, Rock Island & Pacific.—6 per cent preferred, 3 per cent, semi-annually; 7 per cent preferred, 3½ per cent, semi-annually, both payable June 30, to holders of record June 10.

Colorado & Southern.—First preferred, 2 per cent semi-annually, payable June 30, to holders of record June 18.

Delaware, Lackawanna & Western.—1¼ per cent, quarterly, payable July 1, to holders of record July 14.

Fonda, Johnstown & Gloversville.—Preferred, 1½ per cent, quarterly, payable June 15, to holders of record June 10.

Lehigh Valley.—Common, 1¼ per cent, quarterly; preferred, 2½ per cent, quarterly; both payable July 2 to stock of record June 11.

Morris & Essex.—\$1.75 semi-annually, extra, payable July 1, to holders of record June 9.

Annual Report

Sixty-first Annual Report of the Chicago and North Western Railway Company

Year Ending December 31, 1920

REPORT OF THE BOARD OF DIRECTORS

To the Stockholders of the Chicago and North Western Railway Company: The Board of Directors submits herewith its report of the operations and affairs of the Company for the year ending December 31, 1920.

As the railway property of the Company was operated by the Director General of Railroads during the months of January and February, 1920, the results of its operation by the Company, shown in this report, cover, unless otherwise specifically stated, the ten months from March 1 to December 31, 1920, inclusive.

OPERATING REVENUES:		
Freight	\$94,570,196.03	
Passenger	32,126,380.20	
Other Transportation	10,850,286.61	
Incidental	3,208,765.05	\$140,755,627.89
OPERATING EXPENSES (92.54 per cent. of Operating Revenues)	130,252,212.33	
Net Revenue from Railway Operations, carried forward.	\$10,503,415.56	
RAILWAY TAX ACCRUALS (5.37 per cent. of Operating Revenues)	\$7,557,888.55	
UNCOLLECTIBLE RAILWAY REVENUES	28,276.09	
	7,586,164.64	
Railway Operating Income	\$2,917,250.92	
EQUIPMENT AND JOINT FACILITY RENTS—Net Debit	2,217,598.77	
Net Railway Operating Income	\$699,652.15	
NONOPERATING INCOME:		
Accrued Compensation for lease of road to U. S. Government (January and February, 1920)	\$3,802,999.80	
Account amount due from U. S. Government under Guaranty Section of Transportation Act, 1920	16,509,184.88	
Rental Income	704,477.83	
Dividend Income	1,321,243.90	
Income from Funded Securities	222,319.31	
Income from Unfunded Securities and Accounts	490,073.52	
Other Items	61,611.50	
	23,111,910.74	
Gross Income	\$23,811,562.89	
DEDUCTIONS FROM GROSS INCOME:		
Rental Payments	\$124,056.12	
Interest on Funded Debt	1,440,293.55	
Interest on Unfunded Debt	360,398.03	
Other Deductions	340,958.68	
	11,265,706.38	
Net Income	\$12,545,856.51	
DISPOSITION OF NET INCOME:		
Sinking Funds	\$86,002.56	
Dividends:		
7% on Preferred Stock	1,567,650.00	
5% on Common Stock	7,257,625.00	
	8,911,877.56	
Balance Income for the Year	\$3,633,978.95	

GENERAL REMARKS

On March 1, 1920, the property was returned after having been in the possession and under the control of the United States Government for a period of twenty-six months.

As was stated in the last Annual Report, the Transportation Act, 1920, provides that for the period of six months beginning March 1, 1920, and ending August 31, 1920, any carrier desiring to do so could accept a guaranty operating in effect equal to one-half of its compensation during Federal control, and you were advised that the Board of Directors accepted this guaranty.

The total amount due the Company under the guaranty provisions of the Transportation Act, 1920, cannot be definitely stated until all the transactions applying to the guaranty period have been ascertained and the allowances for maintenance and additional compensation determined. The total of \$16,509,184.88, included in the income statements, as published in this report, as "Account amount due," includes only the transactions applying to the period that have been accounted for as of December 31, 1920. Information requested by the Interstate Commerce Commission to enable them to determine the amount due has been furnished as requested.

The account with the Director General of Railroads has not yet been settled. On November 23, 1920, claim was made against the United States Railroad Administration which includes an amount for undermaintenance, and for deficiency in materials and supplies turned back at the end of Federal control, as compared with the amount on hand when the property was taken over. The remainder of the claim was for unpaid compensation, balances on open accounts, accrued interest and depreciations, and for the value of property retired during the Federal control period and not replaced, less all credits due the Railroad Administration, including amounts advanced by the Director General for the construction of additions and betterments and windups for equipment.

In winding up matters arising out of and incident to Federal control, the Federal Control Act authorized the President of the United States to inspect the property and receive actual systems of transportation to secure any information concerning matters arising during Federal control, and the carriers were required to provide all reasonable facilities and upon request of the President to furnish all necessary and proper information and reports compiled from records kept during the period of Federal control, and this to be at the expense of the carriers. As a result, as was to be expected,

there were voluminous reports required, which took much time and a large force of employees to prepare. The work of compilation was carried forward diligently, and as a result all of the reports and statements called for by the Railroad Administration in regard to settlement matters were finished strictly in accordance with the instructions of the Railroad Administration and promptly filed, so that, so far as it is known to your officers and directors, no delay in settling the affairs of Federal control is attributable to any lack of diligence on the part of the company nor for the want of any necessary information.

During the period of Federal control many things occurred which have had far-reaching effect upon the affairs of the company, the most significant of which was the increase in wages. During the year 1917 the payroll of officers and employees amounted to \$47,346,247.29. For the year 1920 it amounted to \$100,550,395.72.

During Federal control practically all of the labor not previously unionized became unionized, and there are now, in addition to the brotherhoods of engineers and trainmen and switchmen's unions, unions representing various shopmen, maintenance of way men, telegraphers, station agents and station employees, freight handlers, etc., and clerks. Some of these organizations are affiliated with the American Federation of Labor and others are not.

In the month of July, 1920, the Railroad Labor Board, a body created by the Transportation Act, 1920, granted an increase in wages applicable to all employees excepting certain subordinate officials and the technical employees of the Engineering Department, which increased their compensation approximately 2%. This increase was made effective May 1, 1920, and due to this award of the Labor Board and other necessary wage adjustments incident thereto, the operating expenses were increased from May 1 to December 31, 1920, \$12,421,000. For a full year's operation this award alone requires an amount greater than the total of the interest charges for the entire year and the dividends for a half year.

The property, when returned to the Company at the end of Federal control, was not in as good repair nor in as complete equipment as it was on January 1, 1919, and over by the Government. The President stated in his proclamation of December 26, 1917, and the Federal Control Act guaranteed that the property would be returned in as good condition as when taken over, and the claim made against the Director General contains the amount necessary to make good this deficiency.

CONSTRUCTION AND MAINTENANCE DURING THE YEAR 1920

Owing to the difficulty of securing material and labor, as well as to the necessity for limiting construction expenditures to the minimum of absolute necessity due to the high cost of labor and material, a very small amount of construction work was done during the year.

Chicago Terminal Elevator.—During the year 1919 an enlargement of the Chicago terminal grain elevator was undertaken, consisting of the construction of seventy-eight bins with interspaces at the storage house, in order to complete the elevator upon the plan originally adopted. This additional construction increased the storage capacity about 3,364,000 bushels, and brings the total capacity of this elevator to 10,000,000 bushels. The erection of the bins was completed and they were put in service on September 1, 1920.

Clinton, Iowa.—During the year 1920 the construction of a modern passenger station and heating plant at Clinton, Iowa, was completed. The station was put in service on May 6, 1920. The work of constructing subways at two streets, and the elevation of the tracks forming a part of the project have been postponed until a more opportune time. The company is required by ordinance to complete one of the subways in 1921, and to complete the other subway and the entire project in 1922.

Hastings, Neb.—A passenger station of brick on concrete foundation with basement to accommodate the steam heating plant was constructed. The former passenger station at this point was destroyed by fire.

Glen Rock, Wyo.—A passenger and freight station of frame construction, with cement stucco finish on the exterior, was completed and put in service. This station was constructed to accommodate a community which has grown rapidly in the last few years.

Ely, Neb.—A passenger and freight station of frame construction, on timber foundation, was constructed and put in service.

Iraun, Neb.—A freight and passenger station of frame construction, on timber foundation, was constructed and put in service.

Franklin Grove, Ill.—A passenger station of concrete tile with brick facing to the level of the window sills and cement stucco finish above, was constructed. The station building formerly located here was destroyed by fire.

Fend du Lac, Wis.—A frame ice house, on concrete foundation and having a capacity of 10,000 tons of ice, with gallery conveyor for filling the house, was constructed. The ice house previously located at this point was destroyed by fire.

Moyfair, Ill.—A one-story freight house, on concrete foundation and supplied with steam heating plant, was constructed. Team yards and tracks were also constructed at this point.

Chicago, Ill.—A two-story brick building was erected at Erie Street coach yard to provide quarters for the storage of material and tools used at this yard and accommodation for employees. The construction of this structure was made a passenger station on account of quarters previously used having been destroyed by fire.

Ashland, Wis.—An extension 840 feet in length is being made to ore dock No. 3. This extension is of timber construction of the same character as the existing dock, and will add 140 pockets to the dock, making its total capacity 300 pockets. This extension is necessary to take care of the additional ore traffic which is increasing rapidly from the territory served by this dock.

Passing tracks were constructed at the following points:

- Butte, Wis.**—Existing track extended 3,100 feet in length.
- Eyota, Minn.**—New passing track constructed 5,000 feet in length.
- Haverhill, Minn.**—New passing track constructed 5,000 feet in length.
- Lime Siding, Minn.**—New passing track constructed 5,000 feet in length.
- Louden, Iowa.**—New passing track constructed 4,800 feet in length.
- Newala, Iowa.**—Existing passing track was extended 3,326 feet.
- Woodruff, Wis.**—Existing passing track was extended 1,913 feet.

Nelson, Ill.—New passing track constructed 2.65 miles in length.
Beuld, Ill.—New passing track 1.13 miles in length constructed. At this point, also, tracks aggregating 3.1 miles in length were constructed for the purpose of affording facilities for cleaning and repairing coal cars.
Broadmoor, Ill.—A second main track 2.12 miles in length was constructed.

Hurley, Wis.—A new track 2,290 feet in length, connecting with the Ashland Division south of Hurley City, and extending eastward to the mines at Ironwood, Michigan, also yard tracks aggregating 11,060 feet, coaling platform, water tank, yard office, coal and oil house and coal heaver's and switchmen's quarters, were constructed to provide for the serving of the mines, access to which over previously existing tracks was cut off by the mining operations.

Chicago, Ill.—A reinforced concrete viaduct extending across the Wells Street Yard was completed and opened to traffic December 31, 1920. This structure provides an approach to a new steel bascule bridge across the Chicago River built by the City and extending from North Franklin Street on the south of the river to Orleans Street on the north, opening a new street from the loop district to the north side, north of Kinzie Street. The viaduct is 80 feet wide and carries two street car tracks. It has a roadway 48 feet wide and two sidewalks each 16 feet wide, with concrete balustrade. The main viaduct is 610 feet long.

During the year the following important bridges were constructed:
 Carrollville, Wis.

Bridge 1516½. Reinforced concrete subway at American Ave., necessary to provide grade separation.

Ripon, Wis. Bridge 1013. 20-foot concrete arch and 320 feet of earth embankment, replacing pile and timber trestle.

Bando, Ill. Bridge 1863. 118-foot deck riveted steel truss span on reinforced concrete abutment and concrete pier, replacing timber bridge.

Fox Lake, Minn. Bridge 503. 75-foot deck plate girder span on concrete abutments, replacing timber bridge.

Pisgah, Iowa. Bridge 256. 90-foot through plate girder span on pile piers, replacing timber bridge.

Rochester, Minn. Bridge 126. Three 75-foot deck plate girder spans on concrete piers, replacing two steel truss spans of inadequate strength for modern power.

Lamberton, Minn. Bridge 526. 43-foot deck plate girder on pile piers and present concrete pier, replacing portion of timber bridge.

Fremont, Neb. Bridge B-8. Platte River. 7 concrete piers constructed to replace pile piers. Part of program of replacing all pile piers in this bridge when renewal is required.

COALING STATIONS

Modern mechanically operated coaling stations were under construction and partially completed at the following points:

Clinton, Iowa. Capacity, 350 tons
 Carroll, Iowa. Capacity, 300 tons
 West Chicago, Ill. Capacity, 300 tons

MISCELLANEOUS

Kenosha, Wis.—In connection with the construction by the City of Kenosha of a new bridge over the river at Main Street, the Railway Company is completing the viaduct over the industry track leading to the Simmons Company and the Bain Wagon Company, a viaduct forming a part of the approach to the new bridge. This is about 40 per cent completed.

NEW EQUIPMENT

During the year the Company arranged for the purchase of the following new equipment to be delivered early in the year 1921:

500 Steel ore cars.
 500 Steel underframe stock cars.
 250 Steel underframe refrigerator cars.
 50 Caboose cars.
 25 Steel passenger coaches.
 9 Steel smoking cars.
 2 Steel mail cars.
 3 Steel combination baggage and mail cars.
 23 Steel baggage cars.
 40 Heavy Mikado type freight locomotives.
 20 Heavy Pacific type passenger locomotives.

RAIL RENEWALS

The following renewals were made with new rail:
 63.25 track miles 100 lb. rail
 129.15 track miles 90 lb. rail
 60.43 track miles 72 lb. rail
 .58 track miles 60 lb. rail

253.41 track miles.

The following usable rail was applied in renewals:
 22.98 track miles 100 lb.
 63.29 track miles 90 lb.
 50.23 track miles 80 lb.
 98.48 track miles 72 lb.
 64.79 track miles less than 72 lb.

299.74 track miles.

BALLASTING

3.60 miles of track ballasted with crushed stone.
 77.48 miles of track ballasted with gravel.
 (17.2 miles of the foregoing material was distributed in 1918 and 1919, but not put under the track.)
 62.32 miles of track ballasted with cinders, of which 6.5 miles was distributed in 1919, but not put under the track.

TIE RENEWALS

A total of 2,543,892 cross ties and 6,450,951 feet (board measure) of switch and bridge ties was renewed.

PROPRIETARY RAILWAYS ACQUIRED

In conformity with action taken by the stockholders at the annual meeting of April 13, 1920, on April 30, 1920, the Chicago and North Western Railway Company acquired by purchase the railway, property and franchises of the following proprietary companies, which have for many years been controlled by it through ownership of the entire capital stock.
Wyoming & North-Western Railway Company, a corporation of the State

of Wyoming, owning a single track railway extending from a connection with the Chicago and North Western Railway at Casper, Wyoming, to Lander, Wyoming, a distance of 147.89 miles.
Pierre, Rapid City and North-Western Railway Company, a corporation of the State of South Dakota, owning a single track railway extending from a connection with the Pierre and Fort Pierre Bridge Railway at Fort Pierre, South Dakota, to Rapid City, South Dakota, a distance of 163.48 miles.

Pierre and Fort Pierre Bridge Railway Company, a corporation of the State of South Dakota, owning a single track railway (and bridge over the Missouri River) extending from a connection with the Chicago and North Western Railway at Pierre, South Dakota, to a connection with the Pierre, Rapid City and North-Western Railway at Fort Pierre, South Dakota, a distance of 1.82 miles.

Belle Fourche Valley Railway Company, a corporation of the State of South Dakota, owning a single track railway extending from a connection with the Chicago and North-Western Railway at Belle Fourche, South Dakota, to Newell, South Dakota, a distance of 23.52 miles.

James River Valley and North-Western Railway Company, a corporation of the State of South Dakota, owning a single track railway extending from a connection with the Chicago and North-Western Railway at Blunt, South Dakota, to a connection with the railway of that company at Gettysburg, South Dakota, a distance of 39.55 miles.

Missouri Valley and Elmer Railway and Bridge Company, a corporation of the State of Iowa, owning a single track railway (and bridge over Missouri River) extending from a connection with the Chicago and North-Western Railway near California Junction, Iowa, to a connection with the railway of that company at Cherokee, Iowa, a distance of 1.10 miles.

Iowa Southern Railway Company, a corporation of the State of Iowa, owning a single track railway extending from a connection with the Chicago and North Western Railway near Miami, Iowa, to near Consol, Iowa, a distance of 13.75 miles.

Macomb County Extension Railway Company, a corporation of the State of Illinois, owning a single track railway extending from a connection with the Chicago and North-Western Railway at Bend, Illinois, to Staunton, Illinois, a distance of 4.15 miles.

The Ladd and Eastern Railroad Company, a corporation of the State of Illinois, owning a single track railway extending from Ladd, Illinois, to Seatonville, Illinois, a distance of 3.25 miles.

The Albany Railroad Bridge Company, a corporation of the State of Illinois, chartering the right of way to build, maintain and use a railroad bridge over the Mississippi River between a point below Fulton, Illinois, and Clinton, Iowa, a distance of 1.10 miles.

Wolf River Valley Railway Company, a corporation of the State of Wisconsin, owning a single track railway extending from a connection with the Chicago and North-Western Railway near Elton, Wisconsin, to White Lake, Wisconsin, a distance of 1.98 miles.

PENSIONS

The Company has continued its policy of awarding pensions to employees, and during the calendar year 1920, 161 employees of the Company were retired from active service and granted pensions. Of these, 91 were on account of pensions having reached the age of 70, and 70 were granted on account of employees having retired permanent physical disability.

On December 31, 1920, there were 1,102 retired employees receiving pensions. The amount paid in pensions during the year was \$385,235.42, of which \$60,081.47 was paid by the United States Railroad Administration and the balance, or \$325,153.95, was paid by the Chicago and North-Western Railway Company. The average monthly pension in force December 31, 1920, was \$3.25.

Since the inauguration of the pension system, the total payments made from January 1, 1901, to December 31, 1920, was \$3,804,030.38.

FEDERAL VALUATION

The work of valuation of the property by the Interstate Commerce Commission has been carried forward throughout the year. The field work, which was commenced in 1919, and carried on continuously from that time to December, 1920, has now been completed, with the exception of some miscellaneous items, which will be finished during the coming spring. This work is done by the Bureau of Valuation of the Interstate Commerce Commission, but the cooperation and assistance of the Railway Company is required in the matter of furnishing maps and information and the preparation of descriptive statements of the property, detailed statements of the cost of its land and equipment, as well as the rendering of active assistance in carrying out the field work and in the preparation of detailed statements of quantities, values and co-operation of the Interstate Commerce Commission and the Federal through the period. It is expected that the work of tabulation and the application of prices and the computations of the various costs, estimates of reproduction costs, etc., will be substantially completed during the year 1921, and that the Commission will be in a position to render a tentative report some time in the year 1922.

During the year 1920, \$426,549.25 was expended, of which amount \$357,632.44 was borne by the company and \$68,916.81 by the Railroad Administration. Since the commencement of this work, \$1,740,935.94 has been expended.

RATES

During the period of Federal control, rates were not advanced as the expense of operation increased. Effective August 26, 1920, however, the Interstate Commerce Commission increased the rates on interstate passenger traffic 20 per cent and on interstate freight traffic 10 per cent, and on rates from 25 to 40 per cent. Several of the State Commissions declined to make like increases on intrastate traffic, and to secure such increases and eliminate unlawful discrimination between state and interstate commerce, the Company applied to the Interstate Commerce Commission and the Federal courts, with the result that substantially all of the intrastate freight and passenger rates were given the same percentage of increase as was given to the interstate rates.

CAPITAL STOCK

There has been no change since the close of the preceding year in the Capital Stock and Scrip of the Company.

The Capital Stock authorized by the Company is Two Hundred Million Dollars (\$200,000,000), of which the following has been issued to December 31, 1920:

HELD BY THE PUBLIC:	
Common Stock and Scrip	\$145,157,128.82
Preferred Stock and Scrip	22,395,120.00
Special Stock	65,000.00
Total Stock and Scrip held by the Public	\$167,617,248.82
OWNED BY COMPANY:	
Common Stock and Scrip	\$2,342,512.15
Preferred Stock and Scrip	8,834.56
Total Stock and Scrip owned by Company	2,346,346.71
Total Capital Stock and Scrip, December 31, 1920	\$169,963,595.53

FUNDED DEBT

At the close of the preceding year the amount of Funded Debt held by the Public and in Sinking Funds was.....\$213,125,000.00

The above amount has been decreased during the year ending December 31, 1920, as follows:

By Bonds and Equipment Trust Certificates redeemed:	
C. & N. W. Ry. 30-year Debentures, 5%.....	\$10,000.00
M. L. S. & W. Ry. Consolidated First Mortgage, 6%.....	4,000.00
M. L. S. & W. Ry. Extension and Improvement Sinking Fund Mortgage, 5%.....	43,000.00
C. & N. W. Ry. Sinking Fund of 1879, 5%.....	80,000.00
C. & N. W. Ry. Sinking Fund Debentures of 1933, 5%.....	285,000.00
C. & N. W. Ry. Equipment Trust Certificates of 1912, 4½%:	
Series A.....	\$300,000.00
Series B.....	300,000.00
Series C.....	400,000.00
	<u>1,000,000.00</u>
	\$1,422,000.00

By Bonds and Equipment Trust Certificates transferred to the Treasury from the Sinking Funds on W. & St. P. R. R. (Ext. Western Div.) and North Western Union Ry. First Mortgage Bonds:

C. & N. W. Ry. 30-year Debentures, 5%.....	\$46,000.00
M. L. S. & W. Ry. Extension and Improvement Sinking Fund Mortgage, 5%.....	22,000.00
C. & N. W. Ry. Sinking Fund of 1879, 6%.....	19,000.00
C. & N. W. Ry. Sinking Fund of 1879, 5%.....	67,000.00
Wisconsin Northern Ry. First Mtge., 4%.....	440,000.00
C. & N. W. Ry. Sinking Fund Debentures of 1933, 5%.....	45,000.00
Mankato and New Ulm Ry. First Mtge., 3½%.....	416,000.00
F. E. & M. V. R. R. Consolidated, 6%.....	1,000.00
C. & N. W. Ry. Equipment Trust Certificates of 1912, Series C, 4½%.....	4,000.00
	<u>\$1,060,000.00</u>
Total Funded Debt redeemed and transferred.....	2,482,000.00
	\$210,643,000.00

And the above amount has been increased by Bonds and Notes sold during the year, as follows:

C. & N. W. Ry. 10-Year Secured Gold Bonds, 7% (secured by \$2,500,000.00 General Mortgage Gold Bonds and \$15,000,000.00 First and Refunding Mortgage Bonds).....	\$15,000,000.00
C. & N. W. Ry. Equipment Trust Certificates of 1920, 6% (secured by equipment allocated to Company by United States Government).....	9,973,500.00
	<u>24,973,500.00</u>
Leaving Funded Debt held by the Public December 31, 1920.....	\$235,616,500.00

BONDS IN THE TREASURY AND DUE FROM TRUSTEE

At the close of the preceding year the amount of the Company's unpledged Bonds and Equipment Trust Certificates in the Treasury and Due from Trustee was.....\$19,749,600.00

The above amount has been increased during the year ending December 31, 1920, as follows:

Bonds Redeemed, exchangeable for General Mortgage Gold Bonds of 1937:	
W. & St. P. R. R. (Extension Western Division), First Mortgage, 7%, redeemed.....	\$14,400.00
North Western Union Ry. First Mortgage, 7%, redeemed.....	20,000.00
C. & N. W. Ry. 30-year Debentures, 5%, redeemed.....	10,000.00
M. L. S. & W. Ry. Consolidated First Mortgage, 6%, redeemed.....	4,000.00
M. L. S. & W. Ry. Extension and Improvement Sinking Fund Mortgage, 5%, redeemed.....	43,000.00
C. & N. W. Ry. Sinking Fund of 1879, 5%, redeemed.....	80,000.00
C. & N. W. Ry. Sinking Fund Debentures of 1933, 5%, redeemed.....	285,000.00
	<u>\$456,400.00</u>
C. & N. W. Ry. General Mortgage Gold Bonds of 1987, due from Trustee on account of Construction Expenditures made during the year.....	1,000,000.00
	<u>\$1,456,400.00</u>

Bonds and Equipment Trust Certificates transferred to the Treasury from the Sinking Funds on W. & St. P. R. R. (Ext. Western Div.) and North Western Union Ry. First Mortgage Bonds:

C. & N. W. Ry. 30-year Debentures, 5%.....	\$46,000.00
M. L. S. & W. Ry. Extension and Improvement Sinking Fund Mortgage, 5%.....	22,000.00
C. & N. W. Ry. Sinking Fund of 1879, 6%.....	19,000.00
C. & N. W. Ry. Sinking Fund of 1879, 5%.....	67,000.00
Wisconsin Northern Ry. First Mtge., 4%.....	440,000.00
C. & N. W. Ry. Sinking Fund Debentures of 1933, 5%.....	45,000.00
Mankato and New Ulm Ry. First Mortgage, 3½%.....	416,000.00
F. E. & M. V. R. R. Consolidated, 6%.....	1,000.00
C. & N. W. Ry. Equipment Trust Certificates of 1912, Series C, 4½%.....	4,000.00
	<u>\$1,060,000.00</u>
	2,516,400.00
	<u>\$22,266,000.00</u>

And the above amount has been decreased during the year, as follows:

C. & N. W. Ry. Equipment Trust Certificates of 1913, 4½%, retired:	
--	--

Series D.....	\$400,000.00
Series E.....	485,000.00
Series F.....	115,000.00
C. & N. W. Ry. Equipment Trust Certificates of 1917, 5%, retired:	
Series G.....	422,000.00
Series H.....	400,000.00
Series I.....	178,000.00
C. & N. W. Ry. General Mortgage Gold Bonds of 1987, 5% (in Treasury on December 31, 1919), deposited as part security for the C. & N. W. Ry. 10-Year Secured Gold Bonds sold during the year.....	2,500,000.00
	<u>4,500,000.00</u>

Total in Treasury unpledged December 31, 1920.....\$17,766,000.00

In addition to the bonds in the Treasury, as above, the following bonds owned by the Company are pledged as security for the C. & N. W. Ry. 10-Year Secured Gold Bonds sold during the year:

C. & N. W. Ry. General Mortgage Gold of 1987, 5%.....	\$2,500,000.00
C. & N. W. Ry. First and Refunding Mortgage, 6% (issued during the year on account of construction expenditures made during the preceding five years).....	15,000,000.00
Total.....	<u>\$17,500,000.00</u>

MILES OF RAILROAD

The total number of miles of railroad owned December 31, 1920, was.....8,328.86 miles

In addition to which the Company operated under Trackage Rights:

Peoria & Pekin Union Railway (in the City of Peoria, Ill.).....	2.02 miles
New York Central Railroad (Churchill to Ladd, Ill.).....	2.80 "
Union Pacific Railroad (Broadway Station, Council Bluffs, Iowa, to South Omaha, Neb.).....	8.73 "
Chicago, St. Paul, Minneapolis & Omaha Railway:	
Blair to Omaha, Neb.....	24.70 "
Elroy to Wyeville, Wis.....	22.79 "
In Sioux City, Iowa.....	2.28 "
Illinois Central Railroad (Sioux City to Wren, Iowa).....	10.10 "
	<u>73.42 "</u>

Total Miles of Railroad Operated December 31, 1920.....8,402.28 miles

The above mileage is located as follows:

In Illinois.....	824.53 miles
Wisconsin.....	2,160.12 "
Michigan.....	510.90 "
Minnesota.....	650.30 "
Iowa.....	1,632.55 "
North Dakota.....	14.28 "
South Dakota.....	1,230.45 "
Nebraska.....	1,100.80 "
Wyoming.....	278.35 "
Total.....	<u>8,402.28 miles</u>

LANDS

During the year ending December 31, 1920, 16,396.11 acres and 92 town lots of the Company's Land Grant lands were sold for the total consideration of \$877,400.18. The number of acres remaining in the several Grants December 31, 1920, amounted to 268,133.16 acres, of which 42,074.51 acres were under contract for sale, leaving unsold 226,058.65 acres.

The Board announces with sorrow the death, on July 22, 1920, of Mr. William K. Vanderbilt (Senior), who served as a director from September 27, 1884, and as a member of the Executive Committee from June 4, 1891, to the time of his death.

Appended hereto may be found statements, accounts and statistics and the condition of the Company's affairs on December 31, 1920.

By order of the Board of Directors.
W. H. FINLEY, President.
Chicago, April 1, 1921.

PROFIT AND LOSS—DECEMBER 31, 1920

	Cr.
Credit Balance, December 31, 1919.....	\$55,531,371.42
Expenses for the Year Ending December 31, 1920:	
Balance Income brought forward from Income Account (see statement, page 32).....	3,633,978.95
Donations.....	42,279.41
Net Profit from Sale of Land Grant Lands.....	909,320.46
Amount transferred from "Appropriated Surplus" on account of the retirement of W. & St. P. R. R. (Extension Western Division) and North Western Union Ry. First Mortgage Bonds.....	2,541,036.62
	<u>\$62,657,986.86</u>
Dr.	
CHARGES FOR THE YEAR ENDING DECEMBER 31, 1920:	
Depreciation accrued prior to July 1, 1907, on equipment retired or changed from one class to another.....	\$443,827.05
Net loss on property sold or abandoned and not replaced.....	181,818.71
Debt discount extinguished through surplus.....	723,803.35
Miscellaneous Debits (Net).....	568,140.01

Balance Credit, December 31, 1920, carried to Balance Sheet.....\$62,657,986.86

Railway Officers

Financial, Legal and Accounting

George N. Yard, acting secretary and treasurer of the Gulf, Colorado & Santa Fe, has been elected secretary and treasurer with headquarters at Galveston, Texas.

J. G. Lynch has been appointed freight claim agent of the Louisiana Railway & Navigation, succeeding J. N. Campbell, who has been promoted to general freight and passenger agent, effective May 23.

J. C. Hume, division claim agent of the International & Great Northern, with headquarters at San Antonio, Tex., has been promoted to general claim agent, with headquarters at Palestine, Tex., succeeding J. S. O'Flynn, deceased.

Operating

W. H. Johnson, superintendent of terminals of the Norfolk & Western with headquarters at Norfolk, Va., has been appointed general agent and superintendent of terminals, effective June 1.

Charles M. Shriver, assistant superintendent of the Baltimore terminals of the Baltimore & Ohio, has been promoted to superintendent of terminals to fill the vacancy made by the advancement of F. G. Hoskins to superintendent of the Baltimore division, effective June 1. Mr. Shriver is 28 years old, having entered the service of the Baltimore & Ohio 11 years ago as a machinist helper at the Mt. Clare shops. After serving his apprenticeship, he served as a machinist at the Riverside shops and later was promoted to fuel inspector. On April 1, 1916, he was promoted to assistant road foreman of engines at Cumberland, Md., and, in March, 1917, he became trainmaster of the



C. M. Shriver

Philadelphia division. He was later transferred to the Ohio division in a similar capacity. Mr. Shriver was furloughed in July, 1918, for military service, and sailed immediately for France where he served as a lieutenant with the railroad engineers in handling the heavy rush of troops and materials. Mr. Shriver returned from abroad in May, 1919, and resumed his service with the Baltimore & Ohio as trainmaster of the Wheeling division at Wheeling, W. Va. He became assistant superintendent of the Baltimore terminals July 1, 1920, from which position he has now been promoted.

Traffic

C. O'D. Pascault, division passenger agent of the Buffalo, Rochester & Pittsburgh, with headquarters at Pittsburgh, has resigned and the position has been discontinued.

J. N. Campbell has been appointed general freight and passenger agent of the Louisiana Railway & Navigation, effective May 23, succeeding E. C. D. Marshall, deceased.

J. A. Rockwell, general agent of the Buffalo, Rochester and Pittsburgh with headquarters at Rochester, N. Y., will retire

in accordance with the pension rules of the company and the office will be abolished, effective June 1.

Robert A. Trovillion, chief clerk to the general freight agent of the Illinois Central, with headquarters at Chicago, has been promoted to assistant general freight agent, with



R. A. Trovillion

the same headquarters, effective May 21, succeeding H. G. Powell, who has resigned to accept service with the Illinois Terminal Company, with headquarters at Alton, Ill. Mr. Trovillion was born at Golconda, Ill., on August 26, 1887, and was educated at the Western Military Academy, Alton, Ill. He entered railroad service on December 10, 1906, as a stenographer in the office of the assistant general freight agent of the Illinois Central at St. Louis, Mo. During the next ten years, he served in various positions including chief clerk in the St. Louis office, and on February 15, 1916, was transferred to Chicago as assistant chief clerk to the general freight agent. He was made chief clerk to the general freight agent on May 11, 1917. Mr. Trovillion served in the air service of the army during the war, and upon his return to civilian life resumed his position as chief clerk.

Robert W. Davis, freight traffic manager of the Buffalo, Rochester & Pittsburgh with headquarters at Rochester, N. Y., has retired under the pension rules of the company, effective May 20, and the office of freight traffic manager has been discontinued. Mr. Davis was born at Union Square, Oswego County, N. Y. He entered railway service in 1871 as an apprentice for the Syracuse & Northern (now a part of the New York Central). The following year he became a telegraph operator. In 1876 he was promoted to agent at Union Square. In 1880 he became train dispatcher and night ticket agent at Watertown, N. Y., and, in 1881, traveling auditor. He then served a short time as auditor and assistant treasurer of the Syracuse, Chenango & New York (now also a part of the New York Central). From 1882 to 1884 he served as a train dispatcher for the Rochester & Pittsburgh (the predecessor of the Buffalo, Rochester & Pittsburgh). He then became traveling freight agent and chief clerk in the freight department and remained in the position until 1892, when he was promoted to general freight agent. In 1907 he was appointed freight traffic manager.

Mechanical

E. J. McSweeney, division master mechanic of the Baltimore & Ohio with headquarters at Washington, Ind., has been transferred to Garrett, Ind., succeeding W. F. Moran, resigned. **C. M. Newman** succeeds Mr. McSweeney. These appointments and changes were effected June 1.

Engineering, Maintenance of Way and Signaling

J. J. Desmond, roadmaster of the Louisiana division of the Illinois Central, with headquarters at McComb, Miss., has been transferred to the Chicago Terminal, with headquarters at Chicago, succeeding P. H. Leonard, who has been appointed track supervisor, with the same headquarters. **C. M. Chumley**, roadmaster of the Mississippi division, with headquarters at Water Valley, Miss., has been transferred to the Louisiana division, succeeding Mr. Desmond. **C. M. Pittman, Jr.**, succeeds Mr. Chumley. The appointments and changes were effective June 1.

P. G. Lang, Jr., whose appointment as engineer of bridges

of the Baltimore & Ohio was announced in the *Railway Age* of May 27 (page 1252). was born at Philadelphia, Pa. He was educated at the Northeast Manual Training High School of that city and at the University of Pennsylvania, from which institution he was graduated in 1905 with the degree of bachelor of science in civil engineering. During 1905 and 1906 he was employed at the Pencoyd plant of the American Bridge Company. During the latter year he left this company to become bridge designer for the Carolina, Clinchfield & Ohio at Johnson City, Tenn. In December, 1907, he entered the service of the Baltimore & Ohio as assistant engineer in the bridge department. In December, 1917, he was promoted to chief bridge draftsman and on August 1, 1918, to assistant engineer of bridges, which position he held at the time of his recent promotion. Since October, 1919, Mr. Lang has been in complete charge of bridge work for the company.



P. C. Lang, Jr.

Purchasing and Stores

John E. Mahaney, whose appointment as superintendent of stores of the Chesapeake & Ohio was announced in the *Railway Age* of May 20 (page 1196), was born at St. Paul, Minn., December 23, 1879, and entered railway service in the stores department of the Minneapolis, St. Paul & Sault Ste. Marie at Minneapolis in 1895. In 1900 he went with the Eastern Minnesota (Great Northern) as general foreman. From 1903 to 1906 he served the Chicago, Rock Island & Pacific in a similar capacity. He then served the Southern Pacific as storekeeper, leaving that position in 1910 to become general storekeeper of the Oregon-Washington Railroad & Navigation. In 1913 he went with the Spokane, Portland & Seattle as general purchasing agent and general storekeeper. Two years later he became general storekeeper of the Norfolk Southern. During federal control Mr. Mahaney served the Procurement section, Railroad Administration, as supervisor of stores of the Northwestern region. On May 1, 1919, he returned to the Norfolk Southern as general store-

keeper, which position he held at the time of his recent appointment.

Obituary

F. M. Rugg, general agent, passenger department, of the Chicago, Burlington & Quincy with headquarters at St. Paul, Minn., was killed in an automobile accident near North Branch, Minn., on May 20.

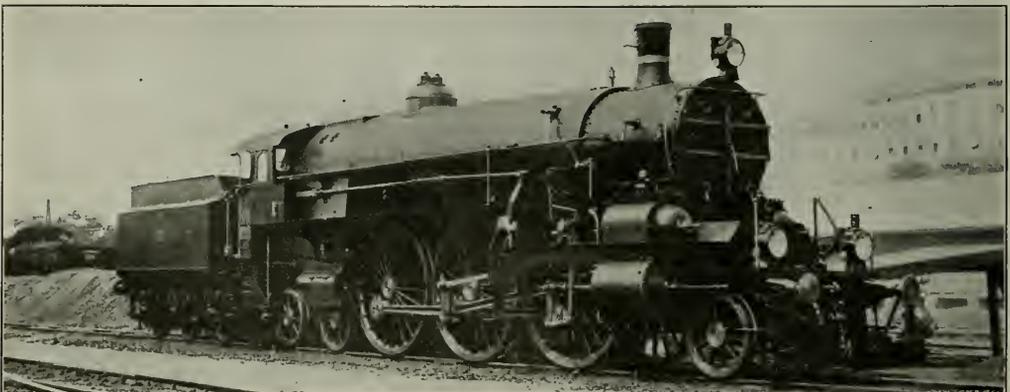
Henry B. Ledyard, chairman of the board of directors and former president of the Michigan Central, whose death was announced in the *Railway Age* of May 27 (page 1252), was born at Paris, France, on February 20, 1844. He was educated at the United States Military Academy at West Point, New York, and entered railway service in January, 1870, in the engineering department of the Northern Pacific. In July of the same year he became a clerk in the office of the division superintendent of the Chicago, Burlington & Quincy, and in 1872 was promoted to assistant superintendent of that road. A year later he was promoted to superintendent of the Eastern division. In October, 1874, Mr. Ledyard was appointed assistant general superintendent and chief engineer of the Michigan Central. He was promoted to general superintendent in 1876, and in 1877, was appointed general manager. Five years later he was elected president of the Michigan Central and served in that position until January, 1905, when he resigned the presidency to become chairman of the board of directors. This latter position he held continuously until the time of his death.



H. B. Ledyard

THE CHICAGO CHAPTER of the American Society of Steel Treating has elected the following officers: Chairman, H. M. Wood, Ingalls-Shepard division, Wyman Gordon Company, Harvey, Ill.; vice-chairman, T. A. Lovegren, Standard Forging Company, Indiana Harbor, Ind.; secretary-treasurer, Harry Blumberg, Illinois Steel Company.

♦ ♦ ♦ ♦



An Austrian Compound, Superheated Passenger Locomotive

EDITORIAL

Railway Age

EDITORIAL

1303.

The Table of Contents Will Be Found on Page 5 of the Advertising Section

F. W. Pflieger, chairman of the Signal section, American Railway Association, in his opening address at the third annual meeting, touched on a point of great importance in recommending the appointment of a Committee on the Economics of Railway Signaling, this committee to make recommendations

for the handling of traffic by signal indications and the operation of outlying switches by remote control to increase efficiency and economy in train movements. It was suggested that this committee be composed of representatives of the operating and of the signal departments. However, train operation is so closely allied with a number of departments that it would appear advisable that representatives of the telegraph and mechanical departments serve on such a committee. The scope of work could be greatly extended by making studies showing the savings accomplished, turning some of the so-called "intangible" ones into the tangible form of dollars and cents. All admit that signals facilitate traffic and promote safety, but what does an hour saved in train movements mean in dollars and cents and what is the actual money saved by preventing unnecessary stops for the delivery of train orders or for taking sidings or stopping at non-interlocked grade crossings? A study of the subject should take into account wear and tear of equipment, fuel consumption and numerous other items; and it appears to be one well worthy the consideration of the American Railway Association.

One of the most marked developments in the design of shop, enginehouse and freight house buildings in recent years has been the increased attention which engineers are giving to illumination, natural and artificial. Conditions are particularly adverse in an enginehouse with its constant cloud of smoke and steam. They are scarcely less severe in the average shop. But curious as it may seem, the value of adequate light in such buildings was not fully realized until recently as will be shown by an inspection of almost any building of this character built a decade or more ago. It is not many years since the action of a progressive eastern road in whitewashing the interior of its blacksmith shop at frequent intervals as a measure for increasing production was heralded as an innovation. More recently building engineers have replaced solid walls pierced by small windows with great areas of metal sash as illustrated in the new Monon shops at Lafayette, Ind., described on another page of this issue. In this building 80 per cent of the wall area is of glass. Nearly the same proportionate area is glass in the new roundhouses built by the Pere Marquette at Saginaw, Mich., and New Buffalo, as indicated in a description of the latter which appeared in the *Railway Age* of March 11. Almost equal attention is being given to the artificial illumination of these buildings by flood lighting and other means of electrical illumination. This increased attention to light is resulting from the growing realization that a workman can do more and better work in adequate light while incurring

Economics of Train Operation

More Light In Railway Buildings

less danger of accident; likewise, in freight-house construction where the improved lighting makes for accuracy in reading markings. Rapid as the progress in the provision of increased attention to lighting has been in recent years, railway engineers can afford to devote still more attention to it, for even a further advance can be made in railway building construction.

With the economy of timber preservation positively established, it is difficult for the layman to understand why

Why All Roads Do Not Treat Ties

the railroads do not use treated cross-ties universally. The answer would appear to lie in the fact that few investments for betterments made by the railroads are so long in paying a return, even though the ultimate gain from such an investment is absolutely certain. Until nearly all of the old untreated ties have been replaced, the annual renewals are determined, not by the average life of the treated ties, but by that of the untreated ties being replaced. Consequently, the advantage to accrue from the greater outlay for treated ties does not assert itself for a period equal to the average life of the untreated timber. But added to this natural obstacle is an artificial one imposed by the Interstate Commerce Commission. Whereas the added outlay covering increases in weight of rail and other items of roadway betterment are chargeable to capital account, no portion of the expense involved in the transition to cross ties subjected to preservative treatment may be handled in the same way. In other words, the road which decides to replace untreated ties with treated ones must carry the added cost in its operating expenses and as a consequence, the expense for tie renewals must be considerably above normal for the period of from five to nine years before the increased life of the treated timber will become effective in reducing cross-tie renewals enough to offset the cost for the preservative process. That it would be difficult to formulate satisfactory rules for capitalizing the change to treated timber is conceded. Timber preservation covers a wide range in the degree of perfection and refinement. Careless, indifferent or unscientific methods, might easily neutralize all the potential advantages to accrue under properly conducted work. Nevertheless, the change to treated timber is a true betterment which should be recognized in some manner in the accounting. The fact that any management which undertakes this betterment must be penalized by increased operating expenses over a period averaging seven years is unquestionably the most serious deterrent to the introduction of the preservative process on many railroads, and there is no question but that a great impetus would be given to this agency for conservation if the Interstate Commerce Commission would recognize the equity of a capital charge for the added outlay during the period of transition. Until then it is up to the directors of the roads to recognize that this movement for real economy involves an added operating outlay for a considerable period and due allowance must be made therefore in passing on the annual operating results, obtained by those in charge of the properties.

Only eight weeks have elapsed since a new record for idle cars was established. At the present time the surplus is still

**Is a Car
Shortage
Imminent?**

almost as great as existed at the beginning of 1919, during the recession in business following the armistice. Despite this enormous surplus, the country is certain to have a car shortage within two months if the present rate of increase in traffic and in bad order cars continues. Between January 1 and April 8 the idle cars increased from about 200,000 to 507,274. This was the maximum and there has been a fairly steady reduction since that time. On April 30 the surplus was 482,076 and on May 15, 450,164, a reduction of 31,912. During the same interval there was an unprecedented increase in the number of bad order freight cars. On January 1 there were 191,234 of all classes unserviceable and there has been a continuous and rapid increase ever since. On May 1 the bad order cars numbered 309,971, and on May 15, 324,969. These figures are all based on the Class I roads. Since the bad order cars are included in the idle cars, the margin of serviceable cars not in use is the difference between the bad order cars and the idle cars, which amounted to 172,105 on May 1 and 125,195 on May 15, a decrease of 46,910 in two weeks. It is evident if the number of serviceable idle cars continues to decrease at the rate of 23,000 a week, there will be a car shortage within six weeks. The situation is sufficiently serious to demand immediate attention. In the normal annual variation of traffic there is usually a gradual increase from April until September or October when the maximum is reached. There is reason to believe that the present increase in traffic is not a temporary revival, but that the improvement will continue. An actual car shortage with over 300,000 cars idle, but all unserviceable, would be a novel situation but one that could never be explained to the satisfaction of the shipper. The first step necessary to ward off such a shortage is to decrease the number of bad order cars. There were 93,279 cars requiring light repairs on May 15 and these can probably be returned to service with little delay. The heavy bad orders amount to 10.1 per cent of all the freight cars and present a serious problem. All of them need extensive repairs. Many are not fit to remain in service, yet they may be badly needed. This is an opportune time to make a careful survey of freight car conditions to determine which cars are to be repaired and which replaced with new equipment. Unless this is done there is danger that new cars will not be obtainable promptly and the demand will be so insistent that the railroads will be obliged to perpetuate obsolete and uneconomical equipment.

The Vast Purchases of the Railways

THE PURCHASES AND STORES SECTION of the American Railway Association met in Chicago this week. How many people in the United States, or even how many railway men, have any adequate conception of the magnitude of the business which is handled by the railway officers who compose the Purchases and Stores Section?

These officers include the buyers of the railways. They do not determine all the things that shall be bought, but they have very great influence in determining the things that shall be bought, and they carry on the negotiations incidental to the buying. It is necessary for each railway to keep on hand at all times a sufficient quantity of materials and supplies with which to make current repairs and replacements and also to make such improvements as are under way. The officers of the stores department have the responsibility of handling, distributing and accounting for all these materials, while the purchasing officers have the responsibility of seeing that they are bought at the best prices consistent with the

quality of the things bought. In addition, the purchasing department usually has, directly or indirectly, responsibility for the purchase of fuel. How large is this business of purchasing, storing and handling fuel, materials and supplies?

Some statistics recently compiled by the Bureau of Railway Economics make it practicable to answer this question more definitely and in more detail than ever before. A comparison of the figures for the year 1916 with those for the year 1920 will throw light not only on the magnitude of the business transacted, but also on the effects produced upon it by the increases in prices and other changes which have occurred within recent years.

In 1916 the Class I railways, exclusive of switching and terminal companies, paid \$250,544,862 for fuel. They charged \$119,785,157 to their operating expenses for depreciation and retirements, which in the long run represent expenditures for materials and supplies. They spent \$447,316,143 directly for "materials, supplies and miscellaneous," the "miscellaneous" being a comparatively small item. This made a total of about \$817,646,162 which was spent for fuel and, directly and indirectly, for materials and supplies. The foregoing figures cover only the items chargeable to operating expenses. As nearly as we can estimate, of the total capital expenditures made in the calendar year 1916 about \$209,100,000 was devoted to the purchase of materials. Therefore, in that year the total expenditures made by the railways, directly and indirectly, for fuel, materials and supplies amounted to about \$1,027,000,000.

In the year 1920 the fuel bill of the Class I railways, exclusive of switching and terminal companies, was \$672,891,964. They charged to their operating expenses \$145,252,339 for retirements and depreciation and \$1,063,769,900 for materials, supplies and miscellaneous. If we assume that one-half of their capital expenditures were made for materials, then on the basis of the estimate of the Bureau of Railway Economics regarding the total capital expenditures in 1920 the outlay for materials chargeable to capital account was over \$285,000,000. This makes a total for the Class I railways, exclusive of switching and terminal companies, of approximately \$2,167,000,000 which was spent in 1920 for fuel, materials and supplies.

It is not claimed for the figures given that they are exactly accurate. They undoubtedly are smaller than the total amounts spent by all the railways of the United States for fuel, materials and supplies, because they include nothing for the expenditures of the Class II and III railways or of the switching and terminal companies, which operate almost 20,000 miles of line.

In view of the magnitude of these figures it is hardly necessary to lay stress upon the importance of the work done by the purchases and stores departments of the railroads. In view of the fact that the figures for 1920 are more than twice as large as those for 1916, it is hardly necessary to dwell upon the extent to which the increases in prices have affected the operating expenses of the railroads.

Furthermore, it should hardly be necessary to do more than give the figures to show how important to the general business of the United States are the purchases of fuel, materials and supplies made by the railroads, and the effects upon general business which are inevitably produced by wide fluctuations in the amounts of these purchases. When the railways are financially able to make purchases on the scale required for the adequate maintenance and development of their properties they are the largest market for some of the largest industries of the country, especially those of coal mining, iron and steel and lumber manufacturing. On the other hand when, as has been the case within recent months, it is necessary for the railways drastically to reduce their purchases of all kinds and practically to suspend their buying of materials and supplies of many kinds, the adverse effect produced upon general business is tremendous.

It will be an auspicious day for the general business of the country when the purchases and stores departments of the railroads are enabled to resume buying and handling fuel, materials and supplies in normal quantities.

Reduction of Railway Wages

THE RAILROADS are again before the Railroad Labor Board requesting the restoration of the rates of pay for railway employees which prevailed before the wage increase of last July. Last week the Labor Board announced wage reductions which it estimates will cut about \$400,000,000 from the annual payroll. This announcement came after the board had received a large amount of evidence from the carriers regarding the decreases which have taken place in the cost of living and in the wages being paid in outside industries for work of a character similar to that performed by railway employees. The Labor Board split the difference, less than two-thirds of the increase of last July being eliminated. Railway executives expressed disappointment; employees' representatives are non-committal and by inference, satisfied.

The average annual wage per employee in 1914 was \$815.44. The wage award of last July made it \$1,926, an increase of 136.2 per cent. The cost of living at the time the award was made was 104.5 higher than in 1914, according to the National Industrial Conference Board's figures. The average railway employee, therefore, was awarded a wage when the cost of living was at its height which was 31.7 per cent higher relatively to the cost of living than he had received in 1914. The decrease just ordered by the Labor Board averages 12 per cent, thus reducing the average annual wage of the railway worker to \$1,694.88, or 107.7 per cent more than it was in 1914. But the cost of living since July, 1920, according to the Industrial Conference Board, has dropped approximately 40 per cent. The railway employee, therefore, instead of receiving an actual reduction in his wages, can, after his money wages have been reduced 12 per cent, buy 40 to 50 per cent more with his wages than in 1914. The average railway wage, measured in money, being, after the 12 per cent reduction, 107.7 per cent more than in 1914, compares very favorably with the increase of 89 per cent which the Department of Labor estimates took place in the average wages of employees in other industries between 1914 and May, 1920. Since that time there has been a decided decrease in general wages, but statistics are not yet available.

Even if the Labor Board were to grant the full requests of the carriers at this time the railway workers would still receive a "just and reasonable" wage measured by the cost of living and the wages being paid for comparable work in other industries. The increase last July averaged about 22 per cent. If all this were wiped out the average annual compensation per employee would be about \$1,581, an increase over 1914 of approximately 94 per cent, as compared with a cost of living which is now 63.6 per cent more than in 1914. The average railway wage would still have fully 30 per cent more purchasing power than before the war.

Many representatives of the employees recognize very clearly the favorable position of their constituency, and, despite public criticism of the board's ruling, have privately admitted its mildness, a few going so far as to characterize the wage cut ruling as a "victory" for the workers.

The carriers are again before the board reiterating their request for the restoration of the rates of pay in effect prior to the board's Decision No. 2, and substantiating them with additional data regarding the two relevant factors in the case, namely, the cost of living and the wages being paid for similar work in other industries. The Labor Board should, in fairness to the railroads and to the public, formulate a new order. The decreases in wages made should approximately restore the wages in effect prior to last July.

A Lesson from the Missouri, Kansas & Texas

THE RAILWAYS of the United States in the last four months of the years 1915, 1916 and 1917 had average net earnings of \$442,000,000 while in the last four months of 1920, under the present rates, they had net earnings of only about \$349,000,000, a decline, compared with the net earnings of the same months for the three other years mentioned, of 23 per cent. In the last four months of 1915, 1916 and 1917 the Missouri, Kansas & Texas had, on the average, net earnings of \$3,872,000, while in the last four months of the year 1920, under the present rates, it had net earnings of over \$5,375,000, an increase over its average net earnings in the same four months of the three years preceding government control of almost 39 per cent.

The Missouri, Kansas & Texas is not a large railway, according to American standards, but it operates 3,793 miles of line, and the fact that it showed in the last four months of 1920 so large an increase in net earnings under the present rates while the railways of the country as a whole showed a decrease, as compared with the three years immediately preceding government control, is a fact which is noteworthy.

The Missouri, Kansas & Texas has been in receivership since 1915. We publish this week the first of two articles regarding the improvement of its physical property and its operating and financial results in the years from 1913 to 1920, during which it has been under the present management. The facts given in these articles seem to make quite clear the reasons why its experience recently has been different from that of most other railways. The principal reasons are that a substantial amount of new capital has been invested in improvements in the property, and that the management has taken advantage of these improvements to increase the efficiency of operation. Since 1913 the average tons of freight carried per train has been increased from 299.4 to 504, or 68.3 per cent. In consequence, an increase of almost 74 per cent in ton-mileage has been handled with an increase of only 3.3 per cent in freight train mileage. An increase of 58.50 per cent in the number of passengers carried one mile has been handled with a reduction of 5 per cent in passenger train mileage.

Practically all the new capital which has been invested in the road under the receivership has been furnished by its creditors, since the new capital invested has been almost the equivalent of the accrued interest which the receiver has not paid. This, however, hardly constitutes an argument for bankrupting all the railroads of the country in order that the interest that otherwise would be paid by them may be invested in improvements. The bankruptcy of one or a few railroads has never caused a national financial catastrophe. The general bankruptcy of the railroads would ruin so many banking and fiduciary institutions and individuals who own their bonds and notes that it would be disastrous to every class of business concerns and individuals in the country.

The lesson which the experience of the Missouri, Kansas & Texas does forcefully inculcate is the desirability from the standpoint of the public of letting the railways earn net returns which will be large enough to enable them to raise sufficient new capital to make needed improvements in their facilities. Such improvements, as the experience of every railway which has been able to make them shows, not only enable the railways to handle a larger amount of business, but also to handle it at less cost than would otherwise be the case.

It is very difficult to make business men and farmers realize that in the long run they do not reduce, but increase, the cost of transportation to themselves when they hold down to the lowest possible limit the net return earned by the railroads. If the railways in the year 1920 had earned a net return of 6 per cent upon their valuation, the total net

return received by them would have been less than one-fifth as large as their operating expenses. Obviously, therefore, in the long run the extent to which the cost of transportation to the public will be reduced will depend mainly upon what permanent reductions are made in operating expenses. All the larger economies in operation, in turn, always have been and always will be obtained largely through permanent improvements in the properties. Improvements in tracks, terminals, locomotives, etc., have made it possible for the Missouri, Kansas & Texas to increase its average trainload so much, and thereby enabled it to handle a largely increased traffic without corresponding increases in the amount of fuel and materials used and the number of men employed. But improvements in the physical plants of the railways can be made only by the investment of new capital, and therefore when business men and farmers cause regulation unduly to restrict the net return that the railways earn they prevent from being made the improvements in the physical properties which are essential to substantially increasing the economy of operation.

While most of the railways of the United States under the present rates suffer from declines in their net earnings compared with pre-war years, some even when still handling a large business, like the Missouri, Kansas & Texas, showed increases in them. These increases in net earnings in every case were due to the fact that the operating expenses did not increase in proportion to the amount of business handled, and in almost every case where a railway recently has suffered relatively less from increases in expenses than its neighbors this has been due to the fact that within the last ten years it has suffered less than its neighbors from inability to raise new capital, and therefore has been able to make more economy-producing improvements.

Of course the lower in the long run the operating expenses of the railways are made the lower in the long run it will be practicable to make their freight and passenger rates. How long will it take to awaken business men and farmers of the country to the fact that in the long run prosperous railways will be able to serve them not only better, but at lower rates, than unprosperous railways?

Chicago, Milwaukee & St. Paul

THE CHICAGO, MILWAUKEE & ST. PAUL did not prove much of a money maker for the government during the period of federal control. It drew on the government heavily during the guaranty period from March 1 to August 31, 1920. In the period since the end of the guaranty period it has been operating at a deficit; it is not even making its operating expenses, let alone sufficient for its fixed charges. The standard return for the St. Paul was \$27,946,820, including extra compensation in the amount of \$440,000 to cover the installation of electric operation between Harlowton, Mont., and Avery, Idaho, which was completed prior to federal control.

The net railway operating income in each of the years 1918 and 1919 was less than \$4,000,000; approximating that figure in 1918, but nearer \$3,000,000 in 1919. In other words, in each of these two years the operations of the property yielded something like \$24,000,000 less than the standard return. In 1920 the operations of the St. Paul resulted in a net operating deficit as shown in the December, 1920, monthly report to the Interstate Commerce Commission, of \$5,819,216. The guaranty for the six months from March 1 to August 31, 1920, the guaranty period, would be one-half the standard return, or \$13,973,410. The net operating deficit for these six months was such that to make good this deficit and the guaranty the government has been called upon to pay no less than \$22,250,811 to meet the provisions of Section 209 of the Transportation Act.

Referring now to 1921, so that we may bring our figures up to date, we have available at this time the figures for January, February and March as shown in the monthly reports to the Interstate Commerce Commission. The net operating deficit, after taxes and rentals, for these three months was \$2,473,236. It is evident from this array of figures that the St. Paul was hardly benefited by federal control. The handicaps arising from federal control, combined with the sharp decline in business in the St. Paul's territory in recent months, give the officers of the property a real problem. There is very good reason for believing, however, that the problem will be solved if present adverse conditions of general business do not last longer than now appears probable. The present management is making energetic and successful efforts to advance efficiency of operation, and a substantial increase in the road's traffic undoubtedly would be followed by a great improvement in its financial results.

The Chicago, Milwaukee & St. Paul is a system with 10,634 miles of line, of which it owns 10,168 solely, 109 jointly and operates 347 under trackage rights. This mileage extends over eleven states. The St. Paul was in the earlier days of its history a granger road. With the building of its Puget Sound line it became one of the transcontinental carriers. The building of this line was intended to give the system an outlet to the Pacific coast, such as was obtained by the Chicago, Burlington & Quincy through its acquisition by the Hill lines. The outlay represented in the Puget Sound extension, the money that has since been spent on it for electrification, and the publicity that has been given these things make it difficult for an observer to realize that the St. Paul was a railroad system of considerable importance even before it reached the coast. Nevertheless, the building of the new line was a matter of no small importance, speaking comparatively, and its effect on the welfare of the system fully as great to warrant the great amount of discussion that has gone on concerning it.

The electrification of that portion of the line from Harlowton, Mont., to Avery, Idaho, 440 miles, was completed in 1915. In 1920 electric operation was begun on the section from Othello, Wash., to Tacoma and Seattle, about 200 miles. A new line, and a line built to such standards as this one, needs business and a large amount of it. It has apparently not had that business in sufficient quantity as yet, although it has done fairly well in spite of the competition of the strong and efficiently operated carriers which were in the field before it. The failure thus far to realize to a sufficient extent on the potentialities of the situation—or, in other words, the fact that the northwest has not yet realized to a greater extent on its own potentialities—explains much of the present difficulty of the St. Paul system.

The lumber industry is one of the most important industries, if not the most important industry, of the region served by the St. Paul. It has been idle for some months; cuttings have been kept down to an absolute minimum. The effect on the St. Paul's earnings can readily be appreciated when it is observed that products of forests constitute 20 per cent of the St. Paul's total tonnage. It is natural, speaking still of 1921, that the present decline in the business of the northwest, particularly in lumber, should have been so sharply reflected in the earnings of the St. Paul as it has been.

The St. Paul is one of the few roads that have made final settlements with the Railroad Administration for operations during the period of federal control. On November 1, 1920, it entered into an agreement with the Railroad Administration whereby it funded the cost of all additions and betterments to its properties, except as to equipment, in a note for \$20,000,000 payable March 1, 1930, and whereby it received in cash, in addition to sums already paid, \$13,750,000. This sum was applied in payment of a note of \$11,500,000 held by the War Finance Corporation and in the payment of the balance on notes held by banks, originally

amounting to \$4,000,000. The notes mentioned had been given in 1919 when the corporation, because of the withholding of its compensation, had to borrow money to meet interest maturities and for other requirements. "In negotiating this settlement," the annual report says, "differences developed between the claims of the company and the director-general, particularly those relating to maintenance expenditures, and rather than involve the company in prolonged and expensive litigation, the outcome of which would necessarily be uncertain, the board favored a final settlement at this time upon the terms above stated, believing it to be for the best interests of the company." In the situation, one cannot help but believe that had the road been in a stronger position financially, it would not have had to make this settlement with the Railroad Administration as quickly as it did and would probably have secured a larger payment than was made it.

The St. Paul carried more tons of freight in 1920 than it did in 1919, but the tons carried one mile were less because of a decrease as between the two years in the average haul. The freight revenue in 1920 was \$117,183,815 as compared with \$106,288,453 in 1919. The number of revenue tons carried in 1920 amounted to 45,041,277, the average haul was 253 miles and the total ton-mileage of revenue freight was 11,384,600,804. The tons carried in 1919 totaled 40,295,220; the average haul was 285 and the revenue tons one mile were 11,501,514,483. The St. Paul's revenue train load in 1920 was 544 tons, a reduction from the average of 554 in 1919. The 1920 average exceeded that for years prior to 1919, typical figures being 442 in 1916; 468 in 1917 and 532 in 1918. The average load per loaded car in 1920 was 25.48 tons; in 1919, 24.58.

One of the features of the St. Paul's operations during the past two or three years has been the large amount of new equipment which has been acquired. The company was allocated by the United States Railroad Administration 100 heavy Mikado locomotives and 3,000 box cars, which number was later increased to 5,000. In 1920, the road placed orders for an additional 100 Mikado locomotives. It also received during the year 15 electric locomotives for its electrified sections.

The figures for operation in 1920 compare with those for 1919 as follows:

	1920	1919
Mileage operated	10,624	10,647
Freight revenue	\$117,183,815	\$106,288,453
Passenger revenue	31,035,594	30,391,921
Total operating revenue	168,189,734	150,370,394
Maintenance of way expenses	28,810,633	23,144,811
Maintenance of equipment	41,557,151	40,422,005
Traffic expenses	17,257,663	1,107,107
Transportation expenses	86,276,148	69,288,819
Total operating expenses	164,697,121	138,561,705
Net railway operating revenue	3,461,613	11,808,689
Tax accruals	1,872,832	6,306,997
Railway operating income	Def. 8,451,167	5,362,271

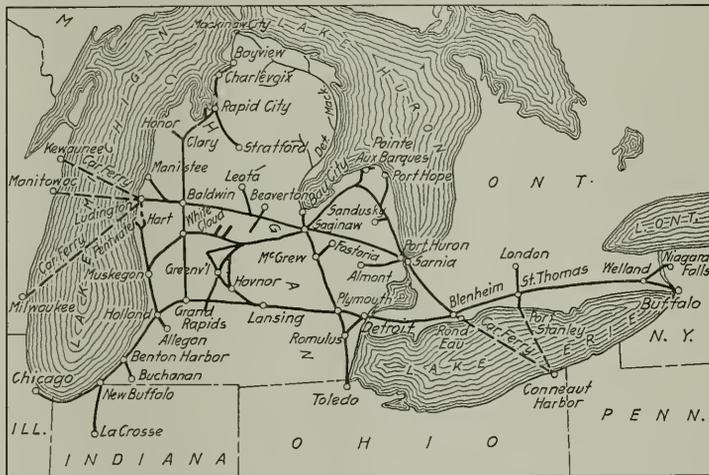
The corporate income account is as follows:

	1920	1919
Compensation accrued	4,640,721	27,945,820
Compensation, January and February	2,250,811	.....
Compensation under guaranty provision	22,250,811	.....
Railway operating income, March 1 to December 31	1,372,519	.....
Gross income	31,128,295	31,723,534
Interest on funded debt	17,593,581	16,690,833
Total deductions from gross income	26,762,224	24,090,489
Net income	4,366,071	7,643,045

Pere Marquette

THE PERE MARQUETTE was one of the few roads that elected not to accept the guaranty of net railway operating income embodied in the provisions of Section 209 of the Transportation Act. The earnings of the property while it was under federal control had been such that this decision seemed at the time it was made to be the proper one. The unusual events which characterized railroad operations in 1920, however, affected the road's operating expenses so drastically, without permitting compensating improvement in operating expenses, that the operations for the six months ended August 31 resulted in a corporate income account deficit amounting to \$46,286.

The earning power developed by the Pere Marquette during the period of federal control was one of the features of that eventful portion of American railroad history. The Pere Marquette had been following a somewhat rocky path, it having been in the hands of receivers from 1905 to 1907 and again from April, 1912, to the latter part of 1916. When the road was taken over by the government its standard return was set at \$2,932,162. In 1918, the first year of federal control, the operations of the property resulted in a net railway operating income of \$3,814,052, or about one-third more



The Pere Marquette

than the standard return. In 1919, when most roads suffered a pronounced decrease in net, the Pere Marquette proved very much of an exception. In that year, its net railway operating income was \$6,680,358, a yield to the government in 12 months sufficient to pay the standard return for the entire 26 months of federal control. The Pere Marquette proved a good money maker for the Railroad Administration.

President Frank H. Alfred in the annual report in explaining the reason for the decision not to accept the guaranty, says: "The Pere Marquette had demonstrated its ability, if unhindered by unusual and exceptional restrictions in the use of its property to earn a sum largely in excess of the standard return allowed. It was considered to be of vital interest to the public that any such excess so to be earned, should be, at the earliest opportunity used for betterments and additions to the property of the company." It was expected, he points out, that the net earnings from operation for the six-months period would approximate \$1,375,000, whereas the corporate net income based on the guaranty would have amounted to \$672,000. As already noted, the corporate

income statement for the six months actually showed a deficit of \$46,286. The reasons that the calculations failed to work out are, of course, well known. They include the outlaw strike of April, the Labor Board's decision in July, the fact that the increase in freight rates and passenger fares was not decided until August, etc.

The Pere Marquette was further handicapped because intrastate passenger fares in Michigan were not increased until March, 1921. Mr. Alfred estimates that the additional wages paid to employees under the Labor Board's award amounted to \$1,340,972 for the four months, May to the end of August. If the increased freight rates and passenger fares had been effective May 1, as, indeed, the directors anticipated they would be, it is estimated that the freight revenues for the four months would have been \$2,863,914 greater than they actually were in that period and passenger revenues \$580,480 greater, a total of \$3,444,394. The excess of estimated additional revenues over the actual amount of additional wages paid, the report continues, would have been \$2,103,423.

The Pere Marquette operates 2,239 miles of line of which it owns 989, controls 127 and operates 227 under trackage rights. The larger part of this mileage is in the state of Michigan. There are, however, lines to Chicago and Toledo and a considerable mileage in Canada. About half of the mileage operated under trackage rights is included in the connection to Buffalo and Suspension Bridge, secured by operation over the Michigan Central from St. Thomas, Ont. A feature of the Pere Marquette's operations is its car ferries which give the property access to connections at Milwaukee and Manitowoc, Wis., and at Conneaut Harbor, Ohio.

Considering the territory traversed by the Pere Marquette it is to be expected that no particular class of traffic would predominate; this is borne out by the following figures: products of agriculture, 13.2 per cent; products of animals, 1.36 per cent; products of mines, 46.40 per cent; products of forests, 8.71 per cent and manufactures, 16.90 per cent. In using these figures attention should not be lost of the Pere Marquette's traffic in and out of the Detroit district. Automobiles make about two per cent of the total tonnage but related products make up a large tonnage the size of which is not indicated by that figure. Because of its location the Pere Marquette is handicapped by having to pay prices for coal somewhat above the average, particularly because of the freight rate on the haul to the Pere Marquette lines. The road also has to meet large debit balances for hire of equipment, that figure in 1920 being no less than \$1,692,898, an amount greater as it happens than the interest on bonded indebtedness.

The Pere Marquette carried more tons of freight in 1920 than in any previous year but owing to a shorter average haul in that year, the ton-mileage of revenue freight was less than in 1919 or 1918. The number of tons of revenue freight moved in 1920 was 14,855,393, the average haul, 165 miles and the total revenue ton-mileage, 2,449,010,342. The revenue tons carried in 1919 totaled 14,783,616; the average haul was 170 miles and the revenue ton-miles, 2,511,959,726. In moving this freight the road secured an average revenue train load of 587 tons. This was a reduction from the figure of 604 in 1919 or that of 637 in 1918, but compared with 563 in 1917, which was the best train loading up to that time. The average revenue tons per loaded car in 1920 were 24.22.

The total freight revenues of the road in 1920 were \$29,754,566 as compared with \$26,504,204 in 1919, and the total operating revenues were \$40,372,814, an increase of \$4,929,678 over 1919. As against this increase in revenues, there was an increase of \$9,883,227 in operating expenses, the total operating expenses in 1920 amounting to \$36,731,955. The operating ratio in 1920 was 90.98 per cent as compared with 75.75 per cent in 1919. The net operating

revenues in 1920 amounted to \$3,640,859 as compared with \$8,594,408 in 1919, a decrease of \$4,953,549. The reasons for this sharp decrease in net are plainly pointed out in the report in an interesting table showing the relation of labor, fuel, material and other costs to total operating revenues. The following selection of figures from this table hardly needs comment:

	RATIO OF CHARGES TO OPERATING REVENUES					
	1918		1919		1920	
	Amount	Per cent	Amount	Per cent	Amount	Per cent
Labor	\$12,694,169	43.84	\$16,531,391	46.64	\$22,938,954	56.82
Material and supplies	2,977,577	10.28	2,759,026	7.79	3,745,885	9.28
Fuel	3,218,971	11.12	3,346,947	9.44	4,983,520	12.35
All other charges	4,497,159	15.53	4,211,363	11.88	5,061,596	12.53
Total operating exp.	\$23,387,876	80.77	\$26,845,728	75.75	\$36,731,955	90.98

Labor costs, it will be observed, made up the larger part of the increase in operating expenses. The increase in fuel costs is also noteworthy. The Pere Marquette does not go through a coal country, with the result that it has suffered from the high prices of fuel coal. As far as 1920 was concerned it suffered also from uncertain deliveries and had to confiscate coal for fuel with resulting higher costs. The poor quality of fuel necessitated a greater consumption; the miles run by locomotives per ton of coal in 1920 were 12.5, as compared with 13.83 in 1919, a decrease of 9.62 per cent.

In addition to these figures showing the relation between labor, fuel and other costs, the annual report also has some interesting data on the matter of deferred maintenance, especially as to equipment. On January 1, 1918, at the beginning of federal control there were in service on the road 398 locomotives good for a total of 2,694 months' service, an average of 6.769 months per locomotive. On February 29, 1920, at the end of federal control, there were 453 locomotives in service, including 58 new locomotives placed in service during federal control. The total months good for service was only 2,263 and the average per locomotive but 4,996. During the 26 months' period prior to federal control, 839 locomotives received general repairs; during federal control, only 639. The average mileage made by locomotives between general shoppings in the 26 months prior to federal control was 26,873; during federal control, 33,035. As far as freight cars are concerned the following figures will be of interest: in 26 months prior to federal control, cars receiving general repairs, 7,593; rebuilt, 6,265; in 26 months of federal control, cars receiving general repairs, 2,006 and rebuilt, 2,678.

The corporate income account for the Pere Marquette shows for 1920 a surplus for the year's operations, including the standard return for January and February, amounting to \$1,393,973 after the payment of interest as compared with a surplus in 1919 amounting to \$1,896,931 in 1919 or \$1,894,125 in 1918. Dividends amounting to \$560,000 were paid on the prior preference shares. No dividends were paid, however, on the 5 per cent preferred stock either in 1919 or 1920; this stock is cumulative beginning January 1, 1919, and dividends on it would amount to \$621,500.

The figures for operation in 1920 compared with those for 1919 are as follows:

Mileage operated	2,234	2,232
Freight revenue	\$29,754,566	\$26,504,204
Passenger revenue	6,938,505	6,127,461
Total operating revenue	40,372,814	35,443,137
Maintenance of way expenses	5,309,721	3,495,488
Maintenance of equipment	8,618,193	6,468,045
Traffic expenses	561,127	337,974
Transportation expenses	19,667,511	14,764,362
Total operating expenses	36,731,955	26,848,728
Net from railway operations	3,640,859	8,594,408
Taxes	1,073,822	762,283

The corporate income account is as follows:

Gross income (including standard return, full year, 1919, two months, 1920)	\$6,433,365	\$3,744,772
Total charges excluding interest	2,801,311	1,212,294
Balance before deduction of interest	3,632,265	3,623,478
Total interest accruals	2,238,292	1,726,547
Surplus	1,393,973	1,896,931



Mechanical Department Must Tackle Big Program

Some Constructive and Practical Suggestions Which Will Bear
Rich Fruit if Followed Generally

THE INTENTION of this article should not be misunderstood. The mechanical departments of the railways have been subjected to much ignorant and malicious criticism during recent months. The really remarkable and steady progress which has been made by that department throughout the development of the railways of this country seem to have been lost sight of. True, the department is not perfect by any means—it never will be. It is, however, on a par with most other American institutions and organizations; in many respects—considering the conditions under which it is forced to operate—it is far ahead of most of them.

With proper backing on the part of the chief executives the capable and efficient leaders in the mechanical department will go steadily forward with the still larger program which lies ahead of them. The purpose of this article, then, is briefly to outline some of the more important parts in this larger program. It must be clearly understood that the things which are here set down are not dreams or vain imaginings of an idealist or chair warmer but rather that they

reflect the attitude and experiences of the foremost mechanical department officers—leaders who have demonstrated rare ability, who have the confidence of their associates and superiors, and who are going forward with a determination of securing an early and satisfactory solution of the great and complicated problems which now confront them.

The right solution of these problems will be a big factor in insuring the future stability and prosperity of American railroads. More than this it will have a large influence in the improvement of the railroad situation the world over since railroad officers in many of the foreign countries are looking intently to this country for inspiration and for guidance.

For convenience the program will be discussed under five heads: Management Problems and the Human Element, Getting the Most Out of Locomotives, Car Conditions Need Permanent Improvement, Speeding Up the Shop Production, and Increasing Engine Terminal Output. The study is not intended to be complete or exhaustive; it simply touches upon a few of the high spots.

Management Problems and the Human Element

A. H. Smith, president of the New York Central Lines, in testifying before the Senate Committee on Interstate Commerce said that "the efficiency of a railroad depends principally upon its men. It is estimated that 95 per cent of railroading is human."

Because the truth of President Smith's statement is generally recognized and because the foreman and subordinate officers form the only live contact between the men and the managements, the tendency to give more attention to the selection, education and training of the foremen and to the elevating and upholding of the dignity of their positions is becoming more and more pronounced. The foreman cannot function properly and efficiently unless he is fully informed as to the policies of the railroad and his particular department, and unless "he has at heart the interest of the company and of the men under him and will

painstakingly co-operate with and assist in every way possible those coming under his jurisdiction."

If able, capable foremen and subordinate officers are not provided it will be absolutely impossible to develop the right spirit and morale. Managements and men must work together in a common cause—a house divided in itself cannot stand—and yet how can this co-operation be secured if the aims, objectives and feelings of the men and the managements are not intelligently and correctly interpreted one to the other. The foreman is the keystone. Progressive industrial leaders and railroad officers have come to a strong realization of this and are giving special attention to selecting, training and cultivating these men.

How can real results be expected when the following condition exists: "The little fellow down the line has his troubles in a supervisory way, which to him are many times mystifying. This is due to the fact that he is following





orders which to him may seem very foolish because he has not full knowledge of the reasons for such orders. This then places him in the class of critics which destroys efficiency."

There are many things which may be done to overcome this condition and to strengthen the foreman so that he may intelligently put forth his best efforts to develop the right sort of co-operation and build up the morale of the organization. Here is what one road is doing: "Each car foreman has a book of instructions outlining his full tour of duty and we are now completing a locomotive book for the foreman in that department. In addition to this we use great care in issuing circulars; before they are sent out every man has an opportunity to pass on the proposal and to give us his suggestions. The result is that when the instructions are issued our men respond very quickly and realize the necessity for any modifications in practice which may be submitted to them.

"We have followed the practice of having the different classes of foremen meet separately each year, thorough preparation being made for each of these meetings which include the presentation of suitable reports and papers. In addition to these meetings for tool foremen, boiler foremen, air brake foremen, back shop foremen, etc., we have an annual car foremen's meeting, a traveling engineers' meeting and a master mechanics' meeting. Bronze tablets are presented each year for first and second prize stations for the locomotive and car departments separately. There is great rivalry among our various points; the award in each case is made by a committee of five judges."

"If a man understands what is wanted of him he is responsible if he goes wrong. If a man is not properly instructed and directed his superior is responsible." This statement has a peculiar significance for the railway mechanical department. With its great variety of equipment and with the

forces scattered over large areas there is need for a painstaking and yet intensive, educational effort not only for the new men and apprentices but for men who have been on the job for months or even years, and yet have never had sufficient instruction as to exactly how important parts of their work should be done and who may not have a clear understanding of the responsibility which rests upon them. This is, of course, a question of supervision and is closely related to the problem of developing the right sort of foreman. It involves also, however, the development of accurate and complete schedules for shop and engine house practices. Some roads have made excellent progress in this direction with splendid results.

The difference between work and play is largely an attitude of mind. When men can be encouraged to go at their

Playing A Game

work in a spirit of play they do more and better work with less fatigue. There is often just as much fun in making a record on a job, or in helping the department, shop or division to make a record, as there is in playing a spirited game. The successful supervising officer must be something of a promoter to secure this interest. There are numberless examples in railroad work of what may be done in this direction. Spirited contests to reduce accidents, to save fuel, to reclaim material, to cut down loss and damage, to increase car and train loadings, to increase production, etc., are familiar to all. It is the promotion of this spirit—and it can be done with small groups as well as large ones—that helps to locate and eliminate lost motion and waste. This spirit, however, cannot be developed by the mere issuing of orders or sending out of circulars; nor can a great deal be accomplished by correspondence, particularly that kind which is often carried on in railway service. Enthusiasm is contagious but it can best be transmitted by personal contact.

Modern apprenticeship methods have had a hard fight to gain a secure foothold on the railroads. Fortunately a number of officers with real vision have stood by through thick and thin. Conditions during the past few years have been hard to contend with and in many respects have been exceedingly discouraging; the clouds are breaking, however, and a goodly number of mechanical department leaders are going forward with renewed energy to carry on the good work and even to extend it beyond the field of training shop apprentices only. Changing conditions require different treatment and without doubt some radical improvements and modifications will have to be made in the methods of a few years ago. The fundamental principles, however, are sound and will serve just as well today as in the earlier days when modern apprenticeship methods were first introduced.

This brings us naturally to another development which has been gradually taking place in the mechanical department in recent years. Possibly the

Get Out On The Job

thought can best be developed by quoting from a letter which we have recently received. "You had an editorial a short time ago (*Railway Age*, April 22, 1921, page 965) which was very good and it would help the mechanical department to function better if it was followed—scrap 90 per cent of the typewriters and let the heads of departments and their subordinates do more super-





vising and not be confined to their desks trying to educate chief clerks in other departments and answering a great many foolish letters that would be better unanswered."

This sounds pretty strong and yet not a few mechanical department officers have refused to allow themselves to be buried in detail routine work and have personally cultivated their subordinates on the firing line with excellent results. Their personalities have been projected down through their subordinates to the very ranks and there has been a great improvement in the morale of the department.

There is a considerable interest among mechanical men on many roads as to the relative merits of the departmental and divisional types of organization.

Departmental vs. Divisional Organization

Poor results are sometimes found on roads having the divisional form and where the operating officers have had no mechanical experience or do not seem to have a proper appreciation of the importance of the maintenance of equipment. Both forms of organization have strong advocates; indeed there is so pronounced a difference of opinion that it would seem advisable to determine the special conditions which must be maintained to make the greatest possible success of either form. True mechanical department officers have little to say in the determination of the kind of organization which shall be followed; at the same time the importance of the mechanical department is such as to warrant a keen interest on the part of its officers in helping to determine the exact conditions under which either type of organization can function to the best advantage so far as the maintenance and operation of the equipment is concerned.

There has been a decided change in status of the mechanical department on many roads in relation to the railroad organization as a whole in recent years—largely since the entry of this country into the world war. The importance and necessity of keeping up the maintenance of the equipment in the interests of good business was strikingly demonstrated early in the war; as a result the head of the mechanical department has assumed a larger place in the organization than he was generally given in pre-war days. Many roads, however, are too far behind the procession in this respect. The recommendations of a chief engineer when he restricts wheel loads or speeds over a piece of track or a bridge are regarded as law. The advice of the mechanical department head, on the other hand, is disregarded in many instances when he protests against the running of inferior and unsafe equipment or insists upon the use of better equipment. Considering the danger of disregarding these protests and con-

Heads of the Mechanical Department

sidering also the importance of the mechanical department and the amount of expenditure which is controlled by it the head of that department is too far removed from the chief executive on many roads. "When constructive ideas are developed by the mechanical department it often takes so long to go through the various channels before they reach the man in authority that by the time they do get to the president and the board of directors the father is frequently unable to recognize his own child. In such cases a mechanical department head to accomplish anything requires more perseverance than mechanical skill."

There are those who contend that the head of the mechanical department should have the standing of a vice-president and report direct to the chief executive who should listen to the comments of a seasoned mechanical department officer who stands exceedingly high in the councils of his road. The chief mechanical officer should at least report directly to the operating vice-president. "Outside of dictating the business and financial policy of the road there is no other post of duty that requires a man with a clearer sense of just what his duties consist of and a complete knowledge as to how they shall best be performed, than that of the man in charge of the mechanical department. Locomotives, cars and roadway must be kept in condition to carry a train safely, of a weight and at a speed consistent with a safe, practical and approved earning operation. Anything below this standard of maintenance and train operation inevitably results in losses that consume the funds required for maintenance and dividends. The old cry of 'too poor to be economical' has been the pitfall for numberless unwary executives. Had they been guided by that time honored axiom of Anything worth doing at all is worth doing well, their managerial history and that of the property they supervised would have been written differently."

Not a few mechanical department officers have been following closely developments in other industries relating to the handling of men. It is becoming recognized more and more that a real study of the labor turnover, for instance, often locates weaknesses in the organization which can be readily overcome. Moreover it costs money to break in new men and the correction of these weaknesses not only increases the efficiency and promotes economical operation but it saves the trained men to the organization. The selection, training and promotion of men is receiving special attention on many roads. More of an effort is being made to assign the men to the kind of work best suited to their peculiar characteristics and efforts are being made to study the men individually and strengthen their weak points. These things

Questions of Personnel

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are all exceedingly helpful in cultivating a right spirit and understanding between the men and the managements.

Standardized wage scales have had a deadening effect upon the mechanics. The men on some roads at least are apparently ready to insist upon a return of piece work.

Incentive Wage Payment

Mechanical department officers have been studying this question carefully and if piece work is re-installed it will undoubtedly be on a better and more stable basis than former methods which resulted from a gradual development in departing from the day rate basis. Some means must be devised to establish a basis upon which the rates can be developed so that as the costs of living change the prices can readily be readjusted. Suggestions along this line were made in an article by G. W. Armstrong in the *Railway Age* of May 20, 1921, page 1157.

The following extract from a letter of a mechanical department officer speaks for itself: "No matter how hard a man tries to give his best, he cannot render one hundred per cent or more without interest and enthusiasm. Interest and enthusiasm in a job cannot be bought; they must be given. They may be encouraged and nothing encourages this spirit so much as hope for and opportunity of promotion. The best paid executive positions are in the operating department. Mechanical department men are seldom appointed to positions of superintendent and to the higher operating positions.

Opportunity For Promotion

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"The experience of some roads at least has demonstrated that men who began their careers as stenographers and clerks can be developed into capable administrative officers. They were given opportunity. They were given a chance to develop. Possibly these men might not be artists at tamping a tie; possibly they might not be able to run a transit as well as some others, but as they have advanced, they have absorbed information and knowledge by observation and contact and they have developed executive ability. Many master mechanics and other men trained in the mechanical department are equally capable of absorbing and advancing if they are not kept on a siding with the switch stand locked.

"Do the higher mechanical officers endeavor to shove their subordinates over into other channels where they can go ahead? Do they endeavor earnestly to find opportunity for their subordinates? Do not some mechanical officers labor under the delusion that unless a man is capable at every job that any machinist, boilermaker, blacksmith or other mechanic has had to do, or may ever have to do, he is unfit to hold a higher mechanical position? Have not the machinists who have advanced to be master mechanics, superintendents of motive power, etc., absorbed useful information on locomotive operation, boilermaking, pattern making, car work, dispatching and to some extent on auditing accounts? They can absorb still more. Others can absorb. Encouragement to learn and opportunity to advance will help any ambitious man to add to his efforts to make the mechanical department function more efficiently and more effectively."

Getting the Most Out of Locomotives

Locomotives built today must operate not only next year, but 20 years from now. They must be built with an eye to the future and, therefore, the mechanical officer tries to incorporate in new power every worthy improvement, realizing that progress is certain to continue and the best today will be scarcely good enough to "get by" a few years hence.

Build for the Future

The efficiency of the locomotive as a heat engine has been nearly doubled within a decade, yet the future promises to bring developments of equal importance. The study of combustion has led to a better understanding of firebox and boiler design, and new types are being evolved as a result. The feedwater heater has passed through the experimental stage and may now be regarded as having established a definite place in future construction. Superheating steam

to an extremely high degree has been tried and its feasibility determined. Improved methods of creating draft are now receiving close attention. Alloy steels have been used to reduce dynamic augment with varying success; the benefits that will accrue are so great there is no question that the trials will be continued until a thoroughly satisfactory material is found. Devices for increasing the tractive effort at slow speed utilize idle weight and improve the tractive power characteristics of locomotives built with trailers. These and other promising innovations are, or soon will be available and as in the past mechanical department officers will play a large part in overcoming the difficulties in their application. Much could be done to accelerate development by preliminary trials on a test plant and it is to be hoped that arrangements can be made for co-operative research at some of the laboratories available for this work.





Fifty-five per cent of the total operating expenses of the railroads is affected to a greater or less degree by the character of the motive power. Because its influence on operation is so far reaching, the locomotive is the most important single factor in the operation of the roads today. Executives

Locomotives, the Vital Factor in Operation

are looking to it more and more as the instrument for cutting the cost of handling traffic. But whether it is a question of designing a new class of locomotives for special conditions, or of distributing the power to get the best results, an intimate knowledge of locomotive characteristics as well as operating conditions is necessary for its solution. The selection of the most economical tonnage or the locomotive best adapted for the traffic requires familiarity with the tractive effort, fuel consumption and maintenance costs of locomotives which few operating officers possess. The mechanical department men are thus becoming more closely allied with those who must determine operating conditions to move the traffic with the least total expenditure.

The selection of new power is becoming an extremely complex problem. When locomotives varied in few particulars, except in weight and the sizes of cylinders and wheels, the choice of the proper design was a simple matter. Now there are available numerous devices to increase the loads that can be hauled, to save fuel and to reduce maintenance. The range of possibilities to effect good operation or bad are almost unlimited.

Closely related to the problem of design is that of the rehabilitation of old locomotives. Remarkable progress has been made in this direction during the past few years. However, there are still many locomotives in service that are uneconomical in the use of fuel and not sufficiently powerful for the service in which they must be used. Such power is only a liability from any standpoint. If kept in operation it is wasteful; if it is to be taken out of service a large charge to operating expenses must be made to retire it if proper depreciation reserves have not been set up.

Convert Old Engines Into Assets

The benefits of improving old locomotives can be obtained in two ways; first, by reducing the cost of operation and maintenance, and, second, by lengthening the service life and thus decreasing the yearly amortization. So many modern accessories are applicable to existing power that, from the engineering viewpoint, practically any old locomotive can be made as efficient as the latest improved design. There are, however, rather sharply defined limits to the changes that can profitably be made in an old locomotive. For many classes of service such locomotives are well adapted and the

extent to which the design can profitably be modified depends on the relative maintenance cost of the existing locomotive, the normal life that can be expected from the boiler, and the fuel consumption. This has been one of the most attractive fields for saving, because under suitable conditions large economies can be effected with a comparatively small expenditure.

To get the most out of the locomotives, they must not only be designed right, they must also be operated right.

Effective Utilization of Power

Adjusted tonnage rating, now quite generally used, insured proper loading, but failed to take into account the time element. One of the important advances in improved utilization came with the general introduction of the record of distribution of locomotive hours. The importance of this form is generally recognized and some roads have adopted special methods for insuring the accuracy of the records. If this feature is closely checked, the data becomes invaluable as a means of getting a higher percentage of time in revenue service and reducing delays and time in shops and terminals. The intensive use of power increases the locomotive miles per day, enables the efficient power to be used to the best advantage, and reduces maintenance costs and fuel consumption. Many roads are now running engines over two divisions with splendid success. Other systems are turning the engines without cleaning or dumping the fires and report a large saving in fuel.

Even more important than getting the most miles per locomotive is getting the most ton-miles. Adjusted tonnage rating, where carefully supervised, gives splendid results. Roads that have supplemented this system by dynamometer car tests have obtained some remarkable improvements in operation. Much of this work was postponed during the war, but a revival of traffic will no doubt find the roads again actively engaged in improving their power by scientifically checking its performance in every-day operation.

The condition of locomotives is seldom considered as a major factor in train loading, yet it has a very great effect.

Economy of a High Standard of Maintenance

One road found that with equipment in good condition the tonnage could be increased in some instances 300 to 400 tons per train, and double-heading could be eliminated. How can the highest standard of maintenance be assured? First and most important is thorough workmanship in the back shop. The majority of operations can be performed while the engine is receiving classified repairs for a fraction of what the work costs if done in the roundhouse. It is, therefore, economical to put the locomotives in condition for efficient con-





tinuous service while they are in the shop for overhauling. As long as the power is in service it should be maintained at the highest degree of efficiency until it is again due for classified repairs. This means that the stitch in time should be given rather than neglecting the engine until heavy repairs are needed and then trying to patch up the defects. One of the greatest aids in accomplishing this object is a definite standard of maintenance for the entire road. Systematic instructions for repairs are being adopted on numerous roads and the benefits are apparent.

Proper workmanship in the vital parts of the locomotive is absolutely necessary, but how is it to be secured with shops filled with "McAdoo mechanics" and jobs assigned according to seniority? The solution of the problem seems to be in the use of special men to follow the troublesome details. One road, for instance, has a man who does nothing else but look after valve motion on the entire system. He is able to check up waste of fuel at the source. Is this not more logical than leaving the detection of errors in valve setting to the fuel supervisors or traveling engineers who have no definite means of checking the cut-off unless the engine is so bad that it does not "sound square"?

Fuel economy is receiving close attention and now, more than ever before, careful supervision is warranted because the cost of fuel absorbs such a large proportion of operating expenses. As an example, on one representative road the cost per 1,000 gross ton-miles increased 246 per cent from 1916 to 1920.

Increasing Ton-Miles Per Pound of Fuel

The reduction of the quantity of fuel used can be accomplished partly by improved equipment, but the greatest factor is the method of operation, irrespective of the equipment. The technique of full economy has been thoroughly developed and securing the best performance practicable is now a matter of administration. In considering this matter two features stand out clearly. First, so many departments are concerned in the conservation of fuel that the organization which is responsible for its use should not have its activities restricted to the bounds of a single department. Secondly, the individual enginemen, and especially the firemen, can effect large savings or cause great losses. Without their full co-operation the best results can never be attained. The fuel department head may be a capable engineer but unless he is also a promoter, unless he can sell the idea of fuel saving to the men, he cannot achieve the full measure of success.

More than the usual amount of trouble has been experienced during the war and since from failure of materials. One mechanical engineer states the problem concisely in the following words: "There is economy of maintenance and operation in purchasing durable material. Material that soon requires repairs, patching or renewal is expensive. During the period of the war, there was a liberal tendency to grant concessions in order to facilitate output. Wherever quality was sacrificed by these concessions, higher costs of maintenance and repairs followed the use of the lower grade material. Where quality was sacrificed, immediate steps should be taken to direct it toward higher grade."

With the proper workmanship and material, and systematic maintenance in the engine house, a definite service can be obtained from each locomotive between shoppings. In this connection a superintendent of motive power recently said: "We have given very close study to the shopping of engines on a mileage basis according to a treatise which was given to every locomotive foreman on the railroad. Shop scheduling of work and the fact that engines are not allowed to be taken into the shop without careful study and, furthermore, knowing that material and shop space is available in advance, have caused our power to be more carefully followed up locally on each division. Master mechanics now readily understand that they must get a certain amount of service out of their power and they, therefore, keep it up from day to day and are avoiding the former practice of wearing an engine out intensively, figuring they can send it to the back shop whenever they please."

A matter allied to locomotive maintenance which deserves at least passing comment is the question of cleaning engines. Few roads have a definite policy with respect to all classes of power and often the appearance is a reliable indicator of the condition of traffic: if revenues are ample, the engines are clean; if times are hard, they are dirty. If there is no economy in wiping, the practice should be permanently discontinued, but if it effects a saving, it is needed at one time as much as at another. If the appearance of the locomotive indicates to the engineer that the railroad is indifferent about the condition of the power, is it reasonable to expect that he will crawl among the dirty parts to make a thorough inspection, or be careful in handling it? The saving effected by keeping motive power clean can never be computed accurately, but the moral effect on the organization gives a handsome return on the money thus spent.

Car Conditions Need Permanent Improvement

On May 15 the Car Service Division reported 324,969 freight cars in bad order, 231,690 of which were in need of heavy repairs. This is a bad situation. Normally the bad orders should not constitute more than four or five per cent of the total equipment and during the months of heavy traffic last year they did not exceed eight per cent; now there are over ten per cent in need of heavy repairs alone. This extraordinary accumulation of run-down equipment is the result of the struggle for solvency which, during the past few months, has compelled many railroads to effect drastic

curtailments in maintenance expenditures without consideration of their ultimate wasteful effect.

Essentially, however, the present situation differs only in degree from that which periodically follows a decline in traffic. Whenever there is a surplus of equipment there is always a heavy movement toward home lines. Large numbers of these cars, which may long have been in need of heavy repairs, are set aside by the owners to await the much needed general overhauling. But, because of lack of adequate facilities or excessive curtailments of maintenance

expenditures, much of this equipment is still in need of heavy repairs when the succeeding period of increasing traffic compels its return to service.

During the period of heavy demand such cars appear repeatedly on the repair tracks, on each occasion to be patched up and moved on with the least possible expenditure. In the aggregate, however, the cost of maintenance under these conditions is excessive, the revenue service performance is seriously impaired and claims for loss and damage are excessive.

There are a number of conditions which, so long as they continue, make any adequate permanent improvement standards of car maintenance and serviceability practically impossible. The first is the lack of an adequate financial surplus to permit an intensive program of maintenance during these periods of light traffic. The effect of this condition has been most marked during the recent business decline and it will probably always exert more or less influence on the maintenance standards of financially weak roads.

How general this influence will be is largely a matter of public policy and is not directly within the control of railway managements. There is ample room for betterment, however, by changing conditions which are within the control of railway managements either individually or collectively, through the agency of the American Railway Association.

From the standpoint of its effect on operating costs, service and the cost of maintenance, the worst condition is probably the perpetuation of weak equipment which should either be retired or adequately reinforced to meet modern service conditions. The cars within this classification, while they probably

do not exceed 15 per cent of the total number of cars of railroad ownership, are the source of a much larger proportion of the total cost of maintenance and account for a large part of the accidents and loss and damage claims chargeable to freight cars.

The desirability of keeping cars with weak draft sills from interchange has been discussed for many years. In 1914 it first received serious attention before the Master Car Builders' Association and a provision, adopted by letter ballot, was added to Rule 3 to the effect that cars of less than 60,000 lb. capacity having short draft arms be not accepted in interchange after October 1, 1916. In 1916 the effective date was extended to October 1, 1917, because of the large number of refrigerator cars affected. In 1917 the date was again extended because of the material shortage existing at that time. In 1918 the time was again extended to October 1, 1920, and last year the effective date was set ahead to Oct. 1, 1922.

In 1918 a provision was added to Rule 3 requiring that after October 1, 1918, suitable reinforcements be applied to all cars of the weak construction as fast as they received general repairs.

Is it not probable that, should this provision fail to eliminate all of the cars of objectionable construction by October 1, 1922, the effective date of the ban on interchanging

these cars will again be moved forward? The time when the railroad may expect to be really free from this equipment probably depends entirely upon the extent to which the policies of the individual roads square with the reinforcement provision of Rule 3.

In the past year two other steps have been taken by the Mechanical Division to improve conditions caused by equipment of weak construction. These are the adoption of changes in Rules 114 and 120. The first recommends that where destroyed foreign cars are rebuilt on the handling line the original construction be modified to the extent of the application of metal draft arms, steel draft members, or other approved reinforcements. The second recommends the application of ends of box cars of the type specified for new cars when equipment with steel underframes requires extensive repairs to the ends.

It is significant that these provisions are recommendatory and not mandatory.

In the meantime, the evils resulting from the operation of weak equipment continue unabated and nation-wide in their effect. Is it probable that further direct legislation will prove to be more effective than that which already has been written into the rules?

Some conception of what it is costing the railroads to continue to operate cars with weak draft construction may be obtained from an analysis of car repair costs which was made in 1911 by F. F. Gaines, then superintendent of motive power of the Central Railway of Georgia, in which it was found that items connected with the draft gear and its attachment to the car accounted for 38.9 per cent of the cost of repairs, 28.4 per cent being chargeable to the item of draft bolts alone. That the equipment under consideration was not operating under the unfavorable conditions that prevail in many sections of the country is evident from the fact that draft timbers and longitudinal sills combined, did not exceed three per cent of the total.

On another railroad, during a recent period of 13 months, there were 889 wrecks or accidents caused by the failure of freight car parts. The largest single item in a classified list of the defects was 144 accidents caused by couplers pulling out. Including with this the other defects pertaining to the draft gear and its attachments, a total of 222 accidents, or 25 per cent of the whole, were attributable to the group.

The next largest single group of accidents was caused by arch bar failures which were responsible for nine per cent of the total. Add these to the draft attachment group and the sum amounts to 34 per cent, practically all confined to a small group of cars aggregating probably not more than 15 per cent of all the railroad-owned equipment in service.

This analysis suggests forcefully the extent of the losses other than the excessive cost of their own maintenance which are being sustained by the continued operation of these weak cars, since their retirement or adequate reinforcement would make it possible to eliminate practically all wrecks and the accidents attributable to these two large classes of defects.

The lading in these cars must frequently be transferred enroute. Apart from the cost of the transfer itself, it is an





exceedingly fruitful source of loss and damage claims. Few loads are transferred for which claims are not presented. Furthermore, an accident resulting from the failure of a weak car seldom occurs, that several other cars do not also appear on the repair track.

The question may well be asked, "If these things are true why does this equipment continue to run?" One reason is a general lack of service records of freight car equipment. Few roads are in a position to apportion to each class of freight equipment its share of the cost of repairs or the added operating expenses resulting from car failures. This is a fundamental defect which makes impossible intelligent decisions on questions of design, maintenance or retirement policies. This statement is not a reflection on the soundness of the judgment of car department officers; but good judgment is helpless without a sound basis of facts on which to act.

While the proper disposition of equipment of weak design is undoubtedly the most pressing problem pertaining to the permanent betterment of freight car conditions, there is still a large field for improvement in general maintenance policies. The two problems are very closely related and the same factors which so strongly tend to perpetuate cars of weak and unsafe design, exert a potent influence in preventing a generally higher standard of maintenance.

Can Maintenance Standards Be Improved?

Little evidence is needed to support the statement that general standards of freight car maintenance are low. The conditions with which the grain shipping roads are confronted yearly during the heavy movement of the crops have repeatedly been referred to in discussions on the floor of the Master Car Builders' Association conventions and elsewhere, in which opinion has usually been divided on territorial lines. These discussions were only reflections of the fact that few railroads maintain the freight cars on their lines beyond the margin required to provide for the handling of the commodities with which they have to deal.

Looking at the situation from the standpoint of good public service and the best interests of the transportation industry, such standards of maintenance are indefensible. And yet under present conditions can any one say that such standards are not sometimes justified when the immediate interests of the individual road are under consideration? With cars in great demand the percentage of home cars on lines rapidly decreases until it seldom runs above 50 per cent and in extreme cases, such as existed last year, drops as low as 25 per cent.

During these periods a large percentage of such repairs as are made must be made on foreign lines. But there is little incentive for the foreign lines to make more than the repairs immediately necessary to keep the equipment fit to run. The direct benefit of any more than this amount of work would probably be derived by a connecting line. During such periods the owning lines have little opportunity to carry out extensive programs of improvement or heavy repairs and with prices for labor and material fixed on the present basis of bare cost plus overhead, many roads find it cheaper to neglect their own equipment and pay for such repairs as are made at M. C. B. billing prices.

Is there not a basic inconsistency between Rule 1 and the

remainder of the interchange rules? Rule 1, by mandate attempts to place all cars, irrespective of ownership, on an equal basis so far as inspection and repairs are concerned. But it overlooks the fact that railroad corporations are essentially no different from and are subject to the same motives as individuals or corporations engaged in commercial or industrial pursuits, and that loyal officers and employees of these corporations are governed primarily by the immediate interests of their own organizations. The rules themselves imply a recognition of this fact since their purpose is largely to define and protect the rights of the car owner and the handling line respectively, the one from the other.

Is it reasonable to expect a high standard of freight car maintenance on a scale of standard billing prices low enough to discourage the handling line from carrying out the spirit of Rule 1 and at the same time, to encourage car owners whose costs are high to neglect their own equipment? A code of billing prices carefully established to avoid exceeding the average cost of labor and material and to which a percentage has only in recent years been added to cover legitimate items of overhead expense, necessarily must be applied at a loss by all roads whose costs are higher than the average and only those roads whose costs are lower than the average are offered any inducement other than a bare interest rate on the investment to provide facilities adequate properly to maintain all the cars on their lines.

Do these facts not suggest the desirability of establishing a scale of billing prices in which is included a reasonable profit in addition to all of the items of expense now taken into consideration?

The effect of such a scale of prices will be felt in several directions. In the first place, instead of being directly opposed, as they frequently are, the common interest of the roads to provide a high standard of public service and the individual interests of the roads would point in the same direction. The increased prices would tend to increase the extent and character of repairs to foreign cars. Just how extensive this improvement would be is open to some doubt, owing to the difficulty of securing promptly such material as must be furnished by the owner. The condition of many cars on their return to the home lines last fall, however, indicates that there is ample opportunity for improvement within the field requiring only such material as is commonly carried by all roads.

But the real responsibility for the maintenance of freight cars rests with the owner. With the suggested scale of prices the owner will be called upon to pay the repairing line a profit on a large part of the work done on foreign lines. And there would be a real incentive to provide for a high standard of heavy repairs to their own equipment to the end that frequent light repairs will be unnecessary. The wasteful results of continuing to operate the troublesome equipment of weak design would be brought home with an added force that would do much to hasten the complete rehabilitation or retirement of these cars. Eventually there would also be a marked improvement in the average standard of construction.

Considering the wasteful results of the patchwork methods of car maintenance, is it not reasonable to suppose that a high standard of maintenance would result in an actual reduction in the aggregate expenditure?



The question of standardization has received a great deal of attention for a decade by executive and operating officers as well as officers of the car department.

Standardization of Freight Cars

Several attempts to force the adoption of a complete standard box car design have been made, but so far without success. Considering the difficulties which have been encountered in the attempt to legislate cars with short draft arms out of service, the prospect for the adoption of a complete standard design does not look bright. Much good work has already been done by the Master Car Builders' Association and its successor, the Mechanical Division of the A. R. A. toward establishing limited dimensions for the strength and interchangeability of essential features of design. Such a standardization of details leaves little more to be desired, so far as interchangeability in interchange service is concerned. The limited extent of further requirements is evident from the fact that eliminating the repairs to draft gear attachments, and assuming an adequate maintenance program on the part of the owner, by far the largest part of the running repairs is confined to trucks, couplers and air brake equipment, the most affected details of which are already interchangeable.

In 1920 the total cost of maintaining over 94 per cent of the freight cars owned by all Class I railroads in the United States was \$626,746,636, an amount over \$17,000,000 larger than the total cost of locomotive maintenance on the same roads. Had the \$609,360,716 spent for locomotive maintenance been administered with the same lack of a definite program which characterizes the maintenance of freight

cars it is doubtful if 50 per cent of the locomotives in the country would now be fit for service. In order to maintain a high standard of serviceability and to secure a maximum of service for each dollar of maintenance expenditure, locomotives are scheduled for periodical classified repairs on a mileage basis. Cars operate under conditions which make impossible the same attention in service that locomotives receive. Is it not therefore a matter of even greater importance that they receive classified repairs at regular intervals, established after careful study of all the factors and strictly adhered to? With an established percentage of the equipment scheduled for classified repairs each year, programs for improvements needed to overcome weaknesses in design or to provide for changing operating conditions can be carried out before the continued failure and repeated patching accumulates an excessive but ineffectual maintenance expenditure.

The one thing most needed to improve car conditions is an adequate basis of fact concerning the service performance of each class of freight cars in relation to the cost of maintenance and the capital investment. With this as a foundation, design, maintenance and retirement policies can be established with a high degree of assurance that the results will be reflected in better net earnings. But to put the subject in its proper light before executive and operating officers, as well as the officers of the mechanical department, and to provide the incentive most needed to make a high standard of maintenance equally attractive to the individual car owner and the railroads as a whole, the prices in the rules of interchange must both be put on a sound economic basis.

Conclusion

Speeding Up the Shop Production

Realizing that slack times should be used to get equipment in good shape for future needs, forward-looking railroad managers have reduced shop and enginehouse forces only under compulsion. Here is what one official has to say regarding this: "Railroads should be so financed by means of a cash reserve that when business is slack the equipment may be put in proper shape for the coming rush of business. The usual procedure is to let repairs lag in slack periods and then, as business picks up, attempt to make repairs when the equipment should be on the road earning revenue. A large number of men must be hired in a hurry, meaning inefficient help and high cost."

New shops and enginehouses are also needed in many

cases but few roads are in a financial position at present to supply this need and some alternative method of obtaining increased capacity and speeding up the work must be adopted.

Increased shop output at lower unit costs can be secured only by a careful analysis of the three component factors:

Three Factors In Shop Output

men, machinery and methods. Of these three factors, the first is most important. The importance of the human element can hardly be overestimated and unless it is taken into consideration, no attempt to improve shop output will be successful. Some roads are already benefiting by care in the





selection and training of employees and when the roads are allowed to pay employees in proportion to their efforts the results will be still more satisfactory. It is important that mutual understanding and confidence, based on fair dealings between management and men, be established to secure the best results. The community loses when square men are fitted in round holes. Wherever possible, men should be given work for which they are adapted and be promoted promptly as opportunity offers. After men, the other two factors, machinery and methods, are about equally important, efficient shop operation being impossible without either.

The modern tendency is to develop and utilize more and more efficient, powerful, labor-saving machinery. Railroad shops are no exception to the general rule and when new machines and devices are tried out, recommendations regarding them should not be lost sight of as is too often the case. That rail-

**New
Machinery
Needed**

road shop men understand the importance of keeping machine tools in good repair and replacing obsolete tools as fast as possible is shown by the analysis of railroad operating expenses recently published by the Bureau of Railway Economics, Washington, D. C. This analysis shows that for 1920 the amount of money spent by the railroads for shop machinery (Account 302) was \$4,596,016 greater than in 1919. Similarly the amount allowed for machinery depreciation, while far too small, was twice as much in 1920 as in 1919. Is "any machine that will run" good enough for a railroad shop? This old idea is fast being dissipated and the time will come, if it is not now here, when the same standards of economy and efficiency will be required of railroad shop machinery as of that used in industrial plants.

Second only to the need for improved, modern machinery is the necessity of utilizing present equipment more effectively.

**Utilize
Old Equipment
More Effectively**

It has been pointed out many times in the *Railway Age* that the output of many heavy repair shops is limited by the capacities of the respective machine departments and proper attention to these departments will show big results. Many old machines are too antiquated to be of value except for scrap but in many cases, desirable results can be secured by providing more powerful drives, increasing the speeds or speed ranges, or possibly strengthening the machines at weak points.

Competent repair gangs should be developed, charged with the duty of carefully and periodically inspecting all machines and keeping them keyed up for maximum production. In this way weak points in the machinery will be discovered and many breakdowns with their resultant delays prevented. It is important that the mistake should not be made of furnishing new machine tools and failing to supply the jigs and fixtures necessary for their efficient operation. Too much stress cannot be laid on the necessity for adequate, time-saving jigs and fixtures. A line should be drawn between efficient devices and those which cost more to make than they will ever save. The government valuation showed a great abundance of small tools of all sizes, kinds and conditions of usefulness. It is apparent that real economies can be effected by restricting the manufacture of these

tools to certain standards determined by experience to be most satisfactory.

One of the most important, if not the most important, method of increasing railroad shop output at small expense is by the installation of shop schedule or routing systems, in charge of competent schedule men and supported by the managements. The idea is not to introduce complicated systems with a

**Locomotive
and Car Shop
Schedules**

multiplicity of cards and forms to make out, but rather to apply the essential principles, allowing details to work themselves out as may seem desirable. The efficacy of shop scheduling has been amply demonstrated. Perhaps the most comprehensive description of what has been accomplished with shop schedules is included in the report of the Committee on Scheduling made at the meeting of the Mechanical Division, A. R. A., last year.

It is important that live schedule men be selected to direct the routing operations but it is most important that shop superintendents and general foremen appreciate the value of the system and determine to realize the maximum benefits from it. By lack of co-operation, an unconvinced general foreman can practically nullify the good effects of a shop schedule system. In doing this, he handicaps himself since the shop schedule will relieve him of an immense amount of detail, show just which department is lagging behind, and why, and so co-ordinate the work of all departments that the maximum number of locomotives, consistent with local conditions, will be turned out per month.

The economies that result from applying locomotive schedule systems can well be duplicated in handling car shop repair work (*Railway Mechanical Engineer*, June, 1921, page 349). This article shows that the same fundamental principles apply and there is no reason why they will not operate practically the same in both locomotive and car shops. As in locomotive repair work the principal object is to have the various car parts repaired in time to be assembled and the cars painted ready for service on a given date. It is not expected that the schedule would apply to light car repairs but only to heavy repair work.

The need of accurate and yet simple methods of computing shop costs is essential and perhaps not fully realized.

**Accurate
Knowledge of
Shop Costs
Essential**

Without accurate knowledge of the cost of making a bolt in a certain way, it is impossible to tell whether the correct method is being used. Similarly, it is impossible to decide on the advisability of purchasing an expensive, specialized machine tool unless the relative costs of manufacture by the old and new methods are accurately known and the difference is large enough to pay interest and depreciation charges on the larger investment. Regulations of the Interstate Commerce Commission clearly define a system of railroad accounting, but details of shop costs are not required and without these there can be no effective control of shop costs. It is not maintained that an army of clerks should be employed to figure every detail, but enough details must be included to guide shop managements in securing the most economical operation. It is particularly important that cost accounts be figured as near as possible to the time when the charge is made and data should be available to predict in advance

what the cost of a new operation will be. This will avoid the expense of making new parts that can be more cheaply bought.

The tendency on progressive railroads at the present time is to establish centralized production shops for the manufacture of all standard small locomotive parts. The use of specialized automatic and semi-automatic machinery for the manufacture of many similar parts in these shops enables great economies to be made. As an example of what may be accomplished along this line an article published in the *Railway Mechanical Engineer*, June, 1917, page 289, will be of interest. The advantages of centralized production are numerous aside from the reduced cost of manufacturing each piece. In the first place finished, or semi-finished parts, in large number can be placed in stock in central storehouses, being furnished on order from any shop or roundhouse on the system. The final machine operations can be quickly performed on local machines and locomotives or cars returned to service in a minimum length of time. Moreover, the fact that small parts are standard and interchangeable is a valuable, time-saving feature. There is also little question that a closer inspection and better grade of material can be secured for all parts made in centralized production departments.

In connection with this it is important that reliable standards be developed for the entire road and more important still that these standards be lived up to. Standards based on good practices and made after thorough investigation can be enforced readily and should be arranged in a substantial systematic form so as to be placed in the hands of all concerned. In order that they may be readily enlarged and revised, a loose-leaf folio should be used.

Much can be accomplished by encouraging constructive criticism on the part of shop employees. Many of these men with long experience have valuable ideas if they can be brought out. A great deal of waste can be avoided by the more careful inspection of material used in the construction of locomotive and car parts. The material should be ordered on practical and conservative specifications and there is economy of maintenance and operation in purchasing material which is durable. During the war, both material and the quality of work were sacrificed in favor of output but this practice should now be corrected. When quality is sacrificed, the well-known final result is an excessive cost over the cost of doing a good job in the first place.

The installation of a modern flue welding plant in a certain shop enabled the flue welding organization to be reduced from nine employees to six with no reduction in output. In another instance, all brake pins for the entire system were manufactured on a forging machine, a practice which re-

leased a turret lathe for other work. In manufacturing cylinder and air pump packing rings, gang tools with six cutters each have been developed decreasing the cost of production 33 per cent. Main rods, side rods, eccentric rods and combination levers are now being manufactured interchangeable from right to left. This results in economy since it is not necessary to carry so many parts in stock. Application of an improved carriage to a driving wheel journal lathe has made it possible to turn and roll two journals at the same time, thus doubling the output. Reclamation plants upon a sound business basis will yield splendid returns.

The importance of grinding, particularly for finish operations on certain locomotive and car parts, should not be overlooked. In view of the success of some railroads with grinding, it is a little surprising to find that many others are not benefiting by this modern practice. Not only is greater accuracy and speed of production obtained but the finish of the work is superior. Ground bearings have demonstrated their superiority over turned and rolled bearings. It is generally conceded that piston rods, valve stems and guides, should be ground, but a great many railroads also grind crank pins, axles and journals. Still other railroads have had success in grinding chilled cast iron car wheels and car axle journals.

On account of the considerable distance between various departments and buildings of repair plants it is essential that some form of transportation system be provided for the movement of locomotive and car parts. In a certain case four industrial trucks were placed in service and are doing the work formerly handled by 20 employees with the usual hand trucks. In addition, the material is handled more promptly with a resultant increase in efficiency due to the material being on hand when needed. Second only to the scientific layout of shops and machinery is the need for wide, clear passageways and rugged, reliable, power-operated trucks. Hard smooth walks should connect all shops and buildings and all passageways should be kept clear. Otherwise the maximum advantages from the use of such trucks cannot be realized. While other forms of motive power may be used the electric storage battery truck, on account of its ease of operation, reliability and relatively low cost has won high favor. Not only has hand trucking been largely eliminated in certain shops but the trucks are scheduled to leave certain points at specified times, thus providing what may be called a shop transportation system. The advantages of this arrangement consist not only in moving material at a reduced labor cost but in increasing the actual production of individual departments. As soon as one operation on a machine part is completed the part is moved to the next machine, and the result is to speed up the production.

Centralized Production Departments

Grinding Locomotive and Car Parts

Shop Transportation Systems

Machine Shop Practice

Increasing the Engine Terminal Output

The tendency at the present time is to provide engine terminals equipped to handle heavy running repairs, thus accomplishing two important results.

The time locomotives are held out of service is reduced to a minimum and, by reserving back shops for heavy repair work, shop schedules are more easily maintained and maximum output secured. It is important, however, to draw a line between repairs which can be economically made at roundhouses as now equipped and those repairs which should be made at back shops.

Draw Line Between Enginehouse and Back Shop

One motive power superintendent, commenting on the increased size and weight of locomotive parts, explains that many terminals are required to meet conditions and follow practices which answered the purpose ten years ago but are now extremely expensive and unsatisfactory. Enginehouse forces should be organized and equipment provided to maintain locomotives at a high degree of efficiency between shoppings for classified repairs. It is important to install the right kind of machine tools in roundhouses and the old practice of

Simple, Rugged Machine Tools Are Needed

shipping obsolete, wornout tools from back shops is expensive and in many cases unwarranted. The cost of a machinist's time is just as great in a roundhouse as in a back shop, and usually the work is wanted in a greater hurry. Why handicap the roundhouse? The installation of simple, rugged machine tools will pay an ample return on the investment.

Perhaps the greatest possibility of economy in operating many locomotive terminals is in providing improved coal and ash handling facilities. The high cost of labor makes it essential to install as much labor saving machinery as is consistent with the size of the terminal. In addition to reducing labor costs, the installation of modern coal and ash handling equipment will facilitate turning locomotives and increase locomotive revenue earning hours.

Coal and Ash Handling Equipment

While overhead electric traveling cranes have been installed in roundhouses this involves practically rebuilding the roundhouse structure and the expense is in many cases prohibitive. For new terminal developments and where it is planned to do a large proportion of the heavy running repairs, however, there can be little doubt of the need for electric overhead traveling cranes. In the average roundhouse, there are big possibilities of improvement by installing monorail electric hoists, jib cranes and portable cranes. These will facilitate removing and handling heavy locomotive parts which must be renewed. As in the case of railroad shops, terminals also should be provided with power-operated trucks and hard smooth passageways in order that materials may be moved from place to place readily. While the two-wheel hand truck still has its use, all long hauls of heavy material should be made by power trucks, or if the size of the terminal does not warrant this refinement, four-wheel trucks with ball bearing wheels of large diameter should be used.

The need of auxiliary drop pits for engine truck and tender wheels is acknowledged by a large majority of railroad men. The advantages of these pits are mainly reduced labor costs and a considerable saving due to returning the locomotive to service more quickly than would be the case if it had to be jacked up at the front end to remove defective truck wheels. If the front tender wheels are defective, a drop pit also saves cutting the engine-tender connections, including the automatic stoker connections when the locomotive is stoker equipped.

It is exceedingly important in roundhouse work to make sure that inspectors and repair men know definitely just what part of the work is assigned to each, no chance of shifting responsibility being allowed. Good results have been accomplished by posting work reports but it is not alone necessary to post these reports on the boards. Each man should be given a slip for the work he is supposed to do, otherwise he will almost invariably pick the easiest work and leave the more important items to the last, often delaying locomotives.

A considerable saving can be effected in the case of loco-

motives requiring but minor repairs by having these repairs made without putting the locomotives over the turntable. The provision of a covered inspection shed with a few repair men to perform the little jobs as soon as discovered by inspectors will thus greatly increase the number of locomotives that can be turned at a given point. Each district boiler inspector should make the same kind of inspection as a government inspector and his report be observed as seriously. Experience has demonstrated that it will pay to have a man on the personal staff of the superintendent of motive power to do nothing else but look after boiler washings, the cost of boiler maintenance being largely dependent on careful, periodical boiler washing with hot water. Hot water washing and refilling systems should be installed in roundhouses with pipes extending to each pit.

The development of careful, reliable men periodically to inspect and pack journal boxes is essential. On one road an expert in valve setting was also assigned to the superintendent's staff and was responsible for saving large amounts of fuel monthly due to the more careful squaring of valves and adjusting of cut-offs.

A timely article on modern roundhouse needs and operation is published in the *Railway Mechanical Engineer*, June, 1921, page 337. It points out among other things the need for careful inspection and prompt repair of all locomotive defects. The time to cure engine failures is before and not after they occur.

The Roundhouse Up-To-Date

The possibilities of altering track layouts at small expense and with important savings in the time required to turn locomotives are mentioned. It is also recommended to provide emergency outlets around single controlling switch points in case of derailment at these points. The most important point developed in the article is the need of capable, efficient roundhouse forces, able and willing to co-operate with each other and with the transportation departments. The need of reasonable hours, good working conditions and adequate compensation, to attract men of the necessary calibre, was strongly emphasized.

Mechanical department officers of both shops and engine-houses should be keenly alert for possible improvements either in machinery or methods, and

Recommendations accompany all recommendations with a full and complete statement of details. Recommendations should be based on facts. To quote another superintendent of motive power, "I have frequently found, both when making or passing upon recommendations, that a full, complete statement setting forth the existing facts, also covering several different remedies and selecting the one which accomplishes the greatest good at the least expense, is usually acted upon quickly and favorably if the funds are at all available. A vague recommendation without supporting facts, on the contrary, causes the officer passing upon it immediately to start some investigating on his own account to see whether he can figure out a cheaper way to do it. Perhaps the case appears so weak that he does not think it entitled to further consideration and sometimes it is put so vaguely that he does not have time to study it out."



Progress of Missouri, Kansas & Texas Since 1913

Increased Capital and Maintenance Expenditures Under Receivership Have Enabled Great Improvement in Operating Results

Part I.

By Samuel O. Dunn
Editor of the *Railway Age*

THE MISSOURI, KANSAS & TEXAS RAILWAY LINES passed under the present management when C. E. Schaff became president in April, 1912. The railway was then a typical southwestern granger road in physical condition and in traffic. It was built with grades conforming to the general surface of the territory served, with narrow banks and cuts and rails of light section and varying weights; and these general conditions still prevailed. Its tracks and bridges were not strong enough to accommodate locomotives of modern size and weights. Most of its engines were light and of old designs, and it lacked good engine terminals and shops for handling and maintaining its power. These things rendered it impracticable to move freight in large train loads and with economy.

Various parts of the property had been built at different times by construction companies largely for speculative purposes. It had been loaded with heavy fixed charges upon an indebtedness taking a wide variety of forms. Its high operating costs and fixed charges had rendered it impracticable to raise the new capital required to make the permanent improvements without which needed operating economies could not be effected.

In 1906 the company had begun to pay small dividends upon its preferred stock. To meet the heavy fixed charges and these dividends, maintenance expenditures were unduly restricted. The total paid in dividends between 1906 and 1914, when they were discontinued, was \$4,420,000. This involved the disbursement of money which should have been spent on the property.

The years 1914 and 1915 were a period of reduced traffic and poor earnings for all the railways of the United States, including those of the southwest. The new management of the Missouri, Kansas and Texas, in addition to discontinuing the dividends on the preferred stock, effected some reduction in operating expenses, especially in transportation expenses. But the condition of the property rendered impracticable as large reductions of expenses as were needed to make a satisfactory financial showing.

In 1915 there came due \$19,000,000 of 5 per cent two year notes. Part of the holders refused to consent to an extension for one year at 6 per cent. In consequence, on September 27, 1915, the Missouri, Kansas & Texas Railway Company and the Missouri, Kansas & Texas Railway Company of Texas passed into receivership, Mr. Schaff being appointed receiver.

In this same period railways having most of the mileage in the southwest became insolvent. This was due very largely to the policy of state regulation to which they were subjected. The southwestern states fixed freight and passenger rates so low that even under good and economical management most of the railways could not make enough net earnings to meet their fixed charges when business was poor.

Immediately after Mr. Schaff took charge of the Missouri, Kansas & Texas in 1912 the formulation of plans for needed improvements was begun, but until the receivership it was impossible to make progress in carrying them out. The receivership removed the necessity of meeting all fixed charges

and made it possible to begin carrying out a real improvement program.

The change in policy was reflected immediately in a large increase of expenditures for maintenance. Before 1916 these expenditures had not in any year exceeded \$10,000,000. In 1916 total expenditures for maintenance were increased to \$14,909,499, or over 50 per cent, and a liberal maintenance program has been continued since. The expenditures chargeable to capital account made under the receivership from September 27, 1915, to December 31, 1920, were \$25,556,283. The interest not paid was almost the same, being \$24,000,000. Of the total expenditures chargeable to capital account \$11,109,965 were chargeable to equipment and \$14,446,318 to roadway and to other permanent structures.

Capital expenditures on a railroad have one or both of two purposes—to enable it to render more and better service, or to handle its traffic at a lower operating cost. If the new investment makes it possible to reduce operating expenses more than it increases interest it yields a net profit. But that new investment may reduce expenses more than it increases overhead charges a proper balance must be maintained between the various improvements made. The mistake has been made on not a few railroads within recent years of acquiring heavier and more powerful locomotives faster than other facilities have been provided to make it possible to secure the greatest practicable service from them. The problem of maintaining the most efficient relationship between increases of the various kinds of facilities is a very difficult one, but only by correctly solving it can a management derive the greatest practicable benefits in increased operating efficiency from any given additional investment.

The entire program originally outlined for making the Missouri, Kansas & Texas a modern railroad in physical facilities and operating and financial results has not yet been carried out. The progress thus far made, however, as evidenced by the manifest improvement of the physical property and of the operating and financial results, has been so great as to afford the best testimony that the general plan of improvements is adapted to the special conditions and needs of the railroad, and when fully carried out will enable the road to produce operating and financial results which will compare favorably with those of other railways having similar conditions.

Improvements in Track and Permanent Structures

The density of traffic on different parts of the M. K. & T. system varies widely. Between Muskogee, Oklahoma, and Denison, Texas, 157 miles, the densest and best balanced traffic on the system is handled. The total freight on this part of the line is almost twice that on the line between St. Louis and Sedalia or on that between Kansas City and Parsons, and almost three times that on any of the lines in Texas below Denison. Indeed, except between Sedalia and Parsons, 159 miles, between Parsons and Muskogee, 117 miles, and especially between Muskogee and Denison, 157 miles, the freight traffic is still so light that it can easily

be handled on a well equipped single track railroad line. The following table summarizes the expenditures on roadway, track and other permanent structures chargeable to capital account made under the receivership to December 31, 1920:

Class	Improvement to roadway and structures chargeable to Cap. Account
Road—	
Right of way and fills, etc.	\$1,102,295
Ballasting	691,270
Rails and other track material	1,260,817
Bridges, trestles and culverts	1,217,462
Elimination grade crossings	15,563
Grade crossing and crossing signals	422,107
Additional main tracks	
Additional yard tracks, sidings and industry tracks	2,945,300
Change of grade or alignment	139,623
Signals and interlocking plants	593,614
Telegraph and telephone lines	204,325
Roadway machinery and tools	145,025
Section houses and other roadway buildings	416,868
Fences and interlocking plants	48,089
Freight and passenger stations, office buildings and other facilities	441,500
Hotels and restaurants	
Fuel stations and appurtenances	609,693
Water stations and appurtenances	439,610
Shop buildings, engine houses and other appurtenances	819,692
Shop machinery and tools	332,539
Grain elevators and storage warehouses	120
Real estate	39,332
Assessment for public improvement	16,529
Terminals and other large projects	1,615,424
All other improvements	719,421
	\$14,446,318
Extension branches and other new lines	
Total road	\$14,446,318

The total mileage operated is now 3,558 miles. Of this, 1,197 miles have been improved and strengthened by widening banks and cuts, 355 miles have been newly ballasted and 970 miles have been reballasted. Before the improvements under the receivership the railway had practically nothing but dirt ballast, and heavy rains and high water frequently resulted in tracks being washed out or sinking into the mud until operation over them became unsafe, if not impracticable. The cost of maintenance of way as well as of transportation was unfavorably affected by these conditions. The remedy was the construction of a more permanent roadway, and the situation in this respect has been greatly improved. Large parts of the railroad are now well ballasted, this being especially true from Sedalia to Parsons and more particularly from Parsons to Denison. The company has quarries and rock crushers at three convenient points where a good quality of rock ballast is obtained. There is a large mileage ballasted with chatts, a considerable mileage with burned clay and some with shell.

The average weight per yard of rail in track on the whole system on December 31, 1912, was 67.56 pounds. As this figure indicates, there was a great deal of very light rail. The average weight of rail on September 30, 1920, was 73.85. New 90-pound rail has been laid on 384 miles and new 85-pound rail on 361 miles; and 260 miles of 85-pound rail, 13 miles of 75-pound and 144 miles of 66-pound second hand rail have been relaid to replace lighter rail, making a total of 1,162 miles on which the rail has been improved. Formerly only a small part of the track was equipped with tie plates. Under the receivership 933,232 tie plates have been applied.

When the present management took charge the bridges were not strong enough to carry heavy locomotives. There have been erected 6,208 linear feet of new steel bridges; and 2,096 linear feet of second hand steel bridges have been erected to replace light spans and trestle bridges. Almost 33,000 linear feet of trestle bridges have been replaced with permanent structures, and 40,087 linear feet of trestle bridges have been strengthened by the application of additional stringers.

There have been acquired 386 motor cars to replace hand cars used in track maintenance work. Important line revisions and grade changes have been made at 11 different

places. Safety in operation as well as expedition in handling traffic have been promoted by the installation of 176 miles of automatic block signals. Numerous new station buildings have been constructed and others enlarged. Many improvements have been made to enable the railway to better maintain and utilize its locomotive power. Six mechanical coaling stations have been constructed and a coal pulverizing plant established at Parsons shops. Oil is now used almost exclusively for fuel on the Texas lines, and fuel oil stations have been provided at all terminals in Texas, including storage facilities, with a total capacity of 750,000 barrels. The water supply of the entire system has been improved by new reservoirs, wells, treating plants and modern pumping stations.

When the present management took charge the Missouri, Kansas & Texas, like many other single track railways, needed a large expansion of its terminals to enable it satisfactorily to handle the traffic it already had and to provide for the steady increase of traffic which was occurring, and the terminals have been enlarged at most important points.

In most respects the most important point on the system is Parsons, Kansas. Here the lines converge from St. Louis, Kansas City and Junction City, Kansas, on the north; and from here runs the branch to Joplin, Missouri, and also the main line southward to Oklahoma City and to Denison. Here are located the principal locomotive repair shops and large classification yards. The freight terminal yard here was extended in 1917 and 1918 by the construction of 27.97 miles of additional track, including three miles of second freight main track approaching the terminal. The standing capacity of the yard was increased from 1,068 to 3,498 cars. As rearranged the yard contains 16 tracks of capacity from 106 to 119 cars, and 32 classification and hold tracks of from 24 to 78 cars capacity. A 32 stall brick roundhouse was extended 15 feet to a depth of 100 feet and seven additional 100-ft. stalls were constructed. The old 50,000 gallon wood water tub was replaced by a 150,000 gallon steel tank on a steel tower. Inadequate boiler washing facilities were replaced by a modern plant of large capacity.

One of the most complete and modern reclamation plants in the country provides excellent facilities for reworking second hand and scrap materials, and adjacent to it is storage space for bridge and building lumber and track and switch material. It has been estimated that during the period when prices of materials and supplies have been so high this reclamation plant has enabled the railway, by reworking old materials, to effect savings averaging around \$50,000 a month. It is always difficult accurately to estimate savings made by reclamation work, largely because of the practical impossibility of assigning to it proper overhead charges; but there can be no doubt that the reclamation plant of this railway has been developed and managed along right lines and has effected large savings.

Other points at which important improvements in terminal facilities have been made are New Franklin and Lindale, Missouri; Muskogee, Osage and McAlester, Okla., and Dallas, De Leon and Wichita Falls, Tex. At Oklahoma City, Oklahoma, complete new locomotive and car facilities are now under construction to replace facilities which had been outgrown.

At San Antonio, Texas, a new belt line was constructed in 1916 and 1917 which is $7\frac{1}{4}$ miles long from the point of the old connection with the Southern Pacific tracks near Fort Sam Houston to the new passenger and freight terminals at South Flores and Durango streets. The work here included the construction of a crossing under the Southern Pacific main track, seven concrete crossings under streets, and eight concrete and one timber crossing over streets. The new passenger station erected here is built of tile and concrete and is one of the most commodious and architecturally

attractive stations in the southwest. It is served by four passenger tracks.

As already indicated, Denison, Texas, is one of the most important points on the system, and here extensive terminal improvements of all kinds are needed and projected. The yard and engine facilities are especially inadequate. It is planned to enlarge the yards at an expenditure of about \$2,000,000, and to build a new modern roundhouse to cost about \$1,000,000. The locomotive repair shop here is to be converted into a central car repair plant for the entire system, and the locomotive shop at Parsons is to be very substantially enlarged to care for the locomotives.

Improvements in Equipment

The expenditures for equipment chargeable to capital account which have been made under the receivership have been as follows:

Class	Expenditures for equipment chargeable to Cap.
	Account
Locomotives, steam	\$4,356,179
Freight train cars	4,079,986
Passenger train cars	498,578
Work equipment	711,651
Miscellaneous equipment	13,927
Improvements to existing equipment	1,449,644
Total equipment	\$11,109,965

Improvements in Locomotive Equipment

Undoubtedly the most significant and important improvement the Missouri, Kansas & Texas has made in its equipment is in its freight locomotives. Table 1 shows the class, number and tractive power of the freight locomotives in service on June 30, 1912, and December 31, 1920.

It will be noted that the largest freight locomotives the road had when the present management took charge were Consolidateds with an average tractive power of 36,313 pounds. At present it has 150 Mikados with an average

the policy of the management to change as rapidly as conditions would permit from the use of the Atlantic to the Pacific type of locomotive for through passenger service. Passenger service to the southwest is quite highly competitive, and improvements in its passenger locomotives were required to enable the Missouri, Kansas & Texas to hold its own in this competition.

During this period the receiver bought 3,500 new freight cars, 410 ballast cars and 300 oil tank cars. Of the new freight cars 1,500 were coal cars (gondolas), 1,000 box cars and 1,000 combination coal and stock cars. A large amount of obsolete car equipment was retired and in consequence there was an actual decline from 24,804 to 21,483, or almost 14 per cent, in the total number of freight cars. The average capacity per car increased about 11 per cent, however, resulting in a total decrease in revenue freight car capacity of less than 4 per cent.

The receiver evidently reasoned that the traffic the road could handle and the economy of handling would be increased more by improving and adding to its locomotives than by improving and increasing the amount of its freight car equipment.

Increase in the road's freight traffic has, however, been so much greater than the increase in the total capacity of its cars as to indicate that it seriously needs more freight cars. An additional evidence of this is afforded by its figures regarding hire of equipment. Within recent years it has been paying out increasingly large amounts for hire of freight cars. Its debit balance on this account in 1918 was \$585,000 and in 1919 was \$841,400. In the last four months of 1920 alone it was \$452,452. These figures probably represent a complete, if not more than complete, offset to the savings in fixed charges and maintenance of equipment costs that have been made by not buying more freight cars.

While there has been a decline in the number of freight

TABLE 1
NUMBER AND CAPACITY OF FREIGHT LOCOMOTIVES, DECEMBER 31, 1920, COMPARED WITH JUNE, 1912

Class	Number, 1912	Number, 1920	Increase, 1920 over 1912		Average tractive power, pounds		Increase av. tr. power	Per cent
			Number	Per cent	1920, lbs.	1912, lbs.		
Mikado	150	150	15*	22.7*	57,671	36,313	20*	.055*
Consolidated	51	66	15*	29.4*	36,293	36,313	0	0
Mogul, 60 ton or over	109	222	113*	50.9*	30,077	28,619	1,458	5.09
Mogul, under 60 ton	60	20	10	20.0	24,098	20,804	3,294	15.83
Totals	370	338	32	9.46	41,151	28,966	12,185	42.07
Total tractive power, all freight locomotives, 1912					9,790,508 lbs.			
Total tractive power, all freight locomotives, 1920					15,225,870			
Total increase tractive power, 1920 over 1912					5,435,362			
Percentage of increase in total tractive power					55.5 per cent			

*Indicates decrease.

tractive power of 57,671 pounds. These locomotives are especially well adapted to the character of freight service that must be rendered on the main lines of heavy traffic. While they are very efficient on its main lines at present, they could not have been efficiently used without the strengthening of bridges and tracks which has been described above. The average weight on drivers of the road's old Consolidated engines was only 85.3 tons, while the average weight on drivers of the Mikados is 112.4 tons. With the bridges and tracks in the condition they were when the present management took charge the operation of these heavy engines on many of the lines where they are now used would have been impracticable.

While there has been an increase of but 9.5 per cent in the number of the railway's freight locomotives, the increase in their combined tractive power has been 55.5 per cent.

The number of switch engines has been increased from 127 to 178, and their average tractive power from 24,709 pounds to 32,490 pounds. The number of passenger locomotives has been increased from 163 to 180, and it has been

cars, an energetic policy of maintenance and improvement of old equipment has been pursued. At the end of the year only about 4 per cent of the road's freight cars were in bad order, as compared with almost 8 per cent for the railways of the country as a whole.

In 1912 the Missouri, Kansas & Texas had 459 passenger train cars, and in 1920 only 442. The principal decline was in the number of coaches. The receiver has bought 67 new passenger cars, the decline in the total number being due to the retirement of obsolete equipment.

General Condition of the Property

Both study of the data regarding the program of improvements which has been carried out, and the writer's own inspection of all the principal lines, show that the property's general physical condition has been greatly improved. This improvement has been mainly due to the expenditures chargeable to capital account which have been mentioned, but also largely to a generous policy of maintenance. The railway's main line from Sedalia, Missouri, to Denison,

Texas, and especially from Parsons, Kansas, to Denison, on which the heaviest business, both passenger and freight, is handled, is in such fine condition that heavy through passenger trains can be run over it in comfort and safety at speeds as high as 70 miles an hour. The various branch lines have not, of course, been improved anywhere near so much, but the improvement in many of them has been substantial.

A Word About the Organization

No matter in how good condition physically a railway is, good results cannot be obtained in its operation without a good organization. Whatever the precise form of organization adopted, its efficiency depends mainly upon its personnel and upon whether there is friction or close co-operation between the different departments. It is decidedly true that Mr. Schaff has succeeded in building up an excellent organization, and even the parceling out of the system under two federal managers under government control produced no effects upon the organization which have very seriously affected its working since the railway was returned to private operation. The successful everyday operation of a railway requires that the operating organization shall be composed chiefly of men still in the prime of life and having not only the initiative and ready resourcefulness, but also the physical endurance, which most men necessarily begin to lose after

Operating Results

The real, ultimate test of the wisdom of any policy of railway development, improvement and operation is the operating and financial results secured. Table 2 gives freight traffic and operating statistics.

It will be seen that the total number of tons of revenue freight carried one mile during the year 1920 was 79.1 per cent greater than in 1913. Including company freight, the increase in ton miles was 73.9 per cent. The increase in the density of revenue freight traffic—that is, tons carried one mile per mile of road—was from 484,573 to 873,342, or 80.2 per cent. Including company freight, the increase in traffic density was 74.9 per cent.

The average tons of revenue freight per train in 1913 was 254.83 and in 1920, 441.93, an increase of 73.4 per cent. The increase in average tons per train, including company freight, was from 299.40 to 504.00, or 68.3 per cent. The increase in the average revenue freight train load of the railways of the United States as a whole in the same period was 46 per cent. The average gross tons per freight train mile on the Missouri, Kansas & Texas increased from 783.66 to 1206.26, or 53.9 per cent. Because of the relatively very large increase in its average freight train load, the Missouri, Kansas & Texas in 1920 rendered 79.1 per cent more revenue freight service than in 1913 with an increase of only 3 per

TABLE 2
FREIGHT TRAFFIC AND OPERATING STATISTICS, PERIOD 12 MONTHS ENDING DECEMBER 31, 1920, COMPARED WITH SAME PERIOD, 1917 AND 1913

	12 months, 1920	12 months 1917	Increase or decrease	Per cent	12 months 1913	Increase or decrease	Per cent
Average mileage operated.....	3,795.42	3,856.31	72.89*	1.9*	3,816.77	23.35*	0.6*
Tons carried, revenue freight.....	13,352,467	12,864,973	487,494	3.8	9,088,565	4,263,902	46.9
Tons carried one mile, revenue freight.....	3,312,953,098	2,986,315,848	326,637,250	10.9	1,849,503,484	1,463,449,614	79.1
Tons carried one mile per mile of road, revenue freight.....	3,778,300,096	3,457,898,682	320,401,414	9.3	2,172,943,329	1,605,354,767	73.9
Tons carried one mile per mile of road, including company freight.....	873,342	772,394	100,948	13.1	484,573	388,769	80.2
Tons per train, revenue freight.....	996,014	891,367	104,647	11.4	569,315	426,699	74.9
Tons per train, including company freight.....	441.93	428.01	13.92	3.3	254.83	187.10	73.4
Tons per loaded car, including company freight.....	504.00	493.60	3.09	0.6	293.71	204.48	69.6
Tons per locomotive, revenue freight.....	24.35	22.03	2.32	10.5	17.28	7.07	40.9
Tons per locomotive, including company freight.....	436.83	427.58	9.25	2.2	250.00	186.83	74.7
Average miles each revenue train carried.....	498.19	495.10	3.09	.06	293.71	204.48	69.6
Gross ton miles per freight train mile (including mixed).....	248.12	231.13	15.99	6.9	203.80	44.62	21.9
Miles run by freight and mixed trains.....	1,206.26	1,154.33	51.93	4.5	783.66	422.60	53.9
Miles run by revenue freight locomotives.....	7,496,573	6,977,194	519,379	7.4	7,257,710	238,865	3.3
Miles run by revenue freight locomotives.....	7,884,094	6,984,302	899,792	8.6	7,398,156	185,938	2.5
Freight car mileage.....	261,570,308	238,822,604	22,747,704	9.5	194,303,127	67,067,181	34.5
Loaded car mileage.....	155,177,603	156,933,687	1,756,084*	1.1*	125,737,447	29,440,156	23.4
Per cent loaded car mileage to total car mileage.....	59.33	65.71	6.38*	9.7*	64.65	5.32*	8.2*
Empty car mileage.....	98,905,166	74,975,170	23,929,996	31.9	61,662,461	37,242,705	60.4
Per cent of empty car mileage.....	37.81	31.39	6.42	20.5	31.70	6.11	19.3
Total cars per freight train (exclusive of cabooses).....	43.89	33.24	10.65	2.0	25.82	8.07	31.3
Loaded cars per freight train.....	20.70	22.49	1.79*	8.0*	17.32	3.38	19.5
Empty cars per freight train.....	13.19	10.75	2.44	22.7	8.50	4.69	55.2
Average number loaded cars per train, north and east.....	20.25	22.69	2.05*	9.2*	15.79	4.46	28.2
Average number loaded cars per train, north and east.....	13.49	10.26	3.23	31.5	9.66	3.83	39.6
Average number loaded cars per train, south and west.....	21.16	22.69	1.53*	6.7*	18.89	2.27	12.0
Average number empty cars per train, south and west.....	12.89	11.24	1.65	14.7	7.31	5.58	76.3
Pounds fuel per 1,000 g.t.m. freight (excluding switch).....	203.66	217.74	14.08*	6.5*	274.08	70.42*	25.7*
Average miles per freight car per day.....	23.23	24.95	1.73*	6.9*	21.85	1.38	6.3

*Indicates decrease.

passing middle life. The Missouri, Kansas & Texas has in the important positions in its transportation, mechanical and engineering and maintenance of way departments an unusual number of men who are still young and full of energy and initiative. There is good feeling and close co-operation between the different branches of the operating department.

The relations between the management and the employees also are unusually good. The management recently inaugurated the policy of inviting the chairmen of the grievance committees of the labor organizations to participate in staff meetings and serve on efficiency committees of various kinds with the officers and to bring before these committees and the staff meetings all the suggestions for improvements in operating methods and service that may occur to them or that may be made to them by other employees. This policy has been received in a cordial and helpful spirit by the representatives of the employees, and will, it is believed, not only serve directly to increase efficiency of operation, but also to increase it indirectly by establishing and maintaining more harmonious relations between the railway and its men.

cent in the mileage run by freight and mixed trains, and an increase of only 2.5 per cent in total miles run by freight locomotives.

It should hardly be necessary to say that this greatly increased efficiency and economy in handling freight was due not only to improvements in locomotives and operating methods, but also to improvements in tracks and other facilities. Without the improvements in tracks, yards and other terminal facilities, it would have been impossible to have utilized the locomotives with so much greater efficiency.

The second part of this article about the progress of the M., K. & T. will be published in our next issue.

400 MILES WITH ONE LOCOMOTIVE.—The Missouri, Kansas & Texas, of Texas, is operating passenger trains between Denison and San Antonio, a distance of 400 miles, without changing locomotives. There are eighty daily trains on this line. The locomotives are of the Pacific type, using oil as fuel, and practically all the engines are making 400 miles a day. This arrangement has been in effect over a year and has been very successful.



New Car Repair Shop of the Chicago, Indianapolis & Louisville at Lafayette, Ind.

C. I. & L. Builds Modern Car Repair Shop

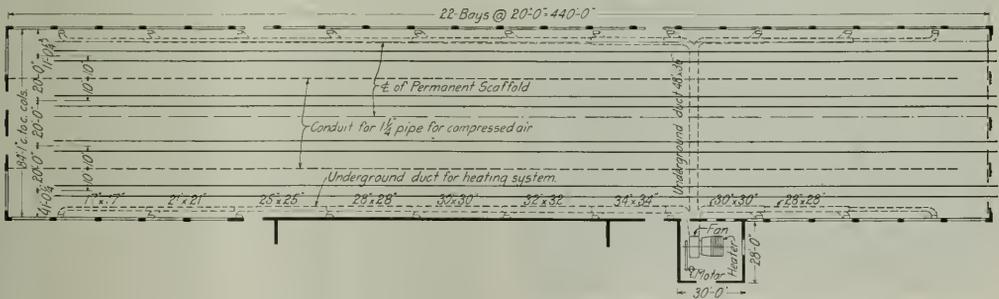
Installation at Lafayette, Ind., Will Greatly Facilitate Rip Track Performance

ON DECEMBER 3, 1920, the Chicago, Indianapolis & Louisville undertook the construction of a large car repair shop and a jacking stall at Lafayette, Ind., the latter for use in straightening steel cars. In less than four months the car repair shop was completed and placed in operation. It is a steel frame structure of the longitudinal type, 440 ft. long, 85 ft. wide, and 40 ft. high, with brick curtain walls and steel sash, transverse monitor roof construction and a concrete floor. It contains four tracks having an

this construction the facilities at Lafayette for repairing cars consisted only of a series of unprotected tracks on cinders.

The Shop Has Well Lighted Interior

The car repair shop as completed joins the paint shop which was already in existence and occupies the site which had previously been utilized for car repairing purposes in the open. A special feature of the building, is the abundance and distribution of the light, the walls, the roof, the interior



Floor Plan of Chicago, Indianapolis & Louisville Car Repair Shop at Lafayette

aggregate capacity for 32 cars, all served by an overhead crane. The total expenditure for the improvement is approximately \$200,000.

This building is an excellent example of modern practice in car repair facilities. Providing as it does complete protection from unfavorable weather, built of walls almost entirely of glass, having a solid, dry and level working floor, affording wide aisles between cars and spacious headroom, and equipped with heating facilities, electric floor trucks and an overhead crane, it stands as an evidence of the increasing realization among railroad officers that it pays to promote the health, comfort and convenience of workmen. Prior to

clearances and even the concrete floor, contributing in producing this effect.

The walls themselves are practically 80 per cent glass. Constructed in bays of 20 ft., of which there are 22 in each side and four in each end of the building, the use of brick is confined to the pilasters and to three narrow horizontal courses, one across the top of the bay, a second across the bottom and a third midway between, the latter serving to obscure the I-beam and crane rail inside the building as well as to assist in bracing the building. The remaining area of each bay is occupied by windows, these windows being 17 ft. wide and 17 ft. high and occurring two in a bay, one above

the other, excepting in every fourth side wall which, being lower by about seven feet than the other three (in order to accommodate the transverse monitor design of the roof) have but one and one-half windows. Each window is composed of 14-in. by 20 in. Truscon glazed glass framed in steel and for the purpose of strength is reinforced by a narrow horizontal steel mullion and by vertical sag rods.

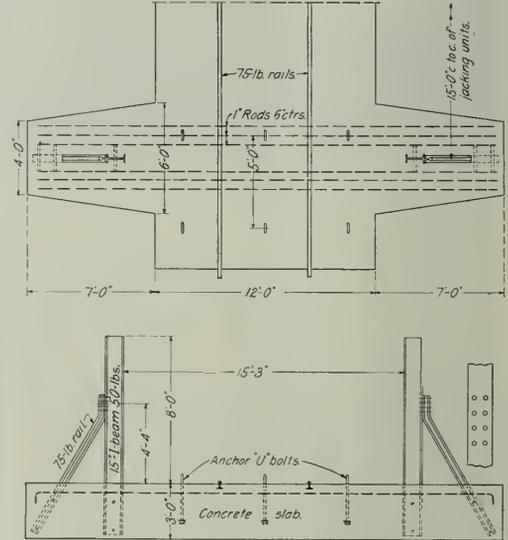
The degree to which the roof contributes in producing the general lighting effect may be appreciated when it is considered that it is supported 40 ft. above the floor on steel trusses which in themselves offer practically no obstruction to light. Also roof monitors 60 ft. wide and about 7 ft. high extend entirely across the building above three of every four wall bays, in the sides of which are window sash 5 ft. high and practically 80 ft. long.

The four tracks enter the building at one end, each through a separate door. They are imbedded in the concrete floor and extend through the house on 20 ft. centers to within 20 ft. of the rear end where an area 20 ft. wide and 85 ft. long is reserved for various machine tools and the supply racks. Spaced as these tracks are on 20 ft. centers with no columns between (the roof, as mentioned, being supported on trusses), an areaway is provided on either side which is ample for the free movement of electric trucks, which are employed throughout the building, as well as the convenient performance of all car repairing work. The widths of these aisles is also such

lengthwise, it provides a means of handling material quickly and conveniently without interfering with work in progress on the floor.

Another feature of the construction is a permanent system of scaffolding erected through one-half of the house. This consists of a row of columns along each side of two of the four tracks, the columns occurring at intervals of 18 ft. along the aisles and together comprising a system designed to facilitate work on the sides of cars, it being the plan to consign all cars requiring such repairs to these tracks.

Access to the shop is had by the four main doorways and



Partial Plan and Elevation of Jacking Stall



Exterior View of Car Repair Shop

as to contribute materially to the effective distribution of the light.

The Shop Is Served by an Overhead Crane

Unusual in car repair shop design and therefore standing out prominently as a feature of the construction is the traveling crane which serves these tracks. This crane, of Bedford make, spans the entire width of the shop 25 ft. above the floor, being supported on crane rails along the side walls of the building. It is operated from a self-contained cab. Equipped as it is with a 20-ton hoist and a 5-ton auxiliary, and capable of moving under its own power either across the shop or

six side entrances, two doors being provided in each side wall and two in the rear. Both car doors and side doors are of the wooden swinging type, the side doors being 8 ft. wide and high, equipped with window sash, while the car doors are all wood in steel frames 14 ft. wide and 17 ft. high.

Air for operating pneumatic tools and for testing purposes is obtainable at valves in the floor between each side wall and its nearest track, there being valves every 50 ft. along a 1¼-in. pipe carried in a plank-covered conduit in the concrete floor.

Ventilation is provided by large and numerous sections of pivoted sash in the wall and monitor windows. Provision is made for heating the shop by a hot air system, whereby air is passed around steam coils and forced by a No. 11 "Si-rocco" fan operated by a 30 hp. electric motor, into hot air ducts which extend along the shop walls below the concrete floor and distribute the air through radiators at intervals of 40 ft. along the wall. Artificial light is provided by electric drop lights extending through the building above the aisles at intervals of 40 ft., auxiliary to which are plugs in the walls for attaching portable lights.

The floor consists of five inches of concrete reinforced with No. 9 woven wire and laid on gravel. The tracks are imbedded in this concrete and depend for their support on cross ties below the floor. The roof consists of 1½ in. tongued and grooved yellow pine sheathing covered by a 4-ply Carey built-up roof and laid directly on steel channel purlins spaced on 7-ft. centers. The roof rests directly on the top chords of the trusses in all cases excepting between

monitors, where the purlins are attached to the web posts near the lower chords. The roof slopes towards the sidewalls on an inclination of $\frac{3}{4}$ in. to the foot, excepting in the last 7 ft. where the slope is greater. The gutters are formed by the tile coping of the walls, and drainage is effected by 5-in. wrought iron down-spouts which descend to the ground on the inside of the building.

Jacking Stall an Innovation in Shop Equipment

All brick in the walls excepting the pilasters and the bottom courses and all side construction excepting the bays directly above the base brick wall are carried by the steel columns which also support the roof trusses and the crane rails. For the purpose of assisting the curtain walls in reinforcing the building longitudinally, diagonal sway bracing is provided in the middle one of each of the three high wall bays.

The jacking stall consists of a row of posts imbedded in a heavy concrete slab, between which a car may be run and jacked tightly against its sides, the posts serving as the jack support. It is 57 ft. long and 18 ft. wide and, in addition to the posts, accommodates three rows of U-bolts, the heads of which extend six inches above the concrete for anchoring purposes. The posts, of which there are four in each row, are 15 ft. apart and consist of I-beams 8 ft. high, braced against horizontal thrust by bent rail sections. The distance between the two rows of posts is 15 ft. 3 in.

The car repair shop and jacking stall have been designed and erected under the supervision of A. S. Kent, chief engineer of the Chicago, Indianapolis & Louisville and were built by A. E. Kemmer of Lafayette. All steel used in the structure has been furnished by the Indiana Bridge Company, Muncie, Ind.

Railroad Hearings Before Senate Committee

Adjournment Taken to June 14. J. G. Walber and E. T.

Whiter Explain Labor Questions

WASHINGTON, D. C.

THE HEARINGS before the Senate Committee on Interstate Commerce in the inquiry into the railroad situation were adjourned on June 3 until June 14 to give the committee time to devote some attention to other matters before it. When the hearing was adjourned E. T. Whiter, chairman of the railroad conference committee which represented the carriers before the Railroad Labor Board, had not quite completed his explanation of the situation created by the national agreements. Mr. Whiter will complete his statement when the committee resumes and will be followed by L. E. Wettling, statistician for the Western roads, who is to put in evidence a series of statistical exhibits, and this is expected to conclude the presentation of the railroad case before the committee. No announcement has yet been made as to the order in which other witnesses are to be heard representing the labor organizations, the shippers and others interested.

Mr. Whiter's testimony regarding the effect of the national agreements consisted largely of the same material he had presented before the Railroad Labor Board at the hearings in Chicago. He said the exact cost to the carriers had never been definitely calculated, but that the estimate made by General Atterbury of \$300,000,000 a year was conservative. Mr. Whiter also included a discussion of the effect of the abolition of piecework. Supplement No. 4 to General Order No. 27, he said, by which men employed on piecework were guaranteed the same minimum hourly rate as the workers on an hourly basis, resulted in a decrease ranging from 10 to 40 per cent in the output of men employed on piecework. Tests conducted by four of the largest railroads showed that men formerly employed on piecework were guaranteed 58 cents an hour on work that would have yielded them only from 28 to 36 cents an hour if they had been paid on the piecework basis. This falling off in production became uniformly noticeable immediately after July 25, 1918, when it was known by the pieceworkers that they would receive no increase, but were guaranteed the minimum hourly rate. Mr. Whiter said, and piecework was finally abolished by the director general on December 31, 1918.

Concerning the National Agreements

After Mr. Whiter had explained the effect of many of the rules of the national agreements, the question was raised as to whether the question is in any way within the jurisdiction

of the committee. Senator Poindexter said that the whole question before the committee is as to whether or not the law should be changed in any respect. Senator Cummins said he understood the showing was made in order to account for the extraordinary expenditures of 1920 which the railroads were compelled to make in observing the rules of the national agreement. He said the committee would not want to take up questions which are pending before the labor board or the Interstate Commerce Commission, but it must necessarily go into the same field in order to ascertain whether there should be any additional legislation to relieve the situation and as the investigation was primarily on the question of railroad expenses the committee would want to know whether the money was wisely or necessarily spent.

Several of the Senators expressed difficulty in understanding why the national agreements made by the Railroad Administration should have been in any way binding upon the railroads after the expiration of federal control. Mr. Whiter explained how the question got before the Railroad Labor Board and how the rules of the national agreements were kept in effect by that board at the time it announced its wage award last July. Senator Cummins said that there is nothing in the Transportation Act, in his opinion, which required the railroads to continue for a single moment the agreements entered into between the director general and the men. The railroads might have attempted to change the rules immediately, he said, but the moment they attempted to change the rules and the men resisted that change, that would have created a dispute which both the railroads and the men were bound under the law to submit to the labor board.

Mr. Whiter said that when the bi-partisan board last March took up the requests of the labor organizations for increased wages which were pending at the expiration of federal control, one of the first questions which the labor organizations placed before the committee was the request for the continuation of the national agreements. The railroads took the position that the national agreements were not a part of the dispute and they continued to take that position before the labor board, but the board did assume jurisdiction over them under its Decision No. 2.

Senator Stanley asked whether under the decision of the labor board the railroads are not still under government control. "What effect," he asked, "has the act of 1920 had

except in relieving you with reference to freight rates, so far as the control of the business is concerned? Are you in any more control of it now than you were before?"

Mr. Whiter said that so far as labor questions are concerned, the railroads are still just as much under government control as before, but they have recently made a gain by getting away from centralization because the labor board has decided that in negotiations with the men on these agreements the individual railroad and the men shall negotiate, but so far as the result of the negotiations for new rules is concerned, it would be necessary to see what develops, whether or not the railroads are still bound hand and foot with some of these restricting conditions or whether they are going to be able to negotiate rules that are reasonable to the men and to the companies.

The statement given before the committee by J. G. Walber, secretary of the Board of Information of the Eastern Railroads, was reported in last week's issue. In reply to questions regarding the handling of wage matters during the period of federal control, Mr. Walber pointed out that he was not criticising what was done, saying it is hard at this time to look back and appreciate the position in which the Railroad Administration was situated during the war.

Pressure due to the demands of outside industries, loss of railroad employees for the service, the necessity for prompt action made it impossible for its wage board to study the matters before it as exhaustively as can be done now. "The lack of data, the time necessary to assemble the data, made it necessary for them to adopt short cut methods and any way to get the results and, as one railroad man, I am here to say that I have the utmost sympathy for the conditions under which the board had to do its work and I have not the least criticism of what they did. I think in many respects they did a remarkable job, considering the conditions under which they had to work. I am trying to simply state the facts and state the situation."

Settlements With Railroad Administration

The testimony of Samuel Rea, president of the Pennsylvania, aroused considerable discussion at the hearing regarding the relations of the railroads with the Railroad Administration concerning the application of the standard contracts. Senator Cummins said that if the railroads entered into contracts he assumed that their attitude is that they are content with the proper interpretation of that contract. Mr. Rea said he could not say that the roads were over content with the contract but that they are, of course, willing to stand by it now and it is only a question of the proper construction.

Alfred P. Thom, counsel for the railway executives, made a statement regarding the controversy with the Railroad Administration, saying that the railroads' claim that the proper interpretation of the contract would fully carry out the intent of the federal control and transportation acts as passed by Congress, but that the interpretation placed on the provisions of the contract relating to maintenance by the director general does not carry out the intent of the law. Senator Cummins said that the director general of railroads would be called before the committee before the hearings are concluded in order that he may be given the opportunity to state his side of the case.

The formula for maintenance contained in the standard contract, Mr. Thom said, is an agreed method of ascertaining whether or not the director general has redeemed his contract to keep the properties in repair and return them in good condition. He was to expend on the property as much money as the carriers expended on the average in the test period and to fairly distribute it over the property, the amounts of money to be adjusted to the different levels of the cost of labor and the cost of material during the federal control period. Moreover, the contract provides, he said, that that

shall be done so that the result shall be as nearly as practicable the same relative amount, character and durability of physical repairation.

The director general, he said, contends that he is not responsible for actual physical repairation if he spends a certain amount of money. Calling attention to the fact that all the members of the committee present are lawyers, Mr. Thom said that the agent of the President, acting under an act of Congress as well as under instructions from his principal, will not be construed to have violated those instructions and to have departed from the act of Congress unless there is no other interpretation which can reasonably be put upon the contract. If there is any reasonable construction of the contract which will put what he did in conformity with his instructions and the act of Congress, that construction must be adopted.

Senator Pomerene said he did not quite see the force of Mr. Rea's suggestion that there might be an amendment to the Transportation Act, because if the question were put up to Congress again it might take a position in entire accord with the position taken by the director general. Mr. Rea said he had only made such a suggestion if it were the only way to avoid a delay of three to five years. If Congress should take the view of the railroads it might bring about a quicker settlement. He thought, however, that the President had full authority and discretion under the law. Mr. Rea said there also seemed to be a difference of opinion among members of the Interstate Commerce Commission in interpreting the maintenance provisions of the standard contract as it applies to the expenditures for the six-months' guaranty period of 1920, because they have not yet reached a conclusion and large sums still due to the railroads for that period are thus withheld. Mr. Rea said that the Pennsylvania's estimate of undermaintenance for roadway and structures for the period of federal control is in the neighborhood of \$40,000,000. As to the maintenance of equipment, the final estimate is not yet concluded.

Railroads Add to Equipment

THE Car Service Division of the American Railway Association has issued its quarterly equipment report for Class I roads for the quarters ended March 31, which shows a net increase over retirements for the quarter of 166 locomotives, 4,591 revenue freight cars, 67 non-revenue freight and 176 passenger cars; while on March 31 there were on order 390 locomotives, 20,340 freight cars and 668 passenger cars.

A summary of the report follows:

	Jan. 1 to March 31		Total Ownership March 31, 1921	Number on order
	Acquisitions	Retirements		
Locomotives:				
Freight	328	206	39,502	217
Passenger	85	85	14,507	54
Switchers	110	66	11,551	119
Total	523	357	65,560	390
Rev. Frt. Cars:				
Bx. Auto and Furn.....	7,068	6,222	1,050,731	6,118
Refrigerators	2,671	310	62,274	2,420
Coal and Coke	7,950	5,967	995,427	8,369
Stock	508	773	80,453	2,293
Flat	679	1,011	104,618	488
Miscellaneous	159	161	49,249	120
Total	19,035	14,444	2,342,752	20,340
Non-Rev. Cars:	1,360	1,293	138,963	676
Passenger Equip*:				
All Steel	178	5	15,646	667
Steel U. F.	89	...	6,459	...
Wooden	38	124	31,288	1
Total	305*	129	53,393	668†
*Coaches	113	†Coaches	417	
Comb.	14	Comb.	24	
Bag. & Ex.	133	Bag. & Ex.	178	
Other	45	Other	49	
Total	305	Total	668	

Signal Section Holds Annual Meeting In Chicago

Proper Signal Location for Efficient Train Movement, Valuation and Other Subjects Are Presented

THE PROPER LOCATION of automatic block signals to direct train movements most economically and effectively, while at the same time affording safe operation, formed the basis of a report which received special attention at the annual meeting of the Signal section, Engineering Division, American Railway Association, which was held at the Drake Hotel, Chicago, on June 6, 7 and 8. This is the third annual meeting of the Signal section and the twenty-sixth annual convention of the former Railway Signal Association. Chairman F. W. Pflieger (U. P.) presided. There was a total attendance of about 300. This meeting is the first held since the stated meeting at New York on December 2 and 3, 1920, as the March stated meeting always held heretofore in connection with the annual meeting of the American Railway Engineering Association at Chicago was cancelled this year.

Chairman Pflieger, in his opening address, commented on the results of the past year's work, pointing out the good accomplished by the Sectional committee meetings in advancing the knowledge of signaling among the rank and file of the men. In pointing out how the field of action is enlarged each year, Mr. Pflieger called attention to the co-operation of the Signal section with the Interstate Commerce Commission in connection with the investigation of automatic train control. He also stated that it is not enough to work on improving and systematizing the signal apparatus but that it is necessary to find new uses for the improved apparatus. In this connection he stated that it is the tonnage train kept moving which returns interest on capital invested and that this movement can be facilitated by eliminating train orders and by communicating the movements which will be made by signal indication. In order to facilitate such work and to promote increased efficiency by signal operation the chairman recommended that a Joint Committee on the Economics of Railway Signaling be appointed, this committee to consist of operating and signal members.

H. S. Balliet (N. Y. C.), secretary of the Signal section, presented his annual report covering the membership and a general outline of the work accomplished by the committees during the period from July 17, 1920, to June 5, 1921. The membership as of July 10, 1920, was 1,510; a total of 276 were enrolled during the last year while 15 were reinstated; the losses during the year totaled 234, giving a total net membership of 1,567 as of June 5, 1921. Five meetings were held by the Committee of Direction, at which 17 subjects were considered. The standing committees had 29 meetings and considered 83 subjects while 36 Sectional committee meetings were held at which 52 different subjects were discussed. There was a total attendance of 2,740 at these meetings. Forty subjects were submitted to the annual meeting for acceptance and submission to letter ballot and 12 publications have been issued during the period covered by this report. Thirteen of the 18 standing committees of the Signal section presented reports with subject matter for submission to letter ballot, for discussion, or as information.

Proper Location of Automatic Block Signals

Committee No. X—Signaling Practice, W. J. Eck (Southern), chairman, submitted for consideration reports on various types of light signals, day and night indication; requisites of signal locations for automatic block signals; automatic train control; application of aspect indicating that train must take siding having non-interlocked switch.

The following requisites for light signals were presented and it was recommended that they be accepted for submission to letter ballot for inclusion in the manual:

1. They shall be free from the possibility of phantom indications.
2. When lamps are operated at normal voltage, the range (on tangent) of signals used to govern high speed trains, must be at least 2,500 ft. on a clear day with a bright sun at or near the zenith.
3. They shall not be so bright as to cause confusion in reading signals at night.
4. Normally a beam spread of 6 deg. each side and below the axial beam shall be provided. Means shall be provided for increasing the beam spread on either side to suit special conditions.
5. Means must be provided to give a distinct indication to enginemen when approaching and when stopped at the signal.

Beam spread is interpreted to refer to points at the angle mentioned where the intensity of the beam is 50 per cent of the axial beam candle power.

The report on requisites of signal location for automatic block signals—which the committee recommended be accepted as information—covers 12 pages of the journal and has in addition 9 diagrams. In the introduction the Committee says:

In the treatment of locations for signals, main consideration has been given to those locations which will most economically and effectively direct train movements, not losing sight of arrangements which afford safe operation.

The subject is first treated with respect to signals for single track railways since more factors enter into the proper locations of signals for these lines than for lines where the normal traffic is in one direction only and much of the reasoning covering following movements for single track roads will apply to the signaling of two or more tracks with traffic of one direction.

Clear vision of signals is important and their location on curves near overhead structures or at other points where the view is obstructed should be avoided in so far as practicable. It is also desirable to avoid their location on bridges supporting the track signaled and such other points where an element of risk may enter into trainmen alighting from a train which has been stopped at a block signal.

In two-position signaling it is desirable that distant signals be not placed too far to the rear beyond the stopping distance to home signals, the approach to which they regulate. So also in three-position signaling, since each signal acts as a distant signal to the next preceding one, consideration should be given to the avoidance of too long blocks. The reasons for this are:

To avoid enginemen running for a considerable time after receiving a caution indication involving, for those roads which require an immediate caution movement at a caution signal, a slowing up of traffic.

To avoid, on those roads requiring an interpretation of a caution signal as indicating the next signal at stop, a tendency for enginemen to forget, after a lapse of some minutes entailed in running this distance, the indication of the caution signal last passed.

To minimize the time, by shortening the space consistent with stopping distance, in an endeavor to preclude opportunity for change in conditions in the second block ahead during the time a train runs between a given proceed signal and the next preceding one.

The following terms have been used which may require some explanation:

A differentiation is made between the meaning of stopping distance and braking distance.

Stopping distance is taken to mean the distance in which any train, operating in the territory involved, can stop and then be in a position with respect to its air apparatus and draw bars to again start.

Braking distance is taken to mean the distance required to

stop any train in territory involved. The train may not necessarily be in condition again to start with ease.

Sighting distance is taken to mean that distance to the rear of a signal in which a following train may have time to observe the signal and also in order that the signal may have time to assume its proceed position after a preceding train has passed out of that section of track controlling the signal.

Time spacing is taken to mean the time required for a train to run over that portion of the line which controls the proceed position of a signal.

Considering now that signals as covered in the subject are fundamentally for the purpose of directing train movements, they must obviously be arranged effectively to provide for: (a) Meeting trains. (b) Passing trains. (c) Spacing trains.

Automatic Train Control

In reporting on automatic train control the committee outlined the work which had been accomplished by the Joint Committee on Automatic Train Control of the American Railway Association and the Interstate Commerce Commission, the duties of which are as follows:

(a) Prescribe rules and requirements for tests of automatic train control devices.

(b) To review the work already done by previous committees in the testing of appliances and to bring the work up to date.

(c) To confer with representatives of the Interstate Commerce Commission in the consideration of this subject.

(d) To arrange with the carriers for practical tests as may seem advisable, and to arrange for the terms and conditions of such tests.

(e) To arrange for necessary record of performances and cost of installation and maintenance and comparisons.

(f) That at all times to co-ordinate their work with that of the representatives of the Interstate Commerce Commission, and to work in co-operation with such representatives.

Information was also presented on the work which had been done by the New York Central-New York State Public Service Committee on automatic train control.

The report on this subject was recommended for acceptance as information.

Take-Siding Signal

In reporting on the application of aspects indicating that a train must take siding at a non-interlocked switch, the following was submitted with the recommendation that it be accepted for submission to letter ballot for inclusion in the Manual:

1. The aspect for instructions to trains to take siding at a non-interlocked switch shall be provided by the display of the letter "S."

2. The day and night indications shall be distinctive from other forms of signal.

3. Where located less than braking distance from the switch, an approach indication shall be provided.

4. Its mounting may be either on a separate mast, or on any signal mast best suited to meet the requirements.

5. The minimum distance of visibility under normal conditions shall be 500 ft.

6. When not functioning, the indicator shall not be visible.

Discussion

All reports, with the exception of the one on automatic train control, met with little or no discussion. J. B. Latimer, signal engineer, Chicago, Burlington & Quincy, went on record as opposed to speed control in connection with automatic train control. It was his feeling that an automatic train stop would amply serve all requirements and he made reference to the use of such a train stop and the results obtained on the Chicago & Eastern Illinois. It was his personal opinion, however, that there would be no necessity for an automatic train control or train stop if an audible warning were used at distant signal locations to indicate audibly the caution position of the signal. Others expressed the feeling that the signal section was 10 or 15 years behind times on the automatic train control question and that one cause of this was the effort to obtain the ideal rather than allow this device to pass through the development stages that is required of any other device which has been adopted in the past. Com-

mittee X would not assume any responsibility for the report on this subject, stating it represented data which has been developed by the government and the Joint Committee on Train Control and that it was given as a matter of information.

Valuation

Committee No. XV—Valuation, J. M. Carley (B. & A.), chairman, submitted reports on the following subjects:

1. Report on average service life in years of the important units of the different types of signal installations.

2. Prepare typical construction program which will include the various types of interlocking, automatic signals and other signal apparatus for: (a) Single-track railroad. (b) Double-track railroad. (c) Three-track railroad. (d) Four-track railroad.

3. Prepare table of relative value units of signal installations.

Under subject 1, the average minimum and maximum service life and the average service life of a large number of units used in signal construction were presented for discussion and for acceptance as information.

Under subject 2, referring to such a program for signaling the committee stated that "after a careful study of the requirements and analysis of the discussion in committee meetings and certain recommendations by letter, the committee recommended that the following outline of, and instructions for, preparing construction programs be accepted as a report on item 4 of the outline of work for the reason that no typical program, however carefully prepared, would be of value to any except a very small percentage of the carriers interested. Each carrier must necessarily investigate the conditions for itself and it is the consensus of opinion that the following outline and instructions will serve the purpose for which the instructions of the committee were initiated." This subject was presented for discussion and for acceptance as information.

Discussion

Committee XV-Valuation, presented a supplemental report for discussion and acceptance as information. This report was based upon an editorial appearing in the *Railway Age* of March 16, 1920. It suggested a method or scheme which may be employed by the various signal departments for keeping a record of the various major units from the time of their installation to their retirement.

It was the recommendation of the committee that a record be kept of the units for property changes. This record should include:

1. Property record in statement form of each change during the life of the installation.

2. Plans showing each change to be indexed or filed with the property record.

The committee presented the following for discussion and action by the section, to the end that a recommendation be made to the Bureau of Valuation, Interstate Commerce Commission, that the instructions governing reports in connection with Valuation Order No. 3 be changed as follows:

Paragraph 7, page 7, of the Second Revised Issue of Valuation Order No. 3.

PRESENT FORM.

Where one carrier assumes the cost of a change upon another carrier's property, or where one or more carriers participate with the owner in the cost of a change in the latter's property, the full detail of the property units involved and their costs shall be recorded in but one set of records, and they shall be the records of the carrier to which the property in which the change has been made was originally inventoried by the commission.

RECOMMENDED FORM

Where one carrier assumes the cost of the change upon another carrier's property, or where one or more carriers participate with the owner in the cost of a change in the latter's property, the full detail of the property units involved and their cost shall be recorded in but one set of records, and they shall be the records of the carrier that originates the charges for changes in the property.

This is desirable due to the fact that many joint plants were inventoried to the carrier which does not originate charges for changes in the property on account of the government field party reaching such points before parties on the other line had reached them.

It was recommended that the section take such action as will bring this matter to the attention of the Bureau of Valuation, Interstate Commerce Commission.

Under subject 3, Units for Use in Signal Valuation, the committee presented units for the record of property changes under accounts 15 and 27. These units were subdivided under primary units and the list was submitted as a guide as to what would be required, with the thought in mind that each carrier is to arrange the list to suit the characteristics of its property. This report also was presented for discussion and acceptance as information.

D. C. Track Circuits

Committee No. XVIII—D. C. Track Circuits, A. R. Fugina (L. & N.), chairman, in submitting a report on specifications of characteristics of track circuits outlined the general conditions existing with reference to a study of this subject. The most important factor, and the one over which the signal engineer has absolutely no control, is the train shunt. Little information about the train shunt under varying conditions is available. Such investigations as have been made by this committee seem to point to the fact that on main track rails the shunting resistance of even a single car or a single pair of wheels is much less than .06 ohm and that for the usual fouling circuit of a switch, the shunting resistance may be less than .06 ohm, but often is much greater. The committee is developing information and data about the shunt resistance under varying conditions, so that it may submit a definite recommendation.

The minimum releasing point of the track relay in service is a vital factor in the safety of the track circuit. This will bear a direct relation to the maximum resistance of the track shunt. It is highly desirable to decrease the rail resistance. Decreasing rail resistance reduces the adverse effect of low ballast resistance. Economy and reliability of operation may therefore be obtained by reducing the rail resistance instead of expending money to increase the ballast resistance.

The report was presented at this time for discussion and acceptance as information only.

A general discussion on track circuits brought out the necessity of devising some means of improving the protection to be afforded by the track shunt fouling circuit at switches. It was the general opinion that with or without improvements in this feature pipe-connected derrails should be required on all turnouts in automatic signal territory.

Other Committee Reports

Committee No. XIV—Contracts, R. C. Johnson (B. R. T. System), chairman, presented four standard forms with the recommendation that they be submitted to letter ballot for inclusion in the Manual. The first form covered an invitation to bidders on block signal and interlocking work; the second was the contractor's proposal for block signal and interlocking work; the third was a standard form of bond to accompany contracts for block signal and interlocking work, while the fourth form submitted covered the proposed contract for execution in connection with block signal and interlocking work.

Committee No. V—Maintenance Rules and Instructions, G. K. Thomas (A. T. & S. F.), chairman, presented two reports and recommended their submission to letter ballot for inclusion in the Manual. The first report covered rules for signal maintenance intended to supersede rules 751 to 777 inclusive and 782 to 784 inclusive now contained in the Manual under the heading Rules for Signal Maintainers.

The remaining 19 rules now in the Manual under this heading have reference to interlocking, batteries, lamps and pole line and will be covered under those heads in later reports. The second report consisted of examination papers on signal maintenance and included 102 questions and answers.

When the maintenance rules and the set of examination questions and answers were presented exceptions were taken to a number of rules because of the liability of their being misinterpreted, particularly with reference to conditions affecting men working at the same place but in different departments. A number of revisions were presented and accepted, after which the entire report was accepted for submission to letter ballot for inclusion in the Manual.

Committee No. VIII—Alternating Current Automatic Block Signaling, C. H. Morrison (N. Y., N. H. & H.), chairman, submitted for consideration a report on calculating power supply and distribution for an alternating current signal system. This report covered the choice of voltage, frequency and transmission and treated of the material of the conductors and their size with paragraphs on wire and pole spacing, sectionalizing, center of gravity of load, line losses, lightning protection, commercial source of supply, power equipment and calculating forms. The calculating forms consisted of power summary sheet, engineering data sheet and load diagram, which were recommended for use in calculating power requirements. These sheets were also submitted with the report and the committee recommended it for acceptance and submission to letter ballot for inclusion in the Manual.

In addition to the above reports others were presented by Committee I—Editing, H. S. Balliet (N. Y. C.), chairman; Committee II—Mechanical Interlocking, C. J. Kelloway (A. C. L.), chairman; Committee III—Power Interlocking, F. B. Wiegand (N. Y. C.), chairman; Committee IV—D. C. Automatic Block Signals, C. F. Stoltz (C. C. C. & St. L.), chairman; Committee VI—Standard Design, F. P. Patenall (B. & O.), chairman; Committee XI—Batteries, A. B. Himes (B. & O.), chairman; Committee XIII—Electrical Testing, P. M. Gault (I. C.), chairman.

Other Reports and General Business

Committee No. 3, on power interlocking, presented specifications for a circuit controller for draw bridges, which after brief discussion was referred back to the committee for revision. After some discussion a specification for electric-motor switch-operating and locking mechanism, together with an operating and overload curve chart was adopted for submission to letter ballot for inclusion in Manual.

In connection with the progress report of Committee 16, oils, the discussion brought out the fact that the specifications for illuminating oil for switch and signal lamps had been adopted by the American Railway Association and that one road, operating 500 miles of line, had saved \$500 in one year by following these specifications.

A general discussion on the education of signal department employees resulted in approval of a recommendation that the sectional committees offer programs of practical educational value and that copies of the proceedings be furnished to all those interested.

R. H. Aishton, president of the American Railway Association, in a brief address to the Signal Section, complimented it on the volume and quality of work completed during the past year. The keynote of his address was that the Signal Section has been entirely too modest with respect to its accomplishments and that it was the duty of each and every representative to tell his railroad management what good has really been accomplished by the Section. In this connection he called attention to the showing made on the road mentioned above by following the specifications for oils prepared by this Section and adopted by the American Rail-

way Association. In submitting reports to the executive committee of the A. R. A. Mr. Aishton recommended that the committees incorporate as an opening paragraph of their reports an outline of the purpose and the important results to be obtained through the adoption of the report.

After miscellaneous business was disposed of the Secretary announced that the next meeting of the Signal Section would be the regular New York meeting, to be held on November 3, at the McAlpin Hotel.

Signal Section Officers Elected

The following officers for the Signal section were elected for the ensuing year: F. B. Wiegand (N. Y. C. Lines West), chairman; C. A. Christofferson (N. P.), first vice-chairman; B. T. Anderson (D. L. & W.), second vice-chairman. Those elected to serve three years on the Committee of Direction are: W. J. Eck (Southern); F. W. Pfleging (U. P.); W. Y. Scott (B. & M.); and W. M. Vandersluis (I. C.).

Signal Appliance Association

The officers of the Signal Appliance Association, chosen for the ensuing year at a meeting held at the Drake Hotel, Chicago, are: Chairman, Henry Lee, *Railway Age*; vice-chairman, G. A. Blackmore, Union Switch & Signal Co.; secretary-treasurer, F. W. Edmunds, Sunbeam Electric Man-

ufacturing Co., New York. Those elected to serve on the Executive committee for two years are: M. R. Briney, Federal Signal Co., Albany, N. Y.; W. J. Gillingham, Hall Switch & Signal Co., Garwood, N. J.; John Roberts, General Electric Co., Schenectady, N. Y.; and F. J. Lebreau, Macbeth-Evans Glass Co., Pittsburgh, Pa. E. A. Condit, Rail Joint Co., N. Y., was appointed chairman of the Arrangement Committee.

The Trend of Railway Earnings Shown in Charts

By Henry M. Sperry, M. Am. Soc. C. E.

DANIEL WILLARD, president of the Baltimore & Ohio in an address before the annual meeting of the National Civic Federation at New York last February, made the statement: "I think that the most constant and persistent problem that confronts the railroads at all times, through all seasons and all periods, is the problem that grows out of being misunderstood. The railroads are such a large undertaking and we have to talk in figures that we so little comprehend that this difficulty is ever present. . . . The

TABLE 1—STATISTICS OF CLASS I RAILROADS—UNITED STATES

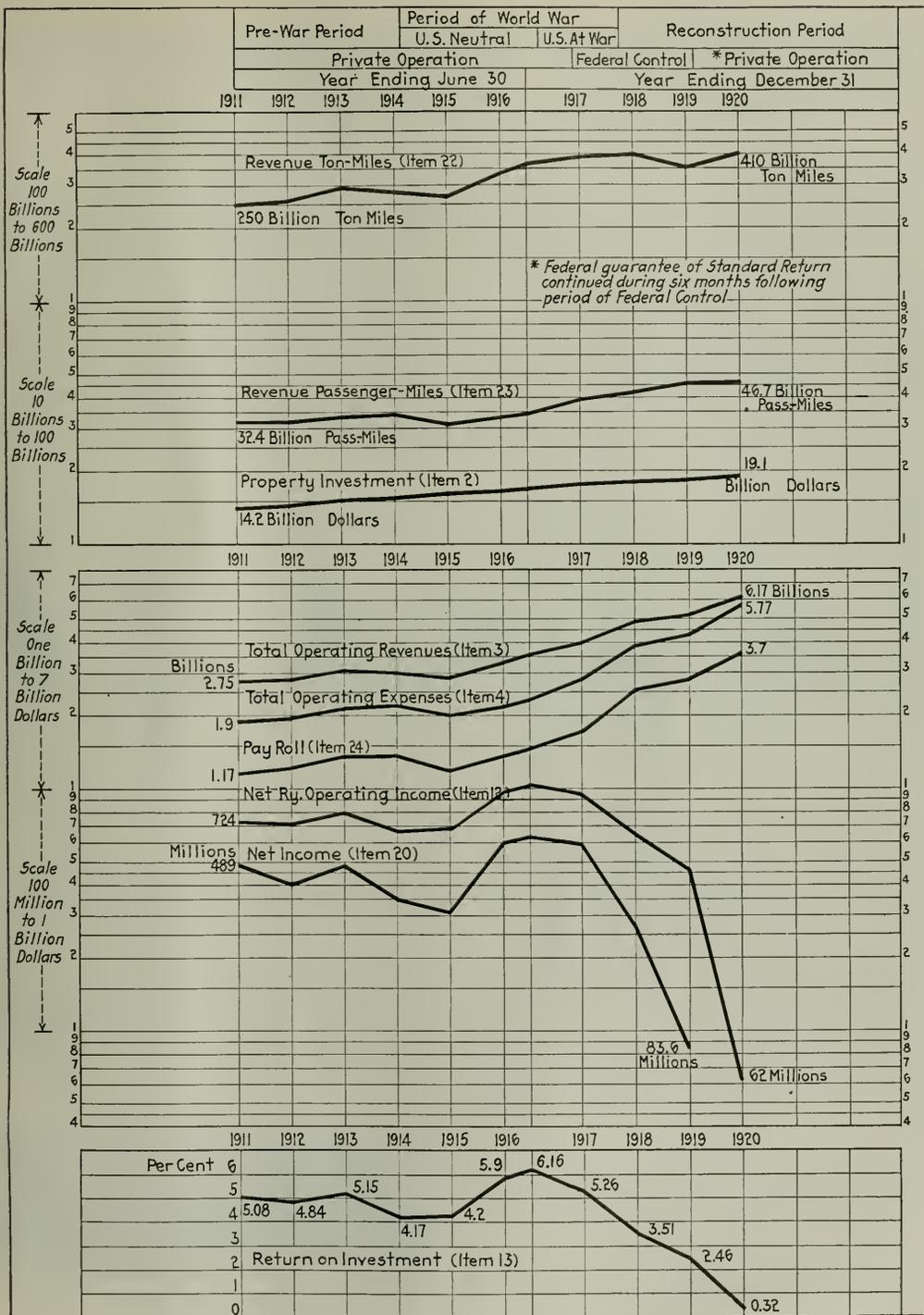
(Railways Having an Annual Operating Revenue above \$1,000,000) (Does Not Include Switching and Terminal Companies)

Item	Fiscal years ended				
	1911	1912	1913	1914	1915
1. Miles of track operated—main track	244,300.77	249,192.74	254,821.20	259,139.53	262,424.88
2. Property investment—Class I roads and their non-operating subsidiaries (investment in road and equipment, exclusive of materials and supplies)	\$14,246,167.475	\$14,632,497,022	\$15,284,763,489	\$15,842,127,273	\$16,257,146,632
3. Total operating revenues	2,752,497,297	2,805,006,544	3,108,361,215	3,031,326,963	2,871,563,947
4. Total operating expenses	1,902,994,333	1,959,094,811	2,173,463,563	2,203,423,812	2,021,160,614
5. Operating ratio—per cent.	69.14	69.84	69.92	72.69	70.39
6. Net operating revenue	849,502,964	845,911,733	934,897,652	827,903,151	850,402,433
7. Railway tax accruals	98,626,848	109,443,407	118,386,899	135,372,579	133,276,330
8. Uncollectible railway revenues	750,876,116	736,466,326	816,510,793	692,330,572	649,917
9. Railway operating income	Dr. 15,577,534	Dr. 15,772,338	Dr. 15,611,817	Dr. 17,686,287	Dr. 19,128,943
10. Hire of equipment—net balance	Dr. 11,193,874	Dr. 12,209,605	Dr. 13,288,841	Dr. 13,656,138	Dr. 15,943,758
11. Joint facility rents—net balance	724,184,708	708,484,383	787,610,435	661,018,147	683,104,833
12. Rate of return on investment—per cent.	5.08	4.84	5.15	4.17	4.20
13. Other income (including miscel. operating income)	273,767,609	219,308,972	241,629,540	243,768,847	186,232,946
14. Total income	997,952,517	927,923,355	1,039,239,975	904,786,994	869,337,779
15. Rent for leased roads	124,960,314	129,046,148	133,018,154	122,592,248	122,528,657
16. Rent for funded debt	345,843,570	359,881,461	368,134,889	373,296,354	387,029,566
17. Interest on unfunded debt	18,116,228	16,735,942	23,045,616	35,958,511	27,509,366
18. Other deductions	459,633,309	400,624,193	485,745,995	550,721,618	516,156,078
19. Net income available for dividends, etc.	397,068,724	339,964,855	322,300,406	376,098,785	259,809,520
20. Total dividends declared out of income and surplus	249,843,166,302	259,981,628,693	297,722,528,693	284,924,749,718	273,913,006,369
21. Revenue, ton-miles	32,371,444,793	32,316,262,549	33,875,085,938	34,566,985,414	31,789,928,187
22. Revenue, passenger-miles	1,167,856,000	1,209,176,686	1,335,612,385	1,337,344,133	1,190,223,755
23. Aggregate compensation of employees					

Item	Calendar years ended December 31			
	1916	1917	1918	1919
1. Miles of track operated—main track	265,802.97	267,574.12	269,174.54	270,556.62
2. Property investment—Class I roads and their non-operating subsidiaries (investment in road and equipment, exclusive of materials and supplies)	\$16,884,440,038	\$17,762,152,127	\$18,213,629,613	\$18,529,749,653
3. Total operating revenues	\$3,596,865,766	\$4,014,142,748	\$4,880,953,480	\$4,144,795,154
4. Total operating expenses	2,357,398,412	2,829,325,124	3,982,068,197	3,499,715,515
5. Operating ratio—per cent.	65.54	70.48	81.58	85.52
6. Net operating revenue	1,239,467,354	1,184,817,623	898,885,283	745,079,639
7. Railway tax accruals	117,113,392	797,486	223,173,499	232,601,396
8. Uncollectible railway revenues	797,486	700,090	613,821	916,889
9. Railway operating income	1,081,556,496	970,197,438	675,096,083	511,561,334
10. Hire of equipment—net balance	Dr. 23,767,262	Dr. 17,999,098	Dr. 15,676,577	Dr. 33,488,823
11. Joint facility rents—net balance	Dr. 17,704,717	Dr. 18,129,570	Dr. 20,899,903	Dr. 27,088,578
12. Rate of return on investment—per cent.	6.16	5.26	3.51	2.46
13. Other income (including miscel. operating income)	210,966,879	233,252,283	309,067,492	274,172,994
14. Total income	1,250,511,396	1,167,321,053	947,650,095	727,157,947
15. Rent for leased roads	158,377,958	132,082,177	126,977,239	123,276,608
16. Rent for funded debt	406,667,567	403,305,438	396,465,997	404,809,456
17. Interest on unfunded debt	14,854,425	15,704,857	29,943,496	42,722,596
18. Other deductions	23,370,717	23,197,012	23,197,012	23,197,012
19. Net income available for dividends, etc.	646,880,673	593,030,606	268,661,350	83,608,435
20. Total dividends declared out of income and surplus	306,176,937	320,395,779	275,336,547	278,516,908
21. Revenue, ton-miles	362,444,397.129	394,465,400,493	405,379,284,206	364,293,063,017
22. Revenue, passenger-miles	34,585,952,026	39,476,858,549	42,676,574,099	46,358,303,740
23. Aggregate compensation of employees	1,468,576,394	1,739,482,142	2,613,813,251	2,843,128,432

*Not yet available. a Total operating revenues for 1920, includes \$64,508,260 of back mail pay collected in 1920, but applicable to services rendered 1917, 1918 and 1919. b Partially estimated.

Note—Net railway operating income, as shown above for 1918, 1919 and 1920, represents the actual earnings from operation of the Class I railways. The "standard return" for these roads (i. e., the net operating income after collecting rental from the U. S. Government), amounted to approximately \$89,500,309 for the years 1918 and 1919, and for 1920 amounts to approximately \$25,000,000, taking into account two months of Government operation, six months of Government guarantee and four months of private operation.



Copyright by H. M. Sperry—Data Prepared by Bureau of Railway Economics

Fig. 1—Leading Factors in Railway Earnings on a Ratio Scale, for a Clearer Comprehension of Relationship

trouble is that we talk in such big figures all the time that no one understands what we are talking about. When we get into billions, millions become minimized. They lose their relative value."

The present article is an attempt to work out a method

Table II—Important Dates

World War—Austria declared war on Serbia.....	July 28, 1914
Adamson Act approved.....	September 3 and 5, 1916
Adamson Act effective.....	January 1, 1917
United States entered World War.....	April 6, 1917
Federal Control began at noon.....	December 28, 1917
Armistice declared.....	November 11, 1918
Transportation Act approved.....	February 28, 1920
Federal Control ended.....	February 29, 1920
Federal Guaranty Period from.....	March 1, 1920
Federal Guaranty Period to.....	September 1, 1920

which permits of a clearer understanding of the relationships between the various factors of railway traffic and earnings and more particularly to show the relationships between those figures expressed in millions and those expressed in billions. One of the charts is worked out in the form of curves plotted on the ratio scale, while in the other the various values are plotted as percentages. The charts point out clearly the great increase in traffic handled in recent years, the great increase in revenues, and show how the still greater increases in cost of operation, more particularly in wages,

not include the standard return for the period of federal control or the guaranty for the guaranty period from March 1 to August 31, 1920. The third part of the chart shows the return on the investment; i.e., the relationship between the net railway operating income and the total property investment.

In this chart the most striking feature is the increase in railway operating expenses, the great increase in the pay roll and the sharp decline in net income. The ratio scale used in these charts is for the purpose of showing relative changes. An increase or decrease of a given percentage in any item on the chart will show the same degree of upward or downward inclination regardless of the magnitude of the item or its position on the chart. If the ordinary arithmetical scale were used the fluctuations in the large items would be more pronounced than the same relative fluctuations in the smaller items.

In Fig. 2 these figures have been put in the form of percentages, based on the years 1911 to 1914 as an average of 100. The chart shows that in the year 1920 as compared with the average of 1911-1914, the Class I railroads of the United States handled 150 per cent of the revenue ton miles of the average 1911 to 1914 and 137 per cent of the revenue passenger miles. This greater transportation service yielded

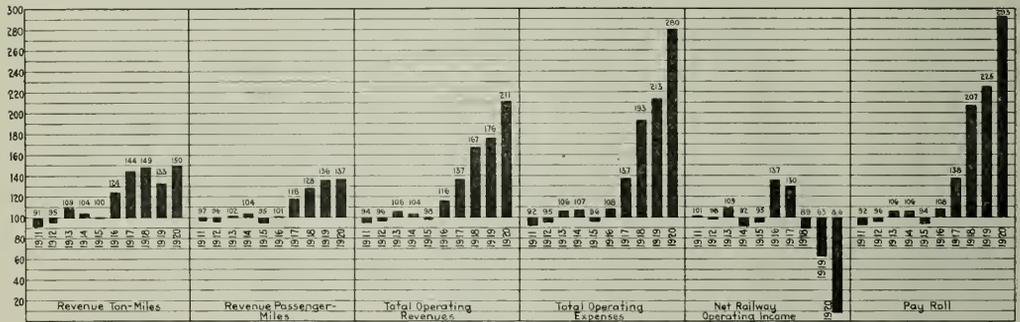


Fig. 2—Railway Traffic, Earnings and Expenses Shown in Percentages of the Average for 1911 to 1914 as 100

have succeeded in reducing and almost eliminating net income.

Fig. 1 is in three parts. It covers the years from 1911 to 1920 and shows (a) the revenue ton miles of traffic in these

Table III—Wage Advances During Federal Control

To all employees, January 1, 1918.....	\$360,000,000
To shopmen, January 1, 1918.....	209,000,000
To maintenance of way employees and clerks, September 1, 1918.....	190,000,000
To agents and telegraphers, October 1, 1918.....	25,000,000
To dining and sleeping car employees, January 1, 1919.....	8,000,000
To enginemen and trainmen, January 1, 1919.....	60,000,000
To shopmen, May 1, 1919.....	50,000,000
To enginemen and trainmen (time and one-half in road freight service), December 1, 1919.....	38,000,000
To maintenance of way employees (time and one-half for overtime), December 16, 1919.....	25,000,000
To clerks (time and one-half for overtime), January 1, 1920..	25,000,000
Total.....	\$990,000,000

May 24, 1921 (a).

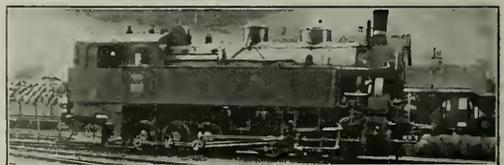
RATE INCREASES

June, 1918—Director-General increased freight rates approximately 28 per cent, and passenger rates approximately 22 per cent.
 August 26, 1920—I. C. C. increased freight rates about 33 per cent and passenger rates 20 per cent, with a 50 per cent surcharge on Pullman fares.

years; the revenue passenger miles and the property investment; (b) the total operating revenues, the total operating expenses, the pay roll, the net railway operating income and the net income available for dividends. The latter figure does

211 per cent of the operating revenues of the 1911 to 1914 period, but as the operating expenses reached a figure of 280 per cent, principally because of an increase which brought wages up to a ratio of 293, the net railway operating income was reduced to but 8.6 per cent of what it was in the years from 1911 to 1914.

The figures from which these charts were made up were compiled by the Bureau of Railway Economics and are given in Table I. For the purpose of making the information readily available Tables II and III are given to show some of the important factors which resulted in the figures which are indicated on the charts.



An Austrian Switch Engine

Copyright by H. M. Sherry—Data Compiled by Bureau of Railway Economics

Carriers Again Ask Labor Board to Decrease Wages

Restoration of the Rates of Pay in Effect Prior to Decision No. 2 Requested by Many Railroads

REPRESENTATIVES of eastern and western railroads assailed the recent \$400,000,000 wage cut authorized by the Railroad Labor Board, the standardization of railway employees' wages and the payment of time and one-half for overtime in freight and yard services in reopening the wage question before the Labor Board on June 6. The recent wage cuts, considered in connection with the data presented to the board at the previous hearings by the carriers, are not large enough and should be increased so as to restore the rates of pay in effect prior to the wage increase of last July, according to the testimony presented at the opening session. The standardization of wages and the payment of time and one-half for overtime in freight train service were attacked by J. G. Walber, representing the eastern roads, who suggested in lieu of the former, that standardization of wages extend only to those rate making groups fixed by the Interstate Commerce Commission.

In opening the hearings, which are a continuation of the hearings which began on April 18 and which have been reported currently in the *Railway Age*, Mr. Walber said in part:

Since the submission by the railroads of their exhibits in April, the downward movement in the cost of living, and in the rates of pay in outside industries has continued and is still continuing. It is evident that there is a general necessity for revisions of the wage scales in all classes of employment. These changes will unquestionably have a pronounced influence upon costs of all kinds, including the cost of living, and will, in our opinion, require in the very near future much greater reductions in the scales of the railroad employees than have been asked up to this time. If the elements set out in Section 307 of the Transportation Act are in control of the situation, and we believe that it was the intent of Congress that they should be given the most specific and direct application that the conditions would permit, a very serious situation will be constantly before us, and it requires very serious consideration whether, in view of the constant changes which are taking place in this period of readjustment it is possible to continue to handle these readjustments of the wages of railway employees in the manner which is now being pursued and the necessities of adjustment of individual classes with relation to all classes.

In other words, the question before us is whether it is to be impossible to make adjustments in the wage scales of one class of employees without involving all other classes. We realize that this is not a matter which can be decided at this time; in fact, it may not be necessary to decide it at this time, but with the diversified conditions in the commercial industries and with the great many different classes of employment in the railroad service, we assert that Section 307 of the Transportation Act does not contemplate that specific relations between wage scales of the various classes should be continued, and that one class cannot be changed without affecting every other class. The Transportation Act itself recognizes that there are differences in the commercial necessities in the different parts of the country, by the establishment of the different rate regions, and as that act requires the Interstate Commerce Commission to give direct consideration of the wage scales in their decisions affecting traffic rates, there appears to be sound reason for holding that in any circumstances the largest area to be considered by the Labor Board in determining wage scales should correspond with these traffic rate regions. In fact, we repeat that Section 307 requires making the most direct comparisons possible, even to the extent of subdividing carriers, if the conditions warrant, so that if for no other reason, railroad wages in each particular section of the country can be brought in direct conformity with prevailing scales of pay for analogous occupations in those particular localities, and similarly with reference to the cost of living in corresponding communities.

The differences in all the elements entering into the situation, whether cost of living, rates of pay in outside industries, general social conditions, etc., are so pronounced as between different portions of even distinct sections of the country; as for instance, within the New England district, within states themselves, and as between rural and urban communities on individual railroads;

that to pay the same scales of wages and apply the same working conditions results directly in discrimination between the employees working in these different places. The standardization of wages for all classes of railroad employees which disregards such local conditions is a serious violation of economic law, and the continuation of such policy would be in violation of the Transportation Act of 1920. The attempts in the past few years to standardize wages over the entire country, when the conditions over the entire country are not and could not, and, in fact, should not be standardized, is a contributing factor to the present situation which is resulting in criticisms of the expenses of the railroads and the quite general conception that there is wastefulness in the expenditures of the railroads, and, therefore, the shippers are being required to pay traffic rates unnecessarily. This experience has also demonstrated that payment of standard railroad wages to all employees is reflected in the wages paid by outside industries and on the farms, all of which contributes to the high cost of living.

It is felt that not only on the railroads but as between the railroads and the commercial industries, economic peace cannot obtain under the existing standardized rates for all classes in disregard of the local conditions as to cost of living, rates paid in outside industries, social conditions, etc., as before referred to, and the eastern railroads are anxious and ready to do all within their power to correct this situation in conformity with the provisions of the Transportation Act of 1920.

In addition to reductions in the unit or base rate of wages as to which the board has announced its judgment in Decision No. 147, there is involved in the present dispute a proposition not covered or provided for by that decision. The proposition referred to is the substitution of pro-rata pay in place of time and one-half for overtime in freight and yard service. We cannot too strongly and emphatically urge the careful consideration by the board of this feature of the pending dispute. Overtime basis of pay in road freight service was injected into the wage schedules as a pay increase measure, and for that reason, as well as because it directly and substantially affects the amount of the employees' compensation rather than the working conditions under which he labors, the railroads feel that it should be dealt with in this wage adjustment proceeding.

After outlining the history of punitive overtime payments, Mr. Walber continued:

Road freight service provides a dual basis of payment; miles and hours cannot be considered in the same category or comparable with other classes of service or labor which is regulatory on the part of the railroads. The principle of overtime for road freight service on the basis of time and one-half is wrong and inequitable, and cannot be fairly applied where the regulation of hours is beyond the control of the employer. The object of overtime, or rather the establishment of penalty rates of pay after a stipulated number of hours of service is a restrictive feature instituted for the purpose of limiting the individual hours of service for what might be termed "stationary employment" where an equitable return is obtained and the duration of service is governable by the employer. The emergencies of road service, involving uncontrollable features which are non-regulatory on the part of the carrier and which it cannot control, separates this class of service from all others, as the railroad has no means of obtaining a proper equivalent. In real service it is quite evident that in many cases neither the management nor the men can prevent overtime. Weather conditions, density of traffic, unexpected breakdowns at points lacking facilities for prompt repairs, may either singly or together cause delays to such an extent that a run which under reasonable conditions takes eight hours, may be protracted to twelve hours. In such cases, the crew is not called upon to perform fifty per cent more labor, as would be the case in a shop, but is required to spend fifty per cent more time in performing the same amount of labor.

After outlining the further development of punitive overtime payments to engine and train service employees during federal control, and quoting Director General Walker D. Hines with respect to his attitude toward these payments, Mr. Walber continued:

It will be observed that the Director General plainly stated that he could not approve of the granting of time and one-half

for overtime on the basis for which it had heretofore been contended, his views coinciding with those of the arbitration boards which had passed upon the subject, and also with those of the railroad managements who are unable to see any justification for the granting of such a penalty measure applying to conditions which are almost entirely beyond the control of the managements or the men themselves.

This attitude of the Director General was brought to the attention of the board in the hearings involving the wage scales, which resulted in Decision No. 2. The contention of the railroad managements that the increased pay resulting from the granting of time and one-half for overtime, which the Director General treated as a wage adjustment in his memorandum, was evidently ignored by the board in rendering Decision No. 2, as we construe the increases granted, which were the same number of cents per hour as were granted other classes of skilled employees, and in that way granting disproportionate increases to the engine and train service employees as compared with other classes. Therefore, all such classes having been treated equally with reference to the amount of increases per hour or per day, in the basis rates, with no consideration whatever of the dual basis of pay applicable to the men in road freight service, we believe we are fully justified in the conviction that the reasons which influenced the Director General in making this concession no longer exist and have been wiped out by the action of the Labor Board in the promulgation of the increases under Decision No. 2.

J. W. Higgins Testifies for Western Roads

Mr. Walber was followed on the stand by J. W. Higgins, executive secretary of the Association of Western Railways, who spoke on behalf of the western carriers. Mr. Higgins said that despite the recent wage cut of \$400,000,000 in the pay of railway employees, western railroads will continue to stand squarely upon their requests for reductions in wages which will restore the rates of pay in effect prior to the last increase of \$700,000,000 ordered by the Railroad Labor Board last July. "The evidence now before the board shows conclusively that the grounds upon which the last increase was made have entirely disappeared by reason of changed circumstances and conditions affecting the cost of living and the rates of pay for work of the same character in outside industries," Mr. Higgins said in outlining the carriers' position.

"The western carriers," he said, "notwithstanding Decision No. 147 which established decreases in rates of pay that are less in amount than those which these carriers have asked this board to establish and which it is asserted are justified upon the records in this proceeding, stand squarely upon and adhere to the prayers in the applications which have been filed for reductions in wages and rates of pay that will restore the wage schedules of these carriers to the basis not in excess of the wages and rates of pay which obtained before the promulgation of Decision No. 2."

Frank H. Alfred, president of the Pere Marquette; F. W. Sargent, general solicitor of the Chicago & North Western; J. J. O'Neill, general manager of the Chicago, St. Paul, Minneapolis & Omaha; J. L. Coleman, general attorney of the Atchison, Topeka & Santa Fe, and G. S. Waid, general manager of the Southern Pacific lines in Texas and Louisiana, also testified for their respective roads, reiterating, to a large extent, the arguments made in the previous hearings regarding the cost of living and the wages being paid for similar work in outside industries. All asked for the restoration of the rates of pay in effect prior to Decision No. 2.

J. G. Walber Presents Additional Exhibits

Mr. Walber, on behalf of all of the carriers, submitted numerous exhibits regarding the cost of living and the wages being paid in outside industries for work similar to that performed by the railway employees. These exhibits showed in general that the cost of living has decreased approximately 5 per cent since the filing of similar exhibits with the board in the wage hearings just ended. One of these exhibits, for instance, showed that the cost of living in May, 1921, is approximately 41 per cent lower than it was in July, 1920, when the peak was reached. Wholesale prices are shown in

other exhibits to have decreased from 5 to 13 per cent since February and it is necessary, according to Mr. Walber, to go back to 1915 and 1916 to find comparable periods.

Regarding the relation of wholesale prices to the cost of living, Mr. Walber called attention to the fact that the Bureau of Railway Economics, which prepared the exhibits, mentions the tendency of retail prices to lag behind wholesale prices.

"We feel that your board is thoroughly alive to the conditions which generally exist with reference to this feature in our industrial situation," Mr. Walber said in explanation. "It is common knowledge that this situation is receiving attention in various ways; press dispatches indicate that the administration at Washington is taking an active interest in the matter of reducing retail prices. We confidently believe that there will be a continued decline in all the elements entering into the cost of living; also that wholesale prices have not reached as low a plane as they will and that there will be a gradual drawing together with the lines of decline of the retail and wholesale prices. In any event, as wholesale prices are steadily declining, the downward movement in retail prices will continue for a much longer period of time."

The railroads completed their pleas for wage reductions on June 7, the remainder of the western roads outlining their requests and the reasons therefor, and Dr. C. P. Neill taking up the arguments in behalf of the southeastern roads. The afternoon session was opened with a controversy between B. M. Jewell, president of the Railway Employees Department of the American Federation of Labor and representatives of the Pullman Company over the right of that company to bring its case for wage reductions before the Board at this time. Mr. Jewell contended that the Pullman Company has had no conferences with "the authorized representatives of the employees" in accordance with the terms of the Transportation Act. The action of the Pullman Company in bringing the case before the Board was defended by G. S. Fernald, counsel, who stated that Mr. Jewell's objections were purely technical. Chairman R. M. Barton of the Board, ruled that the pleas of the Pullman Company for wage reductions would not be heard until the Board had decided the question of jurisdiction.

Representatives of the various classes of employees involved in the wage controversy testified at the afternoon session, all of them stating that they are resting their cases upon the testimony introduced in the recent wage hearings.

Intimations that the attitude of employees in engine and train service was such that their acceptance of wage cuts at this time was not probable were made before the Labor Board on June 8 by L. E. Sheppard and W. G. Lee speaking on behalf of employees in Group I. Mr. Sheppard outlined all the adverse circumstances which might act to influence representatives of the employees in Group I to vote for rejection of the decreased rates of pay fixed by the Labor Board last week when the general chairman of all the carriers affected meet at Chicago on July 1. No specific threats were made, both Mr. Sheppard and Mr. Lee confining their remarks to outlining the probable frame of mind of these employees and stating that if a strike was called blame would lie first with railroads in trying to reduce wages at this time and second with Labor Board in ordering decreases. Mr. Sheppard defended the position of the conductors, whom he directly represents, by stating that discrimination in rates of pay which prevailed prior to federal control has merely been continued by awards of the Railroad Administration and Labor Board. "The cost of living," he said, "has never been argued as a factor in wage schedule making and should not be so considered at this time." He also made a vigorous attack on "open shop" propaganda and in closing stated that railway employees prefer private control, provided they can obtain concessions under such system as they obtained while railroads were under federal control.

Mr. Lee's arguments were based largely upon the statement that the Labor Board after rendering one decision could not alter its findings within a few days without the inference being drawn that it admitted error in the first wage cut order. H. P. Daugherty, representing the engineers, and W. S. Carter, representing the Brotherhood of Locomotive Firemen and Enginemen, also testified before the Board, the latter filing voluminous exhibits regarding the regularity of employment of firemen and enginemen, increases in efficiency as measured by traffic handled, hazards of employment and increases in cost of living as compared with wages paid these employees.

President Not Urging General Rate Cut

WASHINGTON, D. C.

PRESIDENT HARDING and the administration are not seeking an immediate general or horizontal reduction in freight rates. The attitude of the President on the subject of rate reductions is now far more closely in accord with that of the railroad officers, the Interstate Commerce Commission and that expressed in the resolutions recently adopted by the National Industrial Traffic League than would be inferred from most of the despatches from Washington to the daily newspapers. There is no warrant for the assumption on which many of the news stories were based that, because the President wants rates reduced as a step toward the "return to normalcy," he is working for a general or percentage cut in rates which would transfer to the shippers most of the \$400,000,000 which it is estimated the railroads will save in wages during the next year, and that he has been urging such a policy upon the Interstate Commerce Commission.

The President is anxious to have rates reduced and he called on the commission on June 1 to get first-hand information as to what was being done in that direction because of conflicting statements that had been made to him, but he has made no attempt to dictate to the commission in any way and he has since expressed not only surprise and gratification at the progress already made but approval of the course adopted by the commission of working in co-operation with the carriers and the shippers to bring about readjustments of rates where they will do the most good.

Information obtained from commission sources checks with what was given out at the White House regarding the President's conference with the commissioners on June 1; the President also in a later conference with the newspaper correspondents corrected some of the conclusions to which many of them had jumped. The President referred to the evil of horizontal increases or decreases in rates which affect some commodities much more than others because of the difference in the relation between the amount of the rate and the value of the article, in the case of coal for instance as compared with a suit of clothes, and he indicated his entire approval of a readjustment by commodities rather than a general reduction. Incidentally he expressed a rather favorable attitude toward a seasonal reduction in coal rates, such as is proposed by the Frelinghuysen bill now awaiting action in the Senate and which Secretary Hoover has been attempting to bring about by voluntary action of the carriers. The President is interested in this proposal not only from the general standpoint but because the government itself is a large purchaser of coal, but it is understood that railroad officers have expressed an unwillingness to make the experiment.

President Harding's attitude toward the railroad problem has undergone a considerable evolution during the past two or three months, during which he has been consulting on the subject with representatives of all sides of the question. At first he appeared to be convinced that the high rates them-

selves were the principal cause of the railroads' difficulties, instead of the outward and visible manifestation of the high expenses which caused the high rates. In his address to Congress he declared that both rates and the cost of operation must be reduced and possibly he had an idea that it could be done simultaneously. Further investigation of the question showed him that comparatively little could be done toward reducing rates until wages could be reduced and that even then it must be a gradual process. It also showed him that there were many other factors at work of greater importance than the freight rates to cause the business depression. The President was continually receiving complaints from delegations who called upon him or from Congressmen who passed on to him the complaints of their constituents who were being hardest hit by the maintenance of the high level of freight rates while their own prices were being rapidly reduced by the operation of the law of supply and demand.

After various conferences the President began to understand that the complaints of high rates as the term was used generally were actually based on objections to particular rates that had been thrown out of relation to the value of the shipments by the fact that the process of readjustment has been working much more actively in some other directions than it has on railroad expenses. It is likely that the President was particularly impressed with the resolutions adopted by the National Industrial Traffic League at its convention in Cleveland on May 25 and sent to him deprecating "any effort toward a general downward revision of rates until the carriers have had an opportunity to adjust their expenses" and favoring readjustments in conference between carriers and shippers.

As late as May 31 the President had indicated an unwillingness to accept the position of the railroad executives, as it had been reported to him, of general opposition to rate reductions, but apparently he learned later that they had qualified general statements of this character by recognizing the need of many particular adjustments downward. The only information given out at the time of the President's visit to the commission was a memorandum read to the newspaper men at the White House, to the effect that the President had gone to inquire of the commission what progress was being made and that he was gratified to learn of the extent of the readjustments from the general percentage advance that had already been made.

It gives more punch to a newspaper story to picture the President of the United States as an all-powerful boss whose expression of a desire means that he proposes to "start something" than to represent him as a layman seeking information on a somewhat technical subject. Therefore, the President's repeated statements that rate-making is a legislative function delegated by Congress to a commission, rather than a legislative function, and that the present Executive is not inclined to go over the heads of the duly constituted authorities, have either been ascribed to a becoming modesty or subordinated to the interest of dramatic journalism.

The President has been a newspaper editor and publisher, but, to apply a newspaper analogy to his present office and to treat his cabinet as a staff of reporters who are supposed to keep the chief informed as to what is going on, it may be stated that the staff does not include any man assigned to the railroad run. When the President asks his advisers what is doing in their departments that is of general interest there is no one to talk for the railroad business. It is understood that the railroad problem was first brought before the cabinet by the Vice-President because none of the other cabinet officers has any jurisdiction over transportation, but there are men who are somewhat interested in railroad matters and who have heard mild rumors from their friends, the farmers or the manufacturers, that they are not making as much money as they ought to or would like to and if it did not cost so much to transport their products from the places where

they grow or are made to the places where they are worth something they might make more money. Although prices are not regulated it occasionally occurs to the producer that his government has the power to regulate freight rates.

As a result, when Managing Editor Harding holds his semi-weekly staff meetings, his agricultural department editor or his commercial editor may remark that he understands that freight rates are very high, that something ought to be done about it and that as far as he can see nothing is being done about it. Having no member of his staff assigned to cover the Interstate Commerce Commission, Editor Harding decided to go out one fine morning and interview the commission itself. The bulletin he issued on his return indicates that he thought he had dug up a good story and it is said that he expressed some surprise that he had been able to land something like a scoop as a reward for his enterprise in going after both sides of the story.

The commissioners told him that for months they had been working in co-operation with the railroads and the shippers in correcting inequalities that had resulted from the latest percentage increase in freight rates and that several important reductions in rates on particular commodities had been

criticism on the part of those who do not share such feeling on the ground that it has tended to cause many people to hold off buying and thus delay the readjustment.

Freight Car Surplus Continues to Decrease

WASHINGTON, D. C.

THE NUMBER of surplus freight cars for the week ending May 31, as compiled by the Car Service Division of the American Railway Association, shows a further decrease to 394,040, or about 28,000 less than for the previous week. Of the total 155,040 were box cars as compared with 168,272 the week before, and 165,102 were coal cars as compared with 176,442 the week before. The freight car loading also continues to increase, but the compilation of the report for the last week in May was delayed until too late for publication in this week's issue.

The summary of car loading for the week ended May 21 is given in the following table.

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY—ALL DISTRICTS; COMPARISONS OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO. FOR WEEK ENDED SATURDAY, MAY 21, 1921													
Districts:		Total revenue freight loaded										Received from connections	
Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year
1921	1920	1921	1920	1919	1921	1920	1919	1921	1920	1919	1921	1920	1919
Eastern	1921	6,151	2,668	42,076	1,125	5,446	2,768	57,963	69,711	187,908	199,939	191,417	199,540
Allegheny	1921	4,823	2,824	47,848	2,899	7,106	6,515	35,089	92,835	112,029	125,058	112,451	125,058
Pocahontas	1921	2,713	2,596	50,081	2,366	6,496	4,631	49,782	160,251	182,041	164,799	164,799	164,799
Southern	1921	2,180	2,655	50,176	6,044	3,264	7,748	38,729	71,245	102,667	102,667	102,667	102,667
Northern	1921	155	115	24,365	31	1,354	40	2,614	5,140	33,814	33,814	33,814	33,814
Central Western	1921	145	96	18,559	610	2,374	291	168	10,527	32,770	34,261	34,261	34,261
Southwestern	1921	4,190	1,964	19,476	584	15,198	764	38,216	61,637	112,029	112,029	112,029	112,029
Total, all roads	1921	31,316	28,204	169,049	11,233	62,226	59,268	160,009	340,767	862,074	862,074	862,074	862,074
Increase compared	1920	3,266	2,638	18,512	5,337	50,216	30,214	216,030	244,401	768,330	768,330	768,330	768,330
Decrease compared	1920	4,389	1,836	10,537	5,888	12,010	29,054	216,030	96,366	93,744	93,744	93,744	93,744
Increase compared	1919	4,389	1,836	10,537	5,888	12,010	29,054	216,030	96,366	93,744	93,744	93,744	93,744
Decrease compared	1919	3,266	2,638	18,512	5,337	50,216	30,214	216,030	244,401	768,330	768,330	768,330	768,330

L.C.L. merchandise loading figures for 1921 and 1920 are not comparable as some roads are not able to separate their L.C.L. freight and miscellaneous of 1920. Add merchandise and miscellaneous columns to get a fair comparison.

Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year
1921	1920	1921	1920	1919	1921	1920	1919	1921	1920	1919	1921	1920	1919
May 14	1921	34,418	25,999	161,782	5,126	49,365	22,806	215,534	235,538	750,158	843,145	739,945	501,228
May 7	1921	34,847	27,123	143,323	4,626	48,095	13,041	213,535	233,435	718,025	843,184	753,287	494,405
April 30	1921	34,426	29,909	145,010	4,659	48,554	7,725	213,792	237,922	721,997	800,960	752,362	489,073
April 23	1921	32,715	29,602	138,576	4,595	46,711	5,691	211,627	235,010	704,527	717,772	715,042	486,040

worked out and more were in process of being worked out. They may have told him also that the \$400,000,000 wage reduction would not be all velvet for the railroads, that a considerable part of it is needed merely to avert bankruptcy, that even if it could all be applied to rate reductions a 10 per cent horizontal reduction in freight rates would hardly persuade many people to buy in much larger quantities than they are now buying, while it would certainly reduce by that much the revenues on the business that is moving anyway, while a larger reduction on some commodities might stimulate some business to be handled in otherwise empty cars.

As a newspaper man, Mr. Harding may also have been reminded that the thousands of rate adjustments already made have naturally attracted little publicity individually, while those who have been complaining about high rates have naturally made more noise than those who have not been complaining.

The effect of the Presidents' various statements to the newspaper correspondents, however, has undoubtedly had a tendency to encourage a feeling throughout the country that freight rates were due for a fall and there has been much



Central Station, Copenhagen, Denmark

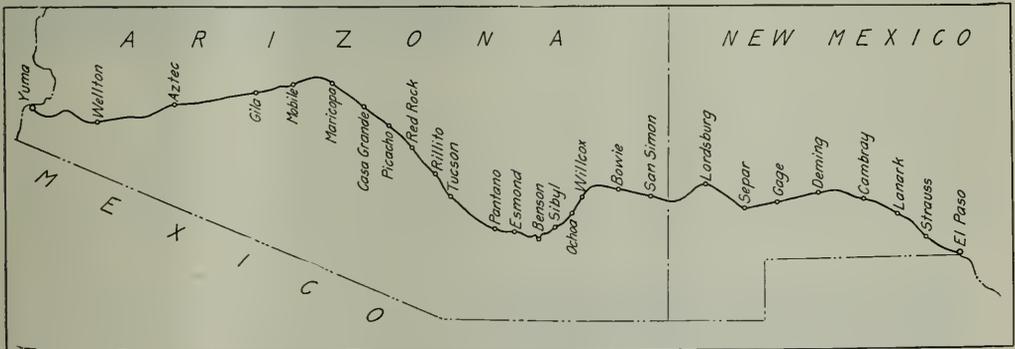
Traffic Troubles Reduced by Enlarging Water Supply

Southern Pacific Effects Annual Saving of \$104,000 by Organizing Systematic Campaign on Tucson Division

THE CONDITIONS on the Tucson division of the Southern Pacific practically from the time the division was opened for operation have borne constant testimony to the extra importance that should be attached to the item of water supply as a factor in train movements through comparatively arid sections of the country. This division extending from Yuma, Ariz., to a point near El Paso, Tex., includes 564 miles of main line, all of which is through desert. The character of this territory is such that in constructing the line in 1879 and 1880, one of the largest items of expense was that of hauling and transporting water for the work. In fact, it was a common belief of the men in charge that no water was to be had in that section. As a result of this belief, together with the urgent need of hurrying the construction in order to effect a connection between the Pacific and Atlantic, the water supplies developed were unsatisfactory, even at that time. However, with but little improvement they remained the only ones until 1917, when it was decided to attempt a substantial improvement. This plan was precipitated by the events of the preceding year when, as a result of large in-

it available for boiler use in order to effect a settlement of the mud. The breaking down of the machinery was a frequent cause of trouble, there being but the one pumping unit. Also freight traffic regularly experienced delays incident to the preference given to passenger movements, there being five passenger trains in each direction daily, all of which carried water cars and which in themselves often encountered conditions at Yuma where it became necessary to obtain their supply of water from the small mains of the city. The change made was that of drilling two wells, one 246 ft. and the other 252 ft. deep and installing two electrically operated Lane & Bowler turbine pumps. The water, though not of the best quality, is present in ample quantity for all purposes.

Having corrected the trouble at Yuma, attention was directed to the situation at Wellton, 37 miles east. The trouble here was not so much one of inadequacy of supply as excessive cost of operation, the supply here in many instances having been carried over the entire freight division from Yuma to Gila, a distance of 123 miles, over a period when



Map of Southern Pacific Showing Water Stations on Tucson Division

creases in the tonnage on the Pacific coast and through the Imperial Valley of California, conditions were aggravated to a point where substantial relief seemed essential. Annoying delays incident to a shortage of water at stations or to their distance apart, and more or less costly maneuvering to make the best of a bad situation were every-day occurrences, while train failures and blockades, though less common, were not unknown. The condition was partially met by hauling water cars a distance of 400 miles, oil tank cars being used for the purpose, but this was an expensive practice, each water car decreasing the capacity of a train for revenue freight by one car and there being a demand at all times for cars capable of transporting oil.

Program for Better Water Supply Begun at Yuma

The plan of relief called for the establishment of water stations on the Tucson division at intervals of 25 miles. Predictions of failure were plentiful but the work was undertaken and a beginning made at Yuma, the west end of the division. It had been the practice here to secure water from the Colorado river, pumping it into large concrete settling tanks and confining it therein for 12 hours prior to making

other wells had been pumped dry or rendered inoperative by machinery failures. The employment of three pumps at this point, however, was a matter which invited improvement. To the end of effecting such an improvement, two Lane & Bowler pumps, belt-driven by two gas engines, were installed with the result that one attendant now handles the work. The saving effected by this change exceeds \$3,000 annually in pumps' salaries alone. The quality of the Wellton water, however, is the poorest on the division. It contains 26.59 grains per gallon of incrusting salt and 53.42 grains per gallon of non-incrusting matter, the total dissolved matter being 80.01 grains per gallon.

The one unfavorable condition now outstanding on the freight division between Yuma and Gila was that of operating trains between Wellton and Sentinel. With a distance of 50 miles between these stations, it happened at times that trains attempting to operate over the district on the supply of water carried in the engine tender would run short before reaching Sentinel and experience serious delay on that account. To overcome this condition, water was prospected for at Aztec. Although an unlikely place for water from all surface indications, Aztec being one of the most desolate

spots on this route, efforts at drilling were successful, the installation at this point consisting of two wells, 710 ft. deep, two gas engine driven Lane & Bowler pumps and a 350,000 gal. steel tank.

Wells 1,746 Ft. Deep at Gila

The situation at Gila was one of inadequacy and, being a terminal point, it was especially urgent that the trouble be overcome. Although there were two wells at this point, the supply would become exhausted during periods of heavy business and necessitate the hauling of water from Wellton, 85 miles west, and from Maricopa, 42 miles east. The problem of supply was solved by digging deeper, a seemingly inexhaustible supply being found at a depth of 1,746 feet.

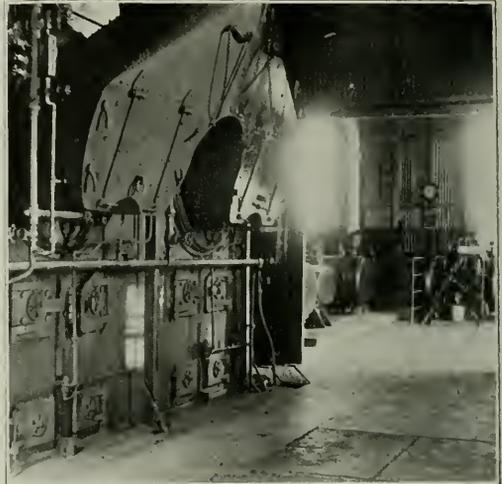
This water, however, like that at Sentinel has a temperature of 110 deg. F., a temperature at which locomotive injectors experience difficulty in picking up the water. A cooling device which has been installed serves a beneficial purpose during most of the year, but considerable trouble from this source is experienced in extreme hot weather. The pumping installation is an air lift system, the air being supplied by two Ingersoll-Rand Imperial air compressors.

The next water station eastward was located at Maricopa, 42 miles from Gila. Twenty-two miles of this distance is up a 1.5 per cent grade, necessitating the hauling of water cars in both directions. In order to overcome this difficulty a search for water was made at Mobile, situated about midway between the two stations and a good supply of fair quality water was found at a depth of 451 ft. Since sinking the one well and the installation of a Luitweiler double-acting deep well pump, operated by a 30-hp. gas engine, no necessity has arisen for the hauling of water cars in this section.

At the several water stations between Maricopa and Benson, 136 miles farther east, it developed that as at Gila the solution of the problem was one of digging deeper, the supply not only being more plentiful at the greater depth but of a better quality. At most stations in addition to deepening the wells, the program included the installation of two pumping units to protect the system against machinery failures. In

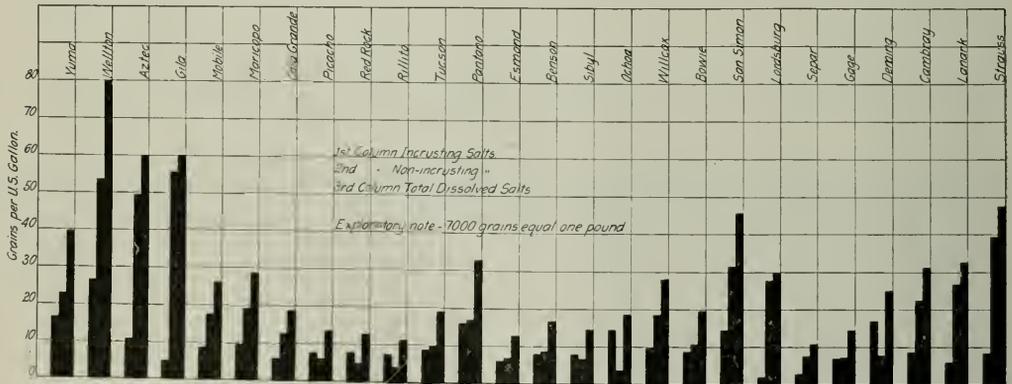
Knowles deep well pumps, supplied by two 80 hp. Pennsylvania type steam boilers.

The likelihood of being able to develop water supplies between Lordsburg, N. M., and El Paso, Tex., a distance of 147 miles, and the only remaining part of the division not yet considered, was considerably less of a certainty than



Interior of Pumping Plant at Bowie, Ariz.

it was at some of the other points. Considerable money had already been spent without success in this region and at one time the hope of obtaining water had been given up entirely. However, judicious prospecting brought in a well at Akela, 81 miles east of Lordsburg, and farther east stations were developed at Afton and Strauss, the plant at Strauss com-



Analyses of Main Line Waters, Tucson Division, Southern Pacific

many instances large steel tanks were also erected. A duplicate of the situation between Gila and Maricopa on the west was encountered in eastern Arizona between Benson and Willcox.

The situation at Bowie, Ariz., was another case of insufficient water which simply required deepening of the existing wells, of which there are three. The wells are now 495, 505 and 768 ft. deep, respectively, and are operated by two

prising two wells 975 ft. and 950 ft. deep, respectively, from which the water is pumped by a Sullivan air lift system. Since the establishment of these stations, the need of water cars on this division has apparently been obviated completely.

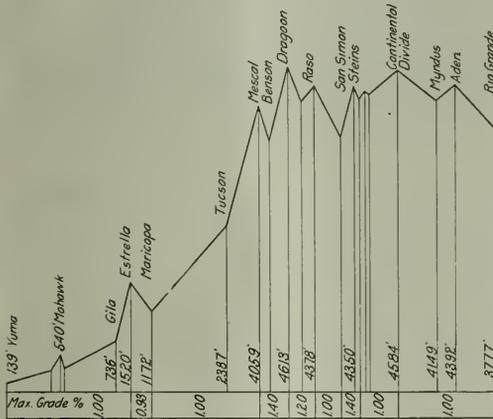
But it cannot be said that the problems have been altogether overcome. On the contrary, the conditions at some points are still far from ideal. Between Yuma and Tucson, for in-

stance, the quality of the water leaves much to be desired. An engine with new flues will only last about four months in this territory, a condition which is partially met by transferring the engines east of Tucson, where about three months' more service is secured from them. As a matter of fact seven or eight months is the average life of flues in any engine operating through the desert. Also during periods of heavy business it is necessary to hire a great number of enginemmen whose experience has been in good water territory and as a result much trouble is encountered in operating the trains until they are able to adapt themselves to the waters. How-

This code is substantially the same as that which has been approved by the Territorial Health Officers' Association, in which are members from the health boards of practically all of the 48 states; and it also conforms to the standards prescribed in the quarantine regulations of the United States Bureau of Public Health. In connection with the adoption of the code by that Bureau, the railroad surgeons had a number of conferences with the government officers, and the code also has been discussed in former meetings of the railway surgeons; the discussion at Boston, therefore, resulted in no material changes.

The report of the committee on physical standards, Dr. C. W. Hopkins (C. & N. W.) chairman, was in the nature of a progress report embodying conclusions, so far as conclusions were reached in this matter, which were formulated while the railroads were in the hands of the government and which were the subject of a brief report by the Railroad Administration just before the return of the roads to their owners. The committee presented a proposed code of general or preliminary rules, embraced in twelve paragraphs; but because of the short time that the committee has been in existence the subject has not been studied in all its bearings, and the matter of recommendations for action was deferred until a future meeting.

The officers for the ensuing year are as follows: Chairman, D. Z. Dunott (W. M.), Baltimore, Md.; first vice-chairman, G. G. Dowdall (I. C.), Chicago; second vice-chairman, Duncan Eve (N. C. & St. L.), Nashville, Tenn.; third vice-chairman, C. W. Hopkins (C. & N. W.), Chicago; secretary, J. C. Caviston, 30 Vesey street, New York.



Condensed Profile of the Main Line of the Southern Pacific, Tucson Division

Railroads Suffer Heavy Losses in Colorado Floods

By J. B. Day

ever, the condition common to the period prior to 1916 and 1917 when an entire division would become blocked and the freight finally backed up to the extent of blocking other divisions owing to the water supplies becoming exhausted at one or two points is now a thing of the past. In 1918 it was estimated that just in avoiding the use of water cars and eliminating the delays which had been incident to their use, a saving of \$104,000 was effected.

We are indebted to Wm. Wilson, division superintendent of the Tucson division, for the information on which the above article is based.

RAILROADS in Colorado have suffered losses estimated at from \$3,000,000 to \$4,500,000 in the floods which have occurred during the past week. The greatest damage was done at Pueblo on June 3 and 4 and the heaviest

Annual Meeting of the Medical Section

THE first annual meeting of the Medical and Surgical Section of the American Railway Association was held at Hotel Westminster, Boston, Mass., on June 3 and 4, with about 75 representatives in attendance. This was the first full meeting since the Railway Surgeons' Association became a part of the American Railway Association, and the temporary officers were confirmed in their positions for the ensuing year.

The principal business was the discussion of the reports of two committees, one on a sanitary code and one on physical standards for railroad employees. The first-named committee, Dr. R. W. Knox (Southern Pacific), chairman, presented a carefully prepared code of 91 sections, which was adopted for use as standard railway practice. It prescribes rules for transportation of sick persons, cleansing of passenger cars and passenger stations, safeguarding ice and drinking water and hygienic care of construction camps. This code will come before the American Railway Association, at its next meeting, for confirmation.



Photo by Underwood & Underwood, N. Y.

Arkansas and Fountain Rivers, Joined by Flood, Washing Away Bridge at Pueblo

losers were the Denver & Rio Grande, the Atchison, Topeka & Santa Fe, the Missouri Pacific and the Colorado & Southern. Other roads which are affected, but to a less degree, are the Union Pacific, the Chicago Rock Island & Pacific and the Chicago, Burlington & Quincy.

Many miles of track have been washed out all over the

state and many bridges large and small have either been washed away entirely or so badly damaged as to require extensive repairs. Rolling stock and shops have been hard hit. On top of the physical damage to the various roads is to be added the loss of revenues resulting at this time from partial paralysis of traffic resulting from the floods, and the loss that is yet to come from shrinkage of tonnage

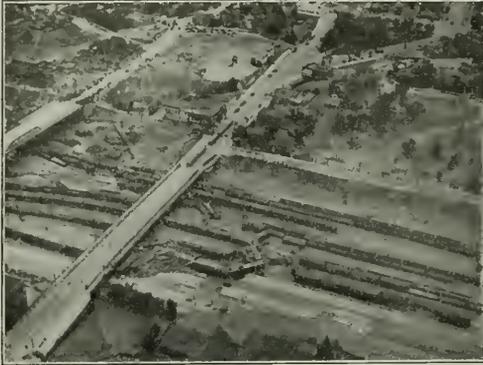


Photo by Underwood & Underwood, N. Y.

Railroad Yards at Union Station, Pueblo. Two Overturned Passenger Trains

due to ruined crops and the apparent wholesale slaughter of cattle, horses, sheep and hogs indicated by reports from various sections of the state.

It is estimated that there are upwards of 300 freight cars piled up in the Pueblo yards in various stages of destruction. How much of this rolling stock can be salvaged is problematical at this time. Two passenger trains, Denver & Rio Grande Number 3 arriving in Pueblo on the evening



Photo by Underwood & Underwood, N. Y.

Overturned Freight Cars

of June 3 and a Missouri Pacific passenger train on an adjacent track, were caught in the union station yards when the flood descended upon the city and were turned over. The loss of life on the Denver & Rio Grande train was estimated at 23. At this writing the trains are still partly submerged and it is impossible to determine definitely how many of the passengers lost their lives. The union station was in ten feet of water at one stage of the flood and the water was reported to have reached a depth of 15 ft. in the Santa Fe yards.

South of Pueblo and east almost to the Kansas line along the Atchison, Topeka & Santa Fe the flood waters wreaked heavy damage. The Santa Fe shops at La Junta were reported under five feet of water and two locomotives and a large number of freight cars were said to have been destroyed. Near Las Animas two miles of the Santa Fe's track was reported washed out and between four and five miles between Lamar, Colo., and Syracuse, Kans. Of all the lines radiating from Pueblo those leading northward toward Denver were least affected. The Santa Fe expects to have its California line in service by June 12 and its Pueblo line some time next week. The Union Pacific, on its Fort Collins branch, north of Denver, incurred severe losses as a result of washed-out track. The Colorado & Southern lines north of Denver to the coal fields also were badly washed out. The collapse of the main tunnel on the Midland Terminal road completely tying up that line for the time being was reported Tuesday.

With the work of surveying the damage only just begun it is impossible at this date to determine with any great degree of accuracy the extent of the damage done. H. A. Tice, superintendent of the Atchison, Topeka & Santa Fe at Pueblo, is quoted as estimating the probable damage to the property of his company at \$2,000,000 and that of the Missouri Pacific at \$1,000,000. At the headquarters of the Denver & Rio Grande it was said that the most conservative estimate of the physical injury to that road, based on incomplete information, is upwards of \$1,000,000. Robert Rice, vice-president and general manager of the Colorado & Southern, said that a conservative estimate of the damage to the property of his company would be \$200,000.

Electric Power for Railroad Traction

FUTURE EXPANSION in the use of central station power was the subject of an address delivered by Samuel Insull, president of the Commonwealth Edison Company, Chicago, at the forty-fourth convention of the National Electric Light Association recently held in Chicago. The major part of his address dealt with the development of interconnecting power systems and in this relation he said he would like to see every committee of the association watch the progress of any plans of federal control of the power industry. With reference to the railroads Mr. Insull spoke as follows:

"I think we can be of great help in the rehabilitation of steam railroads of this country. I am not one that believes in universal electrical propulsion of railroads immediately. I believe that the economic way to get around to that proposition is to develop our production of energy along economic lines, and to develop the transmission of that energy throughout the country on economic lines; to see to it that we are in a position at any time where electrification of steam railroads is desirable in some particular locality, that we shall be able to take care of it.

"I see no reason why we should not finance that operation right up to the point where our energy is taken by the prime mover of the railroad, that is, the locomotive, and in that respect I think we can be of very great assistance; but in all these investigations—and I have studied some of the figures sent out from Washington—there should be the stabilized knowledge that exists in this industry and in this association and its members as the result of forty years of work in the manufacture of energy. The nation is entitled to the benefit of it, the industries are entitled to the benefit of it, and we are entitled to the benefit of it to the extent that it will stabilize our investment to a greater extent . . . and will help to reduce the cost of electric power and enable us to sell it at cheaper prices to all of our customers. . . ."



Meeting of Railway Accounting Officers' Association

Important Action Taken in Favor of Making Portion
of R. A. O. A. Recommendations Mandatory

ADDRESSES BY L. F. LOREE, president of the Delaware & Hudson, and by B. H. Meyer, member of the Interstate Commerce Commission, and important action in favor of making mandatory a portion of the recommendations of the Association relative to interline freight, passenger and disbursement accounting, featured the unusually successful thirty-third annual meeting of the Association held at Atlantic City this week. The meeting, which was held at the Hotel Traymore, June 8 to 10, was attended by some 500 accounting officers. The docket which the meeting followed was the largest yet handled at any of the annual meetings of the Association, being double in size over that of 1920. Besides the important steps looking towards making mandatory a portion of the R. A. O. A. recommendations, the meeting also adopted a large number of new forms, the number of such forms presented exclusive of revisions, being equal to that presented in nearly all of the other years of the Association's history combined.

L. F. Loree, president of the Delaware & Hudson, in his

address before the opening session, outlined the uses for which accounting work was done. He emphasized the necessity for having the records made up as promptly as possible and made a plea for greater co-operation between the accounting and other departments. An abstract of his remarks follows:

The Accounting Officer's Work from the Executive's Viewpoint

By L. F. Loree
President, Delaware & Hudson

The system of accounts with which we are concerned is that prescribed by the Interstate Commerce Commission. Its great defect lies in the meticulous detail and the lack of balance. Some of the accounts in the Commission's system involve sums of money so small as to be almost microscopic when compared with the total, while some of the larger items



could be subdivided to advantage. The main source of the trouble would seem to be the attempt to initiate a method of cost accounting on lines similar to those used by a manufacturing plant.

Statistics cannot take the place of judgment, but they are most valuable aids to judgment. They serve as instruments to thought, to knowledge and to work, and should be compiled in the clearest, the briefest and the most compact form. The ramifications of railroad operations are so widespread, the sources of possible wasteful expenditures, or possible economies, so numerous, that if a railroad is to be managed with a maximum of efficiency, it is important that all information bearing on work done and cost of operation be drawn together and tabulated on uniform bases; that is, there should be adequate statistical information. If sufficiently comprehensive, statistics will aid in the solution of problems and enable conclusions to be drawn and judgment matured. Constant usage cultivates a sense of arithmetical values to that in which the mind becomes responsive in a way analogous to that in which the trained ear becomes responsive to values in harmony.

Statistics should be as few as will cover the essential items and contain the details that explain the fluctuations which have taken place and where they occur. They are exposed to the danger of a careless assumption of data without testing their correctness and to undue refinement in the calculations based thereon. They should be kept so that information can be condensed from period to period on statements that will enable comparison of cumulative periods, and they should be brought together in folders. Much of the beneficial effects to be derived from their use is now lost through their being scattered over numerous sheets and a failure to draw them together.

Greater Use of Diagrams Suggested

The use of diagrams is very helpful and they may be drawn to illustrate many statements, bringing in a very direct way material facts into prominent notice. The changes stand out and save much mental labor in carrying in mind a long series of figures, and the appeal to the memory is, in some ways, more intense. Great care must be exercised in the choice of scales and illustrations for the diagrams, while the use of colors is frequently advantageous to give emphasis or direct attention to the significant facts.

It is important to keep in mind that we have two classes of statistics for measuring efficiency—financial and physical. Much more should be done than has been done by the accounting department in the developing of physical statistics. Such statistics have the great advantage that the units used are constant and not subject to the fluctuations entailed by changes in wages and prices, while they have the advantage of familiarity and close personal association.

The lawyers have a saying "time is of the essence of the contract." Time is of the essence of all statistical data. It may well be that a statistic available on the 4th of the month will have four times the value of the same statistic not furnished until the 20th. Careful study should be made of the dates upon which statistical data are to become available and resolute discipline imposed to produce them on time.

INTIMACY WITH OTHER DEPARTMENTS SOMETIMES LACKING

There is an intimacy in the relationship of the auditor and his accountants with the other departments of the railroad service which is much more direct and pervasive than are the relationships between one and another of the other department chiefs, and his work carries with it a penetration into the several departments that is quite distinctive. On the other hand, the personal and official intimacy that exists between the other departments is singularly lacking in the relationship between the auditor and his accountants and

the officers and employees of the other departments. It is very much to the interest of the railroad properties that this situation, which is in some respects harmful, should be corrected, and it cannot be corrected unless the reasons for it are understood and the proper means to overcome it known.

In the early days of railroading the jurisdiction of the average officer was so limited, and the details with which he had to deal were so comparatively few, that he was to a very large extent able to do his own accounting. A generation ago railroad accounting was a simple matter. As division engineer, I had a "road and bridge material" clerk but I made out the payrolls, handled the correspondence and the rest of the office duties myself. As the business developed and grew, this was no longer possible and the entire accounting of the railroads was drafted into one department. Today the work is most elaborate and is only gotten through with by the aid of much office machinery. Beyond question the change in the practice was not only desirable but unavoidable. To a considerable extent the irritation on the part of the operating officer is a natural consequence, due to the loss of control over work that was until lately under his jurisdiction. It is a natural resultant of the transitional period. What should be done is to make the change as agreeable and as promptly as possible.

A further reason for the existing disharmony is the lack of acquaintance and familiarity of both sets of officers with the problems and difficulties of their associates. In the two great maintenance departments the problems presented involve an acquaintance with mathematics and the laws of physics, which form the basis of the technical education of the officers employed in each, so that the tools they use and their habit of mind are alike, making easy the comprehension on the part of one of the work of the other and the various aspects in which it presents itself. Not to so great an extent, but measurably so, this is also true between the two maintenance departments and the transportation department. The division engineer, in arranging for his ballasting, distribution of ties and rails, putting in new bridges and many other activities, is compelled to consult the train schedules and reconcile his interests with those of the transportation officer, and, similarly the transportation officer has to modify his own movements to meet these demands and is led to consider them in detail and familiarize himself with them. Thus these officers come to have the same intellectual outlook and to speak the same language; they have a common stock of experience and understand each other when they exchange ideas.

ATTITUDE OF I. C. C.

There is no such relationship between the officers of the accounting department and those of the other departments. Bookkeeping is to the average operating officer an esoteric mystery with which he is not in the way of becoming familiar unless he deliberately acquires a new, highly technical and difficult art. On the other hand, the accounting staff has neither the foundation of the technical training nor the experience of transportation movements that make a base from which they can build up a body of knowledge. Much attention will have to be given to broadening the field of knowledge of both parties. The situation, with these inherent and initial disadvantages, accentuated by the changing conditions, is further disturbed by the Interstate Commerce Commission. In putting into effect the accounting rules made effective by the commission on July 1, 1907, its statistician, Henry C. Adams, called together the accounting staff of the commission, and, among other things, said to them:

The government has recently undertaken to do something quite different from that which it has ever undertaken to do before. It has undertaken to exercise a controlling influence upon the administration of railway properties through the agency of their accounts.

The aim of the supervision of accounting is to exercise influence upon the administration and management of railway property.

Not only was this attitude assumed but a provision of the law was taken advantage of to promulgate the idea that the auditor is not so much an officer of the railroad company as he is a responsible officer of the government, and that failure to obey the instructions of the commission might lead to his fine or imprisonment. It would be, perhaps, too much to say that railroad operations can be controlled through the accounts. That would be to make the history of the fact the actuating force bringing the facts into existence. In railroad practice, time, space and matter cannot be made to assume these relations, whatever we may think of Einstein's theory of relativity.

It is needless to say that the attitude of the railroad executive was heartily opposed to this assumption of power, both in letter and in spirit. Mr. Adams went on further in his remarks to say:

I do not know whether what I have said was consciously recognized by the members of the Interstate Commerce Commission when they framed the order under which the operating accounts were promulgated.

Happily, the commission took much the same view of the matter as was taken by the railroad executives and sought to use its powers in the regulation of the carriers rather than in the management of their business. Notwithstanding this, much harm was done, and still to too great an extent the attitude of individual members of the staff of the Commission is in this direction.

It is of the very first importance, if I rightly apprehend the situation, that we, every one, set ourselves resolutely to work to put all these matters in their right relation; and I, myself, think few things are more important, looking to the improvement of railroad practice and the success of the transportation interests from the standpoint both of the public and the owners. As a means to this end, I believe every opportunity should be taken to bring the officers into personal contact—on inspection trips, at staff meetings, at the meetings of the technical organizations—in short, wherever opportunity offers. Much more important than this is the avoidance wherever possible of letter-writing and the substitution thereof of the warmth and sympathy of personal explanation. It might quite well be that this would have the appearance of adding to the work of people already over-taxed, but I am satisfied it would shortly have the effect of materially reducing the volume of the work. Whether this were so or not, it would be, in my opinion, the most effective way of correcting the conditions to which I have alluded.

It is inevitable that with the continued growth of the volume and complexity of the business, the work of the auditor should grow in authority, influence and usefulness.

We who are in a position to influence this growth should be foresighted, diligent and patient in working out the details and fitting them into place, and especially in encouraging and forming those personal relations that will so powerfully aid in their final success.

Some Criticisms and Suggestions

By B. H. Meyer

Member, Interstate Commerce Commission

There never has been a time when the profession which you represent has been more vital to the transportation interests of the country than at present. Without your work the proper conduct of the railroad business from a company standpoint and the performance of the duties of regulatory bodies would be impossible.

New accounts have been set up and old ones modified to meet new requirements of law and of practical operation.

Changes are not always welcome. The decisive test whether or not to make a change lies in the public interest connected with it. The decision, however, can not be made solely from the standpoint of the apparent public interest, because there are a good many things which public interest in a certain sense might seem to require but which do not promise sufficient public and private benefit to warrant the expenditure of the sums necessary to put the proposed changes into operation. To a large extent public and private benefit from improved accounts and statistics coincide. Where the public interest is clearly controlling even the absence of private benefit in the narrower sense of the word may not stand in the way of doing that which the larger public interest requires. There are many interesting things which accounts and the statistics based thereon could readily furnish; but interest alone is not an adequate test. There must exist a dominant public consideration for the requirement. From my official standpoint, changes in accounting and statistical requirements find their justification in the necessities of the proper administration of the laws with the execution of which the Interstate Commerce Commission has been charged by Congress. We have sometimes been requested to require the compilation of statistics thought to be useful to cities and other political units in government, as well as private commercial bodies. Personally, I should not feel justified in extending accounting and statistical requirements of railroads into such fields until Congress has specifically authorized us to do so.

Comparability Lost by Changes

An objection that has frequently been raised against the making of changes in railroad accounts and statistics is that comparability will be destroyed. Comparability has been destroyed or made more difficult as a result of certain changes which have heretofore been made in the form of accounts and statistics, and in the period of time for which they are made. This is a loss which could not be avoided. Comparability is not an end in itself. Public necessity is. Comparability should be preserved to the fullest extent possible, but the mere fact that proposed changes will make comparability more difficult or impossible should not weigh heavily against changes which public interest and efficient company management may require.

Public interest dominated the original formulation and subsequent elaboration of the uniform system of accounts. The principles which these accounts exemplify will in all probability be incorporated in the accounts which may be required in the near future by statute of what are now essentially unregulated private industries. The same considerations which gave rise to public regulation of railroads will usher in an epoch of public regulation of hitherto essentially private industries in certain of the respects in which private industry has not heretofore been regulated. I do not expect this development of public regulation to cover the entire field of industry at once. It will probably begin with relatively few large basal industries, in which the public element has become dominant and the names of which lie in everybody's mind who has had to deal with railroads during the last decade. I believe when that time comes it will be found that the work you have done and the experience which you have accumulated will provide a foundation and a guide in the initial steps of control of price of the products in question. The consolidation authorized by the transportation act may promote this movement.

The Separation of Expenses

When the time comes that general reductions in rates may be seriously considered, one question which will again present itself, and which demands an intelligent answer is whether such reductions as may be warranted shall be made horizontally, covering all traffic, or whether certain commodities or

classes of traffic shall take precedence over others in the downward trend. When we were considering the rate increases of 1920 in Ex Parte 74 this question was presented to us. During the earlier stages of that proceeding it had been suggested that passenger fares, for instance, should not be increased at all, and that the entire burden of providing the increased revenues should fall upon the freight business. That was before the wage awards of the summer of 1920 had been announced. Such figures as were then available indicated that the passenger traffic was at that time yielding a somewhat higher rate of return than the freight traffic. On that state of fact I should have opposed any increase in passenger fares. Until Congress directs otherwise, I shall be unwilling through my official acts to cause passengers to travel substantially at the expense of those who ship freight, or freight transported at the expense of people who travel. Within practicable limits each branch of the business should carry its fair share of the total burden.

Those of you who were members of the joint committees of 1907 will remember that at that time I tried in every way possible to incorporate into the then proposed uniform accounts the basis for this fundamental principle. Happily, we shall soon be in a position where basic data will be available, in fact to a limited extent they are now available, which will enable those charged with that responsibility to say within practicable limits what the rates of return on the passenger and freight services respectively are and should be. It is not for any one except the individual citizen to say who shall and who shall not travel; and yet the contrary would result were some of the views suggested in the record in Ex Parte 74 to prevail. Some seemed to think that no travel except their own was really necessary. The encouragement or discouragement of traveling is a matter of public policy respecting which Congress has not specifically legislated, except to a limited extent, and within the scope of such legislative action we must perform our duties. In the performance of these duties the accounts relating to the separation of expenses between the different branches of the business are indispensable, as they are likewise fundamental for a more detailed development of what is generally discussed under the caption of cost accounting and efficiency.

The Severest Professional Tests

In the administration of section 210 of the transportation act which provides the so-called revolving loan fund of three hundred millions of dollars, we have given much consideration to the earning capacity and probable earnings of the applicant carriers. One of the findings which we are required to make as a prerequisite for the making of a loan is that the applicant has furnished reasonable assurance of its ability to repay the loan within the time fixed therefor. In making up statements of probable earnings, the temptation may present itself to overstate past earnings and estimates of future earnings; and the more doubtful the case the greater perhaps the temptation. On the other hand, when increases in rates are asked for, a temptation in the opposite direction to overstate expenses and underestimate the revenues may be met. Accounts covering the guaranty period present their own inherent difficulties and invitations to be adaptable and elastic in the interpretation of rules and regulations are not wanting. Situations of this kind subject accountants and statisticians to the severest professional test. The strictest conformity to established accounting rules and regulations must be insisted upon as a matter of public right, professional ethics and personal honor and self respect.

In the thought that you would like to know what peculiarities and defects are noted by those in our organization in whom the multitude of currents from the many outside offices which you represent concentrate, I asked our three Directors of Finance, Accounts and Statistics, respectively,

to note those matters which it might be mutually helpful for me to bring to your attention on this occasion. Before I enumerate the matters mentioned by them, I may remark that, generally speaking, the same character of errors, variations and departures is discoverable in all examinations whether made with reference to section 204, 209 or 20 of the interstate commerce act. As might be expected, the large carriers with greater division of labor, higher specialization and ability to command first-class talent keep their accounts in the best form while the small lines where one man often represents several departments, if not the whole road, encounter the greatest difficulties. However, we have found roads in all classes that have seriously handicapped themselves and us because of the condition of their accounts, in making partial payments, for instance, or final settlements under the most urgent financial needs. Please remember that the law requires us to make determinations, not estimates or guesses. We have made every effort to act with promptness but it is impossible for us to be prompt if we lack vital accounting and statistical information without which we cannot lawfully act.

Accounting Shortcomings That Are

Found by Bureau of Accounts

Director Wylie at my request has kindly enumerated the most common accounting shortcomings disclosed in connection with the work in his bureau (Accounts). Among them are the following:

[Commissioner Meyer discussed in detail each of the following points mentioned, but lack of space prevents the inclusion here of his complete remarks.]

1. Improper credits to revenue account 142, Rents of buildings and other property.
2. Improper apportionment of depreciation in accounting for retirement of equipment.
3. Improper distribution of expenditures incurred in making betterments to equipment and fixed improvements.
4. Improper accounting in connection with facilities not used by accounting carrier jointly with one or more other carriers.
5. Improper accounting in connection with property retired and replaced.
6. Improper entries to profit and loss accounts with respect to items of delayed operating revenues, operating expenses and other income items.

Bureau of Statistics

From Director Lorenz I learn that in spite of the development of adding and computing machines the Bureau of Statistics is compelled to conduct voluminous correspondence with carriers regarding simple clerical errors. The following are among the most frequent of correspondence connected with annual reports:

1. Errors in addition, computing statistical averages, and inconsistency between related entries in various schedules of the report form.
2. Omission of returns in supporting schedules provided for showing detail of entries to certain primary accounts.
3. Improper entries due largely to misinterpretation of texts of the accounts.
4. Failure to complete schedules through omission of data for certain columns, totals, etc.

In our monthly report section, the causes of frequent correspondence have been noted as follows:

1. Changes are frequently made in the monthly figures of revenues or expenses after the report has been filed without noting that fact in the next report. This causes difficulty in making the cumulative figures balance with the preceding months.
2. In connection with the equipment and joint facility accounts, frequent clerical and typographical errors occur as a result of the confusion of net debit and credit balances.
3. There is not apparently a careful check of the consistency of the return before it is mailed. If train-miles exceed locomotive miles, or if revenue ton-miles exceed the

revenue and non-revenue combined, some explanation is called for.

4. We often find that an average for a cumulative period is given as the sum of the averages of the preceding months, instead of being computed for the period. In general, in connection with averages, it may be suggested that a rough check can be made by inspection to see whether the average for the current cumulative period falls between that for the current month and the previous cumulative period.

5. In giving the tons and cost of fuel charged to account 394, care is not always taken to make the tonnage and cost comparable.

Bureau of Finance

Since March 1, 1920, I have been intimately connected with financial matters arising under the transportation act. Our Bureau of Finance is the primary workshop in which all such matters are examined and shaped in the first instance. Many suggestions of an accounting nature have come to my colleagues and me from the multitude of problems which have been presented to us. I have relied upon Director Colston to select those which are among the most worthy to be brought to your attention on this occasion. They are as follows:

Aggregate Value of Railway Property

1. The classifications of investment in road and equipment and of general balance sheet accounts should be so modified or so observed and enforced that the book cost at least of "the aggregate value of the railway property * * * held for and used in the service of transportation" may be readily ascertained. Increased importance is attached to such a requirement not only by the provisions of section 15a with respect to rate fixing and with respect to recapture of excess income, but also by the authority given to the Commission for the regulation of securities under section 20a of the Interstate Commerce Act. The real purpose of any system of accounts being to reflect as nearly as possible the essential facts of a business, the accounts of carriers should show as far as possible:

(a) The facts as to the property upon which either separately or as part of a whole a return is to be allowed, and

(b) The facts of the property as compared with securities supported by an outstanding against that property, distributed between properties held for and used in the service of transportation and properties not so held or used. While it is true that the general instructions governing the classification of investment in road and equipment provide that the accounts prescribed in the classification are designed to show the investment of the carrier in property devoted to transportation service, these accounts, either because of failure to observe this general accounting principle or because of customary interpretation of the term "investment" do not reflect the value of the railway property held for and used in the service of transportation. Specifically, it is quite doubtful and because of the condition of accounts up to 1907, it may be impossible for the accounts of many carriers to distinguish between the Investment in Road and Equipment and Miscellaneous Physical Property, account 705, as they should. Account 706, Investments in Affiliated Companies, in many cases does not adequately reflect the property held for and used in the service of transportation and represented by this account. For example, where a majority of the stock of subsidiaries is held by an operating company, and these subsidiaries are leased to the controlling line, the total value of the railway property held for and used in the service of transportation by the operating company is not always reflected in its account. Some roads include the real cost of road and equipment of the leased line in the accounts of the operating line, but others do not. On the other hand, the account Investments in Affiliated Companies may represent large values of the affiliated companies not devoted to the service of transportation, as in the case of subsidiaries owning coal mines or other non-railway property. If in such cases the total of the account, Investments in Affiliated Companies, is used to measure against the requirements of section 15a, or of section 20a, the result would be an overstatement of the capital account upon which earnings may be demanded or against which securities may properly be issued. Consideration might well be given to the question as to whether or not there should be an account intermediate between account 701, Investment in Road and Equipment, and account 702, Improvements on Leased Railway Property, which would show the investment by the lessor company in road and equipment of leased railway property; and if with the leased railway property control of property similar to that embraced by account 705, Miscellaneous Physical Property, were obtained, a subdivision of account 705 might appropriately be provided for.

A Suggestion as to Rent for Leased Lines

2. In view of the preceding suggestion it may be well to invite consideration of the question as to whether or not the obligations of long term leases should be set up on the balance sheet just as the obligations of bonds and other securities are now represented. We have carried into our system of accounts the fallacy frequently held with respect to the obligation represented by a bond, to the effect that the face value of the instrument only need be considered. The obligation to pay the annuity is in the case of a long term bond of very much greater importance than the obligation to pay the principal amount at maturity. In this connection it may be asked if it would not be well to divide or subdivide account 753, Funded Debt Unamortized, according to the rate of interest borne by the obligations, and to provide a further account wherein the obligation to pay rents on long term leases would be represented on the liability side of the balance sheet

either by capitalizing the amount of rent at the rate indicated in the lease or otherwise at the rate fixed as a reasonable rate under the provisions of section 15a, with appropriate adjustments on the asset side of the balance sheet for amounts of capitalized values, if any, in excess of the real values of the properties leased. If it be thought unwise to carry any such amounts in the outside columns of the balance sheet it might be well, nevertheless, to show them in the inside or short columns. A direct application of the principle involved may be noted in a recent case in which the applicant stressed the fact that it had practically no bonded debt and consequently no fixed charge bearing debt, but admitted that rents due upon its leased roads were practically the same as interest payments on funded debt. If one company buys a property and issues against that property 100-year, 6 per cent bonds for the full purchase price, the result is substantially the same as that affecting the transactions of another company which should lease the same property or similar property for 100 years at 6 per cent on the estimated value or purchase price.

Depreciation

3. Consideration might be given to a change in the practice of showing accrued depreciation on the liability side of the balance sheet. It might be better to show it, as I understand is a practice with telephone companies, as deductions from the investment accounts in respect of which the depreciation accrued.

4. As a matter of temporary but considerable interest your attention may be invited to the fact that in respect of the adjustments of railway operating income in the administration of sections 204 and 209 of the transportation act we are required to eliminate improper charges to income, but we are not authorized to supply or increase charges not properly reflected on the carrier's books, and therefore carriers should understand that in making adjustments under sections 204 and 209, no operating charges or maintenance or other operating expenses or for any other account against income can be allowed unless they actually appear on the carrier's books of account in accordance with our accounting regulations.

5. Your hearty co-operation is requested to secure a proper classification of items of ways and structures subject to depreciation in order that scientific bases of rates may be promulgated for application thereto in view of the provisions of section 15a of the Interstate Commerce Act.

Job Costs for Repairs

6. Serious consideration of the matter of maintenance accounts is requested with the view not only of classifying the expenditures, but also of ascertaining job costs for various classes of repairs. Such classifications in the past, through control and guaranty periods would have resulted in great help in solving present problems under the transportation act.

7. The Bureau of Finance thinks some consideration should be given as to whether or not maintenance of way and structure account No. 272, "Removing snow, ice and sand," should be classified as a transportation account similar to account No. 415, "Clearing wrecks."

8. When an order is issued under paragraph (18) of section 1 of the Interstate Commerce Act, authorizing the construction of a new line or the extension of an old line, and under paragraph (18) of section 15a retention of earnings is authorized for a period of years, the operating accounts should be so kept that the separate results of the new line or extension can be shown for the purpose of returns under section 15a.

9. In giving effect to section 209 of the Transportation Act, when any primary accounts other than those for maintenance of way and structures and maintenance of equipment during the guaranty period appear to be disproportionate, carriers should prepare statistics to show that such accounts, under the circumstances, are not disproportionate or unreasonable.

In confining my remarks, as I have, to accounting matters with which you are constantly dealing, I have had in view mutual helpfulness between the offices you represent and the three bureaus through which our related activities are administered. I am persuaded that we can save one another much trouble and expense through a more complete understanding of our respective needs and requirements. What I have brought to your attention has been put forward solely from that standpoint and I know that you will receive and consider it from the same point of view.

The Ground Covered by the Meeting

The association conducted its meeting this year in a new way which proved very successful. The organization has a comparatively small number of standing committees, the more important of which are the Executive Committee and those dealing with general accounts, freight accounts, passenger accounts and disbursements. These committees each consider a large number of subjects, and considerable use is made of sub-committees. The committee reports are prepared in detail and are submitted to the association membership in an agenda, published about a month or six weeks prior to the annual meeting. The agenda this year contained 500 pages. The reports of the committees on freight accounts and on passenger accounts each covered over 120 pages and each over 70 subjects. The annual meeting's opening session was on the morning of June 8. The business of the meeting, however, was begun on June 7 in the form of

meetings of several committees to which all members of the association were invited that they might have opportunity to discuss with the committee any points that were not clear. In case, as a result of the committee meeting, the committee found it desirable to change or enlarge upon its recommendations, its findings were made known in supplements to the agenda made up in mimeograph form and presented to all members of the association present. On the floor of the convention, discussion of the committee's report was conducted with the committee chairman on the platform, committee members being called upon to explain points concerning which there might be question. The committee report was not read in the manner usual of the railroad conventions; only those sections of it were covered in detail concerning which there might be discussion. These details are given to explain how it is that reports covering so much ground could be treated in a manner permitting adequate and satisfactory discussion.

The report of the meeting which follows is of necessity brief.

Report of the Executive Committee

Making R. A. O. A. Interline Accounting Recommendations Mandatory. Under the conditions now and heretofore prevailing, the rules of the Railway Accounting Officers' Association relating to interline accounting—that is, accounting transactions affecting two or more carriers—are, in fact, only recommendatory and have no binding effect beyond the merits of the recommendations.

It is worthy of note that the association's interline accounting recommendations have been generally adopted, on their merits, and are generally in effect on all, or substantially all, carriers.

According to the results of a canvass made a few years ago, the deviations from the R. A. O. A. interline recommendations, by individual roads, were trivial in number and inconsequential in effect. Those deviations are usually attributed to individual opinion or some local condition.

The principle is well recognized that carriers should account, in a uniform manner, for their interline transactions. Uniformity in this respect promotes fairness, fosters impartiality, and is necessary in the interest of the efficient and economical conduct of accounting among carriers. Uniform, standard rules—impartially applied—constitute an integral part of inter-road accounting.

Certainly, those conditions cannot be perpetuated which make it possible for a carrier to deviate from an interline rule according to the whim of the moment or according to its interest in the individual case, while under other circumstances the same carrier may insist on making a literal application of the same rule, when its interests lie in that direction.

If "the greatest good for the greatest number" is to be effective, it is hardly to be conceived that conditions can prevail which warrant a carrier sending to other carriers statements or reports of a size and arrangement that do not conform to a generally accepted standard. Reports, statements, or other interline forms—if lacking uniformity of size and standardization of arrangement—are the source of additional labor and inconvenience in filing and using such reports, statements, or other interline forms, by carriers receiving them.

So far as the executive committee has been able to ascertain, representative members of the Association believe that some of the interline R. A. O. A. recommendations and some of the standard forms devised by this association can and should be made mandatory and binding upon carriers. Other rules and standard forms probably should not be made mandatory and binding at this time, although the future may indicate that more progress can be made. The initial steps

in this direction will not attain perfection and will not represent any fixed or unalterable procedure for the future. The endeavor now is to make a start, and future efforts can be devoted to alteration, expansion, or intensive development, as experience may show to be wise and necessary.

The enforcement of mandatory rules in this connection need not cause us to pause very long. The professional pride of railway accounting officers will undoubtedly be sufficient incentive for them, individually, to enforce such rules. A penalty is not regarded as necessary, beyond bringing the failure to observe any particular rule to the attention of the chief accounting officer of the road at fault.

Any reasonable plans for mandatory rules would take cognizance of the latitude essential for progress and the incentive necessary for development of interline accounting. In other words, mandatory rules must not be so rigid and must not be so absolutely comprehensive as to exclude further progress and development.

This whole subject of mandatory rules for interline accounting, by direction of the executive committee, has been placed before the Committees on Freight, Passenger and Disbursement Accounts, and those committees will submit to the association, in their reports, appropriate detailed recommendations.

This subject refers only to interline freight, passenger and disbursement accounting. The subject has no connection whatever, with local accounting matters. In other words, it does not, in any way, relate to recommendations of the association regarding accounting local to one road or recommendations that partake purely of either an informative or co-operative nature. This subject does not refer, in any way, to freight overcharge claims, as the R. A. O. A. already has in effect mandatory rules for overcharge claims.

Your executive committee recommends to the association that it adopt and prescribe, as far as practicable, mandatory rules with respect to interline accounting for freight, passenger and disbursement transactions.

Committee on Valuation Accounting. Your executive committee recommends that the association create, for the ensuing year, a special committee on valuation accounting, consisting of nine members.

Honorary Membership for Frank Nay. Your executive committee unanimously recommends that honorary membership be extended to Frank Nay, who resigned as vice-president and comptroller of the Chicago, Rock Island & Pacific, effective February 1, 1921, to become comptroller of the Allied Chemical & Dye Corporation of New York.

To the Railway Accounting Officers' Association, Mr. Nay is, and has been, the source of inspiring and encouraging the loftiest ideals for the science and profession of railway accounting and for the association.

He has served this association as president, and has a long and honorable record of service on various committees of the association.

Membership Changes. During the current year your committee has admitted into the association 115 new members.

As of April 23, 1921, the Railway Accounting Officers' Association has 968 active members, representing 329,144 miles of railroad, also certain express companies and water carriers—an increase (as compared with April 21, 1920,) of 85 active members.

The association is now carrying the names of 25 persons on its honorary rolls.

Creation of Committee on Statistics. This recommendation was one of those submitted in a supplement to the agenda.

Heretofore the work of the association has been confined largely in the direction of uniform accounting, particularly with the settlement of accounts between carriers. During the year progress has been made in the matter of uniform

methods. All this, however, is within the well defined jurisdiction of the accounting department, whereas recent events have clearly demonstrated that if we are to maintain our present favorable position in the railroad organization we cannot work and live entirely within ourselves. During the past year, the president of the Railway Accounting Officers' Association has, on several occasions, been called upon to nominate members of the association to serve on committees to consider various matters in which the accounting department was largely interested but for which it could not be expected to assume full responsibility of final determination.

To accomplish the most satisfactory results, the association should be so organized that any subject in which the accounting department may be interested can be referred to a standing committee, which, acting as a whole or through a subcommittee, could consider such subjects with members of committees representing other departments, and thus secure reports on the results of such joint findings.

Your committee recommends that there be created for the ensuing year, a special committee on statistics, consisting of nine members, which would study and report on statistics of the nature necessary and useful to the carriers, but not involving returns required by governmental authorities. It is considered that subjects incident to the reports to be made to the Interstate Commerce Commission, etc., should continue to be handled through the Committee on General Accounts.

The secretary has been directed by your committee to submit an appropriate amendment to the constitution, for action at the 1922 convention, providing for the Committee on Statistics as a standing committee of the association.

Such a Committee on Statistics would undoubtedly be very helpful in forming a point of contact for the accounting officers with the other departments or organizations in railway service, that are intimately concerned with statistics.

Creation of Committee for Conference with Railway Treasurers' Association. The Association of Railway Executives has rescinded its previous action and has continued the Society of Railway Financial Officers, whose name will probably be changed to Railway Treasurers' Association.

Your Executive Committee recommends the creation of a committee for conference with the Railway Treasurers' Association, consisting of five members. Such a committee should be a special committee for the ensuing year, and the Secretary will submit an appropriate amendment to the Constitution, for action at the 1922 convention, making the conference committee a standing committee of our association.

The report is signed by J. G. Drew, president of the association.

Report of Committee on General Accounts

Material Accounting. There was placed before your committee a report prepared by the Committee on Disbursement Accounts of the Railway Accounting Officers' Association on this subject. Your Committee on General Accounts approves the principle that accounting for material should be under the supervision of the accounting department.

Depreciation Charges. The committee submits as information a report of the Depreciation Committee of the Presidents' Conference Committee on Valuation, giving suggestions as to depreciation accounts and the rates of depreciation on various classes of railroad property. The committee was formed to co-operate with the Interstate Commerce Commission with reference to the provision of the transportation act requiring the commission to prescribe rates of depreciation, etc.

Definition of Short Term Notes. The committee has approved a proposed order of the Interstate Commerce Commission as to modifications in the classifications of income, profit and loss and several balance sheet accounts for steam roads, covering the treatment of short term notes, defined in the

transportation act as notes having a maturity date in two years or less from date of issue. Short term notes were previously defined in the classifications as notes having a maturity of one year or less.

Accounting Procedure for Surcharge on Pullman Fares. Announcement was made that the work of checking Pullman surcharge accounting had been put by the Association of Railway Executives in the hands of the Express Central Accounting Committee, a body created by the Executives' Association, and of which A. D. McDonald, vice-president and comptroller, So. Pac., is chairman. The Committee is now organizing a bureau in charge of George W. Lamb, general auditor of the Auditing Bureau, New York.

Settlement of Balances Due by Canadian Roads. The Canadian authorities have instituted a plan of surcharge on current freight and passenger business, which will make it possible for the Canadian carriers to settle balances on current interline freight and passenger business in United States funds, without the necessity of any specific arrangement therefor.

All other balances, accounts, bills, etc., for services rendered or applying on business accruing on and after April 1, 1921, between Canadian and United States carriers shall be settled in United States funds. This arrangement shall be continued for at least ninety days.

The Interstate Commerce Commission has been asked for a ruling as to the so-called "back business" which would permit the carriers to effect the best possible settlement for accounts, bills, etc., accruing in connection with Canadian carriers prior to April 1, 1921. This was considered necessary in view of the commission's order making it illegal for carriers to accept settlements in depreciated currency, and the refusal of certain large Canadian carriers to settle in United States funds for this "Back Business."

The question also came up as to shipments from Canada for export through United States ports, it being explained that the railway traffic officers had made an arrangement which would permit such ports to compete with Montreal.

Suburban Passenger Miles and Passenger Revenue. Reference is made to the following communication from Dr. M. O. Lorenz, director of the Bureau of Statistics, I. C. C.:

At the present time the reports of passenger-miles and passenger revenue of steam roads cover all classes of passenger traffic. It has been suggested that the suburban business could be segregated without much additional labor. Such segregation seems to me desirable in view of the fact that the average revenue per passenger-mile from suburban travel is far below that of the regular passenger travel. I should be glad if you would refer this proposal to the proper committee for comment.

The committee understands that the commission will call for this information, confining it to "commutation" business as distinguished from "suburban."

Equalization Accounts. The committee included in its report, as given in the agenda, proposed text of accounts as suggested by the Interstate Commerce Commission, but discussion of the subject was omitted, as it is understood that the commission's suggested text has since been changed.

Subject: Compilation of Ton-Mile Figures.

This subject was covered in the agenda. The following was given in a supplement thereto:

The sub-committee handling this subject submitted the following report, which was accepted by the committee on general accounts:

The subcommittee, appointed to consider and report back to the members of the committee at its next meeting on the subject of the desirability of a uniform method of compilation of ton mile figures on Forms OS-A, OS-D and other reports of the Interstate Commerce Commission, is of the opinion that in order to bring about uniformity in reporting net ton miles (Item 10 on Form OS-A), the data should be computed from conductors' wheel reports for the following reasons:

(a) The data shown on Form OS-A relates to the actual movement of traffic during the month for which report is rendered and is related to the effort expended in transportation without reference to the revenues received, in that sense being solely an operating statement of traffic moved during the month.

(b) Neither the net ton miles nor gross ton miles actually moved during

the month can be correctly compiled from any reports usually made by Class I carriers other than wheel reports.

(c) It is assumed by your subcommittee that when reference is made to net ton mile statistics being computed from waybills the computation is made from either the monthly freight forwarded reports or received reports, according to the carrier's method of auditing its accounts; and not from actual individual waybills on which the date of movement of the traffic over various sections of the carrier's line would be stamped. On this assumption it is evident that the ton mile statistics of a large majority of Class I railroads would not represent the actual movement of traffic during the month as the calculation would be on the theory that tonnage reported either as received or forwarded from the first to the last day of the month would have either been forwarded from or delivered to stations during the same period. To illustrate—if a railroad audited its accounts on a received basis the calculation would be based on the theory that a shipment received at destination on the first day of the month was forwarded from the originating station on the same day; and so far as its interline accounts are concerned, it would be the assumption that it was forwarded by the connecting carrier on the same day. For this reason your subcommittee feels it is important that all carriers compile and report to the Interstate Commerce Commission the net ton mile figures on a uniform basis, because it is clear that compilation from waybills overlaps that from wheel reports. It is the recommendation of this subcommittee that in order to obtain the uniformity in calculating the ton mile figures required by Form OS-A, the following methods be used:

A. For carload freight the actual weight of lading be used in compiling net ton miles. Where impracticable to obtain the total actual weight of L. C. L. merchandise, estimated weights may be used as follows: (a) On through cars, 7 net tons per car or such other net tons as tests and experience of different carriers indicate is a correct average tonnage to use; (b) on peddler cars unloaded by trainmen, 6 net tons per car of such other net tons as tests and experience of different carriers indicate is a correct average tonnage to use.

B. In determining gross tons there should be added to the net tons as determined above, the stenciled weight of cars.

Your subcommittee recommends, if the compilations as outlined above are made at Division or outside offices, that for the sake of insuring approximate correctness, periodical checks be made to avoid errors of consequence.

The data required by Form OS-D, Item 4, has no reference to that required by Form OS-A, Item 10, and in order that it may be correctly compiled it must of necessity be calculated from waybills for the reasons outlined in paragraph (c) above. Your subcommittee is, however, of the opinion that in the absence of the substantial additional work required in order that absolute correctness may be obtained in determining the net revenue ton miles corresponding with the freight revenue each month, that approximate correctness can be obtained in calculating Item 4 on Form OS-D by using the ton miles ascertained as outlined above for Item 10 on Form OS-A, deducting therefrom the number of tons of company freight carried one mile, the calculation being made either direct from notations on wheel reports or from waybills or other records of actual movements in trains.

It is the opinion of the subcommittee that, covering a period, the method recommended herein will result in approximately as correct statistics of the movement of revenue freight and revenue per ton mile as though the compilation had been made from waybills and as in practically every case where a particular rate is under consideration special statistics are necessary, the method recommended herein would result in uniformly correct statistical matter at a minimum cost and is preferable to different methods of compiling the ton-one-mile statistics.

It should be understood that the recommendation made by this subcommittee refers entirely to the method of compiling statistics required by the Interstate Commerce Commission.

Settlement by Terminal Carriers with Intermediate Carrier.
This subject was discussed in supplements to the agenda.

Whereas, during the past several months agreed balances, particularly freight traffic balances, have not been paid promptly, resulting in much embarrassment on the part of creditor roads, which were unable to meet their obligations due to the failure of debtor roads to pay on the dates specified. It is, therefore,

Resolved, That it is the sense of this Association that the attention of the Railway Executives' Association be called to the necessity of providing such measures as will be appropriate to end such practice.

The committee recommends that the following suggestions be embodied in letter transmitting the resolution, if adopted:

It has been suggested that unpaid traffic and other balances should bear interest from the first of the month following the date when such balances are declared to be due by the rules of this Association, or that perhaps a high rate in the nature of a penalty should be applied. The objections to the adoption of such method are that debtor roads would construe such a rule as sanctioning the withholding of payments provided that they pay interest, and that further, it would offer a temptation to debtor roads to delay rendering reports, or even to withhold the inclusion of waybills, so as to minimize the amounts on which they would be withholding payment and paying interest (or penalty). For these reasons the adoption of a penalty was thought, perhaps, not to be the means of accomplishing the desired purpose.

The Railway Executives may wish, however, to consider the expediency of the adoption of a plan involving the payment of interest or a penalty.

In any event, suitable action should be had as will impress upon debtor carriers that they hold the moneys representing traffic balances only as trustees, and that unless carriers are freely in position to pay such balances as and when payable

under the rules of this Association; that such carriers shall at once take steps to segregate in cash in their own treasuries as collected, or remitted by Agents, such sums as will enable them promptly to meet traffic balances when due.

Reports Furnished Commission. E. M. Thomas, comptroller, C. & O., has been made chairman of a sub-committee to investigate this subject and to compile data showing the numbered reports which carriers are required to furnish the various commissions.

The report is signed by A. D. McDonald, vice-president and comptroller, Southern Pacific.

Report of Committee on Freight Accounts

Revenue Accounting, Forwarding Basis vs. Receiving Basis.—The committee in its original report drew up some detailed recommendations on this subject, but finally decided to hold the matter over for another year.

Special Form of Waybill Covering Perishable Freight.
Your Committee submits herewith a special form of waybill to be used in waybilling perishable freight.

Your Committee understands that the roads generally, use some special form, or attach to the regular waybill stickers to designate preference movement, and it is the sense of your Committee that the adoption of the standard form, by all carriers, would result in uniformity, and eventually all employees handling such waybills would become familiar with the fact that they cover perishable shipments and require preference movement.

Safeguarding the Revenue of Intermediate Carriers. Your Committee is of the opinion that in principle there is no difference between the safeguarding of the revenue of intermediate carriers and that of waybilling carriers.

Your Committee therefore recommends that a check be made by the intermediate carrier to insure the reporting of waybills in interline accounts and that the distribution of the revenue be verified with the same care that is accorded the verification of other revenues accruing from interline traffic.

The following plan is recommended:

A passing report, R. A. O. A. Standard Form No. 119, to be made at the passing off junction station, except that when it is not practicable to prepare this report at the passing off junction station on account of there being no stoppage in transit on the lines of intermediate carrier, the report should be made by special arrangement between carriers at transfer point, breakbulk station, or elsewhere.

However, the intermediate carrier may make a passing report at the coming on junction station if necessary to safeguard its revenue. Where individual carriers require a passing report at coming on junction stations such carriers may obtain a copy of the passing off report from connecting carriers or make necessary arrangement for its compilation.

The preparation of this report on the basis of the passing off junction will permit of the exchange of these passing reports and materially reduce the expense of both junction agents preparing passing reports on the same traffic.

Showing Code Numbers on Interline Forms. Your Committee recommends that all interline forms interchanged between carriers, hereafter printed, show thereon the code number assigned each road for that purpose in "Waybill Code" circular, issued by the Secretary, under date of November 24, 1920, and supplements thereto.

The code number should appear in the same size and style of type used for the name of the railroad. A small space to the left of the railroad name should be allowed so that the code number will show conspicuously; for example:

900. North & South Railway Co.

The purpose in assigning numbers to the carriers in this connection is to establish a uniform code and eliminate the labor of coding by those carriers that need this information

in using mechanical devices for auditing purposes. The code number of the carrier issuing the forms, when printed as indicated, will tend to eliminate errors that might otherwise be made by code clerks.

The code number is especially desirable to facilitate waybill sorting which can be done more economically by numbers than by road names.

Placing Stamps on Back of Waybills. Your Committee recommends that all yard stamps, and all junction stamps in excess of four, be placed on the back of waybills.

Revision of R. A. O. A. Standard Form No. 98, Freight Waybill. Your Committee recommends that R. A. O. A. Standard Form No. 98—Freight Waybill, as shown in the R. A. O. A. 1920 Synopsis be cancelled and the form, as per sample herewith, be adopted.

Two-Figure Per Cent Divisions, Interline Waybill. This subject vied with that of making R. A. O. A. interline accounting recommendations mandatory as exciting the most discussion of any of the subjects discussed by the Committee on Freight Accounts. The advantages of using two-figure per cent divisions and of interline waybilling were emphasized and attention was drawn to the fact that although the matter of simplified divisions had been discussed by the association for many years, no general action had yet been received. The subject was covered in the original text of the committee's report in the agenda. It was remanded to the committee twice, the final result being the following resolution:

Whereas, Interline or through waybilling of freight from point of origin to destination is desirable as an aid in economical and efficient railway transportation; lessens the time required for transporting freight; is helpful in the operation of junction agencies; reduces the number of overcharge claims, and facilitates the investigation of loss and damage, as well as overcharge claims, and

Whereas, Experience has demonstrated that without joint through rates and preferably two-figure percentage divisions, the accounting cost incident to interline waybilling is disproportionate, and

Whereas, The accounting officers, individually and through the Railway Accounting Officers' Association, have endeavored for a period of more than 33 years, to inaugurate or extend joint through rates and percentage divisions, therefore be it

Resolved, That it is the sense of the Railway Accounting Officers' Association that it is necessary to enlist the aid and direction of the railway executives in this subject, particularly at this time when the substantial economy resulting from interline waybilling and percentage divisions would mean so much to the carriers. To that end it is recommended that the Secretary of the Railway Accounting Officers Association be directed to secure from each carrier an estimate of the annual savings to be accomplished by the adoption of through rates and simplified divisions (two figure per cents), and that the President of the Railway Accounting Officers Association communicate the result to the Association of Railway Executives together with a statement of arguments in favor of simplified divisions and suggesting a constructive program for bringing them about; and be it further

Resolved, That the President of the Railway Accounting Officers Association appoint special committees to deal directly with the freight traffic committees of the several regions in the practical working out of the problem, and that such committees be instructed to present a program to the traffic officers and to urge its adoption; and be it further

Resolved, That as a further means of securing prompt action it is recommended that each chief accounting officer arrange, without delay, for a conference with his chief traffic officer and endeavor to formulate a plan of co-operative effort between accounting and traffic officials for the purpose of arranging for two-figure percentage divisions to be furnished the accounting departments when tariffs are issued, and to reduce to two-figure percentage divisions all existing divisions now on a complicated basis.

Making R. A. O. A. Interline Accounting Recommendations Mandatory. In accordance with the policy adopted by the Executive Committee relating to this subject, the Committee on Freight Accounts prepared its recommendations touching certain freight accounting rules and practices. The recommendations as first made up numbered 72 rules, made up in the statement of the provisions which are made mandatory and in the elaborate regulations for arbitration between carriers.

This subject resulted in considerable discussion both in the committee meeting on Tuesday and on the floor of the convention itself. The discussion at the committee meeting centered around the fact that in a number of cases the recommendations of the Committee on Freight Accounts did not agree with those of the Committees on Passenger Accounts and on Disbursements. The Freight Accounts Committee

recommendations required that changes in the rules should require a two-thirds vote, whereas in the case of the recommendations of the other committees only a majority vote was required. Objection was also made to a fee of \$10 to be paid by the carrier drawing attention to an infraction, which provision was not given in the other committee recommendations and to detailed provisions for appeal to the Freight Committee over a decision of the Arbitration Committee. The final action was in favor of making the Freight Committee recommendations uniform with those of the other committees. The proposal to make the R. A. O. A. recommendations mandatory was the subject of heated discussion on the floor of the convention, votes against tabling the matter and against remanding it to the committee for another year being required before the recommendations were finally adopted.

The provision relating to charges in the rules was made to read as follows: "Consideration has been given to various methods of voting on the mandatory rules, and your committee recommends that the adoption of the mandatory rules and future action regarding changes in the rules or additions thereto be taken by the ordinary voting plan."

A brief selection of the rules as finally amended is abstracted as follows. The recommendations which are made mandatory are not new, but have been given in the synopsis for some years.

1. The following rules, relating to interline freight accounting shall be mandatory and binding upon carriers operating in North America that are members of the Railway Accounting Officers' Association, and shall become effective and operative as of January 1, 1922, and shall be applicable to waybills made on and after that date.

2. NAME OF PLAN. Mandatory Plan of Audit Office Interline Freight Settlements.

3. FORMS.
 - 98 Freight Waybill
 - 99 Less than Carload Freight Waybill
 - 100 A stray Freight Waybill
 - 101 Live Stock Waybill
 - 134 Transit Waybill
 - 104 Abstract of Interline Waybills Received (8½ by 11 in.)
 - 109 Abstract of Interline Waybills Received (11 by 8½ in.)
 - 170 Abstract of Interline Waybills Received (8½ by 11 in.)
 - 106 Interline Freight Division Statement.
 - 107 Interline Freight Correction Account.
 - 108 Interline Freight Statement of Differences.
 - 110 Interline Freight Summary.
 - 144 Interline Waybill Tracer.
 - 147 Agent's Waybill Correction.

4. PREPARATION OF WAYBILLS. Waybills shall be prepared by the use of a typewriter, pen and ink, or indelible pencil. If indelible pencil is used, the writing should be set by a press or damp cloth.

5. WAYBILLS TO BE SETTLED. Interline Waybills between such stations and over such lines as have been agreed upon by the carriers interested.

6. COPIES OF WAYBILLS. Copies of Waybills shall not be furnished to destination or intermediate carriers except, that for specific purposes, copies of each individual waybill requested shall be furnished.

7. THE WAYBILL DESTINATION CARRIER SHALL BE responsible for the collection of and accounting for the proper revenues regardless of the final destination of the shipment, and shall promptly issue a waybill correction for each item prepaid or advances corrected, embracing all changes made on the original waybill while enroute or at destination, except that by agreement between carriers, differences in advances and prepaid may be adjusted by "Prepaid Only" waybills.

8. CORRECTION OF WAYBILLS. When an original waybill is corrected by a billing or intermediate agent, the change must be made in ink, showing date, where and by whom made. In such cases, waybill correction should not be issued by billing or intermediate agent. (See Rule No. 7.)

19. ABSTRACTS AND DIVISION STATEMENTS. The waybill destination carrier shall prepare abstracts of all waybills received and reported by receiving agents in the month's account for which settlement is made, showing therefore the amount provided therefor, the per cents, or other bases if divisions, and the apportionment of revenue. Waybills from each station to each station via each junction must be shown separately, each sheet to contain waybills from one station to one station only. By agreement between carriers, the receiving carrier may group a number of receiving stations from one forwarding station. Division statements similarly arranged must also be prepared, showing each carrier's proportion of the joint revenue from each station to each station separately.

20. The settling carrier shall retain original abstracts and division statements, sending first carbon copy to waybill carrier and legible copies to each intermediate carrier as early as possible but not later than the 18th of the succeeding month.

21. When the settling carrier is unable to forward the abstracts and division statements in time to reach destination on or before the 20th of the month, it shall, upon request, on or before that date, notify carriers interested by telegraph of the amount and respective proportions of the freight revenue and in addition thereto advise the forwarding carrier the amounts of advances and prepaid.

22. STATEMENT OF DIFFERENCES AND CORRECTION ACCOUNTS. Discrepancies discovered by forwarding or intermediate carriers in waybills, abstracts, division statements, or correction accounts shall be taken up for adjustment

with the settling carrier in a statement of differences and if approved shall be embodied in a correction account by the settling carrier, together with discrepancies found in waybills, abstracts, division statements, or correction accounts to which attention may not have been called by any other carrier; provided, however, that corrections in the freight, advances, prepaid or proportions, which collectively amount to a net sum of less than one dollar (\$1.00) shall not be included in statements of differences or correction accounts, except that, if such differences affect the settlement with at least one of the interested carriers, including the settling carrier, to the extent of one dollar (\$1.00) or more adjustment shall be made with all carriers interested. When a correction has been excluded by reason of the minimum rule, and a subsequent correction increases the difference to one dollar (\$1.00) or more, the total difference shall be included in the correction account. (See Rules 39 and 40.) The minimum for correction does not relate to settlements with shippers and consignees, or in any way affect the integrity of the rate.

32. **SUMMARY.** The abstracts, division statements and correction accounts, with the summary as rendered, except as provided in Rule 33, shall constitute the basis of settlement. The summary shall be forwarded by United States or Canadian mail, if it will reach destination before the remainder of the papers.

33. Clerical errors in the summary shall be subject to correction before settlement is made, immediate notice to be given by telegraph.

34. **MANNER OF SETTLEMENT.** The settling carrier shall pay to each intermediate carrier, its proportion of the interline freight revenue, whether the freight charges are prepaid or collect, advances and prepaid to be included in the settlement with the waybill carrier. Settlements shall be made upon balances, which shall be subject to sight draft, on or before the 25th of the succeeding month, except where special arrangements are made between interested carriers.

35. **FUNCTIONS TO ACCEPT AND FORWARD WITHOUT DELAY INTERLINE WAYBILLS FOR SHORT FREIGHT.** Receiving and intermediate carriers shall accept and forward without delay through junctions to destinations, interline waybills for less than carload shipments routed via their lines, when all or a part of the freight checks short, the usual record of shortage at each junction to be noted upon the waybills.

36. **REPORTING WAYBILLS FOR SHORT FREIGHT.** When freight is short at destination, the carrier to be reported, but on request of the destination carrier, the waybill carrier shall immediately proceed to establish delivery of the freight and failing to do so within sixty (60) days from date of request, adjustment shall be made by claim in accordance with R. A. O. A. Overcharge Claim Rules.

37. **MATCHING WAYBILLS AND FREIGHT AT DESTINATION.** When the destination of short freight is a station on the line of two or more carriers, the agent of each carrier to which the shipment is routed who holds the waybill, shall advise the agents of the other carriers, of the shortage, giving a description of the freight. The other agents should carefully examine their records and warehouses. If the freight is found to be on hand, it shall be turned over to the carrier holding the waybill. If it has been received and delivered, the charges shall be turned over to said carrier. Provided, however, that when a carrier transports an entire shipment which is astray, and the carrier holding the waybill is another carrier, the revenue shall be surrendered to the carrier performing the transportation service. In the event the shipment (5,000 pounds or more) is only a part of a consignment, the remainder thereof having been handled by the carrier holding the revenue waybill, the carrier transporting the astray portion of the shipment shall, on an order from the carrier holding the revenue waybill, effect delivery to the consignee without charges. The revenue on the entire shipment shall be apportioned between the interested carriers on the basis of the weight handled by each. Provided further that when a carrier transports a car containing 1 c. l. astray freight weighing 5,000 pounds or more, the carrier holding the revenue waybills shall surrender them to the carrier performing the transportation service subject to the foregoing provisions of this Rule.

After the collection of charges from consignee by the carrier making delivery of freight received on astray freight waybill, any subsequent adjustment of charges from consignee shall be accomplished by such carrier.

39. **TRACING WAYBILLS IMPROPERLY REPORTED.** The waybill or intermediate carrier shall send to the settling carrier a statement of differences, R. A. O. A. Standard Form No. 108, for each waybill reported, which cannot be located in the records of the carrier to which reported.

40. When the settling carrier finds a waybill has been improperly reported, it shall return the statement of differences showing the correct waybill reference or the month's correction account in which adjustment has been or may be made.

41. **TRACING UNREPORTED WAYBILLS.** After the accounts for the current and two succeeding months have been checked, waybills not reported by destination carriers must be immediately traced for by waybill and intermediate carriers, a separate tracer, R. A. O. A. Standard Form No. 144, to be used for each waybill. Two copies of the waybill shall accompany the first tracer of waybilling carriers. No copies of waybill shall be required with first tracer of intermediate carriers.

45. **RESPONSIBILITY FOR PROPERLY TRACING FOR UNREPORTED WAYBILLS.** The responsibility for properly accounting for interline waybills rest primarily upon the settling carrier, but the waybill and intermediate carriers shall share the responsibility to the extent of their revenues, if they do not promptly trace for unreported waybills as provided in Rules 41 to 44 inclusive, and Rules 46 and 47.

49. **PROCEDURE FOR CHANGING THE RULES.** Any member of the Association may take up with the Secretary any specific suggestions for adding to or amending these rules. Such communication shall be referred to the Committee on Freight Accounts for consideration and report to the Association. By a majority vote of the members present and voting, these rules may be amended or altered at any annual meeting of the Association, provided, however, that notice of such proposed amendment or alteration is given to the members in advance.

50. **PROCEDURE IN DISAGREEMENTS.** When any member of this Association disagrees with another member as to the interpretation or application of a mandatory rule, and cannot settle his dispute by ordinary methods, he may submit his case to the Interline Freight Accounting Arbitration Committee for a ruling, and the decision of the majority of the Arbitration Committee shall be binding on the parties involved.

When the decision of the Arbitration Committee has been reached, the

Chairman of the Arbitration Committee shall forward same to the Secretary of the Association, who shall notify all parties interested in the arbitration of the Committee's decision.

The carrier decided against shall within thirty days after receipt of the Arbitration Committee's decision, notify the Secretary of the Association that it has accepted and will abide by the decision, or within the same period, submit the case for consideration of the Committee on Freight Accounts as provided in these rules. Failure to so notify the Secretary or submit the case for appeal, shall be considered as refusal to comply with the decision, and the case shall then be handled in the manner provided in Rule 68.

51. **INTERLINE FREIGHT ACCOUNTING ARBITRATION COMMITTEE.** This Committee shall consist of three members directly in charge of freight accounting, one member from the eastern territory, one member from the western territory, and one member from the southern territory. Such Committee shall be appointed by the President after each annual meeting and shall serve until the next annual meeting.

52. **SUBSTITUTE IN CASE OF INTEREST.** If any member of the Interline Freight Accounting Arbitration Committee shall be interested in any question referred to such Committee, or shall for any other reason be unable to serve, the President shall appoint interested members of the Association eligible as substitutes for those interested or unable to serve. If the interest of the President in the specific case is such as to disqualify him for making the appointment, then the appointment of a disinterested member shall be made by the First Vice President, or if the First Vice President be unable to serve for the same or any other reason, then the appointment shall be made by the Second Vice President.

53. **COMPLETING ARBITRATION WORK.** The Interline Freight Accounting Arbitration Committee shall meet on regular days, in addition to its regular term of service, in which to complete the arbitration of such matters as have been submitted to it by the Secretary prior to the annual meeting.

54. **DUTIES OF INTERLINE FREIGHT ACCOUNTING ARBITRATION COMMITTEE.** This Committee shall consider and act upon all matters involving interpretation of the R. A. O. A. mandatory Interline Freight Accounting Rules (except rules governing overcharge and agency relief claims) and involving disputes arising out of the application of such rules.

55. **NO EQUITY POWERS.** The Interline Freight Accounting Arbitration Committee shall have no equity powers, but shall decide upon the evidence contained in the papers. In giving decisions or awards the Arbitrators shall give decision on each and every question submitted and such decision shall be explicit and consistent so that it may be carried out.

56. **NO CAUSE OF ACTION.** When no cause of action lies under the rules, the Interline Freight Accounting Arbitration Committee shall so decide. In such cases, the Interline Freight Accounting Fee shall be charged to the carrier or carriers arbitrating without cause.

57. **STATEMENTS TO BE SUBMITTED.** A comprehensive statement based upon the evidence in the papers shall be made and the points upon which a decision is desired shall be definitely stated. This shall be done over the personal signature of the officer directly in charge of interline freight accounts of the carrier desiring arbitration. All papers shall then be forwarded to the interested carriers for them to attach similar statements. A copy of the letter of transmittal shall be sent to each carrier which handled the file.

66. **PROCEDURE OF COMMITTEE, ETC.** When the foregoing requirements have been complied with (as to which the Secretary of the Association shall be the judge) the Secretary shall attach his acknowledgment of the arbitration fee and forward the papers to a member of the Interline Freight Accounting Arbitration Committee, not the Chairman, who shall render a decision on the papers and forward the same to the Secretary or to any other member of the Arbitration Committee, not the Chairman, who shall render his decision and forward his decision and all papers to the Chairman. The Chairman shall render his decision and forward the decision of the Arbitration Committee, together with all papers, to the Secretary, who shall return all the papers together with the decision rendered by the Arbitration Committee to the carrier from whom he received them originally. Each member of the Arbitration Committee shall send to the Secretary, a carbon of his letter of transmittal to the next member of the Committee. The Secretary shall notify each carrier interested the result of the decision of the Interline Freight Accounting Arbitration Committee.

67. **ARBITRATION FEE; HOW APPOINTED.** The charge for arbitration shall be borne by the carrier or carriers against which the decision is given, and shall be apportioned by the Interline Freight Accounting Arbitration Committee at the time decision is rendered. The adjustment to be made by the bill added to the carrier from whom due.

68. **DECLINING TO COMPLY WITH RULES.** When a member of this Association declines to comply with the decision of the Arbitration Committee, or states in writing that a mandatory rule, not involving a question of interpretation, will not be complied with, the case may be reported to the secretary, who shall notify the chief accounting officers of roads interested of his intention to place the facts before the members of the Association, and failing to receive, within thirty days, advice that this rule will be complied with, shall so arrange.

STANDARDIZATION OF STATION ACCOUNTING FORMS AND PRACTICES. Under date of October 6, 1920, J. G. Drew, President, Railway Accounting Officers' Association, wrote Secretary Woodson as follows:

The subject of standardization of station accounting forms and methods offers many opportunities for constructive work that will be of value and assistance to various members of the Association. All railroads have station accounting, and the variations on different roads are largely variations in details. It would be absurd to say that each road's methods or conditions in this connection differed entirely from the methods used by, or the conditions prevailing on, all other railroads. There undoubtedly are and there must be some broad, general principles of station accounting (both as to

forms and methods) that are applicable to all conditions alike. Our problem is to catch those principles, elusive as they may be, and make them captives for all who are now or may hereafter be concerned with station accounting. Such an achievement would be a material contribution to the advancement of railway accounting as a science.

The committee presented to the association 25 suggested forms covering this important phase of accounting. In presenting these forms, it said:

Your Committee, recognizing the scope and importance of this subject as outlined in the foregoing letter, and owing to the amount of work necessary and time required to compile a complete list of station accounting forms and practices, has confined its activity in connection with this subject this year to a study of the principal forms used in station accounting.

The advantages of a daily system of accounting are recognized and have been recommended, and in appreciation of the trend to this system by all carriers, the forms herewith submitted have been primarily predicated on that system. Your Committee has, however, endeavored to allow sufficient elasticity in the forms to enable the advantageous use of them in connection with a monthly system of accounting.

As an aid in its study your Committee secured station accounting forms from various carriers from every section of the country, the best features of which have been embodied in the forms drafted by your Committee.

In devising these forms, due consideration has been given to the individual requirements of the different carriers as reflected in the forms used by those carriers, and it is the opinion of your Committee that the forms herewith submitted are suitable for use at all stations.

Your Committee, therefore, recommends that the Association adopt the forms as submitted, which will have the effect of canceling R. A. O. A. Standard Forms Nos. 112, 114, 123 and 133, as shown in the R. A. O. A. 1920 Synopsis.

Your Committee further recommends that this subject be left with it for further consideration and report.

Discontinuing the Use of Fractions in Establishing Rates. The suggestion is made that the traffic departments should be asked to eliminate, as far as reasonably possible, the use of fractions in establishing rates.

"Fractions in rates cause additional labor to the agency forces and in the accounting department; also, fractions increase the possibility of error, and to that extent are the causes of overcharges and undercharges."

Through Waybilling of Freight. In the through waybilling of freight from point of origin to final destination, two vital conditions are necessary in order to do so economically, expeditiously, and at the same time protect the revenue of all interested carriers, viz: 1. Through rates, 2. Percentage divisions.

However, to reduce the rebilling of freight en route to a minimum, thus eliminating the possibility of errors, and thereby saving transportation delays, annoyances to patrons from overcharges or undercharges and the adjustments thereof, it is recommended:

1. That freight on which through rates are in effect, but no divisions, be waybilled through instead of rebilled at the junction, to avoid overcharges, on the theory that the ultimate apportioning of revenue between carriers on such traffic can be done more satisfactorily and economically through Audit Offices.

2. That accounting officers continue their efforts to secure the publication of joint through rates and percentage divisions to cover all traffic movements.

3. That we urge the early adoption of a uniform classification, which will more readily permit the publishing of joint rates, especially on inter-territorial traffic. The necessity for

the re-waybilling of freight is primarily caused through failure to publish joint rates.

Quality of Paper Used for Waybills. Your committee recommends the use of good quality (not less than 40-pound, 22 in. by 34 in.), manila paper, in printing waybills.

The report is signed by G. E. Bramon, auditor freight accounts, C. B. & Q. chairman.

Report of Committee on Passenger Accounts

The committee's report covered 72 subjects, the large part of the material given being of a technical nature submitted as information.

Uniform and Simplified Basis for the Division of Interline Passenger Fares. The committee presented for discussion the report of a sub-committee suggesting a method of dividing interline passenger fares on a so-called zone rate pro-rate basis. The proposed method was outlined in great detail and the suggestion was made that it should receive careful consideration by the member roads and left with the committee for further consideration and report.

Card Plan for Recapitulation of Interline Ticket Apportionment. The committee submitted as information two plans which have been worked out, one by J. F. Mitchell, ticket auditor of the Atchison, Topeka & Santa Fe and the other by J. C. Briggs, auditor passenger accounts, St. Louis-San Francisco.

Uniform Method for Handling Milk Traffic. Included in the committee's report was a detailed analysis of the systems of handling milk traffic which are in general use among owners, there being

- (a) The way-bill system of prepaid and collect shipments.
- (b) Ticket system which is distinctly prepaid, and
- (c) Combination of tickets and way-bills.

Indexing Stations in Official Guide. Your committee recommends the following for adoption by the association:

WHEREAS, It is found that the "Index of Stations" in the back of the Official Guide does not afford sufficient convenience to interline division clerks and ticket agents in locating stations, be it

Resolved, that this Association recommends that all large carriers publish a station index in connection with their time tables in the Official Guide, and be it

Resolved, That the passenger accountants of such carriers make request on their passenger traffic officials that this be done, and be it further

Resolved, That a copy of this resolution be transmitted by the Secretary to the Association of Passenger Traffic Officers.

Making R. A. O. A. Interline Accounting Recommendations Mandatory. With respect to the policy adopted by the executive committee, relating to this subject, the committee on passenger accounts has prepared recommendations, which seem desirable from a passenger accounting standpoint, for action by the association, and which are stated below.

1. The following rules, relating to interline passenger accounting, shall be mandatory and binding upon carriers operating in North America that are members of the Railway Accounting Officers' Association; shall become effective and operative as of January 1, 1922, and shall be applicable only to business originating on and after that date.

2. CORE-CLASSIFICATION AND REMARKS DATA. The following code shall be used in compiling interline reports and correction statements:

DS	Discharged Soldier	WT	Winter Tourist
FS	Furlough	ST	Summer Tourist
Cy	Clergy	Spl	Special Excursion
Ch	Charity	Dvt	Diverted
Emp	Employee	ED	Error in Division
Col	Colonist	EA	Error in Apportionment
Gv	Government	Rd	Redeemed
LG	Land Grant	TT	Ticket Tracer
Exch	Exchange	Cl	Claim for Increased Proportion
HS	Home Seekers	CNE	Coupon Enclosed
AYT	All Year Tourist	UR	Unreported

Settlements. Settlements shall be made upon monthly balances, which should be subject to sight draft.

The remaining rules related to dealings among the passenger accounting offices in connection with Labeling Envelopes Containing Reports of Interline Passenger Traffic; Pre-

paid Ticket Orders—Method of Reporting; Exchange Orders; Interchangeable Mileage and Scrip Coupons—Method of Reporting; Correction on Interchangeable Mileage Statements; Baggage Collections—Method of Reporting; Tracing for Unreported Tickets and Baggage Collections.

The rules for arbitration are similar to those recommended by the committee on freight accounts as amended and shown above.

The report is signed by J. C. Briggs, auditor of passenger accounts, St. Louis-San Francisco, chairman.

Report of Committee

on Disbursement Accounts

The chairman, on introducing his report said in part: The work of the disbursement committee for many years was confined to interpreting the accounting classification. Only in recent years has the committee undertaken any work dealing with the standardization of forms and accounting practices. Your committee in its report this year submits some recommendations along these lines, which it believes will be helpful to the carriers. There are many opportunities for constructive efforts in this direction.

Standard Voucher Register and Voucher Index. The committee considered this subject, which was left with it at the last annual meeting of the association with the result that four forms are recommended for adoption by the association:

R. A. O. A. standard form No. 211, vouchers audited register.

R. A. O. A. standard form No. 212, vouchers audited condensing sheet.

R. A. O. A. standard form No. 213, vouchers audited register.

R. A. O. A. standard form No. 214, vouchers audited condensing sheet by operating divisions.

Material Accounting. There was placed before your committee copy of a committee report, adopted at the June, 1920, meeting of Section VI, Purchases and Stores, American Railroad Association, which report contained a provision that it be submitted to the Railway Accounting Officers' Association.

It is understood that your Committee on General Accounts has recommended that the Association approve the principle that accounting for material should be under the supervision of the accounting department.

Your committee offers the following rules for supervision and accounting for material stocks as recommended good practice, realizing that organization and conditions on different roads may necessarily cause a variation from the rules and practices herein described.

1. **SUPERVISION OF MATERIALS AND SUPPLIES:** All material stocks to be under the general supervision of the Chief of the Stores Department, who should give general supervision to the ordering, receipt, care of and issuance of all materials and supplies, except that such supervision may be exercised over special classes of materials such as fuel, stationery, commissary supplies, etc., by special departments organized for that purpose.

2. Direct supervision shall be exercised by the officer in whose accounts the value of the unapplied material is carried.

3. **ACCOUNTING FOR MATERIALS AND SUPPLIES:** The Chief Accounting Officer shall have general supervision and prescribe the accounting for all material.

4. The officer in whose account the value of the material is carried shall keep such accounts and records, and render such reports to the audit office as prescribed by the Accounting Department.

5. **CLASSIFYING AND PRICING:** A standard material classification should be adopted for use by all railroads and for that purpose the Railway Storekeepers' Association's classification is recommended.

6. A standard price book should be maintained and the material charged out at actual cost, or where not available, at the average or latest price obtainable.

7. **PURCHASE INVOICES:** Purchase invoices having been checked as to price and other contract features by the Purchasing Department will be forwarded to the officer receiving the material to be checked against the received record and verified as to quantity, quality and condition.

8. After verifying extensions, make the following deductions when proper:

Transportation charges in accordance with the terms of delivery.

Credit memorandum received from shipper for the return of empty containers, etc.

Shortages, erroneous shipments, loss and damage or other deductions chargeable to the shipper.

Cash discounts if they are to be deducted from the face of the invoice.

9. Make following additions when proper:

Over shipments.

Errors in weight.

Freight allowances, etc.

10. Show on face of the invoice, class number of material, name or number of material account and month taken into account, invoice then to be taken into account certified as correct and returned to the Purchasing Department or other designated officer for voucher.

11. **TRANSPORTATION CHARGES:** All freight, express and other transportation charges such as switching, drayage, etc., paid by the railroad should be taken into the material accounts under the proper material classification.

12. **MATERIAL TRANSFERS:** Transfer invoices or bills covering material transferred from one stock account to another shall be taken into the receiving account as classified and for the quantities and amount as rendered, after which, they shall be checked against the received record, certified and any differences of overages, shortages (except Loss and Damages in Transit—see Paragraph No. 19) or errors in computation shall be adjusted in the succeeding month by counter or additional transfer invoices or bills.

13. **MATERIAL MANUFACTURED IN COMPANY SHOPS:** Material issued from stock in connection with shop orders for the manufacture of other material or articles, should be transferred from the original classes to the class "Material in course of Manufacture."

14. **MATERIAL RETURNED TO STOCK:** All received second-hand and scrap material should be taken into the material accounts currently on basis of prescribed prices, crediting the appropriate operating expenses or other accounts.

15. **MATERIAL ISSUED:** Material and supplies should be charged out on monthly distributions to Operating Expenses and other accounts as used. Certain items of material, such as lubricants for locomotives, train and station supplies and material for minor equipment repairs, the application of which is locally controlled, may be charged out at the time of issuance, in accordance with the prescribed rules of the Accounting Department. The report for such material will be made to the Accounting Department by the officers in whose material accounts the value of the material is carried.

16. **TRANSFERS:** Materials and supplies transferred from one stock account to another shall be made through the medium of transfer invoices or bills. Loss and damage to current stock, when such material will be classified on the face of the transfer invoice or bill and credited to the material account from which transferred.

17. **MATERIAL IN THE COURSE OF MANUFACTURE:** Charges from shops to the material accounts for labor expended on "Material in course of Manufacture" on shop orders, should be taken into store accounts under the class "Material in course of Manufacture" and accounted for the same as other debits to material accounts. Upon the completion of the order the total cost of the manufactured article should be transferred from class "Material in course of Manufacture" to the proper class of the finished product.

18. **OBsolete MATERIAL:** Obsolete material should be accounted for by charging the account or accounts to which such material should be charged with the difference between the stock values and the amounts received from its sale or at its revaluation as scrap.

19. **LOSS AND DAMAGE TO MATERIAL IN TRANSIT:** Loss and damage to material in transit between stock accounts should be accounted for by the consignee taking into account the transfer invoice or bill and obtaining relief in accordance with existing rules of Freight Claim and Accounting Departments.

20. **LOSS AND DAMAGE TO STOCK MATERIAL:** Disposition of the value of material in stock accounts damaged or destroyed by fire or other causes, should be taken up with the Accounting Department as individual cases, who will issue instructions for the chief of the accounts.

21. **SALES OF MATERIAL:** Sales of materials and supplies to Individual and Companies shall be on the basis of the sale orders from the Purchasing Department and shall be charged direct on the monthly distributions and bills prepared on the basis of the prices and terms of delivery quoted on sale orders.

22. **BALANCE SHEETS:** Balance sheets shall be rendered monthly to the Audit office by each officer having a stock account, which shall show the balance on hand at the first of the month, material received, material released and taken into stock account, freight charges, payroll costs, etc., Total debit, and on the Credit side should show the total issues, sales and transfers to other stock accounts, etc., total credits, and net balance on hand at the close of the month.

23. **CLASSIFIED STATEMENT OF MATERIAL, RECEIVED, ISSUED AND ON HAND:** Monthly classified statements in balance sheets in detail by classification in accordance with Railway Storekeeper's Classification of material shall be rendered showing the amounts on hand as of the first of the month, receipts, transfers, total debits—issues, sales and transfers to other stock accounts—total credits and balance on hand at close of month.

24. **INVENTORIES:** Inventory of material and supplies including scrap should be taken periodically, at such times and in such manner as designated by the Accounting Department.

25. The prices applied to inventories should be the cost price of the material.

Standard Form for Reporting Cost of Ice and Salt in Connection with Perishable Freight. The committee recommends the use of a proposed standard form and plan worked up by the National Freight Perishable Committee. The plan is intended to assist the carriers to arrive at a more accurate ascertainment of the costs of ice and other materials entering into the handling of perishable freight.

(The remainder of the report of the accounting officers' meeting will appear in next week's issue.)

Business Meeting of Purchases and Stores Division

Material Accounting and Distribution Subject of Several Reports; Moving Pictures of Reclamation

A REPRESENTATIVE gathering of over one hundred officers of the purchasing and stores departments assembled at the Blackstone Hotel, Chicago, June 9, for the opening of the business meeting of the Purchases and Stores Division of the American Railway Association. The meeting was called to order at 10 a. m. by H. C. Pearce, director of purchases and stores of the Chesapeake & Ohio and chairman of the Division.

Following a few brief remarks by Mr. Pearce, R. H. Aishton, president of the American Railway Association, addressed the meeting. Mr. Aishton said in part:

Address by R. H. Aishton

I think that the text for all meetings and conventions that are being held today, not only in the railroad business but in every other, is economy and conservation. What we are all trying to do in the various sections of the American Railway Association is to develop means of producing economy and conservation that will appeal to the railroads, be adopted by them and result in greater economies.

This matter of economies is very largely in the public eye today. There has been some criticism made of the various sections of the American Railway Association as to lack of effectiveness. In other words, a section or division meets and does most earnest work. The division passes a resolution and prints it in a book and then we wait until the next meeting. When a body like you determines that a thing would be of advantage to the railroad situation, agree also that you will undertake to sell that proposition to the railroads.

There are two matters I want to impress upon you: Clearness in your reports and an absolute declaratory statement. If you believe a thing is good, leave this room with a determination to sell that proposition to your own railroad. A third matter is to let the public know what you are doing, because they do not know today and a great many of our misapprehensions as to the railroad situation arise from a lack of knowledge of what you are doing.

Your chairman asked me before the meeting what I thought about the railroad situation. I am an optimist. It is going to work out. It must work out. There is no question about it. We have solved such problems before and this problem is going to be solved in the same way. The work that you are doing in this division is one of the important factors, in my opinion, that will finally help to solve the problem right.

Chairman Pearce's Address

It was decided not to hold our regular convention this year due to the financial conditions of the railways and for the further reason that it is the duty of every organization, as well as every individual, to apply himself wholeheartedly to the task of readjustment by applying the most rigid economy both publicly and privately. After weighing all conditions carefully it seemed desirable to eliminate every expenditure we possibly could and at the same time to review the work that has been done during the year and lay out the plans for the coming year. With this object in mind a business meeting was decided on to consist of all members of the General Committee, all chairmen of subcommittees and as many members of the Division as each individual railway considered desirable to have attend. All members of the association will have the full privilege of discussion and participation in our work and we will endeavor to develop plans and recommendations for the coming year so that we may start out with a plan of organization which will carry

on the work effectively and be in a position to hold the regular annual convention of all our members next year as usual.

There has been little real constructive work accomplished by this division during the past year due to many causes. Emerging from federal control March 1, 1920, with organizations more or less disarranged, with the greatest activities known in the industrial world, prices climbing, deliveries practically impossible, federal inventories of every description demanding our attention, there was no time to deliberate or carry on constructive organization. While it is true there was little money allocated to carrying on and developing the work we could not have spared the time to have done the work even if we had had the money available.

At the conclusion of the address of the chairman a communication from W. G. Besler was read expressing regret because of his inability to attend the meeting and offering some suggestions regarding the work of the Division.

The minutes of the last convention were approved as printed and the report of the General Committee was then read. The committee reviewed briefly the reports submitted to the last annual meeting of the American Railway Association and the activities of the committees since the last meeting. The report was approved without discussion.

J. Marshall, special representative of the Freight Claim Division of the American Railway Association, addressed the meeting on freight claim prevention with particular reference to the part which members of the Purchases and Stores Division could play in reducing loss and damage.

Stores Department Book of Rules

Consideration was given to the book of rules through a questionnaire sent to 41 railroads, as well as in the discussion at former meetings. Suggestions for changes, additions or revisions of any part of the book of rules which the committee believes are worthy of consideration were set forth in detail together with the recommendations of the committee. Several of the recommendations for changes in the rules are made with the purpose of accommodating the rules to some particular type of railway organization, and where such recommendations would affect the fundamental principles of storehouse organization, the committee has declined to recommend their consideration.

Sample forms have been submitted by several railways for requisition blanks, stock books and receiving records, which differ in varying degrees from the forms recommended in the book of rules. The forms recommended were prepared for general adoption and use, and can be modified to suit the special requirements of any particular railway organization.

SUGGESTED CHANGES

A substitute was proposed for Part 1, Section 1, Paragraph 4, in which the committee did not concur.

Part 1, Section 1, Paragraph 7. The general storekeeper shall be responsible for the proper inspection of all fuel, released rail, lumber, piling, ties (track and switch), and all inspectors employed for this purpose should be carried on his payroll and report direct to him.

Objection is made to this paragraph on the ground that the work of inspection of material should be done by an inspection department. The committee does not recommend any change in Paragraph 7. The items covered by Paragraph 7 and for which the general storekeeper is held respon-

sible for the proper inspection, are in nearly all cases inspected on the line of road and can be more economically inspected by the stores department than by the inspectors of an inspection department.

Paragraph 11. The addition of a sentence specifying that the stock book be kept was suggested, but the committee considered it unnecessary.

Paragraph 17. A rearrangement of this paragraph was suggested which the committee did not approve.

Paragraph 18. The storekeepers at the different division points will report to and receive their instructions from the general storekeeper. It is suggested that this paragraph be rewritten: "The storekeepers at the different division points will report to and receive their instructions from such officers as may be designated by the proper official."

The committee does not recommend any change in Paragraph 18 regardless of the type of organization on the particular railroad; no principle in stores department organization is more firmly established than that the division storekeepers should report direct to the general storekeeper.

Page 51—Section 14. Pricing and classifying usable, needing repairs and scrap materials. All usable material, whether new or second-hand, should be taken into stock at new value, except rail and ties, or at a fixed percentage of the new value to be set by the general storekeeper. Exceptions may be made to this rule and certain items taken into account at fixed prices established by the general storekeeper, if desired.

It is suggested that for the sake of uniformity some definite rule should be laid down for the guidance of all roads, instead of leaving to the general storekeeper the decision as to what price second-hand, and needing repairs, material should be taken into and carried in stock. It is suggested that a certain percentage of the value of the new material should be stated.

The committee does not recommend any change in section 14 as written, believing that a statement of the general principles under which second-hand and scrap material should be handled is sufficient, leaving to each railroad the matter of prices, which must be governed by conditions which prevail in connection with reclamation work and the use made of second-hand material.

It has been suggested that in connection with the delivery of material along the line of road by supply trains some additional recommendations in the matter of accounting for material on the line of road should be made. Special reference is made to material delivered by supply trains and not intended for immediate use.

The committee recommended that the material be carried in stock until used.

Considerable interest is manifested in the use of stock books in division storehouses and the master book in the general storekeeper's offices, the replies from the various railroads indicating a general use of the stock book as recommended by the Railway Storekeepers' Association and Section 6, with such modifications as seem necessary to meet the requirements of the individual lines.

The report was presented by J. W. Gerber, chairman.

DISCUSSION

W. F. Jones, New York Central, in discussing Section 14 stated that the practice of charging out second-hand material at various rates makes comparisons between roads difficult. He advocated the adoption of a definite percentage of the value new. On the Santa Fe and the Burlington second-hand material is taken in hand and charged out at the price of new material. The Southern Pacific uses one-half the price new to provide an incentive for using such material.

D. C. Curtis, Chicago, Milwaukee & St. Paul, described the system of stock books used on that road. The master stock book used at the general store is too cumbersome for

use at smaller points. For outside stores, loose-leaf forms are used, each having the line, page and class shown corresponding to the master stock books.

The rules as amended by the committee's report were adopted and the committee continued.

Classification of Material

The committee sent out a questionnaire to which replies were received from 78 roads. It would appear from the replies received that only about one-half of the member roads have adopted and are using this material classification. Of this number about one-half favor it with no changes to suggest, and claim that it is not costing any more to operate than the classification formerly used, and permits of a better analysis of material used.

The committee recommended several additional subclasses and the transfer of items to permit of closer analysis of values carried. These were as follows:

Class 1c—Take motor, hand, push, and velocipede cars and parts of same from this class, which includes track tools, track materials and wire fencing, and segregate them in a new group as Class 1d.

Class 4—Segregate bridge ties as Class 4a and include lumber, bridge and building, piling and posts as Class 4b.

Class 5b—Separate treated from untreated cross ties, designating the former as Class 5b and the latter as Class 5c.

Class 8—Segregate new rail from second-hand and scrap rail, designating the former as Class 8a and the latter as Class 8b.

Class 13b—This class is created for arch brick for locomotives, removing it from foundry supplies.

Classes 14 and 15—Soft metals in bars, pigs or sheets are taken from Class 15, which includes bar iron and steel, etc., and are placed in Class 14, which includes brass, copper and steel tubing, etc.

Classes 18 and 20—Car forgings are removed from Class 20, which covers car castings of all kinds, brake beams, couplers, metal bolsters, side frames and metal roofs, and are placed in Class 18.

Class 36b—This class is created to cover grain doors, grain and coal door lumber and cooping material for grain and flour cars which are now included in Class 36 with locomotive train and station supplies.

Class 37a—This class is proposed to cover locomotive and car lubricants, exclusive of wool waste, in order to segregate them from all oil house material now included in Class 37.

Class 37b—Includes all oil house material other than locomotive and car lubricants.

The committee further recommended that before the proposed material classification, if adopted, is issued the entire detail or index be gone over with all member roads interested; any stock items not shown being listed and furnished the committee handling this subject for the coming year; also calling attention to errors in units and descriptions.

The committee further recommended that this work of preparing the proposed classification complete with index be assigned to two or three men selected from various interested roads using same, and that ample time be given to complete the work. It is felt that the regular committee assigned this subject cannot devote the time necessary to revise all the details, in bringing this classification up-to-date. The report was presented by C. H. Rost, chairman.

DISCUSSION

With the exception of the changes in Class 37 all of the recommendations of the committee were adopted. During the discussion of the various items considerable difference of opinion was expressed as to the advisability of constantly enlarging the classification. Some of the members are opposed

to a large classification and it was suggested that what was needed was a revision of the classification rather than an enlargement.

The committee was continued and enlarged to enable the appointment of technical sub-committees for handling its future work.

Material Accounting

This committee had not new material to present, but urged the importance of carrying out the present rules. These were adopted by the former Railway Storekeepers' Association at the 1919 convention and were submitted as part of the committee report at the meeting of the Purchases and Stores Division at Atlantic City in June, 1920. The report was referred to the American Railway Accounting Officers' Association for the information and approval of that body, which has it under consideration.

The report was presented by W. E. Brady, chairman.

Uniform Accounting

By H. H. Laughton

Assistant to Vice President, Southern Railway

This subject, so frequently discussed but never concluded to the satisfaction of all carriers, during the past year has been actively before the appropriate committee of the Railway Accounting Officers' Association. The following suggestions are largely in line with the recommendations of its disbursing committee.

SUPERVISION

Unapplied material, irrespective of location, should be under the direct general supervision of the chief of the stores department, who should have general charge of the ordering, receipt, care and issuance of materials.

ACCOUNTING

The chief accounting officer should prescribe the accounting, and through his subordinates should periodically check records, reports, and all local department documents upon which materials and supplies transactions are recorded to see that they are properly kept and that proper distributions of issues are made in obedience to rules of the Interstate Commerce Commission. Accurate accounting can be best secured by having the detail work performed at the local, divisional, or district store, as the actual data can be more accurately obtained at such points than when the accounting is centralized in the general office.

CLASSIFICATION

The universal adoption by all carriers of the standard classification as made by the Railway Storekeepers' Association is advised, to the end that proper comparisons may be procured for the benefit of all railroads. There can be no objection to increasing the number of sub-accounts in any given class to meet local requirements of individual carriers.

PRICES

The charges for material issued should be made at actual cost, or where that is not available, at the average or latest price obtainable. A standard loose leaf price book should be maintained and kept up-to-date.

PURCHASE INVOICES

Accounts payable should be checked as to prices and other contractual features against the original purchase order by the purchasing department and forwarded direct to the officer to whom the material is consigned, who should check each invoice against the receiving record and certify as to quantity, condition, quality, etc. Extensions and calculations should be accurately verified. Deductions, when proper, should be made as follows: Cash discounts when to be taken from invoice; transportation charges according to terms of

delivery; credits from shippers for return of empty containers; erroneous shipments, shortages, loss and damage, or any other deductions which should be charged to shippers.

Additions should, when proper, be made for freight allowances, over shipments, errors in weight or rates, etc.

On the face of the original invoice should be designated the class number of material, name or number of material account, date received and month taken into account. It should be certified as correct and listed to the purchasing department where vouchers should be prepared for settlement.

All freight, express and other transportation charges paid by the carrier should be taken into the appropriate material accounts under the correct classification number.

MATERIAL MANUFACTURED IN COMPANY SHOPS

All material issued from stock on shop orders for manufacturing other articles should be transferred from the original classes to the class "material in course of manufacture."

All charges from shops to the material accounts for labor expended on material in course of manufacture are accounted for the same as any charges in the material account. The total cost of the article manufactured should then be transferred to the proper finished product class.

RECLAMATION

The operation of all reclaiming plants should be under the supervision of the stores department.

MATERIAL ISSUED

Materials and supplies issued for current use should be charged out on monthly distribution reports as designated by the I. C. C. classifications. Reports of issues should be sent direct to the designated representative of the accounting department and copies forwarded to the appropriate officer of the stores department.

TRANSFERS

Transfers made on proper authority from one stock account to another should be through the medium of transfer bills, invoices or requisitions, values of materials transferred to be based on current stock prices. Proper classification should be given on the face of the transfer bill. Quantities and values should be taken into the receiving account as classified on such bills. Overages, shortages, or errors in calculations should be adjusted in the succeeding month by contra-bills.

MATERIAL RETURNED TO STOCK

All released, new, reclaimed, second-hand and scrap material should be taken currently into the proper material accounts on the basis of prescribed prices, to the credit of the appropriate operating expenses or other accounts.

OBSOLETE MATERIAL

When material becomes obsolete it should be immediately considered as scrap and accounted for by charging the proper account to which it would have been charged with the difference between the stock value and the amount of its revaluation as scrap or the amount realized from its sale.

SALE OF MATERIAL

Material and supplies sold on authority of the stores department on sale orders from the purchasing department should be covered by collectible bills or sale invoices based on prices, loading, terms of delivery, etc., as specified on sale orders. These bills should be promptly forwarded to the proper officer for audit and collection. The materials and supplies should be charged out of monthly distribution report for the month for which the materials were shipped.

LOSS AND DAMAGE

Material lost or damaged in transit between stock accounts should first be taken into account by the consignee, and

relief should immediately be granted either by the freight claim or accounting department. Disposition of the status of material that is carried in stock accounts which is damaged or destroyed by fire, floods or other causes, should at once be reported by individual cases to the accounting or claim departments. Prompt relief to the stock account should be granted therefor.

BALANCE SHEETS

There should be rendered to the accounting department by each officer having a stock account a monthly balance sheet, which should show the balances on hand at the first of the month, materials received through purchase, transfers, release and taken into stock account, freight charges, payroll costs, corrections, etc., and the total debit on stock on the credit side. It should show the total issues, sales, transfers to other stock accounts, corrections, etc., total credits, and the net balance at the close of the month.

The accounts should be held open after the end of each month the agreed length of time for taking into that month's balance sheets all obtainable bills payable or transfer invoices received and procurement of requisitions for material issued during the same month. There should also be made each month classified balance sheets in detail in accordance with the Railway Storekeepers' Classification.

STOCK BOOKS

In each department there should be kept detailed stock records especially prepared to cover a period of two years' operations. A master stock record should be kept for all stores by the general storekeeper.

INVENTORIES

There should be taken periodically on the last day of a designated month, not less than twice a year, a full and complete inventory of all unapplied material, including scrap and obsolete material, wherever located. The prices applied to all inventories should be the cost price of the material as reflected by the records. It is frequently desired to take inventories of certain classes of materials monthly. Materials and supplies in transit between stores at the time inventories are taken should be listed on separate sheets as a special exhibit, to be added to the amount on hand.

Materials and supplies on hand when the inventory is taken and included therein, or which may have been issued prior to taking the inventory and charged out, but for which purchase invoices or bills payable have not been received and taken into account, should be listed on separate sheets as a special exhibit to be deducted from the gross amount of material on hand.

Transportation and other charges which may have been included in the cost of material and charged out prior to the completion of the inventory, or included in the cost prices but not taken into account prior to closing, should be listed on separate sheets as a special exhibit to be deducted from the gross amount of the inventory.

All materials reported on special exhibits should be properly classified on such exhibits and either added or deducted from the appropriate classes of the final summary. The net amount of the inventory should be the basis for starting the balance sheet of the stock account on the first of the month of taking inventory. Adjustment of the overs or shorts, as reflected by comparison of balance sheets and inventories should be made by the accounting department.

DISCUSSION

Exception was taken to the recommendation of the author that the inventory be taken twice a year by several members, who objected to the extra expense and considered one adjustment a year as all that is necessary. It was suggested that the use of a price book might be an obstacle in clearing accounts if it is not kept up-to-date, particularly under market conditions when prices are rapidly changing.

Purchasing Agents' Office Records

The committee (C. E. Walsh, Asst. Pur. Agt., Pennsylvania System, Central Region, chairman) unanimously recommended for use as standard in purchasing agents' offices, Form 12-4, an order form (original) and Form 12-4-a, an office copy of the order form.

The committee had also investigated the fan fold machine for writing orders and "is of the opinion that it should be considered where a large number of orders are issued."

The committee was of the opinion that it is not necessary to recommend any particular form for a requisition record in the purchasing agent's office. It recommended the use of the same order form for lumber and stationery as for other material.

During the year the committee prepared several standard forms for use in connection with the requirements of the Clayton anti-trust act.

The chairman of the committee and Assistant Secretary Farrell had several conferences with representatives of the National Association of Purchasing Agents in connection with its proposed invoice form; the committee recommended that next year special attention be given to this form by the new committee, as it is believed considerable money may be saved by the adoption of a standard form of invoice. It should, of course, be understood that the committee of Division VI should confer with the Railway Accounting Officers' Association and the National Association of Purchasing Agents before making any definite recommendations.

DISCUSSION

F. D. Reed, Chicago, Rock Island & Pacific, advocated the use of the uniform invoice. The Rock Island sends its own invoice blank with every order for material. The discussion showed that practically all roads favored the adoption of a standard form and some were already using the one recommended.

H. C. Pearce stated that roads that have not adopted the standard invoice have been deterred from doing so because of the expense involved. The plan proposed by the National Association of Purchasing Agents requires the sellers to provide the standard invoice and should insure its general adoption.

Mr. Pearce recommended that this division confer with the National Association of Purchasing Agents and the Accounting Officers' Association to prepare a standard form of invoice to be furnished by the sellers. The report was accepted and the committee instructed to carry out Mr. Pearce's suggestion.

Unit Piling for Counting

J. G. Stuart (Gen. Storekeeper, C. B. & Q.,) presented an individual paper on this subject. He said in part:

Proper methods of storing material on shelves and in bins and the proper piling in racks and in piles is a long step forward in making it possible for the stockman to get the correct information as to the amount of material on hand and to get it easier.

What is meant by "piling in units?" Simply this: that when material is being placed in stock a certain number of pieces are designated as a unit and as the material is stored it is separated so that each unit contains the designated number of pieces and each unit is in some way separated from the other units of the same material and stands out alone so that, in counting the stock, the stockman counts the units and not the items. For example: If machine bolts were piled in units of 100 each the stockman would count the units and would not attempt to count the bolts. If the pile contained eight units he would count the units and know he had 800 bolts. In case one of the units should be broken so that there were eight full units and part of the ninth, it would, of course, be necessary to count the number of bolts

in the broken unit to get an accurate count of the pile.

In the same way a great many other items, in fact, practically all items of storehouse material, may be piled in units. Bar iron may be piled in units 50 or 100 bars and separated by a wire or a stripe of paint or by recessing a few bars an inch or two back of the face of the pile. Galvanized, black sheet and light sheet steel when piled flat may have the first sheet in each unit extend an inch beyond the face of the pile, in this way making the separation very distinct. Heavier sheet steel may be piled in the same way or all sheets may be piled flush with the face of the pile and a stripe of paint be put along the edge of the first sheet in each unit to mark the separation between the units. Pipe fittings and other small articles may be separated by sheets of scrap steel or tin or cardboard and have a unit piled on each sheet, or trays may be made and a unit put in each tray and the trays put one above the other. Rope received in coils may have tags attached showing the number of feet originally in the coil and the number of feet still left in the coil. Coiled chain may be handled in the same way or if removed from containers and put in bins, tags or washers may be attached to every 50 or 100 feet so that the first tag out shows the total number of feet still left. Leather and rubber belting and hose, when received in large coils, may be handled the same as rope or chain. Gaskets and other items of which large numbers are carried in stock may be put on strings 50 or 100 if count is required, or in packages containing a certain number of pounds if weight is required.

Unit piling may be followed in any store as the improved appearance of stock will usually justify it, but the real benefit in stock taking is obtained where larger quantities of material are carried.

So far as it is possible, the units of each article should be of such number as is usually issued at one time so that the time ordinarily spent in counting or weighing when the material is issued may be saved. In many cases it will be found possible to change the amount to be issued, especially where material is being transferred between stores, so that complete units may be issued.

Some of the advantages obtained in unit piling are as follows: More accurate information as to quantity on hand: When material is piled in units it eliminates the errors which might naturally creep in when material is being counted and, if errors should be made in count when the units are being piled, the different size of the units will be apparent and make it easy to detect the mistakes. The stockman, in going through his stock, in most cases, will be able to get the amount on hand in from one-half to one-tenth of the time which would be necessary if he had to stop and actually count the items instead of counting the units. By giving a more accurate knowledge of material on hand it enables the stockman to more intelligently place his orders or refrain from placing orders and, in this way, enables the store to give better service. Material piled in units always presents an orderly appearance. While it is possible to pile material orderly without piling in units, it is impossible to pile in units and have it disorderly. It conserves material by making it necessary to take better care of material. It conserves space: Unit piling gets the maximum amount of material in a given space and by keeping the material in units it prevents scattered and small piles.

DISCUSSION

U. K. Hall, Union Pacific, spoke on the advantages of unit piling. He stated that where material is not properly piled the storekeepers lack the proper knowledge of the stock on hand and therefore proper piling is reflected in the amount of stock carried. The tray system is used extensively on the Union Pacific and has reduced the time required to take stock fully 50 per cent and has resulted in more accurate records.

Other speakers told of similar results from the introduction of this system.

Handling and Distribution of Material to the Users

The committee (W. D. Stokes, Asst. Gen. Storekeeper, Ill. Cen., chairman,) presented a report of which the following is an abstract:

The purchasing agent must purchase the material and deliver it to the railroad for which it was ordered. The general storekeeper must take the material from this point and follow it to the user, recovering, reclaiming and reporting the salvage.

In order satisfactorily to carry out such procedures as are necessary, the first consideration should be given to the location of stocks, it being an essential that they be placed to the best advantage for delivery when and where wanted without causing an excess investment or unnecessary movement. The ideal arrangement would admit of one general store, as this would provide adequate and thorough inspection, test, check and care of materials, which should be located with proper reference to geographical relationship of the territory to be served and also to the sources of supply. It may be necessary, when conditions warrant, to duplicate this idea by the establishment of district and division stores, but there should be no greater investment in the base supplies than is necessary properly to take care of the requirements.

By restricting the number of places where stock is carried, a larger and more general stock can be maintained for the investment, and the opportunity is enhanced for having on hand that which is wanted.

STORE DELIVERY OF MATERIAL

Delivery to Shops—The shops representing the largest users of classes, if not values of materials, must be first considered. A practical plan is for the stores department to deliver material to the users in the shops, for economic and other reasons; it prevents expenditures for wages to high-priced mechanics, who are frequently used for this purpose. It keeps them at their work, and their machines in operation during a period which otherwise would cause them to be absent securing needed materials. It enables the supervisory forces to keep in closer touch with the progress of the work and the actual needs of the mechanics.

This system ensures accuracy in accounting by reason of requiring that all material orders be revised and the proper description entered thereon by the store delivery supervisor, before they are delivered to the office. It provides the means for obtaining a material order for all material issued. It enables store employees to observe the use of material by coming in personal touch with the men who are actually using it and provides a method by which they can intelligently anticipate and provide for the needs and satisfy themselves that the men will utilize the material as intended. It results in delivering material to points required in less time than other systems now in effect and at a minimum expense. It ensures an opportunity for locating and returning to store stock, materials drawn for use and not applied. It ensures the proper supervision over the manufacture of materials on orders and the return of the finished or repaired products to the store, when completed. It encourages the use of serviceable second-hand and repaired material in lieu of new, and enables by co-operation, to dispose of shop worn material in proper sequence. It prevents inadvertent disarrangement of stock.

Recommended Methods of Delivery to Shops—Delivery of material to shops and repair yards should be made by stores department employees with their own forces and facilities, as well as the return to the store of all material manufactured in the shops, and all material not used for the specific purpose for which drawn.

The work must be under the direct charge of a supervising employee fully capable of co-operating with the user to the extent that only what is required will be delivered as actually needed and of a quality approved as suitable and economical for such use.

The patrol box system is recommended, which consists simply in arranging boxes at specified places in and around shops, where material orders shall be placed and gathered on schedule as provided, and checked by proper supervisory forces. It is less expensive to install and will provide more satisfactory and reliable results. The committee carefully considered the feasibility of the use of the telephone and annunciator systems, and also recommends them when feasible.

When installing shop delivery where it has not been previously effective, a careful check should be made prior to so doing, of the exact cost under the old plan for doing the work—in order that the saving effected may be clearly and decisively shown—and such records should be maintained as may be necessary for illustrating the cost from month to month.

DELIVERY TO LINE OF ROAD

Supply Train—The supply train serves the same purpose for the line that the store delivery does for the shops in precisely the same way. It places the representatives of the stores department in personal contact with the users on the line; it places the storehouse at the disposal of the men on the line that use the material; it establishes the closest and unified relation between the two, which, when coupled with a thorough inspection by the supervisory officers, as it should, furnishes the ideal method of distributing material on the line.

Rail—In the handling of rail the plan must be broad enough to take into consideration all conditions. Generally speaking, new rail should be delivered direct to where it is to be used. Second-hand and relaying rail, except assigned rail for other purposes, should be assembled at central points (as few as possible) where it can be reinspected, reclassified, reclaimed and reshipped. We heartily endorse the report of the Rail Committee, known as Subject 14, which was approved at the 1920 Annual Meeting of Division VI, Purchases and Stores.

Cross and Switch Ties—Generally speaking, cross ties should be shipped and unloaded direct where they are needed, either from the manufacturers' right-of-way or from the treating plants. In many cases the distribution of cross ties can be carried out advantageously with work trains, and in some cases the work can be done by the supply train. On other roads the supply of ties can be generally provided along the right-of-way. No plan for the distribution of cross ties can be adopted that would be satisfactory to all conditions.

Switch ties should be purchased to specified lengths and shipped to a central yard (where they should be assorted into lengths) from which point they should be distributed as ordered.

Bridge and Building Lumber—We are strongly in favor of bridge and building lumber and other materials connected therewith, such as mill-work, hardware, etc., being assembled at as few places as possible, one being preferable, and having all lumber, mill-work, hardware, and other materials assembled and shipped complete direct to the work. This plan does not prevent heavy material like steel girders, stringers, piling, brick, cement, etc., being shipped direct from the sellers, but the fundamental principle of having the material assembled so that all is available and can be forwarded to the work, and the users notified so that forces must not be sent out before material is available, is sound and should be adopted as standard practice.

EMERGENCY STOCK

We recognize the necessity of having an emergency stock of bridge and building and track material at certain locations in case of washouts, floods or other disasters. The amount and kind of such stocks must be determined by the local conditions. Such stocks shall be under the control of the division storekeeper and carried in his stock and he shall be responsible for maintaining them according to the authorized list.

Transfers Between General Store and Division Stores—The usual method would be in carloads in through freight trains, but recognizing the need of having fast service, it is recommended that a certain number of baggage cars be assigned, operating between the general stores and the various division stores. Where baggage cars for this service are not available, then baggage cars on the regular trains can be used, but special service is recommended.

Distribution to Roundhouses, Inspection Points and Large Terminals—The principal inspection points and terminals should be provided for through the division stores, although there are many railroads where this is not practicable and provision can be made from the general store. The reason why it is more desirable to protect these points through the division stores is that the division storekeeper is, and should be, in closer touch with the division officers, and in position to provide, police, control, and therefore be responsible for the requirements, better than any other officer. Generally speaking, this class of material should be delivered via local freights and via baggage cars from the division stores.

Minority Report

C. D. Young, general supervisor stores, Pennsylvania System, made a minority report as follows:

Stores Delivery of Material—It is my recommendation that a paragraph be inserted under the heading "Stores Delivery of Material" to provide for small articles of little value, but of frequent use, which are disposed of by a large number of charges; the thought being that Working Stock Sections should be provided for such material, these Working Stock Sections to contain only an authorized list of items which might be carried as such. By such an arrangement a reduction is made in the accounting; and the material is convenient to the workmen and does not require attendance of material distributors as provided for under heading "Delivery to Shops." Objection was raised by some of the members, who stated that this was not good stores practice, as it resulted in unauthorized use of material and improper charges. I disagreed with this view, and explained that by having a proper authorized list of those items which should be contained in the Working Stock Sections, the first object was met, and that by proper disposition, in a short period of time, of the items consumed, proper charges could be made from an accounting standpoint. I am still of the opinion that this is good stores practice and had in mind that it should be included in the report under "Recommended Method of Delivery to Shops," as supplemental to the patrol box system which was touched upon, with which system I am thoroughly in accord.

Delivery to Line of Road—Under this heading the supply train is recommended; but I feel that the supply train should be supplemented by the use of, and in some cases replaced by, supply cars traveling as a part of local freights or other convenient scheduled train service, and that the report should recognize the desirability, under certain conditions, of operating supply cars as outlined, as well as supply trains.

DISCUSSION

The principal discussion centered around the minority report. Some of the speakers did not consider the establishment of emergency stocks as desirable and advocated that material

should be in the hands of the stores department until actually applied. Others stated that emergency stocks were valuable especially in large shops and no disadvantages were noted in handling material in this manner. The majority report of the committee was accepted.

Moving Pictures of Scrap Reclamation

During Friday afternoon's session a moving picture exhibition illustrating the extent to which reclamation work can be developed was presented by C. H. Hoynville, assistant to general purchasing agent, Atchison, Topeka & Santa Fe. The pictures showed the scope of and the methods employed at the Corwith, Chicago, scrap reclamation plant of the Santa Fe system, which was developed by and is under the jurisdiction of M. J. Collins, general purchasing agent. In connection with the pictures attention was called to the fact that during the Railroad Administration control this reclamation plant was a source of supply of a large amount of material, a quantity of re-rolled iron having been shipped to other roads. A number of other roads also shipped broken and worn material to Corwith, where it was repaired.

The pictures follow the progress of producing re-rolled iron from the receipt of the material at the yards to the stock piles, showing the unloading of the material by cranes, the sorting and classification of material after it has been unloaded, the cutting up and piling of the scrap ready for the furnaces and the rolling process. The pictures also illustrated the repairing of brake beams, cutting worn tires off of truck wheels preparatory to retiring the steel centers, as well as a number of pictures of various classes of reclaimed material.

Supply Train Operation

It is the recommendation of the committee that the following paragraph be added to the original report of last year:

"In addition to the previous recommendations as to the operation of supply trains, it should be understood that on branches or in territory where conditions do not warrant the operation of a train, the service should be modified and a regular supply car substituted, local supervision to determine the frequency. Such a car should be accompanied by the proper stores officer."

It is recommended that Exhibit A, showing service performed by supply train, be made standard practice where supply train service is inaugurated. (Exhibit A is a form for showing the service performed by the supply train. It lists for each division and each month the value of material picked up or recovered and the total credits, the value of material delivered, the per cent of salvage and the per cent of car days saved.)

It has been demonstrated that the supply train can be operated successfully in congested territory and it is being effectively operated on an eight-track railroad.

One of the important results of the supply train is the reduction of stocks on line; rail, new and second-hand and scrap; switch ties; track fittings; frogs; cattle guards; emergency stocks; charged out stocks; all unapplied material, and scrap. It also results in better care of material, consolidation of all material—joints, tie plates, etc.—on each section at tool houses for monthly inventory and check by supply train.

The supply train makes for good housekeeping on the property. The committee feels that figures should be produced showing comparison on various railroads between the cost of distributing supplies under the former system and with a supply train but it has not been successful in obtaining complete data on this subject.

The operation of the supply train is flexible, so that it can readily be adjusted to meet the requirements of a congested main line division of a branch line with light traffic. As conditions change and demand for material and supplies falls

off, the organization on a supply train can be reduced to one man, if necessary, and the disbursements reduced to such essential items as oil, switch and signal lamp supplies, etc. The saving in the distribution of oil alone by supply train as compared with the old method of distributing by local freight is worth the operation of a supply train regularly each month, and when business is light and purchases restricted there is even greater necessity of knowing what is disbursed along the road and in gathering up surplus.

During the past year we have knowledge of three railroads that have installed supply trains based on the report of this committee approved at our first annual meeting. The committee has in its possession letters commenting upon the efficiency and desirability of the service and of the supply train for the information of anyone desiring to review them.

A. S. McKelligon was chairman of the committee.

DISCUSSION

The outstanding feature in the discussion of this report was the experience of a number of roads on which the supply train had been adopted during the past year and the success attending its operation as an economy measure during the recent business depression.

On the Northern Pacific its use has met with great success, where it has won the whole-hearted support of operating and maintenance officers. On other roads, because it looks like an additional operating expense, its use has been curtailed and in some cases discontinued. A number of such cases were mentioned, however, where it has again been reinstated after a month or two of experience under the old method of shipment or supply car distribution. Members who have investigated the Southern Pacific's practice as presented before the division at Atlantic City last year endorse all that was said in favor of supply train operation at that time.

The additions to the standard practice adopted last year as recommended by the committee were adopted.

Reclamation of Material

The committee (W. Davidson, General Storekeeper, Ill. Cen., chairman) has not been able to locate any new process other than covered in previous reports. However, it is noticeable that all railroads are reclaiming very closely. Investigations of scrap being disposed of by sale shows a considerable improvement over previous years. This would indicate that every available piece of material that is eligible for reclaiming is being set aside and worked up. Officers interested should go into this personally, especially at this time, when, with the high cost of material and high price of labor, almost any kind of reclaiming operation is beneficial.

Competent supervision is the most necessary adjunct to successful reclamation. The man to whom the operation of the reclamation plant is entrusted should be one who has been thoroughly trained along these lines. He should be thoroughly familiar with the various classes of material handled on the railroad, so that he can direct this work economically and effectively, eliminating operations from which no profit is derived.

The men who watch the scrap piles should know the values of new materials and at the same time be sufficiently familiar with the various operations necessary to reclaim each class of material that nothing may be salvaged except such material as can be reclaimed with profit.

One of the new features in reclamation, and one which is being developed rapidly, is the welding of materials by the electric or oxy-acetylene process of welding. The success of these processes depends to a great extent on having competent operators, and requires constant personal supervision on the part of the officer in charge to see that proper facilities are provided and a sufficient amount of each class

of work is kept available for reclamation convenient to the operators. It is recommended that attention be paid to facilities for pre-heating, as this important feature at a small cost greatly lessens the cost of welding. These pre-heating furnaces are also of a great deal of value in annealing work after it has been welded, thus preventing fractures from stresses caused by expansion and contraction.

Successful reclamation cannot be carried on without the interest of all concerned, especially the users of the material. Each member should take steps to keep the management of the railroad he represents informed from time to time of the savings made as well as the various processes developed, for by thus stimulating this interest they will not only reflect credit on their organization but will secure the assistance from the heads of other departments which is so necessary to make successful reclamation as a whole.

DISCUSSION

The discussion indicated that not many roads are using large rolling mills but a great many roads are equipped with small rolling mills for reducing the size of scrap rounds and flats. The Southern Pacific has carried on extensive reclamation and rolling mill operations for many years, the long distance from the market making these operations particularly advantageous on this road.

The importance of knowing exact costs of reclamation plant operation, including all items of overhead, and checking closely against prices of new materials was emphasized. Several roads are now endeavoring to keep all possible material away from the scrap dock, concentrating on efforts to save all possible reclaimable material at the points of origin.

Rules for Carrying Out Section X,

Clayton Anti-Trust Act

The committee formally presented a report which has already been issued to all the carriers in circular form under date of November 29, 1920. The plan proposed by the committee recommends that the purchasing officers of each carrier prepare a complete list of the corporations, firms and parties, with whom it is probable it will have dealings aggregating \$50,000 or more during the year, and that these lists be forwarded to the secretary of the carrier by the purchasing agent at frequent intervals during the year with the request that the secretary ascertain from the directors, president, manager, purchasing or selling officer or agent, whether or not

they have any substantial interest in any of the concerns listed, informing the purchasing officer of the facts whenever required by him. A number of forms were submitted by the committee to facilitate carrying out this plan.

H. B. Spencer was chairman of the committee.

Other Reports

Reports were also presented on Cross-ties—Purchasing, Inspection and Distribution and by the joint committee of the operating, mechanical and purchases and stores divisions on fuel conservation. An abstract of the first of these reports will appear in a later issue.

The report on Lumber—Specifications, Purchasing, Inspection, Storage and Distribution was presented by William Beatty, chairman. An abstract of this paper will be presented in a later issue.

Reports on "Buildings and Structures" and "Scrap Classification—Handling and Sales" were also presented and will be reviewed in next week's issue.

Election of Officers

The following officers were elected to serve for the coming year: Chairman, H. E. Ray, Atchison, Topeka & Santa Fe; vice chairman, F. D. Reed, Chicago, Rock Island & Pacific; members of the executive committee: U. K. Hall, Union Pacific; W. A. Hopkins, Missouri Pacific; H. C. Pearce, Chesapeake & Ohio; E. W. Thornley, Baltimore & Ohio; S. B. Wight, New York Central; D. C. Curtis, Chicago, Milwaukee & St. Paul; and E. J. McVeigh, Grand Trunk.



The Virginian's Longest Bridge—the Glen Lyn Bridge, 2,155 Ft. in Length

The Mechanical Division Meeting Postponed

Word Was Received After Paper Was On Press That
Meeting Will Be Held June 29-30

UNDER date of June 10 the American Railway Association, Mechanical Division, issued a circular announcing the postponement of the annual meeting which was to have been held at the Drake Hotel, Chicago, on June 15 and 16. Following is text of the circular:

"Owing to present unusual conditions and inability of members to attend the meeting of the Mechanical Division, American Railway Association, called to be held in this city

(Chicago), Wednesday and Thursday, June 15 and 16, 1921, the meeting has been postponed to Wednesday and Thursday, June 29 and 30, 1921.

"The sessions will be held at the Blackstone Hotel, Chicago, instead of at the Drake Hotel, as originally planned. It is suggested that members arrange for their hotel reservations without delay."

The *Railway Age* will publish a complete account of this meeting in its issue of July 1.

ernment all produce conditions that can only be met through intensive economies.

The executive committee of the association and the Board of Engineers believe that co-ordination and joint facility uses can be best secured through the railroads effecting the organization of their groups in the four rate-making territories established by the commission under the Esch-Cummins Act. Failure to produce substantial economies may lead to supplying by taxation part of the costs of railroad operation.

Consolidations of the railroads into a "limited number of railroad systems" is contemplated by the act as a means for economies. In such consolidations "the capital of the consolidated corporations shall not exceed the value of the consolidated properties as determined by the commission."

The valuations now being made by the government will form the basis of value at which the roads will be taken into the "limited number of systems" called for by the act. They will also determine the aggregate value of the roads comprising each group upon which the return from rates is computed. Upon the proper determination of these and other questions depends the value of railroad securities owned by millions of people, very largely represented by this association.

The board will be of material service in the solution of all these problems.

All of the members of the newly appointed board are men of considerable experience in railroad work. Mr. Stevens has served as a vice-president of the Chicago, Rock Island & Pacific and the New York, New Haven & Hartford and as president of the Spokane, Portland & Seattle. He was chief engineer of the Panama Canal and a member of the American railroad commission in Russia during the war. Mr. Wallace was at one time vice-president of the Kansas City, Mexico & Orient and from 1914 until his present appointment has been chairman of the Chicago Railway Terminal Commission. Mr. Darling was for a number of years chief engineer of the Northern Pacific and was also a member of the American railroad mission to Russia. Col. Molitor, Mr. Stillwell and Mr. Colpitts are consulting engineers with considerable experience in dealing with railroad problems.

Building Material Rates to Stand

WASHINGTON, D. C.

AT A SERIES of conferences held in Washington on June 2 and 3, between the traffic executives of important rail carriers and representatives of associations and shippers interested in the movement of sand, gravel, crushed stone, chert, slag, asphalt, tar, paving brick, cement, yellow pine lumber, short-leaf pine, lumber, redwood, fir, hemlock, oak, gum, cottonwood, and other hardwood lumber, logs, building brick, tile, terra cotta, talc, and other building materials, the carriers were urged by representatives of the building tile and building brick interests to reduce the rates on these commodities by eliminating the advance of 40 cents per ton established under General Order 28 and applying the percentage advance under Ex Parte 74 to the rates in force prior to General Order 28. Representatives of other shipping interests asked for a reduction equalling the entire advance authorized by the commission in Ex Parte 74. The tonnage directly affected by these requests approximates 25 per cent of the total tonnage of the railroads.

A statement was issued by the Association of Railway Executives on June 8 announcing that "after a most careful consideration of the situation as presented by the shippers, and of the present and prospective financial conditions of the carriers, the representatives of the carriers concluded that under existing conditions no general reduction in freight rates can be justified or made effective, and that the carriers are in no condition to accept the far-reaching consequences of the reductions requested at these conferences, carriers themselves, by impairing their ability to continue to The carriers, no less than the shippers, are anxious to work towards a lower level of rates, but it is manifest that this result cannot be accomplished until there is such a reduc-

tion in operating costs and increase of business as will restore the proper relation of net to gross earnings.

"It cannot be overlooked that there are many articles analogous to those above mentioned, on which the demand and the equity of reduced rates could be equally as pressing and as great as they are with respect to the commodities mentioned, and it would be difficult, if not impossible, to prevent the inclusion of these analogous articles in any reduction in rates such as is now requested. Thus substantially more than the 25 per cent of the total tonnage of the railroads above mentioned would be either directly or indirectly involved in the requested reductions. The seriousness to the carriers of the proposal is thus evident.

"The conferences developed that, while, in the opinion of various shippers reductions in freight rates would stimulate the movement of these commodities, the fact remained that this was altogether conjecture, and that there was no assurance that any reduction in freight rates would substantially increase the movement of this traffic. It was admitted that reductions in the selling prices of some of the commodities mentioned, far exceeding the present total freight charges, had failed to create any broader markets. It was also clearly brought out that the hope of reductions in freight rates has resulted in hesitancy on the part of consumers and dealers to place orders, and because of this it was urged that carriers promptly announce their conclusion in order that the present uncertainty may be cleared up."

In notifying the shippers of this action, the carriers stated: "No industry in the country is in more acute distress than are the railroads. Many are not earning their operating expenses and taxes, many more are not earning interest charges, and no group of railroads is earning anything approximating the return contemplated by the Transportation Act to enable them to provide the facilities necessary to accommodate the normal commerce of the country.

"Obviously, therefore, the carriers cannot afford to make any general reduction in rates, nor even the reductions that would follow from the acceptance of shippers' proposals.

"The reduction in wages recently authorized by the Labor Board, but not yet realized, is more than offset by the decreased volume of business due to world-wide conditions affecting, generally speaking, all business and all interests. This traffic does not now produce, even under the advanced level of rates, a margin of profit anywhere near sufficient to meet the universally recognized needs of the carriers. It is a fact that the increases allowed by the Interstate Commerce Commission in August, 1920, in response to the provisions of the Transportation Act, are yielding the carriers less by \$622,000,000 than the return contemplated by this Act; there has been no estimate, from any source, that the recent wage reduction will even approximate that figure.

"The carriers are vitally interested in any changes which will produce needed revenue and would be justified in considering reductions could they have any reasonable assurance that the volume of traffic would be augmented sufficiently to increase their net return. However, the arguments presented indicate that even in the minds of the shippers the result of any substantial reduction in rates is purely speculative not only as to increased volume of traffic but also as to the time when an increased volume of traffic may be expected. It should be universally recognized that the carriers are in no condition to enter the field of uncertain experimentation substantially involving their revenues, for the reason that disappointment in the experiment would result in serious consequences to the public, as well as to the furnish needed transportation to the commercial public.

"It must not be overlooked that the carriers have realized that the percentage increases in rates produced inequalities and in many instances threw rates out of line, and to correct these conditions they have been and are diligently adjusting such situations. . . ."

General News Department

The Missouri, Kansas & Texas has opened an office in the City of Mexico at 24 Avenue Del Cinco De Mayo, in charge of Juan D. Noriega.

The International Railway General Foremen's Association has decided to cancel its 1921 convention which was to have been held September 12, 13, 14 and 15 at the Hotel Sherman, Chicago, owing to the financial stress and serious business conditions.

The first of five Pacific type passenger locomotives now being built in the Reading shops of the Philadelphia & Reading has recently made a trial trip. The four additional engines will be completed and put into service this summer. The engines of this class have a tractive effort of 39,046 lb., and a total weight in working order, exclusive of tender, of 273,600 lb.

The Railroad Training School at Elmira, N. Y., which is fostered by the Erie Railroad, and which teaches telegraphy and all kinds of work required in a small railroad station, now receives women as well as men. Under proper regulations the tuition is free. The age limit for entrants is 17 to 30. The manager is L. J. Baird.

The Pullman shop employees throughout the country, through the system federation, are taking a strike vote to be turned in on June 10. The ballot is being taken because the employees claim the company has not obeyed the decision of the Railroad Labor Board ordering the company to confer with the employees with a view to an agreement on rules and working conditions to take the place of the national agreements.

Preliminary compilations of railway returns for the month of April show a slightly smaller net income than that reported for March. For 196 roads the net operating income was \$25,318,000 as compared with a deficit of \$24,157,000 for April, 1920. The operating revenues were \$411,000,000 as compared with \$381,000,000 last year, while the operating expenses show a reduction; \$359,000,000 as compared with \$381,000,000 last year.

The Senate committee on interstate commerce has decided to hold a hearing on the bill introduced by Senator Cummins to strike out of the valuation act the provision requiring the Interstate Commerce Commission to report the cost of purchase or of condemnation of lands. The committee will allow a short time to W. G. Brantley, representing the railroads, J. E. Benton, representing the state commissions, and a representative of the Interstate Commerce Commission to present their views.

The Interstate Commerce Commission has announced a supplemental tentative valuation of the property of the Chicago, Terre Haute & Southeastern as of June 30, 1916, in which it finds the final value of the property owned and used to be \$20,502,223. This includes \$2,223 for property leased from private parties and \$580,924 on account of working capital and materials and supplies; and the commission reports the present costs of condemnation and damages or of purchase of lands in excess of the present value as \$1,053,557.

The American Foundrymen's Association has postponed the date of its convention and exhibit from October, 1921, to April or May, 1922. This decision does not reflect a lack of confidence in the revival of business in the foundry industry in the near future, for all of the members of the executive committee, at the time of the decision, felt that conditions would be sufficiently improved in the Fall to justify the usual convention and exhibit. It was found, however, that in none

of the eight cities considered was it possible to find, during September or October, adequate hotel accommodation and exhibit facilities. It was therefore deemed advisable to defer the convention till Spring.

H. C. Bixler, for the last three years superintendent of the Manhattan division of the Pennsylvania Railroad, has been appointed transportation engineer for the Port of New York Authority, office at 11 Broadway, New York City. Mr. Bixler was in the service of the Pennsylvania about 33 years, having begun as telegrapher on the Pittsburgh division. In 1891 he was appointed train dispatcher and later assistant trainmaster on the Pittsburgh division. In November, 1909, he was appointed trainmaster of the New York Terminal division and was in that position when the passenger terminal at Thirty-third street was organized and opened for business. Two years later he was promoted to be assistant superintendent of the Philadelphia Terminal division, later becoming superintendent of stations and transfers, with authority over the whole road. From that position he was called back, in 1918, as above noted, to New York City. In this position he had charge of the marine department, the freight piers and stations, the Manhattan division having little or no main line territory. Here, as well as in his last position at Philadelphia, Mr. Bixler had occasion to study all kinds of freight terminal problems. He installed tractors and trailers and other machinery on the New York City piers. He was also on a committee of the American Railway Association which made a study of freight handling at important cities throughout the country.

Superintendents' Association

Owing to the unusual conditions existing on the railways at the present time, the executive committee of the American Association of Railroad Superintendents has deemed it advisable to postpone the 1921 convention which was to have been held in Kansas City, Missouri, on August 24, 25 and 26.

Grand Trunk Loses Suit

The court of appeals of the District of Columbia on June 5 affirmed the action of the supreme court of the District of Columbia in denying a mandamus asked by the Grand Trunk Western to compel the Secretary of the Treasury to issue a warrant for \$500,000 on a certificate of the Interstate Commerce Commission for a partial payment on account of its guaranty for the six months following the period of federal control. Since this action was instituted, Congress has specifically authorized such partial payments to the railroads in advance of final settlement by the passage of the Winslow bill.

Progress in Store Door Delivery

The establishment of store door delivery throughout the country for the relief of terminal congestion and for improving transportation is showing some progress. Upon recommendation of the Federal Highway Council a committee representing the shippers and carriers of Baltimore, Md., has been appointed to work out the details for operating such a system in Baltimore. It has already been decided to undertake such a service. The committee appointed consists of A. E. Beck, chairman and representative of the Federal Highway Council and the Merchants and Manufacturers Association of Baltimore; for the shippers: George P. Neilson, superintendent, American Wholesale Corporation; James M. Easter, president, Daniel Miller Company; Walter Halstein, president, Baltimore Transfer Company; and Robert A. Masson, Masson Transfer Company; for the railroads: Pennsylvania—G. M. Smith, superintendent; S. T. Stackpole, division freight agent;

J. S. Corcoran, freight agent, and F. W. B. Humes, superintendent, stations and transfers; Western Maryland—J. M. Allison, freight traffic manager; C. F. Eckhart, agent, and T. E. Withers, manager of warehouses; Baltimore & Ohio—Golden Shumate, freight traffic manager; W. E. Neilson, freight agent, Camden station; M. F. Steinberger, special engineer, operating department, and J. C. Brown, manager, Blue Line Transfer Company.

John Fritz Medal Goes to France

The John Fritz medal and diploma, the highest honor bestowed by American engineers, has been awarded to Charles Prosper Eugene Schneider, the distinguished French engineer and scientist and head of the great Creusot engineering and steel works of France. The following cable has been sent to his home in Paris:

"John Fritz Medal Board of Award, representing national societies of civil, mining and metallurgical, mechanical and electrical engineers, has awarded you the John Fritz Gold Medal for achievement in metallurgy of iron and steel; for development of ordnance, especially the 75-mm. gun, and for notable patriotic contribution to the winning of the war.

The medal and diploma will be presented to Mr. Schneider by a party of prominent American engineers, led by Ambrose Swasey, chairman of the board of award.

Operating Statistics for March

The bulletin of operating statistics for the month of March issued by the Interstate Commerce Commission shows that the records in car efficiency made by the railroads last year are not being maintained during the period of depression in traffic. The miles per car day for March averaged 20.9 as compared with 24 in March, 1920; the net tons per loaded car averaged 27.2 as compared with 28.1, and the net ton miles per car day averaged 359 as compared with 487. The number of cars per train averaged 37.4 as against 35.6, but the net tons per train were only 626 as compared with 703 last year. The train speed per car shows an increase from 10.1 miles an hour in March last year to 11.4. While the percentage of unserviceable freight cars shows a considerable increase, the percentage of unserviceable locomotives, on the other hand, shows a decrease from 25.7 last year to 23.1 this year.

The Burden of Taxation

"Taxation is the greatest burden industry has today," said Paul Shoup, vice-president of the Southern Pacific Company, in a recent address before the California Bankers' Association at San Diego. Mr. Shoup cited the Southern Pacific Company as an example of industry handicapped by high taxation. "The Southern Pacific Company," he said, "had in 1912, before payment of taxes, interest and other fixed charges, or dividends apportioned to California on the accepted basis, \$23,556,970 of its earnings, out of which in the succeeding fiscal year it paid to the State of California on its property devoted to public service, \$2,954,084 in taxes. In 1920, its earnings apportioned to California on the same basis were \$19,364,560, out of which it will have to pay in the succeeding fiscal year under the new tax laws, \$8,167,000. The ability of the company to give service is impaired, and its consequent inability to reduce freight rates and passenger fares in turn has its effect on other industries."

Black Tom Damage Suits

The United States Supreme Court on June 5 declined to grant a writ of certiorari providing for a review of the decisions of New York and New Jersey courts which held the Lehigh Valley Railroad liable for damages caused in the explosion of munitions at Black Tom Island, New York harbor, in July, 1916.

At Trenton, N. J., on June 7, the Supreme Court of New Jersey, affirming a decision of the county court, decided in favor of the Lehigh Valley in suits brought by the King of England, the Republic of France and the Actna Explosives Company. These suits had been brought for losses due to the explosion, including considerable quantities of munitions which were on barges, and smaller quantities which were in cars on tracks of the Central Railroad of New Jersey, adjacent to the Lehigh Valley dock; and the present decision is

to the effect that the Lehigh Valley is not responsible for these losses, which did not occur on its own premises. In the case of the barges, it is held that they had no business to be at that place at the time of the explosion. Of the sum demanded by France (over one million dollars) about \$122,566 was allowed; and this partial award to France has been made the basis of an appeal by the railroad company to the Court of Errors and Appeal.

Report on Elimination of Waste

The special committee on the elimination of waste in industry appointed by Herbert Hoover while president of American Engineering Council presented its report at the meeting of the executive board of the council at St. Louis, Mo., on June 3. The report as presented was not accepted as final, but was referred back to the committee for revision. It dealt with housing and building, men's ready made clothing, shoes, metal trades and printing industries and its findings show that "waste results from an interruption of production, low production, restriction of production and lost production," of which "over 50 per cent of the responsibilities for these wastes can be placed at the door of management and less than 25 per cent at the door of labor." The report covers in detail many of the abuses found in all industries both on the side of the managements and on the side of labor while recommendations for elimination of waste and also an outline for governmental assistance were likewise submitted in the report.

Mr. Ford's Railroad Raises Pay

Henry Ford, president of the Detroit, Toledo & Ironton Railroad (463 miles, 75 locomotives), announces that from July 1 the minimum daily wage rate of six dollars, now prevailing in the Ford factories, will be extended to all employees of the railroad, with bonuses for demonstrated efficiency. Railroad employees will work only six days a week, the same as workmen in other industries. From 6 p. m. Saturday to 6 a. m. Monday not a wheel will move on train or in shop, except the minimum required to move milk trains. "We are trying to put this railroad on a factory basis," said Mr. Ford. "We are going to work the railroad six days a week, with eight-hour shifts, and rest on the seventh day. We believe it will mean better service to the public. . . . In one month, with a reduced revenue of \$100,000, we showed a profit on our operations, where formerly there had been a \$200,000 deficit."

Off-line commercial agencies are to be closed on July 1 and all traffic solicitation will be managed from the general office in Detroit.

Organization of Technical War Service Officers

In connection with the organization, under the direction of General Pershing, of the reserve armies of the United States, it is proposed to associate informally members of the Army Ordnance Association and the ordnance officers of the Reserve Corps. The membership of the Army Ordnance Association, of which Benedict Crowell is president, is comprised of some 2,400 technical and business experts who, during the war, served either as officers of the Ordnance Department or as executives of industries engaged in ordnance manufacture. For the purpose of offering assistance in the organization of the Reserve Armies and in the solution of local war plans, it is now proposed to form in the metropolitan district of New York, a local organization of the Army Ordnance Association to include as members all ordnance officers of the Officers' Reserve Corps.

There will be a meeting for this purpose at the Engineering Societies' Building, 29 West 39th street, at 8 p. m., Wednesday, June 15. Short addresses will be made by Maj. Gen. C. C. Williams, Chief of Ordnance; Maj. Gen. Robert L. Bullard, Commanding General of Second Corps Area; Brig. Gen. William Weigel, Chief of Staff, Second Corps Area; Col. Samuel G. Shartle, Assistant Chief of Staff, Second Corps Area; Major M. L. Brett, Office of Assistant Secretary of War, and others. All who served as officers in the Ordnance Department during the war, and all who are interested in Ordnance as a factor in preparedness, are invited to attend.

Operating Statistics of Large Steam Roads—Selected Items for the Month of March, 1921,

Region, road and year	Average miles of road operated	Locomotive-miles				Car-miles			Ton-miles (thousands)			Locomotives on line daily			
		Train-miles	Principal and helper	Light	Loaded (thousands)	Empty (thousands)	Per cent loaded	Gross Excluding locomotive and tender	Net Revenue and non-revenue	Service-able	Un-service-able	Per cent un-service-able	Stored	Per cent	
														Service-able	Un-service-able
New England region:															
Boston & Albany.....	1921	394	245,063	265,024	30,843	4,383	2,554	63.2	242,972	98,792	122	28	17.3	...	...
Boston & Albany.....	1920	394	281,722	300,666	32,363	5,260	1,426	78.7	254,104	116,967	124	32	20.5	...	...
Boston & Maine.....	1921	2,481	588,993	588,602	10,607	5,325	66.6	584,925	246,386	344	116	23.2	62	...	...
Boston & Maine.....	1920	2,482	605,596	715,157	66,477	12,050	3,243	78.8	604,056	278,205	332	118	26.2	...	...
N. Y., N. H. & H.....	1921	1,259	1,325,919	1,268,000	18,217	12,250	5,093	66.4	1,247,674	498,666	154	27	19.2	27	...
N. Y., N. H. & H.....	1920	1,938	505,547	523,654	41,723	10,821	2,870	79.0	520,583	246,124	282	112	28.3	...	...
Great Lakes region:															
Delaware & Hudson.....	1921	880	360,541	477,570	33,731	8,475	5,968	58.6	585,381	290,005	277	35	11.2	90	...
Delaware & Hudson.....	1920	880	347,346	398,934	39,924	9,313	4,179	69.5	609,676	323,998	252	37	12.8	15	...
Del., Lack. & Western.....	1921	997	500,996	615,991	118,608	14,860	7,292	67.1	841,751	394,679	333	47	12.4	50	...
Del., Lack. & Western.....	1920	997	542,777	691,814	157,417	17,183	5,331	76.3	923,950	474,055	287	66	18.7	6	...
Erie (inc. Chic. & Erie).....	1921	2,239	941,628	1,051,137	51,797	27,773	16,949	62.1	1,751,365	800,201	563	149	20.9	76	...
Erie (inc. Chic. & Erie).....	1920	2,259	1,125,919	1,268,000	41,833	13,559	12,285	75.4	2,070,634	1,060,642	553	73	13.1	17	...
Lehigh Valley.....	1921	1,431	524,728	579,199	52,756	14,000	8,699	61.7	870,208	402,144	403	129	24.2	116	...
Lehigh Valley.....	1920	1,429	651,874	733,041	69,197	18,669	6,206	75.1	1,051,383	535,169	376	167	30.8	40	...
Michigan Central.....	1921	1,829	438,646	455,279	15,753	12,462	7,604	62.1	688,992	274,414	328	91	21.7	107	...
Michigan Central.....	1920	1,826	320,707	382,777	15,100	7,331	3,975	80.4	473,938	488,084	335	83	24.0	0	...
New York Central.....	1921	5,646	1,663,615	1,802,905	135,055	53,997	33,425	61.6	3,169,362	1,357,675	1,140	498	30.4	355	...
New York Central.....	1920	5,646	2,299,987	2,599,537	185,793	78,112	29,214	72.9	4,931,208	2,136,423	(1)	(1)	(1)	(1)	...
N. Y., Chic. & St. L.....	1921	572	332,085	333,851	568	9,408	5,000	65.3	499,362	198,278	110	58	34.5	33	...
N. Y., Chic. & St. L.....	1920	572	375,859	384,774	1,359	12,285	7,250	84.4	596,227	294,305	104	78	42.9	8	...
Pere Marquette.....	1921	2,207	283,977	291,362	5,306	6,814	4,072	62.8	363,680	172,395	171	37	17.9	30	...
Pere Marquette.....	1920	2,200	340,195	351,044	6,165	8,886	2,438	77.8	429,475	213,150	148	54	26.8	...	...
Pitts. & Lake Erie.....	1921	22	80,635	90,119	608	2,711	1,679	61.1	197,748	110,834	67	11	15.2	23	...
Pitts. & Lake Erie.....	1920	22	157,607	161,764	7,754	5,444	2,674	67.1	385,236	226,306	64	6	14.7	...	...
Wabash.....	1921	2,418	541,623	570,213	30,743	14,983	7,143	67.2	806,933	419,203	277	51	19.8	38	...
Wabash.....	1920	2,418	627,929	645,284	10,305	17,301	4,240	80.3	866,263	491,605	252	81	24.3	...	...
Ohio-Indiana-Allegheny region:															
Baltimore & Ohio.....	1921	5,185	1,606,146	2,002,953	105,653	36,874	25,555	59.1	2,404,102	1,126,125	1,011	389	27.8	230	...
Baltimore & Ohio.....	1920	5,154	2,026,468	2,551,607	149,030	55,525	23,284	70.5	3,436,682	1,817,815	1,031	305	22.7	131	...
Central of N. I.....	1921	679	260,815	286,954	33,306	5,542	4,062	57.7	381,721	189,089	214	50	18.9	19	...
Central of N. I.....	1920	679	342,266	378,680	44,856	6,222	3,832	64.4	424,441	232,713	210	49	18.9	...	...
Chicago & Eastern Ill.....	1921	1,131	207,215	208,424	3,814	4,675	2,770	62.8	277,480	133,921	117	55	32.0	34	...
Chicago & Eastern Ill.....	1920	1,131	207,215	208,424	3,814	4,675	2,770	62.8	277,480	133,921	117	55	32.0	34	...
C. C. & C. & St. L.....	1921	2,396	644,023	680,884	3,591	16,275	12,289	57.0	1,065,808	491,924	319	115	26.3	20	...
C. C. & C. & St. L.....	1920	2,393	737,179	769,643	113	22,981	8,408	73.2	1,239,844	607,887	275	116	29.7	...	...
Elgin, Joliet & Eastern.....	1921	837	103,296	115,410	8,527	2,971	1,331	69.1	217,581	120,147	101	9	8.2	28	...
Elgin, Joliet & Eastern.....	1920	837	103,296	115,410	8,527	2,971	1,331	69.1	217,581	120,147	101	9	8.2	28	...
Long Island.....	1921	395	42,891	50,262	8,402	549	322	63.6	29,766	11,494	35	8	18.8	3	...
Long Island.....	1920	395	44,443	75,091	11,971	772	274	67.6	28,638	12,003	38	13	25.3	...	...
Pennsylvania System.....	1921	10,851	3,864,427	4,218,501	304,634	93,616	58,405	61.6	6,387,970	3,169,794	2,510	713	22.1	795	...
Pennsylvania System.....	1920	10,858	5,054,804	5,628,240	418,804	134,712	57,872	75.0	8,303,575	4,430,133	2,616	883	32.8	81	...
Phila. & Reading.....	1921	691	491,435	507,277	68,339	11,633	6,959	60.5	801,401	374,847	347	87	24.8	...	...
Phila. & Reading.....	1920	690	681,296	786,042	98,844	16,660	8,450	66.3	1,120,834	631,201	367	87	22.4	2	...
Peachontas region:															
Chesapeake & Ohio.....	1921	2,543	638,487	694,505	18,411	17,393	13,432	56.4	1,301,919	674,950	453	107	21.1	98	...
Chesapeake & Ohio.....	1920	2,517	892,960	978,550	36,786	25,984	19,685	61.9	1,904,374	1,068,530	410	129	24.0	...	...
Norfolk & Western.....	1921	2,200	609,173	736,536	25,204	15,722	10,791	59.2	1,192,069	631,195	632	140	18.1	272	...
Norfolk & Western.....	1920	2,192	797,222	1,011,140	48,698	22,400	12,651	63.9	1,672,350	929,819	436	252	36.6	11	...
Southern region:															
Atlantic Coast Line.....	1921	4,883	732,391	734,999	11,879	16,007	9,821	62.0	845,839	317,809	301	119	28.3	2	...
Atlantic Coast Line.....	1920	4,892	777,667	780,794	11,865	16,639	7,508	68.9	855,355	348,937	274	125	31.3	...	...
Central of Georgia.....	1921	1,908	238,922	240,659	2,125	4,816	2,050	76.1	255,962	117,930	100	24	19.4	...	...
Central of Georgia.....	1920	1,913	242,825	245,402	4,758	5,116	4,470	77.6	258,328	125,700	92	27	21.8	...	...
I. C. (inc. Y. & M. V.).....	1921	6,151	1,913,782	1,923,188	23,820	29,951	22,900	63.3	2,398,580	1,071,844	745	103	13.8	26	...
I. C. (inc. Y. & M. V.).....	1920	6,151	1,913,782	1,923,188	23,820	29,951	22,900	63.3	2,398,580	1,071,844	745	103	13.8	26	...
Louisville & Nashville.....	1921	5,026	1,417,797	1,508,970	55,823	23,404	15,806	59.7	1,496,411	688,959	543	113	17.5	28	...
Louisville & Nashville.....	1920	5,024	1,553,864	1,688,487	58,024	28,268	11,225	71.6	1,666,644	836,839	499	135	21.4	...	...
Seaboard Air Line.....	1921	6,531	1,829,689	1,829,689	6,618	9,033	5,490	62.0	2,273,719	1,042,911	621	121	19.4	...	...
Seaboard Air Line.....	1920	6,537	499,977	509,213	9,001	11,550	4,433	72.3	603,462	264,724	391	86	11.1	...	...
Southern Ry.....	1921	6,942	1,182,045	1,203,511	26,734	24,876	11,243	68.9	1,284,609	536,772	819	172	17.3	54	...
Southern Ry.....	1920	6,948	1,487,392	1,531,603	52,709	35,941	10,592	77.1	1,791,670	834,153	952	156	14.0	...	...
Northwestern region:															
C. & N. W.....	1921	8,320	1,530,407	1,568,924	18,059	29,051	18,291	61.4	1,698,857	657,068	620	331	34.8	4	...
C. & N. W.....	1920	8,062	1,754,717	1,792,282	21,744	38,720	14,507	72.7	2,033,311	920,485	671	243	26.6	4	...
C. M. & St. P.....	1921	10,618	1,229,375	1,336,467	61,051	29,620	16,886	64.1	1,605,022	688,860	817	262	24.0	134	...
C. M. & St. P.....	1920	10,618	1,776,661	1,829,689	79,050	36,310	20,898	72.0	2,282,570	1,042,911	854	266	31.1	...	...
C., St. P., M. & O.....	1921	1,726	305,566	328,402	12,613	5,552	2,460	69.3	298,187	118,784	154	51	24.9	28	...
C., St. P., M. & O.....	1920	1,726	346,174	368,103	17,877	6,641	1,803	78.6	325,056	148,494	153	59	27.8	17	...
Great Northern.....	1921	7,982	684,472	704,962	24,823	17,368	6,171	73.8	913,981	443,961	608	170	21.9	270	...</

Compared with March, 1920, for Roads with Annual Operating Revenues above \$25,000,000*

Region, road and year	Average number of freight cars on line daily			FREIGHT SERVICE					Pounds of coal		Passenger service			
	Home	Foreign	Total	Per cent un-service-able	Gross tons per train, excluding locomotive and tender	Net tons per train	Net tons per car	Net tons per car-day	Car-miles per car-day	Net ton miles per day of road	ton-miles, including locomotive and tender	Train miles	Passenger train-car-miles	
														Stored	Incompleting	Net tons per train	Net tons per car	Net tons per car-day	Car-miles per car-day	Net ton miles per day of road	ton-miles, including locomotive and tender	Train miles	Passenger train-car-miles
New England Region:														
Boston & Albany.....1921	3,323	4,699	8,022	6.6	1,383	992	403	22.5	397	27.9	8,090	208	319,833	2,012,683
1920	4,820	10,116	15,096	3.9	907	907	415	22.5	356	20.4	9,578	749	317,681	1,956,896
Boston & Maine.....1921	17,332	14,877	32,209	6.3	3,934	1,106	446	23.2	347	26.0	15,342	162	818,146	4,570,199
1920	7,281	32,670	39,951	8.5	.....	928	427	23.1	224	12.3	3,614	.....	844,908	4,433,385
N. Y., N. H. & H.....1921	24,495	16,978	41,473	14.4	5,563	1,176	511	22.8	182	11.9	8,184	181	1,096,824	6,695,333
1920	7,643	42,945	50,588	5.8	.....	1,030	487	22.8	157	8.7	4,096	214	1,068,482	6,511,835
Great Lakes Region:														
DelaWare & Hudson.....1921	11,976	5,028	17,064	8.7	1,236	1,674	804	34.2	548	27.8	10,688	201	187,876	974,005
1920	2,866	15,506	18,372	5.1	.....	1,595	835	34.2	571	24.0	12,213	221	188,510	912,000
Del., Lack. & Western.....1921	16,215	7,862	24,078	7.8	893	1,650	788	36.6	529	29.7	12,773	183	493,254	3,522,313
1920	1,471	24,067	27,238	5.4	.....	1,702	873	27.6	561	26.0	15,342	162	468,749	3,356,430
Erie (inc. Chic. & Erie).....1921	35,223	15,996	51,219	16.2	10,809	1,860	580	38.8	504	28.2	11,428	148	674,803	5,078,290
1920	6,948	52,475	59,423	6.1	.....	1,842	944	29.6	576	23.8	15,448	168	711,871	4,948,998
Lehigh Valley.....1921	29,297	10,318	39,615	11.6	2,725	1,658	766	38.7	328	18.5	9,068	196	362,789	2,718,428
1920	7,821	31,770	39,591	6.2	.....	1,613	821	38.7	318	19.1	12,079	214	374,167	2,619,726
Michigan Central.....1921	17,892	10,378	28,270	13.7	2,442	1,566	626	22.0	313	22.9	48,339	139	275,571	5,041,230
1920	3,777	38,354	42,131	6.8	.....	1,724	828	24.0	373	19.4	8,600	.....	629,657	5,396,395
New York Central.....1921	84,295	51,960	136,255	10.0	26,513	1,906	816	35.3	321	20.6	7,757	133	2,344,930	17,922,860
1920	22,850	147,056	173,906	6.0	.....	1,828	929	37.2	406	20.4	12,882	256	2,465,501	17,856,411
N. Y., Chic. & St. L.....1921	1,813	4,461	10,274	14.9	1,319	1,594	597	21.1	223	11.1	4,094	26	67,573	417,427
1920	5,482	9,746	11,228	6.5	.....	1,588	783	34.0	846	41.7	16,506	.....	285,656	1,370,882
Perr Marquette.....1921	10,418	7,139	17,557	11.3	1,850	1,281	607	25.3	317	19.0	2,520	165	285,656	1,370,882
1920	3,746	19,690	23,436	6.2	.....	1,262	627	25.1	293	15.0	1,125	199	290,229	1,388,496
Pitts & Lake Erie.....1921	16,477	8,586	24,963	11.8	4,585	2,452	1,375	25.1	293	15.0	1,125	199	290,229	1,388,496
1920	3,457	22,202	25,659	9.3	.....	2,444	1,436	41.6	285	10.2	32,509	102	106,081	525,525
Wabash.....1921	12,857	10,215	23,072	11.1	.....	1,493	633	22.9	479	30.9	4,575	178	522,953	2,689,864
1920	4,835	16,262	21,097	12.2	.....	1,380	668	24.2	641	32.9	5,993	200	534,708	2,693,857
Ohio-Indiana-Allegheny Region:														
Baltimore & Ohio.....1921	67,773	30,971	98,744	9.3	5,570	1,497	701	30.5	368	20.4	7,008	197	1,395,295	8,908,047
1920	19,033	77,553	96,988	6.5	.....	1,696	897	32.7	605	26.2	11,378	.....	1,336,420	8,072,533
Central of N. J.....1921	18,971	10,001	28,972	23.7	3,969	1,464	725	34.1	215	10.7	8,990	216	324,321	1,489,909
1920	3,767	18,992	22,760	11.8	.....	1,246	640	26.6	430	15.7	5,026	53	319,933	1,335,556
Chicago & Eastern Ill.....1921	15,968	2,799	18,767	11.0	5,150	1,339	646	28.7	230	12.8	1,820	94	275,571	5,041,230
1920	8,261	12,982	21,243	9.2	.....	1,482	764	31.4	371	17.9	6,972	.....	237,884	1,539,760
C., C. & St. L.....1921	19,055	16,878	35,933	10.3	5,351	1,655	748	29.6	433	25.7	6,488	145	750,958	4,746,157
1920	2,612	29,452	32,064	5.8	.....	1,688	821	36.8	412	31.6	8,984	.....	739,630	4,617,547
Elgin, Joliet & Eastern.....1921	10,409	4,615	15,024	5.6	3,508	2,106	1,163	40.4	258	32.2	6,322	49	.....	.....
1920	7,907	8,572	16,479	6.8	.....	2,195	1,209	39.5	436	16.3	8,633	.....	.....	.....
Long Island.....1921	1,795	3,183	4,978	4.2	655	694	268	20.9	74	5.6	940	376	195,765	1,024,842
1920	451	6,949	7,400	4.6	.....	646	269	20.9	74	5.6	940	.....	181,062	924,857
Pennsylvania System.....1921	206,263	71,139	277,402	9.9	87,478	1,653	830	33.9	369	17.7	9,423	111	5,926,262	33,978,226
1920	91,437	207,265	298,702	7.9	.....	1,643	876	33.0	478	20.7	13,186	.....	5,269,921	34,172,111
Phila. & Reading.....1921	27,103	12,898	40,001	9.9	6,448	1,633	849	35.9	336	15.5	19,398	204	531,241	2,395,794
1920	5,385	31,496	36,881	4.3	.....	1,645	926	37.9	552	22.0	29,507	.....	513,629	2,352,538
Pocahontas Region:														
Chesapeake & Ohio.....1921	37,347	11,697	49,134	7.3	11,448	2,039	1,057	38.8	443	20.2	8,564	144	447,039	2,463,185
1920	6,816	26,991	33,807	9.2	.....	2,133	1,197	41.1	1,020	40.0	13,695	.....	414,459	2,239,615
Norfolk & Western.....1921	38,351	6,740	45,091	7.0	13,859	1,036	403	45.2	189	9.2	2,430	180	391,116	2,418,188
1920	8,896	23,790	31,596	10.6	.....	2,098	1,166	41.5	949	35.8	13,686	.....	397,611	2,443,721
Southern Region:														
Atlantic Coast Line.....1921	21,814	12,232	34,046	13.7	.....	1,155	433	19.8	301	24.4	2,097	142	909,386	6,572,908
1920	5,975	30,315	36,290	9.6	.....	1,101	449	21.0	310	21.4	2,301	.....	885,506	6,147,777
Central of Georgia.....1921	4,844	4,159	8,994	18.6	1,848	1,072	494	25.6	439	16.6	1,994	160	324,444	1,499,936
1920	1,432	6,059	10,491	4.5	.....	1,064	518	24.6	387	20.3	2,121	.....	319,434	1,671,760
I. C. (inc. of M. & V.).....1921	45,085	17,949	63,034	6.6	10,943	1,505	673	28.2	549	30.8	5,621	153	1,472,422	8,993,298
1920	11,627	42,763	54,390	6.4	.....	1,573	759	28.0	860	42.7	7,606	.....	1,391,363	8,147,562
Louisville & Nashville.....1921	12,844	24,789	41,633	8.2	94	1,060	539	29.6	648	30.6	5,733	182	905,292	5,334,038
1920	16,224	18,759	34,983	11.1	.....	1,111	484	21.8	470	17.7	4,413	.....	905,292	5,334,038
Seaboard Air Line.....1921	11,005	9,133	20,138	16.9	.....	1,099	422	20.8	301	22.7	1,715	187	627,931	3,864,076
1920	3,120	22,875	25,995	6.2	.....	1,207	540	22.0	329	19.8	2,414	201	599,035	3,662,990
Southern Ry.....1921	38,875	22,609	61,484	8.2	7,400	1,057	454	28.1	189	15.0	3,871	215	1,300,653	8,481,133
1920	15,010	51,119	66,129	4.3	.....	1,204	560	23.1	407	22.7	3,871	.....	1,486,356	8,930,069
Northwestern Region:														
C. & N. W.....1921	47,748	25,489	73,237	7.5	5,500	1,110	429	22.6	289	20.9	2,548	202	1,688,715	10,020,020
1920	61,118	13,880	75,000	6.0	.....	1,170	525	23.8	354	17.0	3,683	.....	2,059,885	9,816,067
C. M. & St. P.....1921	44,201	18,232	62,433	10.4	4,871	1,242	533	22.7	356	23.5	2,623	165	1,699,833	10,020,020
1920	19,803	71,857	91,660	6.3	.....	1,341	615	25.1	404	21.5	3,527	.....	1,410,064	8,808,138
C. St. P. M. & O.....1921	3,722	11,390	15,112	10.4	1,950	976	389	21.4	259	17.1	2,220	197	323,439	1,807,827
1920	1,678	10,451	13,382	9.4	.....	1,111	459	22.4	358	20.4	2,275	.....	320,018	1,853,737
Great Northern.....1921	46,685	9,991	56,276	13.0	.....	1,335	649	25.6	234	13.5	1,794	193	1,003,570	5,838,112
1920	18,322	28,233	46,556	8.4	.....	1,354	664	25.5	474	25.2	2,762	.....	962,867	5,883,828
M. St. P. & St. Ste. M.....1921	16,705	9,332	25,037	10.3	2,400	1,087	491	23.4	291	18.4	1,727	149	442,217	2,253,937
1920	3,770	18,022	21,792	6.9	.....	1,444	535	23.1	494	25.7	2,427	165	407,147	2,509,638
Northern Pacific.....1921	36,2													

Freight Station Section—A. R. A.

The first annual session of the freight station section of the American Railway Association will be held at Hotel Sherman, Chicago, on Tuesday, Wednesday and Thursday, June 21, 22 and 23. The call, signed by R. O. Wells, secretary (Chicago), advises members to secure their hotel accommodations direct, without delay, because of general congested conditions. The Pullman Company will, according to its usual custom, refund one-half the sums paid by members on Pullman cars.

The program of topics to be discussed at the meeting is embraced under five heads, namely, Freight Claim Prevention; Operation; Station Settlements; Station Traffic; General. The topics are lettered, as follows:

Freight claim prevention: A—Prevention of loss of entire package. B—Affirmative check of l.c.l. merchandise. C—Detection and correction of errors in l.c.l. freight before cars are forwarded. D—Locating concealed losses. E—Pilferage of shoes, hats and drygoods; detection of concealed losses. F—Elimination of various bureaus. G—The inspection bureau. H—Advantages of blind tally checks. I—Distinctive coloring of way-bill blanks for order shipments. J—Bonding of receiving and delivery clerks.

Operating: A—Weighing less l.c.l. freight. B—Illegible billings. C—Licensing of public cars.

Station Settlements: A—Accounting for interline switching. B—Collections and credits. C—Credits, safe method of handling. D—Forwarding of way-bills overhead for all merchandise cars, excepting local freight. E—Use of card way-bill with car instead of revenue way-bill. F—Interline waybilling. G—Desirability of universal through waybilling.

Station Traffic: A—Question of assessing charge for intercepting l.c.l. shipments at point of origin.

General: A—Organization of freight station forces in the interest of education and efficiency. B—Relation of freight station to traffic department. C—Warehouse supervision. D—Standardizing freight cars and application of the graduated minimum weight rule.

Inspection of Cars on the Interborough

The right kind of discipline of car inspectors consists in securing men so fully competent for their duties that they do not have to be disciplined. This would seem to be the lesson of the experience of the Interborough Rapid Transit Company, New York City, as interpreted by Frank Hedley, president of the company. The Interborough runs express trains every day, for hours at a time, at intervals of two minutes or less. In such an exacting traffic a delay of half a minute is liable to be the subject of an inquiry, so that the inspection of the hundreds of passenger cars (motors) in use on these trains constitutes a problem which must be dealt with in the most thoroughgoing fashion.

Mr. Hedley, in a recent address, said:

"You must, of course, have a high standard of inspection and maintenance. We maintain our motors on a mileage basis in connection with lubrication. Our motor cars make 1,200 miles before they are laid up. Then they are taken in, oiled and adjusted, the carbon brushes adjusted, the brakes adjusted, etc., and put in shape for another 1,200 miles. We do not have any terminal inspections at all. After a car runs 1,200 miles the mileage clerk puts it in the yard for inspection. We have a system of indexing all the work there is on that car. When the car comes in it is carded by the shop clerk. And this card has on it a list of every item that has to be examined. Different men are assigned to different things, and before that car goes out that card has to be filled out with the initials and number of every man who inspected his particular part of the work.

"If anything happens to that car out on the road, and it hasn't gone 1,200 miles, we know the very men that should have put it in shape to make it go 1,200 miles. If a man is at fault, he is, of course, disciplined. But we don't administer very much discipline, other than conversation, because after a man has proved himself two or three times to be careless, we can't bother with him any more. We let him go. It is much better to let him go than to suspend him. That only makes a man dissatisfied and more careless. As a result, we run frequently, day in and day out, for thirty days, without developing a single second's interference with the train movement because of defective inspection or defective equipment."

Traffic News

E. L. Dalton has been appointed traffic manager for the American Radiator Company, with headquarters at Chicago.

A. C. Holmes, traffic manager of the Empire Refineries, Inc., Tulsa, Okla., was appointed president of the Transportation Club of Tulsa at a meeting of the board of governors on May 23, succeeding J. A. Bernier.

Freight rates on vegetables, melons and apples from the Pacific Coast to eastern points are to be reduced, according to an announcement given out on June 6. On vegetables and melons the rate will be \$1.75 per 100 lb. to places east of Chicago and the Mississippi river. On apples, without the storing in transit privilege, the rate, beginning September 1, will be \$1.50 per 100 lb. This last applies to Colorado and practically all points thence east to the Atlantic seaboard.

For the third week in succession the production of soft coal has been practically stationary at approximately 8,000,000 tons, according to the weekly estimate of the Geological Survey, the total for the week ended May 28 being 8,053,000 net tons. The general trend of production continued to parallel closely that of 1919, but was below it. The average daily output for May was the lowest in any May since 1915. Shipments of soft coal from the lower lake ports, however, continued to increase during the last week in May and the total shipments for the season are well ahead of both 1918 and 1920.

Although the proposal of the transcontinental railroads to reduce rates between the Atlantic and Pacific Coast terminals on a large number of commodities especially subject to water competition has not yet reached the Interstate Commerce Commission, the Commission is already being flooded with telegraphic protests, based on the newspaper reports of the intentions of the carriers, from the representatives of the intermediate communities whose rates would not be lowered. The application of the roads for fourth section relief is, therefore, expected to stir up the old controversy over the relation of transcontinental rates.

Pacific Coast Fruit via Panama Canal

Shippers of perishable commodities from the Pacific Coast have obtained the promise of the United States Shipping Board, through R. M. Semmes, district representative in the West, of facilities for the shipment of greater quantities of Washington, Oregon and California fruits and produce to the Eastern seaboard by water, according to a statement issued in Washington.

The attitude of the board as outlined by Mr. Semmes is to place refrigeration in Shipping Board vessels, if the shippers can assure the board that the business will be a profitable one. Members of the Pacific Coast Producers' Association formed to promote shipments of fruits and vegetables through the Panama Canal, assured Mr. Semmes that all refrigerated space provided would be filled on Eastern voyages. Representatives of the association are said to be negotiating with steamship companies for a rate of 90 cents a box from Pacific to Atlantic ports. Representatives of the fruit growers say that the fruit industry is being strangled by high rail rates and that railroads have refused to give emergency rates, as was done with lumber industry, because growers had not taken advantage of competitive water routes and forced reduction.

Congress Should Keep Hands Off

The New England Traffic League, composed of leading shippers of New England, in resolutions adopted on June 8, disapproves immediate general reductions of freight rates. The resolutions say:

"Whereas, The New England Traffic League notes a tendency in various sections of the country to call for a general reduction in freight rates and . . . bills have been introduced in Congress calling for a plan of legislation whereby rates would be fixed by Congress; be it

"Resolved, That freight rates are only a small factor in the

present business depression and at this time no general reduction in freight rates can be made effective without serious harm to the carriers; adjustments of individual rates should be handled in an orderly way by application to the carriers or by complaint before the Interstate Commerce Commission as provided by law; . . . it is not for the best interests of the country to have rates made by Congress or to depart from the method of rate making as provided in the Transportation Act of 1920; and . . . the league is opposed to efforts that are being made to obtain a general reduction in freight rates prior to railroad operating costs being reduced. . . ."

Cattle Raising in Georgia

The Central of Georgia Railway, to promote cattle raising in the territory adjacent to its lines, has encouraged the farmers—one in each county—by joining in the establishment of test pastures for the purpose of demonstrating, to everyone interested, that good results can be obtained in this business in spite of obstacles formerly supposed to be prohibitive; and 46 such pastures have been sown with approved grass seed this year.

Cattle raising has been classed as a risky enterprise in the southern states because of the ravages of the Texas cattle tick, and also because the climate was supposed to be less favorable than that of the northern states; but the Agricultural Department of the railroad company decided to try to overcome the objections—the tick having been practically exterminated—and last autumn announced that it would spend \$100 in co-operation with some farmer in each one of the counties traversed by the railroad's lines; and the offer has been quickly accepted in all of the 46 counties; 12 in Alabama and 34 in Georgia. Each tract has been selected because of its suitability for pasturage, offers of land which is already producing profitable crops being rejected. Three kinds of seed were principally used, and the railroad company bought large quantities of these and sold them to the farmers at cost prices; two tons of Dallis grass, three of Carpet grass and six of Lespedeza (Japan clover), some of the seed going to farmers other than those operating the test pastures.

That beef and milk can be produced in Georgia and Alabama at a good profit has been demonstrated already, as appears from statements published in the railway company's magazine.

Shippers Ask Reductions in Freight Rates

Representatives of shippers of sand and gravel and other road building materials and also shippers of lumber held conferences at Washington on June 2 with a committee of railroad traffic executives for the purpose of urging reductions in the rates on those materials. Facts were placed before the railroad officers for the purpose of showing that high rates are preventing the movement of those kinds of freight. The lumber men said that the present rates are forcing users of lumber to look to local mills and that the railroads are losing the long haul traffic. No definite reply was given by the railroad men.

An appeal to President Harding to give his assistance in securing reductions in freight rates to "save the California fruit and vegetable growing industry from destruction" was presented to the President on June 1 by all the California members of the House of Representatives. G. W. Luce of the Southern Pacific and W. G. Barnwell of the Atchison, Topeka & Santa Fe, held a conference at Washington on June 3 with Traffic Director Hardie of the Interstate Commerce Commission and Henry J. Ford, special assistant to the commission, who has just concluded a series of conferences with railroad officers and shippers in the West on the subject of fruit and vegetable rates. The information brought out at these conferences was discussed and it was understood that a plan of adjustment involving some reductions in the rates was proposed to be submitted to the various railroads concerned.

Senator Fletcher of Florida on June 1 read in the Senate a telegram from the Florida Citrus Exchange, doubting railway testimony to the effect that the movement of perishables shows increase over last year. "It is indisputable largest percentage Florida's citrus crop in its history was not shipped this last season because price not sufficient to justify expense of shipping. The vital question is not the volume moving but the net result to producers and their ability to continue production. . . . This has been most disastrous season in every citrus area of the United States in which increased freight rates have played the big part."

Commission and Court News

Interstate Commerce Commission

The Commission has found not justified proposed new individual and joint minimum rates for less than carload shipments, between eastern points and points in Carolina, south-eastern and southeastern Mississippi Valley territory.

R. H. Countiss has filed a fourth section application with the Interstate Commerce Commission for permission, on behalf of the Southern Pacific and the Santa Fe and their steamship connections at Gulf ports, to make rates on canned goods, dried beans, barley, asphalt, condensed milk, dried fruits and rice from California terminals to New York, low enough to meet the competition of carriers using the Panama canal. Application for fourth section relief on westbound traffic has not been received by the commission. In this application permission is requested to reduce the rate on asphalt from 83.5 to 65 cents; on barley from 74.5 to 65; beans, from \$1.42 and \$1.1255, according to the minimum, to 65; condensed milk from \$1.205 to 65; dried fruits in tight containers from \$1.835 and \$1.665, according to the minimum, to 75; dried fruits in sacks from \$2.165 and \$2, according to the minimum, to 95; and rice, from \$1.00 and 92, according to the minimum, to 65 cents. A large number of requests to be heard in protest against reduced rates westbound, have been received from Spokane, Salt Lake, and Arizona and New Mexico points. No protests have been received against the proposed reduced eastbound rates.

State Commissions

The Corporation Commission of the state of Oklahoma on May 26 ruled that the railroads of that state should file tariffs before June 10, which will reduce freight charges within the state 35 per cent, passenger rates 20 per cent and Pullman rates 50 per cent. The ruling followed the denial of the plea of the carriers to extend increases granted last September.

Court News

Federal Control Did Not Suspend

Hours of Service Act

The Federal District Court for the Western District of Pennsylvania holds that the taking over by the government of the control of the railroads did not suspend the operation of the Hours of Service Act, and a railroad's officers and agents, retained in their positions by the Director General of Railroads, remained subject to the act. In an action against them for permitting employees to remain on duty for a longer period than 16 consecutive hours, it is held that the delay of a train by unavoidable accident is not a license to keep the crew of the train on continuous duty over 16 hours. To excuse such service it must be shown that the officer or agent made at least some effort to avoid excess service. *United States v. Geer*, 268 Fed. 385.

Engine Standing Near Crossing Not a

Signal of Danger as a Matter of Law

The Circuit Court of Appeals, Fourth Circuit, in a crossing accident case holds that whether a traveler on the highway has duly looked and listened is generally a question for the jury; and a standing engine, that has given no sign of movement, is not such a signal of danger that a court should hold as a matter of law that a traveler must have it under observation every moment as he approaches a public crossing. Not all reasonable men would agree that a reasonably prudent man, seeing an engine standing at rest about 100 feet from the crossing with no sign of movement, might not with a sense of safety undertake to go over the crossing after passing an obstruction of his view of only 25 feet, rely-

ing upon hearing a signal before the movement of the engine. Judgment for plaintiff was affirmed.—*Director General of Railroads v. Zanzinger*, 269 Fed. 552.

Federal Taxation Act—Allowance for Depreciation

On the question as to the amount a railroad is entitled to deduct from its gross income for depreciation under the Federal Corporation Tax Act, §38, the Circuit Court of Appeals, Sixth Circuit, holds that the measure of depreciation is the difference in the intrinsic value of the property as a whole at the beginning and end of the year, and that the enhanced value of parts through repairs and replacements should be set off against the depreciation of other parts not repaired or replaced.—*U. S. v. Nashville, Chattanooga & St. Louis*, 269 Fed. 351.

Discrimination Not Sufficient Evidence of Damage

The Federal District Court for the District of Massachusetts holds that a finding of the Interstate Commerce Commission that an unjust discrimination has been made by a railroad in making a separate charge against a shipper for switching from the pier used by him, while absorbing such charge from piers used by his competitors, is not sufficient evidence to authorize the recovery of damages by the shipper. The measure of his damages is not the amount of the unjust discrimination, but the amount by which such unjust discrimination has injured him.—*Hillsborough Mills v. Boston & Maine*, 269 Fed. 816.

Bill by Stockholders to Enjoin Consolidation of Lake Shore and New York Central Held Insufficient

The Circuit Court of Appeals, Sixth Circuit, holds that a bill to restrain the consolidation of two railroad companies (the Lake Shore and the New York Central) on the general ground that it would be a violation of the Constitution statutes and public policy of the States concerned, filed by the holder of a fraction (one thousandth) of 1 per cent. of the stock of one of the companies, purchased after the consolidation agreement was made, does not state ground for equitable relief where no objection to the consolidation is made by the State authorities, and no allegation is made showing that the complainant would suffer injuries by depreciation of stock. It is also held that section 4 of the Anti-Trust Act limits suits to enjoin violations to those brought by the government, and does not authorize a stockholder to maintain a suit to restrain his corporation from consolidating with another on the ground that it would be an illegal combination under the act.—*General Investment Co. v. L. S. & M. S.*, 269 Fed. 235.

Day and Night Telegraph Offices

The Circuit Court of Appeals, First Circuit, reversing 265 Fed. 800, holds, in a case similar to that reported in the *Railway Age* of May 20, page 1188 (*U. S. v. Cornwall & Lebanon*, 268 Fed. 680), that the language of Section 2 of the Hours of Service Act does not exclusively mean stations continuously operated throughout the 24 hours; it includes stations operated at night and by day and may include hours which are part of the day and part of the night. The opinion is a long one. The court says in part: "The words night and day were apparently used in a general sense, and not in the sense that, in and of themselves, the words were to be accepted as arbitrarily decisive of a classification based strictly upon a division between night and day." The offices in question, were Amherst and Arlington, in Massachusetts. The station at Arlington remained open from 5:45 a. m. to 9 p. m.; Amherst from 6 a. m. to 9:06 p. m. The Interstate Commerce Commission, says the court, has interpreted the phrase "continuously operated night and day" as applying to all offices operated during a portion of the day and a portion of the night. * * *

The court cites two Circuit Court of Appeals cases—one in the Fourth Circuit, *U. S. v. A. C. L.*, 211 Fed. 897, and one in the Sixth Circuit, *U. S. v. G. R. & I.*, 224 Fed. 667.—(*U. S. v. B. & M.*, 269 Fed. 89).

Extreme Rule as to Care for Passengers Does Not Extend to Trifling Dangers

A passenger in a Pullman chair car, while walking along the aisle to the door after the car had stopped at a station, stumbled over a hassock or footstool which was in the aisle or projected into it, and fell and received an injury for which he sued the Director General of Railroads, alleging that the insufficient lighting of the car co-operated with the careless placing or leaving of the obstacle to constitute actionable negligence. From a verdict and judgment for the defendant the plaintiff appealed, contending that the instructions to the jury did not require from the defendant a sufficiently high degree of care.

The instructions put upon the defendant the duty to exercise ordinary care to see that the aisle was not obstructed by a footstool. The trial court declined to charge that the defendant was bound to exercise the highest degree of care and prudence consistent with the conduct of its business. The stricter rule imposing the more extreme liability is the one which expresses the duty of a common carrier as to all the special perils of transportation. The reason of the rule is that the passenger delivers himself into the custody and control of the carrier, that he is helpless against these perils, and that he is compelled to, and rightly does, rely upon the carrier for protection. The Circuit Court of Appeals, Sixth Circuit, affirming judgment for the defendant, says that the reason of the rule does not extend to those comparatively trifling dangers which the passenger meets while upon a railway car only in the same way and to the same extent as he meets them daily in his home or in his office or on the street, and from which he easily and habitually protects himself. The rule of merely reasonable or ordinary care, to be measured by the circumstances of the case, has been frequently applied under closely analogous circumstances. Such as the falling of a package from the parcel rack; the falling of a car window; a door sill or platform slippery with ice; baggage in the aisle; fingers caught in a door. *Bassell v. Hines*, 269 Fed. 231.

Consignee Cannot Escape Payment of Lawful Freight Charges by Contract With Carrier

A railroad as terminal carrier sued a consignee, a commission merchant, for a balance claimed for freight and refrigeration on nine carloads of vegetables and fruit, delivered at Boston during 1911 and 1912. They were shipped in interstate commerce on straight bills of lading, but the consignee had no knowledge of their issuance or terms. When the consignee accepted the cars it paid all charges claimed. The merchandise was sold at once and the net proceeds remitted to the shippers. Later, the railroad company discovered that it had collected less than the lawful rate, and demanded the undercharges. Maintaining that it had accepted the shipments on the understanding that the charges were as reported, and had not agreed to pay more, the consignee refused the demand. Neither party was wholly successful in the courts below (230 Mass. 206). Each obtained a writ of error and a writ of certiorari to the United States Supreme Court. That court says, by Mr. Justice McReynolds:

"Commission merchants often receive from strangers shipments of perishable articles for sale at market prices. The court below held that whether York & Whitney Company impliedly agreed to pay the rates imposed by law was a question of fact to be determined upon consideration of all the circumstances. It accordingly approved a judgment, entered upon a verdict, favorable to that company as to charges upon one carload (No. 280), and in behalf of the railroad for those claimed on account of eight carloads (No. 281).

"We think . . . the liability of York & Whitney Company was a question of law. The transaction between the parties amounted to an assumption by the consignee to pay the only lawful rate it had to pay or the carrier the right to charge. The consignee could not escape the liability imposed by law through any contract with the carrier, either expressed or implied. The judgment in favor of the consignee was reversed and that in favor of the railroad was affirmed.—*N. Y. C. & H. R. v. York & Whitney*. Decided May 16, 1921.

Foreign Railway News

New Line in Chihuahua

The Mexican government has signed a contract with a mining company permitting the construction of a railway in the northern part of the Mexican state of Chihuahua, according to advices from Commercial Attache Jackson, Mexico City. The projected line is to run from Candelaria to Lamentos Mountain, a distance of approximately 80 miles.

French Railway Unions in Quarrel Over Issues

According to Paris dispatches to the New York Times, the organized employees of the French railways are suffering from serious internal dissension resulting from a recent vote of 55,140 to 33,667 in favor of adhering to the doctrines of the communists at Moscow. The executive council of the union is still in the hands of the moderates, however, and the radically inclined members were unsuccessful in their attempt to secure a revision in the personnel of the council. In the general disorder resulting the moderates have withdrawn from the unionists' congress and a schism has resulted which seems at present to have weakened considerably the labor movement on the railways.

Program of Ninth Congress of the International Railway Association

The ninth congress of the International Railway Association will be held at Rome, Italy, from April 18 to May 1, 1922. The following subjects will be discussed:

Construction of Roadbed and Track—by C. H. Ewing, vice-president of the Philadelphia & Reading; K. Alberg, principal engineer of the bureau of roadway construction of the Swedish State Railways; E. F. C. Trench, chief engineer of the London & North Western; M. Henry, associate chief engineer of way and works of the Eastern Railway (France); and M. Candelier, chief engineer of surveys, plant and structures, of the Northern Railway of France.

Maintenance and Supervision of Track—by Earl Stimson, chief engineer of maintenance of the Baltimore & Ohio; C. J. Brown, chief engineer of the Great Northern (England); and G. Barbieri, chief of the works division of the Italian State Railways.

Special Steels—by W. C. Cushing, engineer of standards of the Pennsylvania; M. Mesnager, professor and director of the test laboratory of the School of Bridges and Highways (France); and M. Sand, vice-president of the directorate general of the Swiss Federal Railways.

Reinforced Concrete—by G. A. Haggander, bridge engineer of the Chicago, Burlington & Quincy; W. W. Grierson, chief engineer of the Great Western (England); C. Leemans, engineer of way and works of the Holland Railway; P. M. Buelow, chief of the bureau of engineering of the Danish State Railways; and M. Golard, chief engineer and director of special service and works of the Belgian State Railways.

Economic Production and Use of Steam by Locomotives—by G. J. Churchward, chief mechanical engineer of the Great Western (England) and M. Lacoïn, associate chief engineer of motive power and rolling stock of the Orlean Railway (France).

Trucks, Axles and Locomotive Springs—by George Hughes, chief mechanical engineer of the Lancashire & Yorkshire (England); E. Minsart, principal engineer of motive power and rolling stock of the Belgian State Railways; and M. Bochet, inspector general of mines (France).

Passenger Cars—by W. J. Tollerton, general mechanical superintendent of the Chicago, Rock Island & Pacific; R. W. Reid, carriage and wagon superintendent of the Midland (England); F. de Vargas, chief engineer of motive power and rolling stock of the Northern Railway (Spain); and M. Biard, honorary chief engineer of the Eastern Railway (France).

Electric Traction—by George Gibbs, chief engineer of electric traction of the Long Island; J. J. W. van Loenen Martinet, manager of electric traction of the Netherlands State Railways; E. Gerard, honorary secretary general of the Ministry of Railways, Marine, Posts and Telegraphs of Belgium; M. Ofverholm, director

of the electro-technical bureau of the Swedish State Railways; A. Donati, director of the special electrification service of the Italian State Railways; E. Huber, chief engineer of electrification of the Swiss Federal Railways; and M. Sabouret, chief engineer of technical services of the Orleans Railway (France).

Passenger Terminals—by A. S. Baldwin, vice-president of the Illinois Central; L. Maccallini, principal inspector of the directorate general of the Italian State Railways.

Freight Stations—by H. G. Kelley, president of the Grand Trunk; E. Ehrenfreund, manager of the Italian State Railways in the department of Turin; M. Moutier, assistant manager of operation of the Northern Railway (France).

Slow Freight Traffic—by W. H. Williams, vice-president of the Delaware & Hudson; V. U. Lamalle, administrative director of the Belgian State Railways; Sir H. A. Walker, general manager of the London & South Western; and E. Ehrenfreund, manager of the Italian State Railways in the department of Turin.

Locomotive Cab Signals—by A. Herdner, honorary chief engineer of motive power and rolling stock of the Midi Railway (France); and F. Villa, chief engineer of works of the Italian State Railways.

Net Cost, Rates—by Howard Elliott, chairman of the board of directors of the Northern Pacific; and Henry Gréard, chief operating assistant of the Orleans Railway (France).

Customs Examination—Messrs. Jordan and Prudent of the operating department of the Paris, Lyons & Mediterranean.

Interchange of Rolling Stock—C. W. Crawford, chairman of the general committee of Division II, Transportation, American Railway Association; M. Charron, associate chief engineer, operating department, of the Midi Railway (France).

Workmen's Dwellings—A. F. Banks, president of the Elgin, Joliet & Eastern, and F. Lollì, chief of the works division of the Italian State Railways.

Cars for Light Railways—C. Gaviraghi, director of the Haute Valteline Railways (Italy).

Operation of Light Railways, Working Rules and Regulations—by F. Level, director of the Local Interest Railways (France).

Special Methods of Traction on Light Railways—H. B. Spencer, director of the Division of Purchases of the United States Railroad Administration, and P. Biraghi of the Sicilian Society of Economic Railways.

Safety Appliances on Light Railways—by M. Bonnevie, general technical inspector of the Belgian National Society of Local Railways.

Brazil to Spend \$21,000,000 on Railways

Because of the present transportation crisis throughout Brazil the national congress has authorized the government to construct new railway lines and to improve those already existing, the funds for the work to be secured by the ordinary federal revenue and by additional credit operations, according to Commercial Attache Schurz, at Rio de Janeiro. According to the local press the present expense budget sets aside \$1,092,000 (milreis to dollars at par) for the termination of the construction of the Sao Luiz-Caxias railway; a like amount for the prosecution of the construction on the Central of Piahy; \$928,200 for the Petrofina-Therezina railway; \$291,564 for the Cruz Alta railway; \$346,000 for the Paranapanema-Rio de Peixe lines; a like amount for the Araranga and Urussanga; and \$819,000 for the Mossoro railway. For construction on the Great Western and the Rede Bahiana, bonds of the public debt will be emitted to the amount of the respective contracts.

Besides these expenditures, the budget is said to authorize the following expenses "for the account of credit operations or other extra resources": \$1,092,000 for the San Luiz-Caxias, intended for the large bridge connecting the island of Maranhao to the continent; \$546,000 for the Central of Piahy; \$2,347,800 for the Petrofina railway; \$218,400 for the Cruz Alta; \$5,460,000 for various lines of Rio Grande do Sul and the San Pedro de Alcantara-Uberaba; \$491,400 for the construction of the Central Rio Grande do Norte; \$1,638,000 for a line at Massiaambu, in Santa Catharina; \$2,184,000 for the coal lines of Parana; \$819,000 for the Mossoro railway; and \$1,092,000 for the coal lines in Santa Catharina. The total amount authorized for these projects reaches the sum of \$21,585,564.

The government of the state of Rio Grande do Sul is negotiating in the American market for a loan of \$10,000,000 for railway improvements, according to unconfirmed press dispatches.

Equipment and Supplies

Locomotives

THE LIGONIER VALLEY is having repairs made to 2 locomotives at the shops of the Baldwin Locomotive Works.

THE INTERNATIONAL RAILWAY SUPPLY COMPANY, New York, has booked with the American Locomotive Sales Corporation, for account of the Trinidad Government Railways, 6 10-wheel freight locomotives to be constructed at the Montreal plant.

Freight Cars

THE ILLINOIS CENTRAL is asking for prices on the repair of 1,000 coal cars.

THE MISSOURI PACIFIC is asking for prices on the repair of 2,000 cars.

THE NEW YORK, ONTARIO & WESTERN is having repairs made to 250 box cars.

MITSUI & Co., New York, reported in the *Railway Age* of April 22, as inquiring for 40 air dump cars, for the South Manchurian Railway, has ordered this equipment from the Kilbourne & Jacobs Manufacturing Company. These cars are to be of 20 cu. yd. capacity.

Iron and Steel

MITSUI & Co., New York, has ordered from the United States Steel Products Company, 550 tons of 60-lb. rail and accessories, for use on the Hanshin Electric Railway, Japan.

THE NEW YORK CENTRAL will receive bids until 12 o'clock noon, June 23, for 1,000 tons of No. 120 Dudley section open hearth steel rails, plus 5 per cent of second quality rails, with the necessary angle bars.

THE DELAWARE, LACKAWANNA & WESTERN will receive bids until 12 o'clock noon, June 20, for steel bridge in connection with elimination of grade crossing 0.93 mile west of Mountain Lakes, N. J., and also will receive bids for 300 tons of Mayari pig iron, Pennsylvania Steel Company's specification No. 1.

Miscellaneous

THE NEW YORK CENTRAL will receive bids until 12 o'clock noon, June 20, for a minimum of 300,000 gal. and a maximum of 400,000 gal. of asphaltum base fuel oil, with gravity of 18-20 deg. Baume cold test 10 deg.

THE NORFOLK & WESTERN is asking for bids until 12 o'clock noon, June 22, at Roanoke, Va., for parts for electrical apparatus; 400 rods galvanized wire fencing; 24 steel flanged engine truck wheel tires; approximately 45,861 lb. soft steel bars; 116,711 lb. steel plates; 580,302 lb. steel shapes and repairs to electrical apparatus.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company is contemplating additions to its power house at Albuquerque, N. M., to cost approximately \$150,000.

CHICAGO, ROCK ISLAND & PACIFIC.—This company has awarded a contract to the Railway Water & Coal Handling Company, Chicago, for the construction of a new water treating plant at West Liberty, Iowa. This company is also accepting bids for the construction of a coaling station at El Reno, Okla., to replace a structure which burned, and for new coaling stations at Enid, Okla., and McFarland, Kan.

ILLINOIS CENTRAL.—This company, which was noted in the *Railway Age* of May 27 (page 1246), as accepting bids for the construction of a subway over Hawkeye Highway near Earlville, Iowa, has awarded the contract for this work to W. J. Zitterell, Webster City, Iowa, at a cost of approximately \$50,000. The company, which was noted in the same issue of the *Railway Age*, as accepting bids for an extension to its roundhouse at Paducah, Ky., has awarded the contract for this work to the Ellington-Miller Company, Chicago, at a cost of approximately \$15,000. R. L. Frazer, La Center, Ky., has been awarded the contract for improvements to the yards at Paducah, Ky., at a cost of about \$10,000. The Illinois Central has awarded a contract on its Yazoo & Mississippi Valley lines to E. H. Walsh & Company, Memphis, Tenn., for the construction of a brick yardmaster's office at Baton Rouge, La., at a cost of \$12,000.

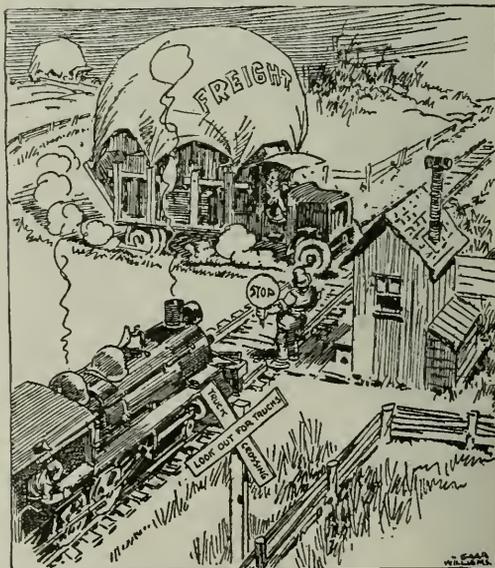
LOUISVILLE & NASHVILLE.—This company has awarded a contract to the Roberts and Schaefer Company, Chicago, for the installation of three N. & W. type mechanical cinder handling plants at Corbin, Kentucky.

MISSOURI PACIFIC.—This company has awarded a contract to Joseph E. Nelson & Sons, Chicago, for the construction of a water station at Bush, Ill., which is estimated to cost between \$40,000 and \$50,000.

SAN ANTONIO & ARANSAS PASS.—This company contemplates the construction of a new passenger station at Taft, Tex.

WABASH.—Correction.—This company, which was noted incorrectly in the *Railway Age* of June 3 (page 1295), as having awarded a contract for the construction of a passenger station at Macon, Mo., to the Unit Construction Company, St. Louis, Mo., has awarded this contract to Joseph E. Nelson & Sons, Chicago.

THE STOP-OVER PRIVILEGE at Philadelphia, which has been suspended for several years, is to be restored. This assurance has been given the Philadelphia Chamber of Commerce by officers of the three railroads. This promise is the culmination of more than a year of constant appeals of Philadelphia business firms claiming that they had lost business because purchasers from cities of the West and South have found it inadvisable to stop in Philadelphia, owing to absence of stop-over privilege on tickets.



From the *Indianapolis News*.

Pretty Soon

Supply Trade News

Roy G. Owens, vice-president in charge of sales of the Lakewood Engineering Company, Cleveland, Ohio, has resigned.

The Canton Foundry & Machine Company, Canton, Ohio, has removed its New York City office, from the Grand Central Palace, to 45 West Eighteenth street.

The Concrete Mixing & Placing Company has removed its office from 123 West Madison street to 802 Great Northern building, 20 West Jackson boulevard, Chicago.

T. G. Windes, Jr., sales engineer of the Refinite Company at Omaha, Neb., has been appointed sales engineer of the International Filter Company at Chicago, effective June 1.

Ward A. Miller, manager of the wire products division of the Midvale Steel and Ordnance Company at Philadelphia, Pa., has been appointed district manager of sales at the Chicago office of the company, effective June 6.

W. H. Bleecker, Jr., district sales manager at the Chicago office of the Page Steel & Wire Company, New York, has been transferred to the New York office in the same capacity, and E. J. Flood has been appointed district sales manager for all Page products at the Chicago office, 208 South La Salle street, succeeding Mr. Bleecker.

Charles A. Kothe has been appointed mechanical superintendent of the American Automatic Connector Company, Cleveland, Ohio, succeeding N. M. Barker, resigned. Mr. Kothe in 1900 entered the service of the Erie Railroad as a machinist and subsequently served in various positions at different places until 1913, when he was promoted to master mechanic at Marion, Ohio. He subsequently was transferred in the same capacity to Port Jervis, N. Y., and from 1919 served as general inspector at Youngstown, Ohio, until his recent appointment with the American Automatic Connector Company.

Colonel Washington A. Roebling, for many years vice-president of John A. Roebling's Sons Company, Trenton, N. J., has been elected president, to succeed his nephew, Karl G. Roebling, who died on May 29. Colonel Roebling, who is 84 years old, was engaged, with his father, John A. Roebling, in building the suspension bridge over the Allegheny river at Pittsburgh, and the Cincinnati and Covington suspension bridge. With his brother, Charles G. Roebling, he successfully carried out the work of completing the Brooklyn bridge, the construction of which devolved upon them after the death of their father in July, 1869.

Henry T. Gerdes, mechanical engineer and manufacturer, of New York, has been elected president of the Hauck Manufacturing Company, Brooklyn, N. Y., maker of oil burners, oil forges, oil burning appliances, etc. The other officers of the company are: M. C. Hauck, first vice-president; A. B. Hauck, second vice-president; H. H. Kress, third vice-president; A. H. Stein, treasurer, and J. Lutz, secretary. Mr. Gerdes, who succeeds the late Arthur E. Hauck as president, is a graduate of Stevens Institute of Technology. He was for many years manager of the Treadwell Engineering Company, Easton, Pa., and has a practical knowledge of the manufacture of oil burning torches and appliances.

The Manufacturers Exhibition Company, Inc., has established a permanent world market for machinery in the building occupying the block on Sixth avenue, Eighteenth street and Nineteenth street, New York City. The company's plans are broad in scope, including American and international promotion of the sale of all American manufactured mechanical products. There are exhibits of machinery of all kinds and many of the exhibitors have their own representatives in the market, but those who have no one present are repre-

sented by trained technicians who will conduct the buyers through the exhibits, explaining all points desired. L. R. Duffield, who was general manager of the Philadelphia Bourse for over ten years and recently general manager of the International Exposition of Industries, is president and general manager of the Manufacturers Exhibition Company, Inc.

The Westinghouse Electric and Manufacturing Company

The gross earnings of the Westinghouse Electric & Manufacturing Company from sales billed for the year ended March 31, 1921, as shown by the company's annual report, were \$150,980,106, which is an increase of nearly \$15,000,000 over the gross earnings of the previous year. The manufacturing and selling cost was \$138,774,085; and the net income available for dividends was \$12,617,536, or 16.8 per cent on the company's capital stock. Dividends at the rate of 8 per cent per annum were paid during the year on both the preferred and common shares of stock.

There is included in the cost, \$5,315,196 for depreciation and adjustment of inventories, which were valued as of December 31, 1920, at a cost or market value, whichever was lower. An appropriation of \$5,000,000 from surplus for a special contingent reserve has also been made to provide for further possible shrinkages and adjustments in the inventories.

Property and plant account shows an increase over the previous year of \$9,361,404. The amount of unfilled orders on hand April 1, 1921 was \$65,621,000.

The consolidated general balance sheet follows:

ASSETS	
Property and plant.....	\$48,708,478
Investments	16,624,717
Current assets	135,339,230
Other assets	5,592,093
Total.....	\$206,264,518
LIABILITIES	
Capital Stock—	
Preferred	\$3,998,700
Common	70,813,950
Funded debt	36,275,000
Real estate, purchase money mortgage.....	60,000
Current liabilities	44,748,683
Reserves	8,102,905
Profit and loss—Surplus.....	42,265,280
Total.....	\$206,264,518

Trade Publications

LOCOMOTIVE CRANES.—The Browning Company, Cleveland, Ohio, has issued an elaborately illustrated, forty-eight-page catalog, on its locomotive cranes. The book contains a detailed description of the construction of the Browning crane, with data concerning the capacities, clearances and dimensions of the various types and a large number of illustrations showing the cranes engaged in a wide variety of work on the railways and elsewhere.

BURLINGTON COUNTY (N. J.) farmers were surprised last week by a notice from the Pennsylvania Railroad of an increase of 100 per cent in the tariff on their special daily fast freight to New York markets. The farmers say that they will at once turn to motor truck transportation. Beverly, in the heart of the rich truck-growing section of Burlington county, shipped more than 1,000 carloads of products by special train into New York markets last year. The 100 per cent increase in the cost of their special train comes on top of the 40 per cent increase in freight rates made last summer. To obtain the special train the farmers pay the regular freight rate, plus an extra tariff. This tariff last year cost them \$102 extra a day and they arranged for the service at the same rate this year. Then the railroad gave notice that the special charge would be increased to \$205 daily this year. The railroad had overlooked in its first estimated order No. 11,241 of the Interstate Commerce Commission issued Jan. 5 of this year, which raised the mileage charge for all special freight trains from \$1.25 to \$2.50.

Railway Financial News

ATCHISON, TOPEKA & SANTA FE.—*To Continue Dividends in 1921.*—This company expects to continue the present dividend rates on both its preferred and common stocks throughout 1921, according to a statement of President W. B. Storey made at the close of the board meeting on June 7, at which the regular semi-annual dividend of 2½ per cent was declared on the preferred stock. The Wall Street Journal quotes Mr. Storey as saying:

Even if the Labor Board's wage decision had not been made, the company had plans in mind whereby the dividends could be kept up at the expense of a most rigid program of economy on upkeep. This would have been accomplished without neglecting the safety of the lines and in a way that would meet all traffic demands. It would have meant an increased amount of work in the future to take care of the company's natural growth and expansion. But even with the wage decrease, the company will still have to curtail to some extent on upkeep and improvement in order to carry out its decision to keep the dividends going. Under present depressed traffic conditions the wage reduction was not sufficient, but the decrease showed that the Board had taken proper consideration of the importance of the matter.

The wage reduction should cause no expectation that rates will come down. They will only come down if the volume of business increases to a point where the carriers can take the business at a lesser cost than at present. To give an example of how the company has been misled in order to meet requirements, since December 16,000 men have been laid off at a saving of about \$3,000,000. Under good conditions nearly all of these would have been necessary for work in connection with the road's natural growth. In view of the wage reduction some of them will be put back on, but the number will be regulated not so much by the reduction as by the way in which business picks up.

May and June should show much better than the earlier months of the year in earnings, but an appreciable improvement is not looked for until July. In that month the Atchison especially is favored by heavy grain business.

The flood in Pueblo has cost the company several hundred thousand dollars and has caused a temporary cessation of both passenger and freight traffic to certain points in that vicinity. The California business has not been hurt since transcontinental business regularly routed through Pueblo has been diverted to the road's southern lines, but business into Denver will be held up for about ten days.

BALTIMORE & OHIO.—*Authorized to Assume Obligations.*—This company has been authorized by the Interstate Commerce Commission to assume obligation of liability in respect of \$675,000 of equipment trust, 6 per cent gold notes issued by the Bethlehem Steel Company in connection with the purchase of 549 steel hopper cars.

CENTRAL OF NEW JERSEY.—*Authorized to Assume Liability.*—This company has been authorized by the Interstate Commerce Commission to assume obligation or liability as guarantor in respect of the payment of principal and interest of \$4,987,000 of bonds of the American Dock & Improvement Company, the maturity date of which is to be extended.

CHARLES CITY WESTERN.—*Asks Authority to Issue Notes.*—This company has applied to the Interstate Commerce Commission for authority to issue \$384,000 of 10-year, 6 per cent gold notes to retire an outstanding issue of 7 per cent bonds and other maturities.

CHICAGO, ROCK ISLAND & PACIFIC.—*Authorized to Issue Lease Warrants.*—This company has been authorized by the Interstate Commerce Commission to issue six lease warrants for \$158,885.54 each in connection with the procurement of 30 steel coaches and five steel chair cars from the Pullman Company.

CHICAGO, TERRE HAUTE & SOUTHEASTERN.—*Authorized to Issue Notes.*—This company has been authorized by the Interstate Commerce Commission to issue 7 per cent promissory notes to the amount of \$837,000 to refund the amount remaining unpaid of its outstanding 7 per cent demand notes and to pledge as collateral for the notes all or part of \$1,485,000 of its first and refunding mortgage 5 per cent gold bonds.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—*Authorized to Issue Bonds.*—This company has been authorized by the Interstate Commerce Commission to issue \$1,052,600 of refunding and improvement mortgage bonds and use them in the acquisition of the capital stock of the Evansville, Indianapolis & Terre Haute.

EVANSVILLE, INDIANAPOLIS & TERRE HAUTE.—*Authorized to Issue Bonds.*—This company has been authorized by the Inter-

state Commerce Commission to issue \$400,000 of its first mortgage 7 per cent, 30-year bonds and to pledge them with the Secretary of the Treasury as collateral security for a loan from the United States of \$400,000 to assist it in making additions and betterments estimated to cost \$800,000.

GRAND TRUNK.—*Defaulted Interest to Be Paid.*—The New York agency of the Bank of Montreal announced on June 3 that it would pay coupons due on April 1, 1921, detached from Grand Trunk Pacific Railway 4 per cent mortgage, Prairie section, Series A, and Mountain section, Series B, and Lake Superior Branch bonds. The payment of the interest on these bonds, amounting to approximately \$500,000, has been in technical default since April 1.

LONG ISLAND.—*Authorized to Issue Bonds.*—This company has been authorized by the Interstate Commerce Commission to issue \$3,876,000 of refunding mortgage 4 per cent gold bonds and to exchange them for a like amount of its unified mortgage 4 per cent gold bonds. The Pennsylvania is also authorized to guarantee the principal and interest of the refunding mortgage bonds.

MASON CITY & FT. DODGE.—*June 1 Interest Defaulted.*—The controlling road, the Chicago Great Western, has officially announced that the interest due June 1, 1921, on the first mortgage 4 per cent, 50-year gold bonds will not be paid. The bondholders' protective committee, formed last November, with Mortimer N. Buckner, president of the New York Trust Company, as chairman, states:

The committee in December last advised holders of the bonds that the payment of the June 1, 1921 installment of interest, as well as subsequent installments, was seriously imperiled, and that a situation existed which made it imperative in the interests of the holders of the bonds to examine into the affairs of the railroad company and its operation, maintenance and management by the Chicago Great Western, and to take concerted action for the establishment and enforcement of their rights and the protection of their interests. A very substantial amount of the bonds has since been deposited with the committee, and the detailed examination referred to is now being conducted. In compliance with the request of holders of undeposited bonds and in order to afford further opportunity to avail of the benefits of the deposit agreement, the committee has extended the time within which bonds may be deposited with the New York Trust Company, 26 Broad street, New York City, depository, or with the Illinois Trust and Savings Bank, Chicago, sub-depository, to and including June 20, 1921, after which date further deposits will not be received except at the option of the committee and upon such terms and conditions as the committee shall prescribe.

MISSOURI, KANSAS & TEXAS.—*Authorized to Issue Notes.*—The receiver has been authorized by the Interstate Commerce Commission to issue \$450,000 of receivers' equipment notes and to pledge them with the Secretary of the Treasury as security for a loan. The authority previously granted to issue \$675,000 of equipment notes has been revoked.

NORFOLK & WESTERN.—*Authorized to Sell Bonds.*—This company has been authorized by the Interstate Commerce Commission to sell at not less than par and accrued interest \$269,000 of convertible, 4 per cent, gold bonds, 1,213,000 of convertible 4½ per cent gold bonds and \$522,000 of convertible 6 per cent gold bonds, the unsold remainders of three issues which were authorized for general corporate purposes prior to June 28, 1920.

NORWOOD & ST. LAWRENCE.—*Authorized to Sell Bonds.*—This company has been authorized by the Interstate Commerce Commission to sell or issue in exchange for certain outstanding promissory notes \$199,000 of first mortgage 5 per cent gold bonds for the purpose of satisfying certain existing liabilities and to issue promissory notes for \$16,969.50 in connection with the purchase of a locomotive.

PENNSYLVANIA.—*Asks Authority to Lease Roads.*—This company has applied to the Interstate Commerce Commission for authority to lease the railroad and property of the Pittsburgh, Chicago & St. Louis and the Grand Rapids & Indiana for 999 years from January 1, 1921.

To Pay Notes.—The \$24,469,322 4½ per cent notes due June 15 will be paid off at maturity at the offices of the company, Broad Street Station, Philadelphia, Pa., or at 85 Cedar Street, New York City.

PERE MARQUETTE.—*Authorized to Issue Notes.*—This company has been authorized by the Interstate Commerce Commission to pledge and repledge from time to time \$3,231,000 of its first mortgage, 5 per cent bonds of 1916 as collateral security for short-

term notes, but the commission withholds authority applied for to issue notes for a sum not exceeding \$2,100,150 in its present financial condition, because no information has been furnished by the applicant as to the terms of the notes.

READING COMPANY.—Decree Form Filed.—The form of decree by which the Reading Company properties will be separated in compliance with the decision of the United States Supreme Court was filed in the United States District Court at Philadelphia on June 6. It was drawn up in accordance with the plan recently approved by the court and was submitted by counsel for the Reading Company. Under the decree the Reading Coal and Iron Company will be separated from the Reading Company and the latter will be merged with the Philadelphia & Reading Railway under a new name and will be subject to the regulations of the federal and state laws as a common carrier. The only trustee named in the plan of segregation is the Central Union Trust Company of New York, to take over the stock of the Lehigh and Wilkes-Barre Coal Company from the Central Railroad of New Jersey. The other trustees, who will hold the stock of the Jersey Central, owned by the Reading, until a favorable time arrives for its sale, have not been named. Neither is the name of the new coal company to be formed given in the decree.

New Director.—Charles Ewing, vice-president of the Philadelphia & Reading, has been elected a director to succeed Isaac Heister, deceased.

SOUTHERN RAILWAY.—Application for Loan Withdrawn.—This company has withdrawn its application to the Interstate Commerce Commission for a loan of \$3,825,000 from the revolving fund and the commission has cancelled the certificate. The commission has also vacated its order of December 31, in so far as it authorized the Southern Railway to pledge \$5,900,000 of general mortgage bonds as security in part for the loan, but authority has been granted to the company to pledge and repledge from time to time all or part of \$7,229,000 of its development and general mortgage 4 per cent gold bonds as collateral security for short term notes.

ST. LOUIS-SAN FRANCISCO.—Voting Trust to Expire.—The voting trust for the preferred and common stock will expire by limitation on July 1 and will not be extended. Preparations are now being made for the exchange of stock certificates for the voting trust certificates.

TERMINAL RAILROAD ASSOCIATION OF ST. LOUIS.—Asks Authority to Issue Bonds.—This company has applied to the Interstate Commerce Commission for authority to issue \$719,000 of general mortgage, 4 per cent bonds to reimburse the treasury for expenditures made from income in 1920. The bonds are to be sold on a 6 per cent basis through the Central Union Trust Company.

TONOPAH & GOLDFIELD.—New Director.—Walter L. Hachlen has been elected a director.

UNION PACIFIC SYSTEM.—Annual Report.—The income for the calendar year 1920, compared with the calendar year 1919, after excluding all offsetting accounts between the Union Pacific Railroad Company, the Oregon Short Line Railroad Company and the Oregon-Washington Railroad & Navigation Company, is as follows:

	1920	1919	Increase or Decrease
Operating revenues (March 1 to December 31)	\$175,260,837	.....	\$175,260,837
Operating expenses (March 1 to December 31)	135,112,026	.....	135,112,026
Revenues over expenses (March 1 to December 31)	\$40,148,811	.....	\$40,148,811
Rental from United States Railroad Administration	7,099,433	\$39,369,411	-32,269,958
Railway operating income	\$47,248,264	\$39,369,411	\$7,878,853
Operating expenses, corporate, not assumed by United States Railroad Administration	\$191,217	\$909,343	-718,126
Federal income and other taxes	10,754,015	2,293,226	8,460,789
Total corporate expenses and taxes	\$10,945,232	\$3,202,569	\$7,742,663
Railway operating income over corporate expenses and taxes	\$36,303,032	\$36,166,842	\$136,190
Other income, representing rents received and incidental operations	1,492,885	527,183	965,701
Total income from railroad properties	\$37,795,917	\$36,694,026	\$1,101,891

Deductions, representing rents paid, hire of equipment and incidental operations	1,833,655	144,926	1,688,729
Net income from railroad properties	\$35,962,262	\$36,549,100	—\$586,838
Income from investments and other corporate income	12,298,956	13,026,686	— 727,730
Total income from all sources	\$48,261,218	\$49,575,786	—\$1,314,568
Interest on funded debt and miscellaneous corporate charges	15,586,987	15,156,573	430,414
Net income from all sources	\$32,674,231	\$34,419,213	—\$1,744,982
Dividends on stock of Union Pacific Railroad Company:			
Preferred stock at 4 per cent	\$3,981,740	\$3,981,740	.....
Common stock at 10 per cent	22,229,160	22,229,160	.....
Sinking fund requirements	30,877	11,377	—20
Total appropriations of net income	\$26,221,777	\$26,222,277	—\$500
Surplus, transferred to profit and loss	\$6,452,454	\$8,196,937	—\$1,744,482

The annual report of the Union Pacific will be reviewed editorially in an early issue.

WICHITA NORTHWESTERN.—Asks Authority for Mortgage.—This company has applied to the Interstate Commerce Commission for authority to place a first mortgage for \$600,000 on its property to secure a loan from the United States of \$381,750, or, if arrangements can be effected, for \$431,750; also to retire \$200,000 of an outstanding mortgage of \$181,750 for additions and betterments.

Settlements With Railroad Administration

The United States Railroad Administration reports the following final settlements, and has paid out to the several roads the following amounts: Carolina, Clinchfield & Ohio, \$550,000; Oregon Electric, \$90,000; Oregon Trunk, \$100,000; Farmers Grain & Shipping Company, \$25,000; Southern Illinois & Missouri Bridge Company, \$40,240.10; Baltimore Steam Packet Company, \$820,000. The payment of these claims on final settlement is largely made up of balance of compensation due, but includes all other disputed items as between the railroad companies and the administration during the 26 months of federal control.

Guaranty Certificates Issued

The Interstate Commerce Commission has issued certificates for partial payments by the Treasury on account of the six months' guaranty period to the railroads for 1920, as follows:

Ann Arbor	\$75,261
Arizona Eastern	390,000
Cincinnati, Saginaw & Mackinaw	90,000
Detroit, Grand Haven & Milwaukee	250,000
Detroit & Huron	7,500
Galveston, Harrisburg & San Antonio	150,000
Houston, East & West Texas	145,000
Houston & Texas Central	60,000
Maryland & Pennsylvania	30,000
Michigan Air Line	27,000
Missouri & North Arkansas	15,000
New York & Pennsylvania	70,000
Ohio River & Western	110,000
Pontiac, Oxford & Northern	75,000
Toledo, Saginaw & Muskegon	75,000

The commission has also reached a final determination of the amount of the guaranty of the Ann Arbor and has issued a certificate for the balance of \$75,261.85 due the carrier, which has already received partial payments amounting to \$240,000.

Dividends Declared

Atchison, Topeka & Santa Fe—Preferred, 2½ per cent, semi-annually, payable August 1 to holders of record June 30.
 Beech Creek—50 cents, quarterly, payable July 1, to holders of record June 15.
 Delaware & Hudson—2¼ per cent, quarterly, payable June 20, to holders of record May 28.
 Kansas City, Ft. Scott & Memphis—Preferred, \$1 quarterly, payable July 1 to holders of record June 24.
 New York, Chicago & St. Louis—1st preferred, 2½ per cent, payable July 2 to holders of record June 20.
 New Orleans & Northeastern—6 per cent, payable June 29 to holders of record June 15.
 New York & Harlem Common and preferred, \$2.50, payable July 1 to holders of record June 15.
 New York, Lackawanna & Western—1¼ per cent, quarterly, payable July 1 to holders of record June 14.
 Pittsburgh, McKeesport & Younghoegheny—\$1.50, payable July 1 to holders of record June 15.
 St. Louis, Rocky Mt. & Pacific—Common, 1 per cent quarterly; preferred, 1¼ per cent, quarterly; both payable June 30 to holders of record June 18.

Railway Officers

Executive

T. S. Rowland, vice-president, secretary and treasurer of the Chicago, Burlington & Quincy, has resigned as secretary and treasurer, effective May 26. He will continue to serve as vice-president.

E. E. Nash, general manager of the Minneapolis & St. Louis, with headquarters at Minneapolis, Minn., has been elected vice-president and general manager, with the same headquarters, effective June 3.

V. V. Boatner, superintendent of the Memphis division of the Yazoo & Mississippi Valley, with headquarters at Memphis, Tenn., has been elected president of the Peoria & Pekin Union, with headquarters at Peoria, effective June 1.

C. I. Twyman, division passenger agent of the Chicago, Burlington & Quincy, with headquarters at Galesburg, Ill., has been promoted to general agent, passenger department, with headquarters at St. Paul, Minn., succeeding F. M. Rugg, deceased.

Carl Nyquist, secretary and treasurer of the Chicago, Rock Island & Pacific, with headquarters at Chicago, has been elected vice-president, effective June 1. He will retain his duties and title of secretary and treasurer. Mr. Nyquist was born at Chicago on November 17, 1877, and entered railway service on March 3, 1898, in the department of the secretary and treasurer of the Rock Island at Chicago, and has served continuously in that department since then. In 1910 he was promoted to assistant secretary, and later was appointed assistant treasurer in addition to his other duties. In July, 1918, during the reorganization accompanying federal control, Mr. Nyquist was appointed federal treasurer of the Rock Island. He resigned this position on November 1, 1918, to accept election as secretary and treasurer of the corporation, succeeding George H. Crosby, vice-president, who had retired.



C. Nyquist

Operating

J. M. Walsh, superintendent of the Memphis terminal division of the Yazoo & Mississippi Valley, with headquarters at Memphis, Tenn., has been transferred to the Memphis division, with the same headquarters, succeeding V. V. Boatner, resigned to become president of the Peoria & Pekin Union. **E. Bodamer**, trainmaster, with headquarters at Memphis, succeeds Mr. Walsh. **J. A. Zanone** has been appointed trainmaster, succeeding Mr. Bodamer. The appointments and changes were effective June 1.

W. J. Edwards, superintendent of the Alabama Great Southern, has been promoted to general superintendent of the Southern with headquarters at Chattanooga, Tenn., succeeding F. P. Pelter, resigned. **M. E. Madden**, superintendent of the Georgia Southern & Florida, has succeeded Mr. Edwards as superintendent of the Alabama Great Southern with headquarters at Birmingham, Ala. **L. F. De Ramus**, train-

master of the Georgia Southern & Florida, has succeeded Mr. Madden as superintendent, with headquarters at Macon, Ga. **L. O. Perkins**, trainmaster of the Northern Alabama with headquarters at Sheffield, Ala., has succeeded Mr. De Ramus as trainmaster of the Georgia Southern & Florida, and **H. A. DeButts** has succeeded Mr. Perkins as trainmaster of the Northern Alabama. These changes were effective June 4.

Financial, Legal and Accounting

H. W. Johnson, assistant controller of the Chicago, Burlington & Quincy, with headquarters at Chicago, has been promoted to controller, with the same headquarters, effective May 26, succeeding C. I. Sturgis, elected secretary and treasurer.

C. I. Sturgis, controller of the Chicago, Burlington & Quincy, with headquarters at Chicago, has been elected secretary and treasurer, effective May 26. Mr. Sturgis was born at Paris, France, on July 21, 1860, and entered railway service in 1880, as a clerk in the local freight office of the Burlington at Chicago. His entire railway service, amounting to forty-one years, has been spent with that company. After serving in various positions in the Chicago offices, Mr. Sturgis was appointed cashier with headquarters at Denver, Colo., and later was returned to Chicago as paymaster. He served in this position until February 1, 1895, when he was promoted to assistant general auditor, with the same headquarters. Mr. Sturgis served successively in this position and as general auditor of the Burlington for twenty-three years. On September 1, 1918, he was promoted to controller, retaining his headquarters at Chicago, and was serving in this position at the time of his recent election.



C. I. Sturgis

Traffic

H. A. Williams has been appointed district freight representative of the Baltimore & Ohio, with headquarters at Milwaukee, Wis., effective June 1.

J. W. Britt has been appointed general agent of the transportation and traffic departments of the New York Central, Lines West, with headquarters at Detroit, Mich., effective June 1.

Mechanical

Reinier Beuwkes, electrical engineer, of the Chicago, Milwaukee & St. Paul, has been granted a leave of absence for several months and has gone to South America with his family.

C. M. Hoffman, superintendent of machinery of the Verde Tunnel & Smelter railroad, with headquarters at Clarkdale, Ariz., has been appointed superintendent motive power and machinery of the Los Angeles & Salt Lake, with headquarters at Los Angeles, Cal., effective June 1, succeeding D. P. Kellogg, who has resigned.

Obituary

A. L. Kuykendall, assistant superintendent of the Southern Pacific, Texas lines, with headquarters at Houston, Tex., was killed in a motor car accident near Garrison, Tex., on May 25.

EDITORIAL

Railway Age

EDITORIAL

The Table of Contents Will Be Found on Page 5 of the Advertising Section

The *Railway Age* in its issue of last week devoted twelve pages to the annual meeting of the Railway Accounting Officers' Association at Atlantic City, June 8 to 11. The report, as it appeared, was

The R. A. O. A. Meeting

not complete; the remainder of it, therefore, is given in the present issue. The space used, however, was by no means excessive when one considers the calibre of the speakers who were invited to address the meeting; the great amount of ground which the meeting covered; and the multiplicity of the important subjects on which action, favorable or otherwise, was taken. The R.A.O.A. annual meeting discussed committee reports aggregating 500 pages. Two of the important committees each discussed over 70 subjects and their reports each covered over 120 pages. Despite this great weight of material which had to be handled, the meeting was so ably conducted that there was not an uninteresting moment during the entire four days the accounting officers were at Atlantic City, nor was there a single subject that failed to receive as complete discussion as the nature of the subject warranted or as the members present desired. The committee chairman and committee members of the Railway Accounting Officers' Association deserve credit for the amount of work which they have done to make the past year's work a success and for the able manner in which the R.A.O.A. annual meeting was conducted.

The management of the Illinois Central was among the first in the country to foresee the coming of a decline in railroad traffic and to begin preparations for reducing its operating expenses in anticipation of the approaching decline of business. President Markham issued warnings to his officers and

Mr. Markham's Significant Letter

employees regarding what was coming while his railroad was still handling the largest business in its history. For this reason a circular letter to officers and employees of the Illinois Central which Mr. Markham issued on June 10 is of unusual interest. He refers to the fact that the decision of the Labor Board in regard to the reduction of wages will result in a substantial reduction of operating expenses. He adds, "You will be interested in learning that we intend to invest that money in maintenance which has been deferred—in the employment of additional men and in the purchase of materials and supplies. We have not waited for the money to come in, but we have already entered upon our program, and we believe that other railways will do likewise. The action of the Labor Board, therefore, operates as the first signal for the opening up of business which will redound to the benefit of the public at large. Crop prospects are favorable. This railway recognizes its pressing duty to patrons to place roadway and equipment in condition to serve them this fall. The Labor Board decision will help to enable it to meet that duty." It is significant that Mr. Markham in his letter refers to the necessity of putting "our affairs in such shape that we will be enabled to grasp the first signs of business revival" to start upon a program of expansion and development. With railway traffic slowly but steadily increasing, with the car surplus slowly but steadily declining,

and with more freight cars and other railway facilities needing rehabilitation or enlargement than ever before, it will hardly be necessary for anybody to emphasize to the railway managers the need for entering promptly upon programs of improvement and expansion if regulating bodies and the public will give them opportunity to earn the money necessary to enter upon and carry out such programs.

The hearings before the Railroad Labor Board on the requests of the various carriers for wage reductions, outlined elsewhere in this issue, ended in a somewhat remarkable manner, considering what had passed before. Instead of the bitter reiteration of charges and counter-charges, which had marked

The Labor Board's Lovefest

many previous sessions, there were expressions of good-will, sympathy and understanding and pledges of co-operation. This phase of the proceedings was introduced by remarks of F. W. Sargent, general solicitor of the Chicago & North Western, an abstract of which appears elsewhere in this issue. Negotiations between the railways and their employees are in progress throughout the country, and there is contained in Mr. Sargent's remarks and the remarks made by labor leaders in response to them a lesson for both the employers and employees directly engaged in these negotiations. From the standpoint of both the employees and the railways there is great need of the better understanding and co-operation advocated in the concluding session of the Labor Board in the wage hearings. Better understanding and co-operation would mean more efficient operation of the roads, larger net earnings for the companies and higher wages for the employees than they can reasonably hope to retain without them.

Speaking of a project in which he was interested but concerning which he was experiencing difficulty in securing data much needed to strengthen his case

A Salesman Without A Price

before the management, a purchasing officer said: "I am in the position of a salesman without a price and you know how much consideration I would give to a salesman who couldn't quote me a price on the goods he was trying to sell." Is this not highly suggestive of the difficulty met by many railway mechanical, engineering and signal officers who complain of inability to secure much needed equipment and facilities? Carrying the figure further, can any salesman expect to inspire confidence in the mind of the prospective purchaser who does not possess a thorough knowledge of his own goods? Do not mechanical officers, for example, who are seeking additional facilities for their shops and engine terminals, frequently fail to meet this essential requirement of salesmanship? There are many psychological problems of salesmanship to which the true salesman devotes much thought and hard work, the solution of which may be beyond the capacity of the busy department head. But he can acquire a knowledge of his project so thorough that he can anticipate and answer intelligently every question likely to arise in the mind of the executive

and until he has this knowledge not only is he almost certainly doomed to failure if he asks for authority to proceed, but he is acquiring a reputation likely to prove a serious handicap on future occasions when executive authority is required. Nothing is likely to do more to paralyze the much needed progress in building up and improving mechanical department and other facilities than attempts to sell nebulous projects to railway executives. The effect of no essential plan for improvement is so intangible that a little critical study will not disclose a means of placing it on a concrete dollars and cents basis.

The alinement of a signal light may play an important part in safe train operation, particularly at places where more than one light is visible at once to the engineman of an approaching train. For example, at an interlocking plant the home signal and train order lights, which may be in close alinement with each other, may have their lamps focused where the maximum beam or most favorable indication is picked up at different points as a train approaches the signals instead of being focused on the same point, which should be the location at which an engineman obtains his first view of the signals. If one signal gives a stronger indication than the others at the point where it is first seen, that indication will naturally be impressed more strongly on the mind of an engineman than those giving a dim indication, particularly on high speed trains. As a consequence there may exist an opportunity for an engineman to misinterpret his indication, causing him to think he has a clear home signal when the light may be from the train order or other signal located close to and in line with the home signal. In the investigation of accidents such as at Porter, the alinement of the lights has been given little consideration, but it is important that every operating officer should know that the most favorable conditions exist at locations where confusion may be caused.

As might be expected of a compromise measure, the British railway bill, which has been advanced to its second reading in the House of Commons, is being severely criticised from all sides. Perhaps the strongest opposition of all is that of the Scottish railway companies. These companies object to the bill because they say it will tend to perpetuate the present wage scales which they believe to be on too high a plane for the railways to bear. Rate increases, they believe, do not afford a remedy for the situation because of the diminished traffic resulting. Compulsory consolidations they hold to be unconstitutional. Mr. Clynes, speaking for labor, opposes the bill because it fails to provide for public ownership and control. Sir F. Banbury of the Railway Companies' Association says of the bill that in order to avoid a temporary catastrophe the railways are being asked to submit to something which will lead to a catastrophe lasting for all time. He proposes as the only solution for the problem the return of the roads to their owners without government interference. Although they fail to grow very enthusiastic about it, apparently many shippers and business men have taken the attitude that the bill offers the only solution of a very complicated situation. Various objections have arisen regarding the amounts to be paid the railways for claims against the government. In some quarters they are said to be insufficient, in others too large. It would perhaps be safe to conjecture, in view of the fact that the objections to the measure are arising from sources whose interests are so varied, that there is little likelihood of any formidable combination on a substitute measure. The very

divergence of the criticism, rather than any intrinsic merit in the bill itself, would seem to be its chief source of strength, auguring well for its final passage without substantial change.

One of the most convincing reasons why the railroads, as well as other industries, should give careful study to methods of performing work is contained in the report of the committee of engineers appointed by Secretary Hoover to investigate waste in industry. The report brings out the fact that the production of the country could be increased immediately 50 per cent by the full utilization of existing facilities. The managements of the industries of this country are acknowledged to be the most efficient in the world, and the railroad managements are no exception. It is, therefore, somewhat surprising to find such disparity between present efficiency and the attainable; and it would be even more surprising if this report should not prove to be the incentive for intensive studies to ascertain the best ways of more closely approximating the attainable. So far as the railroads are concerned, one means to the end that immediately suggests itself is an increased use of mechanical handling devices. Many such machines have already proved their value in the various branches of railroad work. By no means, however, have the roads exhausted the possibilities of material handling apparatus in the shops, in speeding up the handling of freight, in saving of time and labor in construction and maintenance and for various other purposes. No one can doubt that further studies in this direction will be well worth while.

Continually increasing in size and weight the motion work, machine parts and appliances of locomotives have long since passed the point where they can be economically removed by hand and transported on two-wheel trucks. Locomotive parts have to be renewed frequently in roundhouses, and mechanical devices for handling them should be installed wherever the volume of work warrants. Manual labor will thus be reduced to a minimum and important savings effected. For example, when removing an air compressor in a roundhouse not provided with crane facilities, some sort of make-shift support must be arranged above the compressor to which to attach a chain and falls for lowering the compressor to the floor. Not less than two and sometimes four men are required for this operation which takes considerable time and physical effort and is also more or less dangerous. Overhead electric traveling cranes have been installed in certain engine terminals for handling work of this kind quickly and effectively, but their installation involves practically rebuilding the enginehouse structures. The expense would seldom be warranted except in new terminal developments where it was intended to handle large amounts of heavy running repairs. There is considerable room for improvement in present roundhouses, however, at a relatively small expense, by installing monorail electric hoists, jib cranes and portable cranes. These will accomplish practically the same results at a much smaller cost. Closely allied with the question of proper facilities for removing and applying heavy locomotive parts is the need of efficient means to transport them from the locomotive to the machine shop or department where necessary repairs are made. Important economies can be effected by eliminating as far as possible the use of two-wheel trucks and substituting four-wheel trucks with roller- or ball-bearing wheels of large diameter. In all important roundhouses, electric storage battery or other power-operated trucks and

Why Not Use More Machines?

Signal Lights and Accidents

Engine Terminal Crane and Truck- ing Facilities

Objections to English Railway Bill

tractors should be used. To realize the maximum benefit from these material handling devices, the enginehouse floors must be maintained in good condition, hard and smooth, and all passageways kept clear. Arrangements for the prompt and easy handling of material in roundhouses will pay large returns on the comparatively small investment involved.

What Railway Capital and Labor Have Got

THE SPOKESMEN of the railway labor unions will soon appear before the Senate Committee, which is investigating the railway situation, to give their explanation of the fact that the railways are in a serious financial condition. No doubt they will offer the same explanation they offered to the Railroad Labor Board. They have charged before the Labor Board that the troubles of the railways are chiefly due to financial mismanagement. They have alleged that the railways have issued excessive amounts of securities, large parts of which are fictitious because not based on actual investment made in the properties, and have paid interest and dividends on these securities, thus disbursing money which should have been spent for improvements. They have contended that failure of the companies to invest this money in improvements has prevented them from effecting economies in operation, and that this, and not high wages and inefficiency of labor, is the reason why their operating expenses are excessive.

The answer to all these charges is afforded in incontrovertible form by the statistics of the Interstate Commerce Commission. These statistics show just what has been done with all the earnings of the railways each year, and especially what part of them has been paid to Capital as a return upon its investment in the physical facilities, and what part has been paid to Labor for its work. Since Labor claims that Capital has been getting too much, let us compare the amounts Labor and Capital actually have been getting.

The Senate Committee asked for data regarding developments of all kinds on the railways from 1912 to 1920. In 1912 the railways had 1,642,119 employees, to whom they paid approximately \$1,210,000,000 in wages, or an average of \$737 per employee. In 1919 they had 1,913,422 employees, to whom they paid approximately \$2,843,000,000 in wages, or an average of \$1,486 per employee. The increase in the average wage per employee was over 100 per cent, and the increase in the total wages paid was \$1,634,000,000, or over 135 per cent.

In the year ended on June 30, 1912, the interest paid by the railways on both their funded and unfunded debt was \$376,600,000, and the dividends paid on their stock \$340,000,000. This made the total amount received by the holders of all their securities \$716,600,000. The average amount paid out annually to the owners of all their securities in the years 1913 to 1919, inclusive, was \$720,300,000. The total amount of interest paid by them in the year ended December 31, 1919, was \$446,800,000, and the total amount of dividends paid by them was \$278,500,000, making a total paid to the holders of all their securities in that year of \$725,300,000. In other words, between 1912 and 1919 the amount of wages paid to the employees increased \$1,634,000,000, or 135 per cent, and the total amount of interest and dividends paid to all the holders of the bonds and stocks increased \$8,800,000, or 1.25 per cent. In 1912 railway Capital received 59 per cent as much as railway Labor. In 1919 it received less than 26 per cent as much.

Comparison is made between the statistics of 1912 and 1919, because complete information regarding the interest and dividends paid in 1920 are not yet available. If the data compared were those of 1912 and 1920 the contrast between

the increase in the reward received by railway Capital and railway Labor would be much more striking. In 1920 railway Labor received \$2,500,000,000 more in wages than in 1912, or over 200 per cent more, while the total interest and dividends paid to railway Capital certainly was not more than in 1919. Therefore, while in 1919 Capital received 59 per cent as much as Labor, in 1920 it did not receive 20 per cent as much.

While the total return paid to railway Capital increased hardly at all between 1912 and 1919, the total investment in property, as shown by the books of the railways, increased from \$14,600,000,000 to \$18,500,000,000. The interest and dividends paid in 1912 were 5 per cent upon the property investment; in 1919 they averaged 3.9 per cent. The figures given for interest and dividends are not the net operating income earned in the years mentioned, but the actual net amounts paid to the stockholders and bondholders, whether from earnings, government guarantees or from any other source.

When the spokesmen of the labor unions appear before the Senate Committee with their charges regarding the causes of the present financial condition of the railroads, the members of that committee may deem it not inappropriate to ask them some such questions as the following:

How can financial mismanagement of the railroads logically be held responsible for their troubles when in seven years the total interest and dividends paid by them increased only \$8,800,000, while in the same seven years the wages paid to railway Labor increased \$1,634,000,000 or 185 times as much, and in the eight years from 1912 to 1920, \$2,500,000,000, or 285 times as much as the return actually paid to railway Capital?

How can it logically be claimed that railway Capital has been treated, or has treated itself, too well and Labor has been treated unfairly, when the facts show that the average percentage of return upon investment received by Capital declined from 5 per cent in 1912 to about 3.9 per cent in 1919, while the average wage of a railway employee increased from \$737 in 1912 to \$1,486 in 1919, or over 100 per cent; to \$1,820 in 1920, or 147 per cent, and is now running at the rate of \$1,926, or over 160 per cent more than in 1912?

The total amount of public service rendered by the railways in 1920 in hauling freight was 55 per cent more than in 1912, and the amount of public service rendered in carrying passengers was 45 per cent more. For its part in rendering this increased service to the public railway Capital received practically no more interest and dividends than in 1912, while railway Labor received 200 per cent more. Wherein do these facts indicate that railway Capital, by dishonest manipulation, etc., "explicitly" both the public and the employees, as the labor leaders allege?"

The charge that the present plight of the railroads is due to financial mismanagement is as baseless buncombe as was ever disseminated. They have not all been well managed, financially or otherwise, but they have been brought to the verge of ruin, not by the way they have been managed by the companies that own them, but by the war, by government control, by indefensible and intolerable labor union exactions, and by a policy of regulation which until recently has been amazingly wanting in both intelligence and foresight.

The simple fact that the total interest and dividends paid to the security owners of the railways have stood practically still for ten years while all items of their expenses have been greatly increasing, while the profits made in all other industries have been increasing, while the total production of the country, and, in consequence, the demands made upon the railroads for transportation, have been increasing, is quite sufficient to show why the railways are physically and financially in the condition they now are.

Attitude of the Railways Regarding Rates

THE RAILWAYS of the country recently have sought to make clear their attitude regarding general reductions, and also regarding readjustments of rates. On behalf of the railways Chairman Morris, of the Central Freight Association, on June 8 sent an open letter to shippers of road building and other construction materials who had asked for general reductions of rates to stimulate the movement of their traffic. This letter was quoted in the *Railway Age* of June 10, page 1365, under the heading "Building Material Rates To Stand." It stated that neither present conditions nor reductions in operating expenses which are in immediate prospect will justify any general reductions in rates, but that the carriers are hospitable to suggestions of readjustments which it can be shown are needed, and which will be advantageous to shippers and general business and not unduly disadvantageous to the railways.

Nobody claims that on the present rates the railways are making too much, or even enough, net earnings. Everybody knows that they are not. Substantial reductions in expenses due to declines in the prices of fuel and materials, to reductions of wages and to the abolition of some wasteful rules and working conditions are in sight. With the traffic which has been moving, and the total earnings which the railways have been making thus far in 1921, they would not, however, be able to earn anywhere near a 6 per cent return if they were allowed to retain the benefit of all the reductions in expenses which are actually in prospect. Traffic and total earnings are slowly increasing, but deferred maintenance which has accumulated within recent months is so large that increased earnings due to increased traffic should and will, for months to come, be largely absorbed by increased maintenance expenditures.

It is argued by some that general reductions of rates would cause a large increase in traffic and net earnings, but the relative smallness of the traffic moving is due to general business conditions. The improvement in general business conditions is causing an increase of traffic, and it is very doubtful if the increase would be appreciably accelerated by general reductions of rates. In response to demands from different classes of shippers the railways in several cases already have made general reductions in rates. On April 1 a reduction of approximately 10 per cent in freight rates on lumber was made from the northwest to points east of the Missouri River, but the increase in lumber movement from the northwest since then has been so small as to indicate that the reduction in rates has had almost no effect. The western lines made a reduction in rates on potatoes, but it did not have any appreciable effect. An emergency reduction in live stock rates was equally fruitless. The outcome in each case show that the small business of the shippers was due not to the freight rate, but to want of sufficient demand for their commodities. So long as this condition exists the effect of general reductions in rates would be merely to reduce the earnings of the railways, and not to stimulate traffic.

The ablest and best informed group of industrial traffic experts in the United States are those composing the National Industrial Traffic League. This organization at its recent meeting in Cleveland adopted resolutions strongly deprecating any general reduction of rates and urging that there should be none until the railways are able to make enough net earnings to put them on a sound basis financially and to begin improving and enlarging their facilities.

While it is certain that early general reductions of rates would increase the financial difficulties of the railways and postpone needed rehabilitation of their properties, it is so doubtful whether they would have a good effect on any other class of business that experiments of that kind should be

postponed for the present. On the other hand, it is generally recognized that the percentage advances in rates which were made in 1918, and again in 1920, created many unfair discriminations and made many individual rates, and even groups of rates, in different territories and communities excessive. The Interstate Commerce Commission, the railways and the shippers are engaged almost daily in making readjustments to eliminate these inequalities, and the general tendency of these readjustments is to reduce the general level of rates. This process of readjustment should be carried on as rapidly as possible so that the many inequalities will be removed before the time comes when general reductions can be made.

That the time will come when the general reductions can gradually be made, we have no doubt. The total traffic handled, if we may judge by past experience in this country, is sure largely to increase, and large reductions in operating expenses in addition to those in immediate prospect are bound to be made. The result is sure to be large increases in the net earnings of the railways if experiments in general reductions of rates are not made too soon. The Transportation Act not only requires the Interstate Commerce Commission to permit the railways to charge rates which will enable them to earn an average annual return of 5½ to 6 per cent, but the same provisions in effect require the Commission to reduce the rates when the net earnings of the railways are sufficient to justify it.

The general tendency of rates should, and undoubtedly will, be downward in future, but general reductions should follow and not precede the earning of adequate net returns by the railroads. The effect of unduly hurrying the process of reduction would be to further cripple our already seriously crippled transportation system, and would not only delay the time when it could be restored to a satisfactory physical condition, but indefinitely delay permanent improvements in the physical properties which are needed to enable the roads to handle their business with the greatest practicable economy and with the lowest practicable rates.

Number of Railroad Employees Reduced 400,000 in a Year

WHILE THE RAILROADS will continue until July 1 to pay the increased wages awarded by the Railroad Labor Board last year, they are paying them to a much smaller number of employees than they had on their payrolls last year. A compilation just made by the Bureau of Railway Economics from returns from 175 Class I railroads shows a reduction of 14.97 per cent in the number of employees during the first quarter of this year as compared with the first quarter of last year and a reduction of 20.05 per cent for the month of March as compared with March, 1920. As there were 2,009,000 employees in the service of all the Class I roads last March, if the same percentage holds good the total reduction in force during March amounted to about 400,000. For the 175 roads alone it was 379,000 for March and 282,000 for the quarter. For January the reduction was 8.37 per cent and for February of this year it was 14.74 per cent.

There was also a reduction for the three months' period of 22.28 per cent in the number of hours worked by the employees on an hourly basis, and a reduction of 3.59 per cent in the days worked by those reported on a daily basis, but because of the higher wages in effect since May 1 of last year the reduction in the payroll was only 4.93 per cent and the average employee in service received 12 per cent more than for the first quarter of 1920. The total compensation paid to employees for the three months was \$717,425,173 for the 175 roads, or \$37,000,000 less than they paid for

the corresponding quarter last year before the latest wage increase.

The reduction in the number of employees for the quarter corresponds very closely with the decrease in the volume of freight business, which was about 15 per cent less than for last year. The decrease in passenger travel was somewhat less. The greater reduction in the number of hours than in the number of employees indicates not only that a part of the forces have been put on a short time basis but also a reduction in the amount of overtime work.

The fact that the reduction in force is less than the decrease in the volume of business handled may reflect some increase in efficiency but it probably represents in the main a considerable amount of deferred maintenance, as during the period of dull business the railroads have been forced to delay the repair of cars and locomotives for lack of funds. The bureau's compilation for the 175 roads follows:

Number of employees—	1921	1920	Increase or decrease 1921 over 1920
January	1,734,675	1,893,185	d 8.37
February	1,592,338	1,867,622	d14.74
March	1,509,597	1,888,068	d20.05
Average 1st quarter.....	1,604,713	1,887,220	d14.97
Total hours worked.....	858,449,158	1,104,504,381	d22.28
Total days worked.....	17,142,012	17,780,742	d 3.59
Total compensation.....	\$717,425,173	\$754,653,744	d 4.93
Average for quarter.....	\$447	\$399	12.

d Decrease

which its association recently has committed itself, its efforts will be of very doubtful value. We are impressed by the experience and calibre of the men who compose the new board, but we are frankly dubious as to the amount of good it can accomplish.

New Books

Railway Accounting Officers' Association 1921 Synopsis. Edited by E. R. Woodson, Secretary of the Association. Published by the Railway Accounting Officers' Association, 1116 Woodward Building, Washington, D. C. 6 in. by 9 in.; 400 pages. Bound in cloth.

The R. A. O. A. synopsis which was published in July last year was a book of 228 pages. The 1921 Synopsis contains 400 pages. This expansion in size has not been due to any change of policy which has led the editor to change the style of the book; it represents the additional material developed in the biggest year in the history of the Railway Accounting Officers' Association.

The R. A. O. A. Synopsis is a somewhat unique publication. It is a compilation of the recommendations, mandatory or otherwise, as to standard practices, forms, etc., which have been made and approved from year to year. Because of the multiplicity of the subjects which have been covered and the care that is taken in the association as to the recommendations made, the book is in reality a text book on the subject of railway accounting. It does not attempt to cover the underlying basic principles upon which railway accounting rests, but it does give those details of railway accounting practice which are not available to the student of the subject in any other form. To the accounting officer, the book is an absolute essential. To the ambitious clerk, it should prove equally indispensable for there is no other way in which a student of railway accounting can secure the information as to what are agreed upon as the best methods of carrying out railway accounting work.

The book is divided into four principal sections: Freight, passenger, disbursement and overcharge claims. The recommendations as to over-charge claims have been mandatory in the past; this year the association took the further step of making mandatory also a portion of the freight, passenger and disbursement recommendations. To take care of this situation properly, the editor has arranged each of the freight, passenger and disbursement sections so that in each case the recommendations which have been made mandatory are given first, followed by those which are recommendatory only and concluding with the standard forms. Each section is carefully indexed, so that the book may readily be used for reference purposes. The value of the standard forms is so well realized as hardly to need comment. The number of forms shown is especially noticeable; during the past year the association originated as many new forms, not counting revisions, as in nearly all the previous years' history of the association combined.

There is another feature of the book that should not pass without comment. That is its timeliness. The book naturally could not be published until after the annual meeting had passed on and approved the recommendations resulting from the year's work. The fact that the book is in readiness so soon after the annual meeting is worth more than passing notice.

THE STATE OF TEXAS in 1920 had 4,158 railroad accidents, as compared with 3,351 in 1919, an increase of 807. It was estimated that the damage to track and equipment in 1920 was \$1,752,222 and \$1,121,353 for 1919. Other figures, as tabulated by the Railroad Commission of the State, showed that 289 persons were killed, compared with 196 in 1919, including four passengers in 1920 and seven passengers in 1919. The total injuries in 1920 were 2,933 and in 1919 they were 2,651.

The Board of Economics and Engineering

UNQUESTIONABLY, IT IS a real task which lies before the Board of Economics and Engineering, the creation of which has recently been announced by S. Davies Warfield, president of the National Association of Owners of Railroad Securities. The board in a measure must first justify its existence as a new complication in the already complex railway situation; it has an exceedingly difficult problem to consider, and it is not unlikely that its creation and future procedure may be the subject of criticism in various quarters. The desire behind Mr. Warfield's various efforts, of which this is the latest, to make the security owners more of a power in the railway situation can readily be appreciated. The present position of the security owners is not as favorable as it might be nor as satisfactory as it really must become if railroad securities are to be looked upon with sufficient satisfaction by the investor. However, the *Railway Age* must agree with those who assert that successful operation of our railways is the task of those who are in charge of operating them.

It must reassert its opinions that what the railways and the public need is the opportunity for the railway managers to work out their problems "on their own" and as provided by the Transportation Act. Technically the managers represent the stockholders, but actually they represent the interest of the bondholders, also, for whatever they do to further the real interests of the stockholders is bound to protect and benefit the bondholders, who have a prior claim upon net earnings.

If the Board of Economics and Engineering enters upon its investigation in a purely scientific spirit, and one appreciative of and sympathetic regarding the real difficulties with which railway managements are faced, it can be helpful. If, on the other hand, it allows itself to be dominated by the spirit of intolerance, and antagonism toward and unwillingness to co-operate with the railway managers which has been manifested at times by the association which it represents in the past; and if it enters upon its work with strong preconceptions in favor of the plan of railroad reorganization to

Letters to the Editor

Do the Railroads Want College Men?

STATE COLLEGE, Pa.

TO THE EDITOR:

Although the college student has had very little to say as to the policy pursued by the railroads in the employment of the college man, he is deeply interested in what the future has in store for him in railroad work. The *Railway Age* has from time to time discussed the problems of the college man and the railroads. Letters on the subject from college professors and railway officials have been published, the faculty claiming that the general attitude of the railroads toward the college man does not induce him to go into railroad work.

On the other hand, letters from railway officials state that the college man does not come up to expectations in most cases and that railroad work requires men of certain temperament and qualifications. One letter in particular stated that the railroads wanted students who had received good grades in their studies and had also taken an active part in athletics and campus activities. From this it appears that the railroads must have the highest grade of material available. In years past it has been commonly understood that if you desired a first class article you had to pay the price.

There are three institutions, of which the writer has some knowledge, that offer special courses to prepare a student for railroad work. They are Purdue University, the University of Illinois and the Pennsylvania State College. These courses and special subjects were added to the curriculum to meet the demand for technically trained railroad men. In comparison with the number who have registered in other courses, few students have availed themselves of the facilities offered to prepare themselves for railroad work. All three of these schools have excellent laboratory equipment and other facilities that usually make a course attractive. With few exceptions, the students who have taken the course in railway mechanical engineering at Penn State have been special apprentices from the New York Central or Pennsylvania railroads. Very few students who are not already affiliated with some railroad register in the railway course.

At the recent convention of the A. R. E. A. there appeared to be considerable discussion on this subject. Some of it was devoted to the kind of a course the student should pursue in preparing for railroad work. Such discussion will be of little value if only a few students take the course. Criticism without something better to offer is worthless. We realize that the railroads are going through a critical period in their history. At the present time the problem of the college student does not amount to much in comparison with the other problems that are to be solved. However, something should be done towards forming a connecting link or liaison between the technical railway student, or the college student who would like to go into railroad work, and his future employer.

Let us consider what the relation is between the student in other courses and his probable future employer; for example, the mechanical engineer. The American Society of Mechanical Engineers has a student branch in which it takes a great deal of interest and goes to considerable pains in seeing that the student members are well informed about the fields of work they are going into. Each week some prominent engineer from some well-known firm or manufacturing concern speaks to the student society on the engineering field that he is engaged in. The students are told of the opportunities in sales engineering, refrigeration, power plants, etc. These different lines of work are made to look very attractive and interesting because quite a number of the speakers come with moving picture films or with stereopticon views. Before

the college year is over most of the larger fields of engineering endeavor have been presented to the student in some manner or other, with one exception—he hears nothing or very little about the railroads.

Of course he reads quite a bit about the railroads in the daily press at the present time, but as an appeal to the college student to go into railroad work it is very poor advertising. At the same time, the engineers who come to speak to the student societies get a good line on the most promising of the senior class and if their firms are in need of men they usually get the pick of the lot. During the past three weeks representatives from quite a number of well known manufacturing companies have come to Penn State and have interviewed a large number of the engineering students who will graduate in June. They have already signed up for their respective companies some of the most promising material in the class. Other students whom they thought would be of value to their companies were approached in regard to future employment. The railroads cannot complain, for they make no effort to pick their men, they simply wait for the men to pick the railroad. Possibly this is the reason that the college man who has started to work for the railroad has not always come up to expectations.

For the past eight years the students in railway mechanical engineering at Penn State have supported an organization known as the Motive Power Club. For eight collegiate years they have met once a month to listen to a railroad talk from a member of the faculty or one of the students. Sometimes they have been fortunate in getting some man over from the Altoona shops of the Pennsylvania Railroad or someone from the New York Central. However, this has not happened very often. There has not been a representative of a railroad here this year, and further there is no record of one coming here since 1917. As other concerns come to Penn State year after year for engineers they must be well pleased with men that they are getting. We have gotten reports of similar conditions at both Illinois and Purdue, but the point that the writer wishes to bring out is that the men who have declared their intention of going into railroad work do not receive any encouragement or have any interest shown in them by their future employers. The lack of interest would not be so noticeable if it were not being received by the other student societies. The freshman who has not quite made up his mind as to the engineering course that he intends to pursue cannot help but see that there is a difference.

As a solution the writer would like to offer the following:

1. The appointment of a "student relations" committee from the American Railway Association to see that the student engineer is properly informed of the opportunities in the railroad field; that there is some kind of liaison between the A. R. A. and the student railway societies; that arrangements be made whereby each technical school is provided with at least one speaker a year from the nearest railroad to speak on a purely railway subject.

2. The eventual organization of a student branch of the A. R. A. Such an organization would be composed of students from all courses, such as civil, electrical, industrial and mechanical engineering, who contemplate going into railroad work. It would be similar in composition to the senior organization.

3. Change of policy of the railroads whereby there will be selection of the men whom they believe will be best fitted for railroad service, instead of the present policy of making the man come to the railroad for the job regardless of whether he is the right kind of a man or not.

The writer does not intend to be presumptuous or to take issue with the opinions and judgment of older and more experienced men in railroad work. He merely offers the above as a possible solution of the situation, if the railroads really want the college man.

MARTIN B. RICHARDSON.

President of the Motive Power Club of The Pennsylvania State College.

Progress of Missouri, Kansas & Texas Since 1913

Marked Improvement in Efficiency of Operation Due to Physical Improvements and Better Methods

Part II

By Samuel O. Dunn
Editor of the *Railway Age*

AS THE INCREASE from 299.4 to 504, or 68.3 per cent, in the average tons of freight per train of the Missouri, Kansas & Texas between 1913 and 1920 indicates, there was a great increase in the efficiency of operation of the property between these years.

The increase in service obtained from freight locomotives has been especially great. On June 30, 1913, the Missouri, Kansas & Texas had 395 freight locomotives with a total tractive power of 12,218,545 pounds, or an average per locomotive of 30,933 pounds. On December 31, 1920, it had only 370 freight locomotives, but their total tractive power was 15,225,870 pounds, or an average per locomotive of 41,151 pounds. The average increase in tractive power per locomotive was 42.07 per cent. The increase in the number of tons moved one mile per locomotive (including company freight) was from 5,501,127 in 1913 to 10,211,622 in 1920, or 85.6 per cent.

The railways of the country for many years have been increasing the average tractive power of their locomotives. The increase in the amount of traffic handled with each locomotive has not been in proportion to the increase in average tractive power. In consequence, in the ten years from 1902 to 1913 the number of ton miles of revenue freight service handled *per 1,000 pounds of tractive power* on the railways of the United States declined from 269,000 to 222,000. Since then it has been increasing, and in 1920 it was about 260,000 tons, an advance over 1913 of over 17 per cent. During 1913 the revenue ton mileage *per 1,000 pounds of tractive power* of the locomotives of the Missouri, Kansas & Texas was 151,369; while in 1920 it was 217,587, an increase of 43.8 per cent. The Missouri, Kansas & Texas has a lighter traffic and one consisting of a smaller proportion of bulky commodities adapted to slow freight service than the average American railway, and therefore cannot reasonably be expected to render as many ton-miles of freight service with each locomotive in a given period as the average railway of the country, but the figures show that since 1913 it has increased the ton mileage of freight service rendered two and one-half times as much in proportion to the increase in the tractive power of its locomotives as have the railways of the country as a whole.

An increase in the average freight service rendered with each locomotive may be obtained either by running each locomotive more miles in a given period, or by making each pull more tons in each train, or by both means. As the size, power and complexity of design and construction of locomotives have increased in this country, there has been generally a decline in the average number of miles run annually by each freight locomotive. Undoubtedly this has been largely due to the fact that the number, size, power and complexity of locomotives have been increased faster in proportion than the increase in and improvement of the facilities for turning and maintaining them.

The experience of the Missouri, Kansas & Texas has been much more satisfactory than that of the railways generally. The average miles run by each of its freight locomotives in 1913 was 18,729 and in 1920 it was 20,498, an increase of over 9 per cent.

The average mileage made by its locomotives probably would have shown a still greater increase if it had had better facilities for turning and maintaining them. During most of the last two years it has had an average of about 25 per cent of its engines out of actual service, 10 per cent being in the shops and 15 per cent waiting to get in. The locomotive plants and machinery at locomotive terminals have been inadequate to making needed light running repairs, while the main locomotive repair shops have been inadequate to handling all the heavy repairs needed. This is a condition which the management understands, which it already has made some improvements to remedy, and improvements for more completely remedying which it has projected. Besides the extension of the locomotive shop at Parsons, plans for which already have been mentioned, it is expected to build a small locomotive shop at Waco. Better facilities and machinery for making light running repairs also are to be provided at various locomotive terminals.

The large increase in the traffic handled, both in proportion to the increase in the number of locomotives and in proportion to the increase in their tractive power, has been due mainly to an unusual increase in average tons hauled per train. An increase in average train load may be secured by increasing the number of tons of freight loaded in each car, by increasing the number of cars in each train, or by both means. The increase in car loading obtained depends largely upon the co-operation secured from shippers and regulating authorities. Increase in the number of cars hauled per train depends almost entirely upon improvements in facilities and operating methods. Average tons per loaded car, including company freight, increased from 17.28 in 1913 to 24.35 in 1920, or 40.9 per cent. Average cars per freight train increased from 25.82 to 33.89, or 31.3 per cent.

Statistics of Car Efficiency

The hauling of loaded cars causes operating expense, but also brings in revenue. The hauling of empty cars causes directly nothing but expense and is a patent economic waste when at all avoidable. The Missouri, Kansas & Texas always has had an excessive proportion of empty car mileage, and the figures show that this condition has not been improved. In 1913 its empty car mileage was 31.70 per cent of the total car mileage, and in 1920 it was 37.81 per cent. The average number of empty cars per freight train in 1913 was 8.50, and in 1920, 13.19, an increase of over 55 per cent. This large amount of empty car mileage is partly due to a badly balanced traffic, and partly to special characteristics of the traffic. The northbound and southbound freight on the densest part of the system, that between Denison and Muskogee, are about the same, but there are important parts of the railroad such, for example, as that between Sedalia and Parsons, where the traffic in one direction is as much as 50 per cent greater than in the other.

Furthermore, on some lines commodities are moved in large volume in one direction which cannot be handled in the same kind of cars as commodities moving in large volume in the opposite direction. There is a large livestock movement from Texas to Kansas City and St. Louis, with con-

sequently a long haul of empty cars practically the entire length of the road back to Texas. In 1919, 3.54 per cent of the road's total traffic was livestock—an unusually large proportion. Cars in which coal is moved southbound must be returned empty, as there is practically no lumber or other bulky traffic northbound for which they can be used. The empty car mileage of the Missouri, Kansas & Texas was increased in 1920 by orders from the Car Service Commission which required it to haul large numbers of empties practically the entire length of its line to protect loading in south Texas. The railway is also in an oil producing territory, which makes it necessary to handle large numbers of tank cars for which there is practically no back loading. It is subject to large seasonal movements of cotton and other agricultural products, for a large part of the cars used in which no back loading can be secured.

The large empty car mileage seems irremediable as long as the conditions of production and commerce in the territory of the Missouri, Kansas & Texas remain what they are now. An attempt partially to remedy it has been made by providing 1,587 combination coal and stock cars.

The average miles per freight car per day also seem quite low, having been 21.85 miles in 1913, 24.96 in 1917 and 23.23 in 1920. This low average is partly due to delays to cars at cotton compresses, and to the holding of tank cars

Louis-San Francisco were not so protracted as that of the Missouri, Kansas & Texas, and therefore the Missouri, Kansas & Texas has had the advantage of having a relatively larger amount of money invested in it which otherwise would have been paid out to the owners of its securities than have the Missouri Pacific and the St. Louis-San Francisco. The average load per car of the Missouri, Kansas & Texas in 1920 was less than that of either of the other roads, but the increase of its average carload between 1913 and 1920 was greater, both in amount and percentage, than that of either of the other roads. Its average train load in 1920 was about 42 tons more than that of the Frisco, and about 121 tons less than that of the Missouri Pacific, but its increase in average train load in seven years was 81.89 per cent, that of the Frisco 41.92 per cent and that of the Missouri Pacific 48.71 per cent. The absolute increase in its number of tons per train also was greater than that of either of the other roads. The management of the Missouri, Kansas & Texas was added in securing its relatively greater increase in tons per car and per train by the fact that it had a relatively larger increase in total traffic. The revenue ton mileage of the Missouri, Kansas & Texas increased 50.5 per cent, that of the Frisco 24.3 per cent, and that of the Missouri Pacific 44.4 per cent.

The effects produced by the increases in traffic which have

TABLE 1
FREIGHT AND PASSENGER EARNINGS, YEAR ENDING DECEMBER 31, 1920, COMPARED WITH 1917 AND 1913

Freight	EARNINGS, YEAR ENDING		DECEMBER 31, 1920, COMPARED WITH		1917 AND 1913		
	12 Months, 1920	12 Months, 1917	Increase or decrease	Per cent	12 Months 1913	Increase or decrease	Per cent
Average mileage operated.....	3,793.42	3,866.31	72.89*	1.9*	3,816.77	23.35*	0.6*
Freight train revenue.....	\$47,363,850.89	\$29,027,903.37	\$18,335,947.52	63.2	\$20,250,482.88	\$27,113,368.01	133.9
Per cent of gross revenue.....	64.96	66.97	2.01*	3.0*	63.29	1.67	2.6
Freight train revenue per mile of road.....	12,485.79	7,507.91	4,977.88	66.3	5,305.66	7,180.13	135.3
Freight train revenue per revenue car mile (cents).....	6.32	4.16	2.16	51.9	2.79	3.53	126.5
Freight train revenue per ton.....	18.11	12.15	5.96	49.1	10.41	7.70	74.0
Freight train revenue per ton per mile (cents).....	3.55	2.26	1.29	57.1	2.23	1.32	59.2
Freight train revenue per ton per mile (cents).....	1.43	.97	.46	47.4	1.09	.34	31.2
Passenger							
Revenue from passengers.....	\$19,378,120.16	\$11,160,922.06	\$8,217,198.10	73.6	\$9,552,480.30	\$9,825,639.86	102.9
Per cent of gross revenue.....	26.38	23.75	.83	3.2	29.85	3.27*	11.0*
Passenger service train revenue.....	\$23,906,941.22	\$13,296,529.47	\$10,610,411.75	79.8	\$11,294,301.85	\$12,612,639.37	111.7
Passenger revenue per mile of road.....	5,108.35	2,886.71	2,221.64	77.0	2,502.77	2,605.58	104.1
Passenger revenue per train mile.....	2.54	1.46	1.08	74.0	1.19	1.35	113.4
Passenger train revenue per mile of road operated.....	6,302.21	3,439.08	2,863.13	83.3	2,959.13	3,343.08	113.0
Passenger service train revenue per train mile.....	3.14	1.74	1.40	80.5	1.41	1.73	122.7
Average revenue from each passenger.....	2.23	1.65	.58	35.2	1.35	.88	65.2
Average revenue per passenger per mile (cents).....	2.94	2.39	.55	23.0	2.30	.64	27.8

*Indicates decrease.

for long periods, which is characteristic of territories where oil development is going on. It is also partly due to congestions which occurred as a result of large and practically overnight opening of oil fields on lines which were not in condition to handle the sudden increase of traffic. Another unfavorable influence is the chronic delays to cars loaded with grain, cotton and similar commodities at Galveston awaiting export.

Some light may be thrown on the results which have been obtained by the development and operating policies which have been followed on the Missouri, Kansas & Texas by a few comparisons of its operating units with those of some other railways in the same general territory. The Missouri Pacific, the St. Louis-San Francisco and the Missouri, Kansas and Texas all have lines in the southwest, but the Missouri, Kansas & Texas has a larger part of its mileage in that territory than either of the other roads. The Missouri Pacific, for example, has lines extending as far west as Pueblo, Colorado, while the Frisco has a line running to Birmingham, Alabama. However, all of them are classed as primarily southwestern roads. Furthermore, all have greatly improved their operating results within recent years, and all have been in receivers' hands within recent years, although the receiverships of the Missouri Pacific and St.

occurred, the increases in efficiency of operation which have been obtained, and the advances in rates which were made under government control are indicated by the statistics regarding total revenues from freight and passenger train service which are given in Table 1. These statistics also reflect to some extent the effect of the advances in rates which were made on August 26, 1920, and which, therefore, were in effect during the last four months of 1920.

The increase in total freight revenue in 1920 over 1913 was 133.9 per cent. The increase in freight revenue per train mile was from \$2.79 to \$6.32, or 126.5 per cent. Since the increase in the revenue per ton per mile was only from 1.09 cents to 1.43 cents, or 31.2 per cent, it will be seen that very much the greater part of the increase in the revenue per train mile was due to the increase in the average tons per train. The increase of 135.3 per cent in freight train revenue per mile of railroad, with an increase of only 31.2 per cent in the average revenue per ton per mile, of course reflects chiefly the very large increase made in the amount of traffic moved over each mile of road.

The increase in passenger service train revenue of 111.7 per cent was due only in a small measure to advances in passenger rates, since the average revenue per passenger per mile increased only 27.8 per cent. It was due chiefly to an

increase of 58.5 per cent in the number of passengers carried one mile. This largely increased passenger traffic was handled with 396,514 passenger train miles less than in 1913, a reduction of 4.9 per cent. In consequence of an increase of 66.8 per cent in average passengers per train mile, and of the increase of 27.8 per cent in the average revenue per passenger per mile, the passenger revenue per train mile increased 113.4 per cent.

Table 2 gives total revenues and expenses during the years 1913, 1917 and 1920.

The increase in total earnings in 1920 over 1913 was 127.9 per cent. Unfortunately, the Missouri, Kansas & Texas between 1917 and 1920 suffered from the same enormous increases in operating expenses, unaccompanied by corresponding advances of rates, from which all the railways of the United States suffered. While between 1913 and 1920 its total earnings increased 127.9 per cent, its operating expenses increased almost 193 per cent. Between the years 1917 and 1920 its total earnings increased 68.2 per cent, and its operating expenses 110.8 per cent. In consequence, during 1920 its expenses consumed over 95 per cent of its earnings, and with gross earnings of almost \$72,915,000 it had a net operating revenue of only about \$3,000,000. But it came out of this period better than most of the railways of the United States, for most of them during this period had no net operating revenue at all.

One measure of the comparative efficiency with which a

present freight and passenger rates were in effect, and also in the last ten months of 1920, during six months of which the advances in rates granted by the Interstate Commerce Commission in August were not in effect. It will also be

	4 Months ended Dec. 1920	10 Mos. ended Dec. 1920 (Federal excluded)	10 Mos. ended Dec. 1917	Increase 1920 mos. over 1917	Per cent increase 1920 over 1917
M. K. & T. Lines.....	38.11	41.47	35.53	5.94	16.72
Frisco Lines.....	39.05	41.82	34.50	7.32	21.22
Kansas City Sou. System.....	39.75	42.26	31.62	10.64	33.65
Missouri Pacific.....	42.12	44.43	33.28	11.15	33.50
Rock Island Lines.....	44.60	46.17	37.08	9.09	24.51

seen that the transportation ratio of the Missouri, Kansas & Texas increased less between 1917 and 1920 than that of any of the other lines mentioned. Its comparatively low present transportation ratio is due to the improvements in facilities and in operating methods which have been made under the receivership.

Results of Operation Under Advanced Rates

These improvements put the railway in a good position to benefit by the advances in rates granted by the Interstate Commerce Commission in August, 1920, and statistics regarding its earnings and expenses in the last four months of 1920, following the advances in interstate rates authorized by the Interstate Commerce Commission, make, of course, a

TABLE 2
TOTAL REVENUES AND EXPENSES, YEAR ENDING DECEMBER 31, 1920, COMPARED WITH 1917 AND 1913

	12 Months, 1920	12 Months, 1917	Increase or decrease	Per cent	12 Months, 1913	Increase or decrease	Per cent
Total traffic.....							
Average mileage operated.....	3,793.42	3,866.31	72.89*	1.9*	3,816.77	23.35*	0.6*
Gross operating revenue.....	\$72,914,737.06	\$43,344,150.39	\$29,570,586.67	68.2	\$31,998,115.75	\$40,916,621.31	127.9
Gross operating revenue per mile of road operated.....	19,221.37	11,210.75	8,010.64	71.5	8,383.56	10,837.81	129.3
Operating expenses.....	69,880,878.90	33,146,110.59	36,734,768.31	110.8	23,859,067.66	46,021,811.24	192.9
Operating expenses per mile of road operated.....	18,421.60	8,573.06	9,848.54	114.9	6,251.12	12,170.48	194.7
Net operating revenue.....	3,033,858.16	10,198,039.80	7,164,181.64*	70.3*	8,139,048.09	5,105,189.93*	62.7*
Net operating revenue per mile of road operated.....	799.77	2,637.67	1,837.90*	69.7*	2,132.44	1,332.67*	62.5*
Taxes accrued.....	2,086,855.03	1,983,114.74	103,740.29	5.3	1,406,748.05	682,106.98	48.5
Taxes per mile of road owned.....	587.96	549.86	37.20	6.8	395.58	191.48	48.4
Operating income, taxes deducted per mile of road operated.....	244.50	2,120.65	1,876.15*	88.5*	1,763.87	1,519.37*	86.1*
Ratio of operating expenses to operating revenue.....	95.84	76.47	19.37	25.3	74.56	21.28	28.5
Transportation ratio (including trans. fer inv.—Cr.).....	43.87	36.10	7.77	21.5	39.65	4.22	10.6

*Indicates decrease.

railway is being operated which often is used, is the ratio of its transportation expenses to its total earnings. Expenditures which are made for maintenance go into the physical property, and therefore a relatively high ratio of maintenance expenses to total earnings, other things being equal, indicates that a property is being well maintained. On the other hand, every dollar which is spent for transportation expenses is gone forever, and therefore the lower is the transportation ratio to total earnings the more favorable are the operating and financial results, other things being equal.

Recent years have been a period of high transportation ratios because operating expenses, and especially transportation expenses, have been increased more than rates. The railways of the southwest usually have had comparatively high transportation ratios, because they usually have suffered from relatively low freight and passenger rates and inadequate earnings.

The table at the top of the page shows the transportation ratios of some railways having large mileages in the southwest in the four months ended December, 1920, and also in the ten months ended December, 1920, as compared with the ten months ended December, 1917.

It will be seen that the Missouri, Kansas & Texas Lines had the lowest transportation ratio of any of the railways mentioned, both in the last four months of 1920, when the

much better showing than those for the entire year 1920. They alone afford a real and substantial basis for estimating the financial results which the management of the Missouri, Kansas & Texas really can hope to obtain in future.

It is a difficult and precarious undertaking under present conditions to estimate the net return which any railway can reasonably be expected to earn. There have been greater changes in all the unit costs of operation and in both freight and passenger rates within recent years, and even within recent months, than in many years before. Furthermore, there have occurred, and are still occurring, extraordinarily wide fluctuations of both freight and passenger traffic.

The Missouri, Kansas & Texas has been subject to these changing influences along with other railways. We have entered a period when it is only reasonable to assume that there will be marked reductions in all the unit costs of operation, including especially the principal items, cost of supplies, cost of fuel and cost of labor. If these reductions in costs prove to be large, and if developments show that present freight and passenger rates are so high as to restrict the movement of traffic, we shall probably see in the comparatively near future reductions of rates. No one can foretell how these changes will affect the financial results of the railways as a whole, or of individual railways.

It seems fair to assume, however, that the combined effect

of the changes will be to increase rather than to reduce the net return of the railways as a whole. The Interstate Commerce Commission has held that the railways of each large group in the country should be allowed to earn a net return of six per cent upon the valuations fixed by it. On a six per cent annual basis the Class I railways of the country in the months of September, October, November and December, 1920, should have earned a net operating income of \$407,815,000. Even the guarantees under government control which were based upon the net operating income earned in the three years ended on June 30, 1917, were in these months for the Class I railways as a whole \$342,424,000. The net operating income actually earned by these railways in these months was \$233,146,000.

The railways as a whole in the western territory, in which the Missouri, Kansas & Texas is located, fell almost as far short of earning the net operating income expected in these four months as those in other parts of the country. It is fair to assume, therefore, that measures will be adopted which will result in substantially increasing the net earnings, and consequently the operating income, of the railways as a whole, including those in western territory, and that the Missouri, Kansas & Texas will be benefited to some extent at least by these measures.

It is therefore interesting, and seems highly significant, to find that in the last four months of 1920, when the railways as a whole, including those in western territory, showed a great decline of net operating revenue compared with the average earned by them in the same months of the years 1915, 1916 and 1917, the Missouri, Kansas & Texas earned a much larger net operating revenue than it did on the average in the same months of 1915, 1916 and 1917. The net operating revenue earned by it on the average in the last four months of the three years just mentioned was \$3,871,807, while its net operating revenue in the months September to December, 1920, inclusive, was \$5,375,291. The Missouri, Kansas & Texas on the average in the last four months of 1915, 1916 and 1917, earned 43.4 per cent of its annual average net operating revenue in these years. If we should assume that the net earnings in the last four months of 1920 were 43.4 per cent of what it should earn in a normal year with existing unit costs of operation and existing rates, we should conclude that its net operating revenue for a year would be \$12,385,463. Its average net operating revenue in the years 1915, 1916 and 1917 was \$8,907,222.

This would indicate a very substantial increase in net operating revenue. When, however, other very important and pertinent factors are taken into consideration, it will appear that this estimate of its probable net operating revenue is too low. Among these factors are the following:

First: The Missouri, Kansas & Texas on the average in the years 1915, 1916 and 1917 carried 36.5 per cent of its freight tonnage in the last four months of the year. In the latter part of the year 1920 it suffered from a decline in traffic, as a result of which in the last four months of the year it handled only 32.5 per cent of its total freight for the year. The tonnage handled by it in the last four months of 1920 was actually smaller than in 1917. If its total tonnage in the last four months of 1920 had been relatively as large as it was in the first eight months of the year it would have handled 837,298 tons more than it did. Its average revenue per ton during these four months was \$4.25, and this additional tonnage would have increased its total earnings by \$3,558,516. The additional cost of handling this additional business would not have exceeded one-half of the total revenue derived from it, and therefore this business would have increased the net operating revenue by at least \$1,779,000.

Second: A large amount of traffic originating prior to the advance in rates in August was carried at the old interstate rates in these four months. It is estimated that if all

its business had been carried at the new rates the total earnings in the four months would have been \$225,000 greater. All this would have been added to the net revenues.

Third: Operating revenues as reported for the four months do not include an item of about \$100,000 in sleeping car surcharges earned during the period.

The following table indicates how the earnings would have been affected by these differences in traffic and in earnings in the four months September to December, inclusive:

	Actual earnings	Estimated earnings
Total operating revenues.....	\$27,600,379	\$31,483,895
Total operating expenses.....	22,225,088	24,004,088
Net operating revenue.....	\$5,375,291	\$7,479,807

In the three years 1915, 1916 and 1917, when there were very few changes in the rates of the Missouri, Kansas & Texas, and when the unit costs of operation were increasing, but not at such an abnormal pace as in recent years, the road in the last four months of each year earned on the average 37.8 per cent of its total annual operating revenues and incurred 36 per cent of its operating expenses. These percentages applied to the "estimated" earnings and expenses for the last four months of 1920 in the above table to get figures for a constructive year under present rates and wages, produce the following results:

Total operating revenues for a year.....	\$83,291,000
Total operating expenses for a year.....	66,678,000
Net operating revenues.....	\$16,613,000
Operating ratio.....	80 per cent

Tax accruals and uncollectible revenues, which must be deducted before arriving at total operating income, amounted in the last four months of 1920 to \$655,118. This indicates that under present conditions these items will amount in a year to about \$2,500,000, which would leave operating income of about \$14,100,000 available for rentals, hire of equipment, interest and dividends.

I believe that this is a reasonable and conservative estimate of the net operating income that the railway should earn with a normal traffic under existing unit costs of operation and existing rates. As already stated, the average net operating income earned in the years 1915, 1916 and 1917 was \$8,907,222.

There is, however, another important point to be taken into consideration in this connection. The authorities of some states in which the Missouri, Kansas & Texas operates did not make advances in state rates corresponding to those made by the Interstate Commerce Commission in interstate rates. The Interstate Commerce Commission in certain cases already has instructed state authorities to advance state rates to the same basis as those fixed by it. It is estimated that from the traffic handled by it in the months of September to December, 1920, inclusive, the Missouri, Kansas & Texas would have earned \$907,300 more than it actually did if the state rates had been advanced. On this basis, its annual earnings would be increased by about \$2,400,000 a year by appropriate advances in state rates, and all of this additional revenue would be added to its net revenues. On this basis the road would have total operating revenues in a normal year of \$85,691,000, an operating ratio of about 78 per cent, and, after paying its taxes, an amount of about \$16,300,000 would be available for rentals, hire of equipment, interest and dividends. This is the most optimistic estimate that can be made now of its operating income under normal conditions: a conservative estimate on the basis of a traffic equal to that of 1920 would be around \$14,000,000 available for rentals, hire of equipment, interest and dividends.

Looking to the future, it seems that the principal needs of the Missouri, Kansas & Texas, assuming that it is to be reorganized and taken out of receivership, are the following:

1. A conservative reorganization which will reduce its fixed charges so that they will not be more than \$5,000,000

a year, and preferably somewhat less. Every railway is subject to wide fluctuations of traffic and earnings, and high fixed charges make it necessary in every period of light traffic drastically to reduce maintenance expenditures, which injures the property, with resulting higher operating expenses and smaller net earnings in the long run. The foregoing estimates of the Missouri, Kansas & Texas' earning capacity are based on a normal year's business. No railway should be required to pay much more than one-third of its normal annual operating income in fixed charges. If, then, in a normal year, it pays another one-third of its operating income out in dividends, it has a reasonably safe margin for declines in earnings in bad years, and for investment in improvements in good years.

2. The Missouri, Kansas & Texas needs a large increase of traffic. With adequate terminals and equipment it could handle a much larger traffic on most of its lines, and a great part of the increased gross earnings would go to net earnings. The road has at present an excessive empty car mileage. Great efforts should be made to stimulate industrial and agricultural development in parts of its territory from which

traffic would move in the same directions as the present empty car mileage, and thereby help to load the empties. Every ton of freight loaded in a car that otherwise would move empty is almost so much clear gain.

3. The road needs relief from state legislation which requires it to maintain general offices in three different states—Missouri, Kansas and Texas. It is estimated that the elimination of this duplication of general offices, which is due to unwise state legislation, would save \$250,000 in operating expenses annually.

4. It needs a continuance of the development of its physical property along the lines of the present general program, and especially increases and improvements in its yards and in its facilities for repairing and maintaining its locomotives and cars. It also undoubtedly needs a substantial addition to its freight car equipment.

Under a reasonable system of regulation and with able and foreseeing management, such as the railway has had within recent years, it can be made a property which cannot only earn fixed charges of the amount indicated, but also substantial dividends for its stockholders.

Labor Board Considers Wage Reduction Pleas

Hearings Closed with Good-Will and Promises of Co-operation—
Decision Expected Soon

HEARINGS before the Railroad Labor Board on the requests of various carriers for wage reductions were closed on June 9 after short rebuttal statements on behalf of both carriers and employees. The requests of the railroads, which were substantially for the entire elimination of the increases granted by the Labor Board last July, are now under consideration by the Board in executive session. The Board has announced that its decision will be handed down before July 1 so that the reductions decided upon will become effective on that date.

The session on June 9 was opened with the testimony of W. S. Carter, president of the Brotherhood of Locomotive Firemen and Enginemen. Mr. Carter, in concluding his remarks requested the Board to rule as to whether the Board's Decision 119 abrogating the national agreements applied to the train service brotherhood's schedules. Mr. Carter stated that many roads have so construed this decision and that the employees will "fight ten times as hard against the abrogation of their schedules as they will against a moderate wage cut." Mr. Carter's stand was backed by the executives of the other brotherhoods. The controversy was finally ended when Dr. C. P. Neill, representing the southeastern railroads, stated that the carriers would agree with the men in their request for a ruling as to the scope and intent of Decision 119.

Among the other representatives of the employees who presented short arguments against wage reductions were G. A. Grubb, secretary-treasurer, National Marine Engineers' Beneficial Association; T. F. Jones, chairman of a committee representing a majority of the clerks on the Nashville, Chattanooga & St. Louis; J. L. Eldridge, Railroad Yardmasters of America; W. B. O'Neill, president, International Association of Railroad Supervisors of Mechanics; P. F. Richardson, president American Federation of Railroad Workers; John Grunau, United Association of Railroad Employees of America; W. L. Heacox, Order of Railroad Station Agents; J. W. Costello, Marine Engineers' Beneficial Association No. 13, Port of Philadelphia; E. P. Groff, Ferry Boat Engineers, Port of Philadelphia; R. C. Bailey, Ameri-

can Association of Engineers, and W. A. Williams, Brotherhood of Dining Car Conductors.

Case Closed with Talk of Better Co-operation

The case was closed with a rebuttal statement by F. W. Sargent, general solicitor of the Chicago & North Western. Mr. Sargent's plea for co-operation between railway employees elicited similar remarks from many of the labor leaders and caused Chairman R. M. Barton to say: "The chairman thinks he can say for the Board that he is delighted to have this hearing close with such good humor on both sides and he would be even more pleased if he could expect to have the decision that is to be handed down by the Board received in the same way."

After admitting certain inaccuracies in an exhibit filed earlier in the hearing and to which his attention had been called, Mr. Sargent said in part:

I was considerably disappointed after the last hearing at some of the articles appearing in some of the labor journals—glaring headlines to the effect that the railroads treat labor as a commodity, and so on and so forth. I repudiate that statement on behalf of the western carriers. So far as we are concerned, we want to co-operate with our employees in every way we can. I personally want to see them have all the wages that we can possibly pay them that are fair and reasonable. I believe—and you will pardon me for being personal—there is no man in this room that has faced poverty any harder than I have, and I know what it means. I have chopped wood in my lifetime from daylight to dark in order to live, and I have had the gaunt figure of poverty staring me in the face at different times. I have ridden the middle plains of the West from daylight to away into the night, and while I have plowed corn as hard as any living man, I have never limited myself to eight hours, and what I did has never injured me in the least.

I am not making any argument against the eight-hour principle. I am merely saying to these men I can sympathize with them. I want to state to these men who have such great influence with the great masses of railroad labor in the country, that no living man can make a success of his life based on the eight-hour day. If he does not engage himself in some useful occupation and study after his ordinary vocational hours have closed—if he puts in his time in the poolrooms and moving picture theatres—he never can and never will be able

to make a success out of his own life. I want to say—and I would like to drive it home to every young man—that the time is here when we must remember what our forefathers did in our country. Do you think these great railroads would have been built on an eight-hour day? Do you think the pioneers of this country could have developed this country on an eight-hour day? Let us not forget these fundamental principles. Let us work to the end of the eight-hour day, but in doing it let us undertake to inspire the thought and belief in every man that he owes a duty to himself, to his country and to his fellow-man to make use of the other eight hours.

Just in passing I want to say to our good friends on the other side that so far as we are concerned, there is not a locked door in our general offices. We have some marked "Private," but they are not private. The books are open, and I would like to have Mr. Daugherty come and examine them all. There is no class and no distinction on our property, and I want to say that in my judgment the time is here when the employees must get into the harness with us, and we with them, if we are to pull this country out of the horrible depression that it is in to-day. Let us co-operate to that end.

I want to compliment this board in co-operating toward that end. This board is, in a large measure, an experiment. It is the greatest experiment, in my judgment, ever undertaken in any civilized form of government, and I say to you and to these men we want co-operation. As far as our company is concerned, we are going to obey the board's orders in every detail, even if it drives us into bankruptcy, without any qualifications whatsoever. That is our purpose and our spirit, and we want Mr. Carter, Mr. Sheppard, Mr. Daugherty, Mr. Lee and Mr. Jewell to co-operate with us to the end that we may show this property in a condition of progress, and if we do, our employees can share with us in that prosperity. Let us meet across the table and understand one another, and if this board does not do any more than bring about that spirit, it has accomplished the greatest good that could be accomplished for this country.

I cannot refrain from saying, at this time, that I feel that the public of this country ought to understand these matters thoroughly. I am not going to criticize any co-ordinate branch of the government, but I have seen some criticisms in the investigation going on in Washington to the effect that the board has not acted with promptness and there have been some dilatory methods. Speaking for the western carriers, I want to say that we believe this board has acted with the utmost promptness and dispatch and that the country ought to understand that the questions involved in the Transportation Act have made it impossible to act with greater rapidity in this matter.

Employees' Representatives Promise Co-operation

The manner in which Mr. Sargent's plea was received is indicated by the following remarks of some of the labor leaders:

H. P. Daugherty, representing the Brotherhood of Locomotive Engineers, said: "I do not know when I heard anything that pleased me so much as what Mr. Sargent said about co-operation and I want to say to him that we will meet him more than half way and we will go down on the Chicago & North Western if that is the disposition of that railroad and settle these things without coming to the Board."

Mr. Carter said: "Perhaps if that which has been said in the last few minutes could have the same publicity in the public press as the contrary has, public opinion might be different. After all these scraps, as we call them, the closest of friendships between the representatives on both sides have arisen. We may call each other names at times, we may disagree with each other, and if it were not for the 18th amendment we might go out and take a drink together."

B. M. Jewell, president of the Railroad Employees' Department of the American Federation of Labor, said: "I want to say to Mr. Sargent that the organization I represent will accept his invitation. We will help the railroads to make a record and to show other organizations in this country that the way to do business is to co-operate with one another."

Board Hears Pullman Dispute

The dispute over the right of the Pullman Company to bring its request for wage reductions before the Board at this time, the opening phases of which were outlined in the

Railway Age of June 10 (page 1336), was heard by the Board in an extra session on June 10. The character of the arguments presented at this hearing were similar to those outlined in the *Railway Age* as noted above. Mr. Jewell introduced as a witness, Harry Smith, chairman of the committee representing those Pullman employees who are members of the Railway Employees' Department of the American Federation of Labor. Mr. Smith described the dissatisfaction which he claims exists among the Pullman shop employees as the reason for the strike order which he put out several weeks ago. This order was later revoked by Mr. Jewell. After hearing the arguments on both sides the Board took the case under advisement.

Board Rules in Agreements Controversy

A dispute which had arisen between several of the larger carriers, including the Chicago, Burlington & Quincy, the Chicago & Eastern Illinois and the Texas & Pacific, and their shop employees as to whether an agreement should be made in accordance with the Board's Decision No. 119 with each of the six shop crafts or with the Railway Employees' Department of the American Federation of Labor representing the six crafts was decided by the Board in a decision handed down on June 14. After Decision No. 119 was handed down these carriers and their employees proceeded with the negotiation of agreements as to rules and working conditions. At the outset the question arose as to whether a separate agreement should be made with each of the shop crafts or one agreement which would include the employees, members of the Railway Employees' Department, regardless of the department in which they were employed or the craft in which they worked. The carriers insisted that they had the right to make a separate agreement with each of the crafts or separate agreements with the employees in the maintenance of equipment, maintenance of way and structures and the maintenance of signals and telegraph departments of the various roads.

The decision of the Board in each case is that inasmuch as "the work of the six shop crafts and the conditions under which it is performed are so similar in the main characteristics as to make it practicable and economical to treat said crafts as constituting such an organization or class of employees as is contemplated in the Transportation Act and in Decision No. 119 of the Labor Board, but one agreement should be made for the six shop crafts including employees in other departments.



Photo by Ewing Galloway

Southern Pacific Station at San Antonio, Texas

Lift Bridges Compared With Other Movable Forms

An Analysis of Their Relative Advantages and a Detailed Study of the Vertical Moving Types

IT IS A coincidence that two valuable papers on movable bridge spans, prepared by well known bridge engineers, have been made public almost simultaneously. One of these, a paper by Ernest E. Howard, consulting engineer, Kansas City, Mo., was presented before the American Society of Civil Engineers on May 4, 1921, and comprises a detailed study of the vertical lift bridge. The other is an analysis of the relative economy of movable spans, comprising essentially a comparison of the lift, bascule and swing types by Dr. J. A. L. Waddell, consulting engineer, New York, and will form one of the chapters of his forthcoming treatise on "Economics of Bridge Work." Abstracts of these two papers are presented below. Dr. Waddell's, being more general, is presented first.

The Economics of Movable Spans

By Dr. J. A. L. Waddell
Consulting Engineer, New York

In dealing with the economics of movable spans it will suffice to consider only those types thereof which have survived the test of time, relegating the others to oblivion. The surviving types are the swing, the bascule and the vertical lift; and the first mentioned, as will be shown further on,

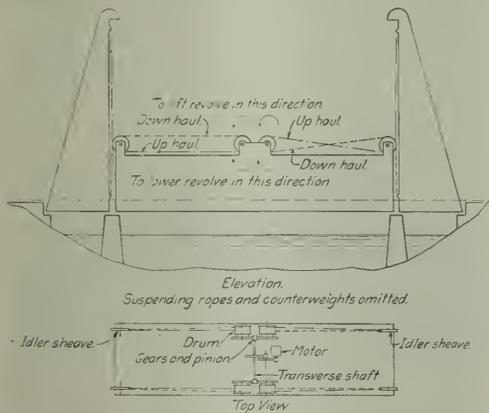


Diagram Showing Typical Arrangement of Operating Machinery and Cables for a Lift Span

has no longer any real *raison d'être*. The choice today, consequently, is between the bascule and the vertical lift, with the preponderance of advantage and economy in most cases favoring the latter.

Before beginning a discussion of the comparative costs of the three surviving types, it will be well to consider thoroughly all their important advantages and disadvantages, excepting only those that relate to first cost of construction, plus capitalized cost of maintenance and repairs.

Swing-Span Versus Either Bascule or Vertical Lift

(1) The swing provides two openings, while either the bascule or the vertical lift affords only one. This is claimed by the advocates of the swing as an advantage; but it is

not often such, because very seldom is there a location at which there exists a possibility of the water traffic being so great as to necessitate the simultaneous passage of vessels in opposite directions.

(2) The swing, on account of either its pivot pier or its draw protection, offers much more obstruction to the flow of water than does either of the other types.

(3) The cost of maintenance is more in a swing span than in either of the others on account of the upkeep and periodical replacement of a costly and perishable draw protection.

(4) The swing, of necessity, occupies space outside of that required for the accommodation of land traffic, while the other types do not.

(5) The least practicable time of operation is usually twice or thrice as great for a swing as for a corresponding single-leaf bascule or vertical lift.

(6) Either the vertical lift or the bascule affords better automatic adjustment of the railroad tracks thereon than does the swing span.

(7) In the case of future enlargement of the bridge to accommodate an increase of traffic, the swing has to be torn down and rebuilt, but a vertical lift or a bascule can simply be duplicated alongside.

(8) The danger of the span's being struck, when in motion, by passing vessels is much greater in the case of a swing than in that of either of the other types.

(9) The wider the roadway of a swing the more obstructive does it become to navigation, while the widening of either a vertical lift or a bascule does no harm thereto whatsoever.

(10) In passing vessels with low masts, a swing has to open just as fully as for a high-masted craft, which is not the case with a vertical lift or a bascule.

(11) In sand-bearing streams the protection-works for the moving span of a swing bridge cause a deposit of sediment, and thus often tend to obstruct navigation.

(12) In the case of a shifting channel, the two openings in a swing may score an advantage for that type over the other types, in that vessels might be able to pass through one opening after the other has been silted up; but under such conditions the silting is more than likely to block both openings. Moreover, for such conditions the vertical lift is far superior to the other two types, in that the design of the structure can be made so as to raise at any time any one of several similar spans, simply by shifting thereto the towers, the machinery, and the house or houses.

Vertical-Lift Versus Bascule

Comparing the vertical lift with the bascule, the former has several advantages, amongst which may be mentioned the following:

(1) The floor is always horizontal, permitting the employment of any type of deck that can be used on a fixed span, which is not the case for a bascule. That type of movable span necessitates a timber deck with its consequent fire-risk.

(2) Great wind pressure during operation has no appreciable effect on a vertical lift, while it may cause serious delay to a bascule, or even, under extreme conditions, prevent its operation altogether.

(3) The vertical lift does not have to rise so high for

low-masted passing craft as does the bascule; and thus it saves a considerable amount of time and power.

(4) In railroad bridges when the moving span is down, it acts just like any fixed span, as far as operation under traffic is concerned, which cannot be said for either the swing or the double-leaf bascule.

(5) In case of a shifting channel, it is feasible to make a number of the spans alike and to arrange, for any time in the future and at comparatively moderate expense, to have the towers and machinery taken down, transferred, and re-erected, so as to lift any one of the spans.

(6) The vertical lift, when its towers do not rest on flanking spans, lends itself readily to a further raising or lowering of the grade line in a way that no other type of movable span can possibly do; for all that is necessary is to change the elevation of the bearings of the lift span.

(7) The vertical lift accommodates itself to a skew crossing far better than does the bascule, as in the latter the tail has to be squared, while in the former both the span and the towers may be skewed, thus reducing the clear waterway (and consequently the length of moving span) to a minimum.

(8) By spanning the opening between tops of towers in a vertical lift bridge, electric-wires, water-pipes and gas-pipes can be carried across; but the accomplishment of this in the case of a bascule or a swing would necessitate either expensive and troublesome submarine cables and conduits or special towers for carrying an overhead span.

(9) The inherent simplicity of the vertical lift as a piece of mechanism, compared with the bascule, makes it more reliable in operation, and, on that account, somewhat less expensive.

Types of Swing Spans

The choice between these rim bearing and center bearing swing spans is mainly a matter of taste or sometimes one of prejudice; for there is no great difference in their first costs, what there is being in favor of the latter, which also has a slight advantage in respect to amount of power required to operate. In the author's opinion the principal economic advantage of the center-bearing type is due to the smaller diameter of the pivot pier. There is a difference of opinion among railroad engineers and even among high authorities on bridges concerning both the relative merits and the economics of these two types. A combination of the rim-bearing and the center-bearing swings is advocated by some engineers, but the author, on general principles, objects to hybrid designs, and especially in the case where there must exist a great uncertainty concerning the distribution of load between rim and pivot.

While there is apparently a saving in first cost by cutting down the length of one arm of a swing-span so as to convert it into a "bob-tailed" structure, that saving is generally absorbed by the adoption of more power and heavier machinery (with which to operate against unbalanced wind loads), heavy counterweights, and the special metal needed to support the counterweights.

Economics of Bascule Spans

Bascule spans may be divided into two general classes—single-leaf and double-leaf. The former type is superior to the latter in rigidity, but inferior in appearance, because of lack of symmetry. In the opinion of most railway engineers, on account of the difficulty in properly connecting the outer ends of the two leaves, the double-leaf bascule ought not to be employed for steam-railway bridges, for the reason that the lack of rigidity and the great deflection involved are not compatible with truly first-class construction.

The simplest form of bascule is the ordinary heel-counterbalanced, trunnion type; and this is the kind which is generally adopted when the minimum clearance allowed above water will permit. In many cases the height is not sufficient

for the heel of the span and the counterweight to clear the water or the pier-tops, and then the span must be lengthened and a water-tight pit must be provided into which the heel and the counterweight may descend. The expense of construction thus involved is very great; and, consequently, the more complicated and unsightly types, having towers and counterweights above the roadway, are resorted to.

Either of the two primary types of bascule may be divided into three general classes, viz., trunnion, rolling-lift, and roller-bearing. All of these are good, but none is best for all conditions, nor can it be said absolutely that one is always more economical than another.

The rolling-lift is sometimes the cheapest, as has been shown often by competitive bids on different types submitted by contractors; but it is not good practice to adopt it when the pier foundations are of piling, on account of the shifting of the center of gravity of the load on the piles as the span rolls backward and forward, and because of the possibility of pier settlement. The great advantage of this type is its retreating bodily out of the way of passing vessels.

The roller-bearing type has not been much used. When properly designed, it is neat, scientific, and in every essential way excellent, but is not pre-eminently economic.

Economics of Vertical-Lift Spans

The governing conditions which prove economic for the vertical lift, in comparison with the other types of movable spans, are as follows: Low vertical clearance; large horizontal clearance; heavy moving span; existence of fairly-long flanking-spans; deep foundations, especially when the flanking spans are long; expensive piers, when flanking spans are long; skewed crossings; concrete deck desired; other first-class deck, especially if heavy; shifting channel; high wind pressures to be provided for; wide deck; necessity for quick operation.

A low vertical clearance is evidently favorable to the vertical lift. The real factor in this case is the required vertical movement of the lift span. A greater clearance above the water when the span is down favors the vertical lift; since, for any required clear height with the span raised, the vertical movement is reduced.

A large horizontal clearance favors the vertical lift in comparison with the bascule. For a given weight of moving span, the towers, counterweights and machinery of a vertical-lift bridge are independent of the span length, while those items for a bascule vary nearly directly therewith.

Increased weight of span is favorable to the vertical lift. This is chiefly due to the weight of the rear legs and bracing of the towers, which, for a given height thereof, are nearly as heavy for light spans as for heavy ones. For a very light span and high vertical clearance, the weight of the towers may nearly equal that of the span; whereas, for a heavy span and the same vertical clearance, it may be only one-third of the said weight. There is no such variation in the case of the bascule, since the weight of the bracing is a smaller proportion of the total weight of the towers and counterweight trusses.

A layout in which the economic length of the flanking spans is much greater than the proper length of a bascule tower-span favors the vertical lift. In such a case the rear legs of the vertical-lift towers rest on the flanking spans without producing any material stresses therein. But in bascules with overhead counterweights it will be necessary to put in an additional pier, or to carry the weight of the counterweight on one of the flanking spans, or to put the counterweight trunnion over the pier and cantilever the flanking span out to support the trunnions of the moving span.

Deep foundations and expensive piers are favorable to the vertical lift, as compared with the bascule, when long flanking spans are employed; but for crossings over canals or canalized rivers the cost of the substructure usually has little effect

on the comparison. A crossing where the piers rest on piles or sand is especially favorable to the vertical lift, since the total loads for that type are less than those for the bascule. Rolling-lift bascules are not well adapted to such foundations. Deep foundations are usually unfavorable to the swing, on account of the large base of the pivot pier.

Advantage can be taken of a badly-skewed crossing by the vertical lift; for both the span and the towers may be skewed with very little extra expense, while at least one end of the bascule will have to be squared, thus lengthening the span and increasing the cost.

In respect to quickness of operation, this condition does not affect materially the comparative economics of vertical lifts and single-leaf bascules; but both the double-leaf bascule and the swing are at a disadvantage, since they take fully twice as long to operate as do the other types.

The question of flanking spans is of such importance that the author has found it necessary in his practice and in his economic studies to divide the vertical-lift bridge into two distinct types—one where there are fixed spans flanking the movable span, and the other where there are not.

General Elements in the Design of Vertical Lift Bridges

By Ernest E. Howard

Consulting Engineer, Kansas City, Mo.

The principal element of the lift bridge, in its simplest form, is a simple span equipped with machinery for operation, suspended at each end by wire ropes which pass over sheaves on towers and connect to counterweights about equal to the span weight. Variations in almost every feature have developed: Towers may be in part supported on adjacent spans; four vertical columns per tower, with four sheaves, may be used; both towers and span may be square or skewed.

When the lift span is short, the rear bracing of the towers



An Elaboration of the Lift Span Idea. The North Kansas Bridge Over the Missouri River with a Lifting Lower Deck

may be omitted and overhead struts used instead. Where the lift movement is small, each column may be independent, the sheaves placed transverse to the span, and two counterweights hung outside the columns at each end. In one bridge the columns are part of the lift span and extend down as legs into wells in the piers; the sheaves are on the piers and the counterweights are suspended underneath the floor, thus no tower or machinery is above the deck. Towers may be of steel, wood or concrete; concrete towers may be treated architecturally and excellent appearance secured.

Adaptability and Economy

In some alluvial rivers the location of deep-water channels varies through periods of years. Large expenditures occa-

sionally have been made to construct additional movable spans or to maintain a channel under an existing span. This condition may be met by the use of equal spans, as any span can be made to lift and the towers supported on adjacent spans; towers and machinery may be removed from one location and re-erected in another. Similarly, a bridge may first be constructed with fixed spans, and, later, one span may be made movable; also, towers and machinery may be installed and an old fixed span converted into a lift span, thus economically providing for navigation.

Substructures as well as superstructures must be considered in determining comparative economics of movable spans. Tower piers of lift bridges differ little from ordinary piers. The added loads are vertical and do not change in amount or position during span movement, wind excepted. The elaborate protection pier, common with the swing span, is not necessary, and the lift span shows its greatest comparative economy where foundations are deep or expensive, or are carried on piles. For narrow openings where vessels with lofty masts must be accommodated a bascule is preferable; but where the vertical clearance required does not exceed the channel width, the lift span is found to be nearly always cheaper than the swing bridge or bascule, notably for long spans.

Qualities of Wire Rope

The qualities of wire rope are essential features of lift-bridge development. A wire rope composed of steel wires twisted into strands which are twisted about a central rope or strand of wires or oil saturated hemp, is much more elastic than the elements composing it and more flexible than a bundle of the same wires wrapped together straight. Extreme fiber stresses from bends of large radius are very small. Steel of great tensile strength can be used, and no other flexible tension member can approach so small a cross-section with equal strength. Each wire and the finished rope can be tested and an element of marked homogeneity secured of varying characteristics as desired.

The life of a wire rope operating over a sheave is a function of the number of operations. Biggart's experiments with sheaves up to 42 rope diameters developed that the first wire will break approximately at the mid-point of rope life in operations. Applied to sheaves of 60 diameters, his formulas indicate a rope life of about 1,000,000 operations, or for a bridge, say, 50 operations daily up and down for 25 years. Yearly examination of suspending ropes will give timely warning of approaching weakness long before replacement is necessary. With suitable connections such replacement can be made without any interference with traffic or bridge movement.

Forged steel sockets of full rope strength are used to connect ropes to structural parts. The load on a group of ropes of unequal length or uneven stretch may be distributed equally to each by equalizing bars or levers. A clamp on the ropes just below the sheave prevents movements of equalizers due to rope divergence, yet leaves every rope free to equalize.

Suspending Sheaves

Suspending sheaves of 60 to 80 rope diameters afford satisfactory proportions between direct tension and bending stresses in ropes. Grooved sheaves of single steel castings, or of cast rim sections and hub riveted to structural webs are used. Composite sheaves not fully riveted are not satisfactory unless the shop work is better than is ordinarily the case. Sheaves 12 ft. in diameter, 36-in. face, have been supplied as single castings.

The two sheaves on a tower are quite independent, and slight variations in position cause no difficulty provided only that each pair of bearings are in proper relation. The sheaves can be skewed and the suspending ropes led directly from lift-span truss to counterweight, or the sheaves can be

set in any lateral position and the ropes connected to a portal girder of the lift span.

Operating Machinery

The most used and most approved operating machinery comprises operating drums with motor attachment on the lift span controlling operating ropes. Near the middle of the span are four spirally grooved drums connected through trains of gears to motor or engine. Each drum contains and controls two operating ropes which pass, respectively, under and over deflecting sheaves at the corner of the span, thence one upward and one downward to connections on the tower column. Revolution in one direction winds on the up-haul ropes, pays off the down-haul ropes, and lifts the span; reversal of the drums pulls the span down.

The operating ropes connect to take-up devices and may be adjusted to have the same general tension at each corner. The span is thus moved, held level during operation, and may be held at any point or backed down by stopping the machinery. No other locks are necessary, although occasionally used, principally as part of a track-interlocking system.

Methods of constructing counterweights vary with navigation conditions. When there is a closed season the lift span is placed on the piers, the suspending ropes connected and laid over the sheaves, the counterweight frames hung in place, wood forms bolted to them, and the concrete deposited. When the channel must be kept clear, the counterweights can be built in raised position on special beams attached to the towers or other falsework, the lift span floated in, or erected in elevated position, attached to the ropes and lowered to lift the counterweights so their supports may be removed.

Counterweights of pre-cast blocks can be erected with ordinary equipment without falsework, provided only that the channel may be blocked for the few hours needed to raise and place the counterweight parts. They can be taken down as readily, so this form is always used where various spans are made liftable, and is regarded with favor for any bridge.

Except when the span and counterweights are at the same elevation, the suspending ropes are unbalanced. Ordinarily, this varying unbalanced load is handled by the surplus capacity of the operating machinery. Exact balance for all conditions may be secured with counterbalancing chains. Suspending sheaves may be used at the corners of a lift span effecting a three-part rigging of suspending ropes, reducing the counterweights by one-half, and doubling their height of movement. This was found advantageous with a very heavy span with low lift.

The counterweights are guided during movement by jaws engaging vertical tracks on the towers. The span is similarly guided, with allowances for temperature variations of span length, and for the deflections of the towers. At one end the span is held both laterally and longitudinally, at the other only laterally. To bring the span to exact lateral position for proper junction of track rails, the lower few feet of the guide-tracks are battered out to take up all lateral clearance in the guides at the seated position of the span. The guide-jaws may have rollers. Spring guides bearing on tracks on the faces of tower columns have been used, but are less satisfactory than the jaw guides.

The pier at the end of a lifting span supports, in addition to the loads of a fixed span, one tower, sheaves, and ropes, one counterweight, and additional wind load. For a single-track railroad bridge, Class E-55 loading, and lift span 200 ft. long for an ordinary inland river, this total extra load on one pier, except wind, is about 275 tons, which is additional to an ordinary imposed load for the fixed span of about 1,200 tons.

Near together over the Willamette river in Portland, Ore., serving the same kind of traffic, are one steam operated swing

span, one electrically operated swing span, one excellent double-leaf bascule span, one double-deck lift span, and one simple lift span. County records show that the latter, the Hawthorne Avenue bridge, serves more tonnage of traffic, operates more quickly, and costs less per operation than any of the others. Its openings average 15 daily, the average time that traffic is delayed per opening is 110 sec., the power consumption is less than 2 kw. per operation, and the cost of power per operation is about 5 cents. The lift span is 245 ft. long.

The lift-bridge idea may be applied not only to lifting spans, but also to a bridge floor supported at several points along its length, called a lifting deck, which is peculiarly adaptable to double-deck structures. In older forms, of



A Further Elaboration of the Vertical Lift Span. The Harriman Bridge at Portland. A Lift Span with a Lower Lifting Deck

which a few small spans have been built, the lifting deck and its counterweights were supported from the overhead trusses. The later structures relieve the supporting trusses of about half this load by placing the counterweights at the ends of the span. The North Kansas City Bridge over the Missouri River has a lifting deck, 425 ft. long, serving a double-track railway.

The Harriman Bridge over the Willamette River at Portland, Ore., offers a noteworthy example of the exceedingly feasible variations possible with the wire-rope lift-bridge idea, for it has a lifting deck suspended under a lift span which can be operated without movement of the span; or both can be raised at will. This design met the special condition of dense highway traffic on an upper level which is obstructed only a few times a day for the passage of masted vessels, although the lower deck is open sometimes for as many as one hundred boats per day.

A LIQUIDATING CORPORATION whose object will be to round up and take title to all American goods sent to South American countries which have been unclaimed or refused by the consignees is to be formed by a committee which has been named by the Argentine-American Chamber of Commerce. This committee will endeavor to dispose of such unclaimed merchandise and return the proceeds to the owners in this country, thus assisting in the liquidation of a credit which has been frozen solidly for several months.—*New York Times*.

Railroad Hearings Before Senate Committee

Presentation of Railroad Testimony Nearly Completed —Maintenance Expenditures Discussed

WASHINGTON, D. C.

THE HEARINGS on the railroad situation before the Senate committee on interstate commerce were resumed on June 14. E. T. Whiter, chairman of the railroad conference committee which represented the carriers before the Railroad Labor Board, completed his statement regarding the effect of the National Agreements and was followed by L. E. Wettling, manager of the statistical bureau for the Western lines, who presented and explained to the committee a large number of statistical statements prepared by the Bureau of Railway Economics which contain the basic data prepared by the railroads for the hearing, some of which had already been presented in the testimony of individual witnesses. Mr. Wettling was to be followed by W. H. Williams, chairman of the Wabash, and Alfred P. Thom, general counsel of the Association of Railway Executives, was expected to conclude the railroads' presentation this week with a final summing up of the case. The committee has indicated its intention of hearing next from S. Davies Warfield, president of the National Association of Owners of Railroad Securities, who has a plan for the reorganization of the railroads, and later from any shippers who desire to be heard, although the committee has thus far heard from very few representatives of shippers who desire to testify. Representatives of the railroad labor organizations asked that their appearance be postponed until July 5 because of the hearings before the Railroad Labor Board in Chicago and general meetings of labor organizations called for the first part of July to consider the wage decisions.

The necessity for making up for the lack of adequate maintenance during the period of federal control in order to restore the railroads of the country to a condition to meet increased transportation demands was responsible for a large part of the increase in the cost of railroad operations in 1920, Mr. Wettling said.

Chairman Cummins called attention to the fact that this increase in the cost of maintenance was particularly marked during the six months' guaranty period; and, in reply to his question, the witness explained that it was necessary to make extraordinary expenditures for maintenance immediately after the termination of federal control.

Guaranty Does Not Cover Any Excessive Maintenance

"It has been alleged," said Senator Cummins, "that the railroads were reckless during the guaranty period because the government in any event must make good the amount from the federal treasury. I want it to be especially emphasized that the Transportation Act guarded completely against any such contingency as that and if it turns out that the railroads have expended more from March 1 to September 1, 1920, than they ought to have spent according to a formula which was adopted under the standard contract, then the government is not required and will not be required to pay anything because of that fact."

"In other words," interjected Mr. Thom, "the guaranty does not protect the railroads for any excessive expenditure for maintenance."

"One of the controlling factors," said Mr. Wettling, "which tends to distort such comparisons and makes the increase in these expenses in the 1920 period seem disproportionate to the increase in other expenses, lies in the fact that the expenses in the corresponding period in 1919 were subnormal because of restrictions placed upon them by the director general.

"Necessarily such a policy produced a condition of under-maintenance and the roads were turned back on March 1, 1920, in a run-down condition which made it imperative, in the interest of safe and adequate service to the public, that so far as possible the roads be rehabilitated and restored to the condition and efficiency in which they were found when taken over by the government on December 28, 1917.

"This necessity was especially urgent in view of the fact that the public was at that time demanding of the railroads with fair promise of continuance the greatest service in their history, and to perform this task it was essential that the roads be promptly brought to their highest possible point of efficiency, limited only by the ability to obtain the necessary labor and material together with the money with which to pay for the costs.

"The costs were abnormally increased over the corresponding period of 1919 by several well known factors, the principal items being the labor award of July 20. This large increase affected the costs materially during four months of the period under consideration and the cost was also greatly increased, during the entire six months, by reason of the so-called National Agreements, none of which were in effect during the corresponding period of 1919; another large factor entering into the increased cost of maintenance was the increase in prices of material which in May, 1920, were more than 20 per cent greater than in May, 1919, and continued to increase, reaching their maximum in July and August, the average for the year being estimated at about 30 per cent over the average price for 1919.

"The fact that the natural tendency was to limit these maintenance expenses to what were absolute necessities should be evident when consideration is given to section 209 of Transportation Act, 1920, which definitely fixed a limit on the amounts to be allowed for such expenditures and constituted public notice to the carriers that any expenditures in excess of such limits would have to be borne by the carriers themselves.

"Nevertheless, because of the urgent necessities therefore the carriers continued their program of restoration of the properties until in October, 1920, when it became apparent that a general business depression was imminent and that the full net revenues anticipated as a result of the advances granted in Ex Parte 74 were not being realized. Most of the roads had little hope of further advances from the Railroad Administration and because of the refusal of the Secretary of the Treasury to honor certificates of partial payment for the guaranty period the carriers found themselves short of funds and were thus manifestly unable to continue the necessary maintenance expenditures and the expenditures since November, 1920, have suffered a substantial reduction below the necessary requirements by many roads."

Expenditures Necessary to Put Properties in Condition to Handle Traffic

Senator Cummins had called attention to figures shown in an exhibit filed by Mr. Wettling which divided the 1920 figures between the two months' period during which the roads were still under federal control, the six months' guaranty period and the four remaining months of the year after the rate increase. Senator Cummins said that the increase in expenses for maintenance of way and structures during the guaranty period as compared with the corresponding period of 1919 of 45.4 per cent, and in maintenance of

equipment expenditures of 39.2 per cent as compared with increases of only 15.1 per cent and 10.9 per cent, respectively, in the six months ended with February, 1921, arrested attention. Mr. Thom replied that for that reason he desired to call attention to the fact that under the terms of the law the railroads are not protected by the guaranty for the entire amount of the maintenance expenditures during this period, but only to the extent of the amount to be determined by the commission. The railroads made this necessary increase in expenses with their eyes open, he said, because the expenditures had to be made to put the properties in condition to handle the traffic. Senator Cummins said it would be well at that point to read into the record the provision of the transportation act which thus limits the guaranty and directs the commission to apply the rule of the standard contract as to maintenance, saying that he desired to emphasize that point. He added that it is not yet known whether the commission will allow the full amount of the expenditures. Mr. Thom said that it is known, however, that the commission will reduce the amount to be charged for maintenance, for the purpose of fixing the guaranty, to the standard provided for in the act.

In explaining the increase in the amount of money spent by the railroads during 1920 for maintenance purposes compared with the previous year, Mr. Wetling said the railroads performed more maintenance work during the past year than in either 1918 or 1919 when they were under federal control. Although the cost was much greater owing to the increased cost of labor and materials, he said, they performed less, however, in 1920 than they averaged annually during the test period which consists of the fiscal years of 1915, 1916 and 1917. Mr. Wetling said the increase in the amount expended for maintenance purposes in 1920 over 1919 "was not abnormal or excessive."

"In full recognition of the fact," said Mr. Wetling, "that the roads had not been fully maintained to the proper standard during federal operation and that the traffic being offered by the public demanded that the roads be immediately restored to pre-war efficiency in order to render proper and adequate service and notwithstanding the realization that the costs would be excessive because of the trend of prices of material and the probable outcome of the demand for higher wages than before the Labor Board, the roads diligently began their efforts to restore their properties to the high degree of efficiency which obtained prior to the war."

Reports from 93 per cent of the Class I railroads representing approximately 218,000 miles, show that in 1920 they spent \$961,304,000 for maintenance of way and structures compared with \$727,705,000 in 1919 and \$616,742,000 in 1918, while during the test period they averaged \$383,699,000.

In 1920, those roads laid 2,262,033 tons of new and second-hand rails the total cost of which was \$82,219,999, compared with 2,027,159 tons costing \$69,961,049 in 1919 and 1,615,963 tons costing \$50,836,964 in 1918. During the test period the yearly average was 2,041,676 while the total cost was \$54,166,631.

The ties placed during those years follow:

	Average per annum Test Period	1918	1919	1920
Switch ties (feet).....	172,689,571	160,024,789	176,079,389	170,345,383
Bridge ties (feet).....	55,625,964	45,400,555	49,644,851	41,533,926
Other ties (number)....	83,885,109	69,327,243	73,398,922	77,015,580
Total cost	\$58,135,355	\$62,886,865	\$84,156,035	\$107,772,885

Taking up the question of ballast, Mr. Wetling said those roads in 1920 applied 19,118,553 yards at a cost of \$12,045,000 or an average cost of 63 cents per yard. In 1919 those roads applied 17,518,791 yards at a cost of \$9,481,545 or an average cost of 54 cents, while in 1918 they applied only 14,796,252 at a total cost of \$6,472,151 or an average cost of 43 7/10 cents per yard.

Of the total cost of maintenance of way and structures, \$577,688,000 or 60.09 per cent was paid to labor. Cost of material was 29.67 per cent. During the test period \$209,906,000 or 54.71 per cent went to labor; \$401,331,000 or 65 per cent in 1918 and \$439,140,000 or 60.35 per cent in 1919.

In connection with the exhibit showing the results of operation since the rate increase, Senator Cummins called attention to the fact that railway revenues in March showed a decrease of two-tenths of one per cent in spite of the increase in rates, showing the effect of the decrease in traffic. Mr. Wetling said there was a reduction for the month as compared with March last year of 27 per cent in ton miles and 13 per cent in passenger miles. The senator also pointed out that the railroads had effected a reduction of \$20,000,000, or 4.8 per cent, in the operating expenses for the month and asked if that were not a hopeful sign. Mr. Wetling said that while the railroads were reducing their expenses, the figures showed that about \$15,000,000 of the reduction was in maintenance expenditures, which represented largely the postponement of work rather than a real saving. He also called attention to figures compiled by the Bureau of Railway Economics from a questionnaire sent to the railroads, showing that the railroads had actually expended less for labor in the first three months of 1921 than in the corresponding period of 1920 by reductions in force, because the number of employees during the first quarter this year was about 15 per cent less than last year. In connection with the table comparing the operating accounts from 1912 to 1920, Senator Cummins said that the public is being misled by the repeated publication of figures showing the net operating income earned in 1918 and 1919 during the period of federal control, because people were led to believe that the government's loss from the operation of the railroads was only the difference between the amount actually earned and the guaranty to the railroads. If the government had properly maintained the properties, he said, the net operating income would have been smaller and the loss to the government would have appeared larger, and he estimated that the government's loss after allowing for undermaintenance claims would be at least a billion and a half instead of seven hundred, eight hundred or nine hundred million dollars.

"The public will never comprehend what government control cost," he said, "until we have to make an appropriation to pay the final bill."

National Agreements

Mr. Whiter had been questioned by members of the committee as to who was responsible for the rules of the national agreement for shop men. Quoting from the testimony of Frank McManamy, formerly assistant director of the Division of Operation, Railroad Administration, before the Railroad Labor Board on April 11, Mr. Whiter said the committee which actually negotiated this agreement was composed entirely of men of union labor affiliation, at the time employed by the Railroad Administration, after two distinct groups of representatives of the men and of the Railroad Administration had failed to agree on a set of rules. The final negotiation of the agreement, he said, "really amounted to a session of labor representatives sitting down with former conferees and working out a schedule satisfactory to themselves, but in large part wholly unsatisfactory to the railroad officers who represented the government and who had previously disagreed upon about half of the rules suggested."

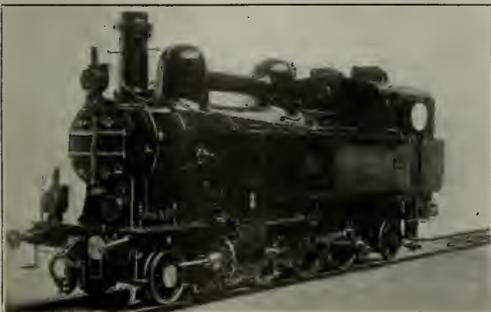
"I have read in the newspapers," Mr. Whiter said, "some criticism of the Labor Board as to the long delay in hearing and disposing of the question of continuing the national agreements, rules and working conditions. The Labor Board had before it the demands of some 20 or more organizations for consideration in addition to the short line hearings, hearings on cases of individual railroads, and other routine work, so that when the magnitude and scope of the question is taken

into consideration in my judgment all things considered the Board has handled their work promptly.

"Decision No. 119, dated April 14, 1921, issued by the United States Railroad Labor Board, directs that Decision No. 2, extending the rules, working conditions and agreements in force under the authority of the United States Railroad Administration, will cease and terminate July 1, 1921, and calls upon the individual railroads and their employees to negotiate new schedules of rules covering working conditions. The Labor Board lays down 16 principles which are to be taken into consideration in the formation of the new rules. If the organizations meet the individual managements in the spirit intended by Decision No. 119 much will be accomplished; if on the other hand the organizations maintain the position contending for that which in effect would be a continuation of the national agreements, thus ignoring the principles laid down in Decision No. 119, little or no progress will be made. Therefore, it remains to be seen whether the roads will be successful in negotiating reasonable and proper rules, or whether the whole question will again be thrown back to the Labor Board for decisions as to what constitutes reasonable rules. If the latter becomes necessary it is obvious that the railroads will not promptly realize the relief from these ultra-restrictive rules, which they believe Decision No. 119 intended."

Mr. Whiter said he had received information that the federated shop crafts intend to remain firm for the principles if not the exact language of the national agreements and that he had just received a pamphlet issued to the members of the federation reporting the results of the negotiations up to date on 85 railroads, which he said plainly indicated the purpose and intention of the federated crafts to hold out without any qualification for the principles of the national agreement. If that is to be their attitude, he said, it is going to be impossible to reach any satisfactory agreement and the whole matter will go back to the labor board for consideration and decision. The crafts will refuse to consent to any agreement unless the railroads agree to accept the principles of the national agreement, which would mean the continuance of the burden of at least \$300,000,000 a year, which the railroads ought to be relieved of. Mr. Whiter said that a large number of the railroads have entered into negotiations for new rules to take the place of the national agreement, but that very little progress is being made because of this attitude of the organizations.

Senator Cummins announced that the railroads would be expected to complete their presentation by Friday, June 17, and that Mr. Warfield would be heard beginning on June 21. Clifford Thorne and S. H. Cowan have arranged for an appearance on July 11. Only three or four Senators attended the hearing on Tuesday and Senator Cummins alone represented the committee on Wednesday.



An Austrian Suburban Locomotive

Committee Reports of Purchases and Stores Section

AN ACCOUNT of the business meeting of the Purchases and Stores Division of the American Railway Association, held on June 9-11 at the Blackstone Hotel, was published in the *Railway Age* issue of June 10, page 1355. Owing to lack of space, the reports of the Committees on Buildings and Structures, Scrap Classification and Cross Ties were not included and abstracts are therefore given below.

Buildings and Structures

The committee (J. E. Byron, Gen. Storekeeper, Boston & Maine, chairman) stated that few questions had been referred to it during the year, but that it thought it desirable to emphasize certain points referred to in previous reports.

Construction and Insurance—Lest any impression prevail that "steel unprotected" is not damageable by fire, the use of unprotected metal as structural material, particularly in carrying weights, is even less desirable than substantial timber and plank construction, being more susceptible to fire damage, losing its strength quickly when heated, involving extra expense in removing debris from ruins of such construction, and under schedule insurance the rate on storehouses constructed of wood or unprotected metal is about 50 per cent greater than where other materials are used.

The aggregation of value represented by the contents of a storehouse would alone justify protection against fire regardless of any insurance consideration. But seldom does insurance carried completely cover heavy loss, generally leaving a balance which is irrecoverable, and, what many times exceeds the direct loss, a consequential loss, which includes, among other items, expense of temporary quarters, increased cost of new facilities or in replacing stock, delays to or loss of labor and equipment through lack of proper material and high cost of recovering salvage, necessitating the most careful consideration of fire hazards and their protection.

With regard to rates, nearly all railroad storehouses are insured under schedule policies carried by the road on its property in general, and as the scheme of rating and renewing such general schedules is one of broad classification of risks and fluctuations according to the loss record of each road, it is not possible to estimate the probable rates for any particular type of construction or protection.

Fire Protection—Among other protective measures the subdivision of storehouses by substantial partition walls at reasonable distances to help confine fire to the section in which it starts is most important, and automatic sprinklers are recommended as the best device available, the installation to be planned by experts.

Fire protection appliances and safeguards should be provided only after consultation with fire prevention department of the road, or, if none, with other competent authority, as to what types and locations are suitable, etc. As some appliances on the market are not approved, the standards developed along these lines in recent years by men of wide experience, such as the Railway Fire Protection Association, should be carefully adhered to.

Fires in oil houses or similar hazards are of such nature as to require special precautions, and their prevention should be the subject of reference to the fire prevention department, or such other competent authority as the Railway Fire Protection Association.

Standards—The more this subject is investigated, the more is realized the entire lack of standards covering buildings, shelving, counters, racks, containers, etc. A careful study of this subject by each road is again recommended, and the adoption of standard prints covering the various types of buildings, as well as of standard facilities to be used therein or in connection with such buildings.

Attention is again called to the tremendous need of suit-

able structures in which to house materials to prevent loss and deterioration from exposure to the elements. While this has been followed carefully on some roads, we feel that on many roads it has not been given the attention it deserves.

Location—While every report dwells upon the importance of locating material storage buildings where they will be most convenient to the operations to be served there still exists a tendency to place such buildings without regard to their accessibility, and the saving in labor and time which due consideration of this feature involves.

Scrap Classification—Handling and Sales

The committee submitted the following changes in the Standard Scrap Classification:

TERMS OF SALE

Old Form

Sealed bids for this scrap to receive consideration must be in this office by 12 o'clock noon on.....

Final shipping directions must be furnished within 10 days from date of award. When shipping directions for material are not furnished within 10 days from date of award, it shall be optional with this company to cancel the sale at any time thereafter.

Shipment will ordinarily be made within 30 days after receipt of shipping directions unless prevented by causes beyond our control. If shipment is not made within 60 days, prevented by causes beyond our control, it will be optional with either party to cancel balance due, within 10 days thereafter.

Current tariff switching charges will be made for delivery to connecting lines.

Suggested Changes

Sealed bids for this scrap, to receive consideration, must be in this office by 12 o'clock noon on..... and remain in effect until 12 o'clock noon on.....

Final shipping directions must be furnished within five days from date of award. When shipping directions for material are not furnished within five days from date of award, it shall be optional with this company to cancel the sale at any time thereafter.

NOTE.—Majority report, five days: Messrs. Hoinville, Kirk, Jones and Hughes. Minority report, ten days: Messrs. Haynes and Munster.

Shipment will ordinarily be made within 30 days after receipt of shipping directions unless prevented by causes beyond our control. If shipment is not made within 45 days, prevented by causes beyond our control, it will be optional with either party to cancel balance due, within ten days thereafter.

CLASSIFICATION OF SCRAP IRON AND STEEL

10 Boilers, Fire Boxes and Tanks, Uncut.
All kinds, attached or separate.

11 Boilers, Fire Boxes and Tanks, Cut Up.
Iron or steel boiler or tank plate cut into sheets and rings.

17 No. 3 Railroad Cast.
Pieces weighing over 500 lb.; includes cylinders and driving wheel centers, and all other material that can be broken under a drop; otherwise same specification as Classification No. 15.

29 Limed Iron and Steel.
All kinds of material from interior of boilers (except flues which are encrusted with lime or corrugated by the action of water), such as crown bars, crown bar bolts, staybolts, etc.

43 Sheet Scrap No. 2 and Miscellaneous.
Includes netting, other than stack wire, all galvanized or tinned material, composition brake shoes and gas retorts.

82 Belting.
No. 1 belting, leather, six inches wide and over.
No. 2 belting, leather under six inches, punchings and trimmings.
No. 3 belting, rubber, all kinds.
No. 4 belting, compositions.

Other changes suggested consisted merely in the wording of class designations.

The report is signed by C. H. Hoinville, chairman of the committee, A. T. & S. F.; J. C. Kirk, C. R. I. & P.; J. R.

8 Angle and Splice Bars, Patented Joints Only.

11 Boilers, Fire Boxes and Tanks, Uncut.
All kinds, attached or separate. Specify whether with or without flues.

11 Boilers, Fire Boxes and Tanks, Cut Up.
Iron or steel boiler or tank plate cut into sheets and rings (with or without staybolts).

NOTE.—Question of whether to include sheets from steel cars.

17 Cast, Railroad No. 3.
Pieces weighing over 500 lb.; includes cylinders and driving wheel centers, and all other castings; otherwise same specification as classification No. 15.

29 Limed Iron and Steel.
All kinds of material from interior of boilers (except flues which are encrusted with lime or corroded by the action of water) such as crown bars, crown bar bolts, staybolts, etc.

43 Sheet Scrap No. 2 and Miscellaneous.
Includes netting, other than stack wire, all galvanized or tinned material, composition brake shoes and gas retorts, and any other iron or steel material not otherwise classified.

82 Leather Belting.
No. 1 leather belting six inches wide and over.
No. 2 leather belting, under six inches, punchings and trimmings.
No. 3 rubber belting, all kinds.
No. 4 composition belting.

Haynes, C. B. & Q.; W. F. Jones, N. Y. C.; A. W. Munster, B. & M.; E. H. Hughes, K. C. S., and B. T. Jellison (chairman ex-officio), C. & O.

Railroad Losses in Colorado Exceed Five Millions

Early Estimate on Destruction to Property and Life Greatly
Overshadowed by Recent Survey

REPEATED HEAVY RAINS and warm weather attacks on mountain snows have caused untold damage to Colorado railroads in the last two weeks. The catastrophe at Pueblo on June 3, which resulted in the death of several hundred persons and a \$5,000,000 loss to the railroads, overshadows the troubles elsewhere in the state, but these collectively add a great sum to the flood bill imposed on the roads. Nearly all roads have suffered north of Denver. The Colorado & Southern, the Fort Collins branch of the Union Pacific and other lines were thrown out of service by washouts. Similar conditions near Sterling caused short interruptions to traffic on the Union Pacific and the Chicago, Burlington & Quincy. Later, about June 10, high

road bridges over the Arkansas River, besides three over the Fountain River. Only one, the Santa Fe bridge to the Union Station, escaped. All the others lost one or more spans or large portions of approaches. The Missouri Pacific yard and engine terminal has been cut off by a new channel of the river, so it is now on an island without rail connection. A Denver & Rio Grande and a Missouri Pacific train were caught in the flood while trying to escape to high land, and the cars were overturned, with the loss of several lives, the number not known.

The two thousand cars in the yards during the flood suffered enormous damage; many were floated away and overturned or crushed by impact or pressure of debris. There



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Overturned Passenger Trains on the Station Tracks. Pueblo Union Station Building on Right

water in the Grand and the Animas rivers threatened the Denver & Rio Grande near Grand Junction and Durango, respectively, while the Silverton branch of the former road is out of service.

The great local precipitation which led to the Pueblo disaster brought about a sudden runoff into the channels of the Arkansas River and its tributary, the Fountain, which joins in the city, and the rush of water which wrought such havoc in this city carried destruction to railway property from Canon City on the west to the state line on the east and as far north as Colorado Springs. As a consequence, not a single line of railroad was in a condition to carry relief trains into the city for two days after the flood.

The flood on the evening of June 3 passed through the heart of the city, covering a scene about one mile wide with a 12-foot blanket of madly rushing water. The flooded area included nearly all of the intensive terminal developments of the railroads entering Pueblo. In it were six rail-

road bridges over the Arkansas River, besides three over the Fountain River. Only one, the Santa Fe bridge to the Union Station, escaped. All the others lost one or more spans or large portions of approaches. The Missouri Pacific yard and engine terminal has been cut off by a new channel of the river, so it is now on an island without rail connection. A Denver & Rio Grande and a Missouri Pacific train were caught in the flood while trying to escape to high land, and the cars were overturned, with the loss of several lives, the number not known.

The reclamation has been slow because of the debris and mud which covered all tracks except those in the path of the fastest water, many of which were washed out. A large part of the tracks were covered from one to two feet with mud and had to be dug out before cars could be moved. The Rio Grande and the Santa Fe roundhouses were in a like condition. Twenty carloads of mud had to be taken out of the Santa Fe turntable pit before a single locomotive could be released.

The first line to be opened into the city was the Rio Grande and Santa Fe route from Denver, detouring from one line to the other to avoid the worst washouts, and coming into the Santa Fe Eighth Street yard, the only one in shape to handle any cars at all. Next, the Denver & Rio Grande

Trinidad line was opened, and after clearing a track through the Union Station, it was possible to run trains through from Denver to Trinidad on June 9. The Missouri Pacific, after completing a long pile trestle approach to its Fountain River bridge, was able to bring in its first train from the east on June 12, using Santa Fe terminal tracks. The Santa Fe has driven a 1,000-foot pile trestle to take the place of its

this stretch. East of Nickerson, Kan., the river had crossed the roadbed at two different points into Bull Creek, and it is at these two points that the greatest damage was done.

The Rio Grande line north along the Fountain River was



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Railway Property in the Lower Part of the City

bridge over the Fountain and also repaired breaks in the approaches to the Arkansas River bridge near Nepesta, and was expected to resume service to La Junta about June 16.



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Arkansas River Bridges: Santa Fe on Left, Denver & Rio Grande on Right

cut by caving river banks, requiring shooflys totaling about three-quarters of a mile in length, and will be opened for traffic shortly. The line of this road to Salida suffered very heavy damage, consisting largely in washing track off the roadbed. Traffic will not be restored for ten days or more, as



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View in Yards South of Arkansas River

The regular service over the Santa Fe's Northern division will be restored on the night of June 14. A work train passed over this division on June 13, and two local trains were restored to schedule on June 14. In this district the roadbed between Syracuse, Kan., and La Junta, Colo., is very soft and it will be necessary to run trains very slowly over

a break in this line of the Rio Grande cuts the Denver-Salt Lake City line in two. Through passenger trains of the Rio Grande are now routed via the Union Pacific.

The Denver & Rio Grande was affected at so many points on June 14 that freight movement totaled only 150 train miles. The Colorado & Southern's Leadville line will be out

of service for at least two weeks. The Denver & Salt Lake has been subject to repeated traffic interruptions of short duration.

The Colorado & Southern's approach to Pueblo from the south will not be opened for some time, as changes in the channels of the Arkansas and Fountain rivers make it difficult to restore the north approach to this road's bridge over the Arkansas.

Reclamation of railway property in the city is progressing rapidly. Large numbers of wrecking cranes are picking up the overturned cars and many locomotive cranes are being used to clear tracks of mud and debris. The labor situation in the city has been good, as a uniform rate of pay established under martial law removes competition for men. The local supply is plentiful, and very few men have been recruited outside the city. Railways are as yet unable to estimate damage accurately.

Freight Car Loading

WASHINGTON, D. C.

AN INCREASE OF 18,907 in the number of cars loaded with revenue freight during the week ended on May 28, compared with the previous week, was shown by reports from the railroads compiled by the Car Service Division of the American Railway Association. The total for the week was 787,237 cars. This was 110,970 cars under that for the corresponding week in 1920 but 23,476 more than were loaded during the corresponding week in 1919.

Increases as compared with the previous week were reported in the loading of all commodities except ore. The largest gain was made in the loading of grain and grain

loaded with ore, or 1,500 below the week of May 21. Grain and grain products were the only commodities to show an increase over the corresponding week last year.

All districts reported increases in the number of cars loaded during the week which ended on May 28 over the previous week except the Pocahontas, although that district was the only one to report an increase over the corresponding week in 1920.

The freight car surplus for the period from June 1 to June 8 averaged 389,526, a decrease of less than 4,000, as compared with the previous week. Of the total, 147,656 were box cars and 162,035 were coal cars. On June 1 the percentage of bad order freight cars was 16.7 as compared with 16 on May 15.

Short Lines Establish Consolidated Purchasing Agency

WASHINGTON, D. C.

AS ONE MEANS of lowering railroad operating costs, with which the Interstate Commerce Commission as well as the railroads, is actively concerning itself, the American Short Line Railroad Association has established a consolidated purchasing agency in Washington for the benefit of its membership throughout the United States. This membership now consists of some 500 separate railroad corporations with a combined main line mileage of approximately 25,000.

It is believed that important economies will accrue to the short lines by the combined purchases of their material requirements and that in like manner the cost to the manu-

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO, FOR WEEK ENDED SATURDAY, MAY 28, 1921

Districts	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Merchandise L.C.L.	Miscellaneous	Total revenue freight loaded			Received from connections		
										This year 1921	Corresponding year 1920	Corresponding year 1919	This year 1921	Corresponding year 1920	Corresponding year 1919
Eastern	1921	7,456	2,723	45,301	1,151	5,840	2,596	56,358	69,248	190,673	212,429	172,408	198,331	243,378	207,142
	1920	5,295	2,078	50,718	3,310	7,922	6,330	49,224	11,054	162,807	185,251	157,312	182,312	243,378	207,142
	1919	2,893	2,981	51,443	2,695	2,418	6,996	43,746	49,635	162,807	185,251	157,312	198,331	243,378	207,142
Allegheny	1921	2,349	3,031	50,563	5,818	3,443	9,276	38,603	72,168	185,251	157,312	157,312	141,337	141,337	123,007
	1920	203	1,227	23,080	45	1,434	21	2,599	5,024	32,533	31,485	32,981	18,321	21,545	17,150
	1919	141	110	17,821	592	2,312	253	1,92	10,064	31,485	32,981	32,981	21,545	17,150	
Pocahontas	1921	4,862	1,794	20,424	597	14,840	788	38,392	32,583	114,250	125,487	111,714	61,698	86,002	46,968
	1920	3,449	2,010	21,221	118	18,507	2,929	25,708	51,545	114,250	125,487	111,714	61,698	86,002	46,968
	1919	10,942	7,183	4,644	711	13,831	16,965	27,226	31,631	113,133	125,487	111,714	42,188	59,887	50,398
Southern	1921	9,053	7,981	7,837	1,191	16,594	44,708	21,709	42,729	151,802	133,949	133,949	59,887	59,887	50,398
	1920	14,920	6,884	15,759	186	4,978	857	29,946	34,637	110,467	125,487	111,714	42,188	59,887	50,398
	1919	8,727	10,251	20,118	458	6,167	4,670	22,687	48,475	121,563	101,235	101,235	72,380	59,823	
Northwestern	1921	5,461	2,826	4,219	220	6,936	780	16,828	26,104	63,374	70,180	55,162	44,578	52,072	46,470
	1920	4,014	2,642	6,334	193	7,302	1,060	16,768	31,867	70,180	55,162	55,162	52,072	46,470	
	1919	46,337	27,518	164,870	5,605	50,277	28,673	215,095	248,862	787,237	898,207	898,207	519,191	676,601	
Central Western	1921	33,038	28,677	174,612	11,680	62,247	69,426	150,595	367,932	898,207	898,207	898,207	676,601	676,601	
	1920	35,523	28,624	153,642	6,045	54,247	54,247	431,180	431,180	898,207	898,207	898,207	676,601	676,601	
	1919	13,229	.....	.....	.....	.....	.....	64,500	.....	.....	.....	.....	.....	.....
Increase compared 1920		1,159	9,742	6,075	11,970	40,753	215,095	119,070	110,970	.....	.....	.....	157,470	.....
Increase compared 1919		10,814	.....	11,228	5,605	.....	215,095	.....	23,476	.....	.....	.....	.....	.....
Decrease compared 1919		1,106	.....	.....	10,268	25,574	.....	.....	.....	.....	.....	.....	.....	.....

L.C.L. merchandise loading figures for 1921 and 1920 are not comparable as some roads are not able to separate their L.C.L. freight and miscellaneous of 1920. Add merchandise and miscellaneous columns to get a fair comparison.

May 21	1921	37,252	26,368	158,512	5,337	50,216	30,214	216,030	244,401	768,330	862,074	777,324	508,969	666,585	557,879
May 14	1921	34,018	25,599	161,792	5,126	49,365	22,506	215,524	235,538	750,158	843,145	739,940	501,228	620,196	540,955
May 7	1921	34,847	27,123	143,323	4,626	47,095	13,041	213,535	233,435	718,025	843,184	753,287	495,386	594,418	549,712
April 30	1921	34,426	29,909	145,010	4,659	48,554	7,725	213,792	237,922	721,997	800,960	752,362	489,073	545,205	554,350

products, the total being 46,337 cars or 9,085 more than the previous week. A total of 164,870 cars were loaded with coal which was 6,358 cars greater than during the preceding week but 9,700 less than during the corresponding week last year.

Merchandise and miscellaneous freight, which includes manufactured products, showed a gain of 3,526 cars over the previous week, the total being 463,957, while the total loading of livestock was 27,518 cars, or 1,150 cars higher than the week before. A total of 50,277 cars were loaded with forest products and 5,605 with coke. Reports showed 28,673 cars

manufacturer will be greatly reduced by dealing in quantities through one purchasing agency only, while serving at the same time some 500 railroads. This agency will have three sections or departments: new equipment and materials, second hand equipment and industrial development.

The so-called short line railroads of the United States vary in size and character from a small industrial railroad with practically a one-man organization up to a completely equipped railroad of several hundred miles. They are located in all parts of the United States, some in remote sections, and for this reason the selling expense to the manufac-

turer in proportion to the volume of business done is such that his margin of profit to these lines must be greater than to the trunk lines.

The plan contemplates that the consolidated purchasing agency will secure from these lines budgets of their anticipated requirements for the approaching quarter, and from these budgets the various items will be tabulated and consolidated. Inquiries will then be sent to the manufacturers on a basis of the aggregate quantities to be purchased, and they will be given shipping specifications at the same time to enable them to make up manufacturing schedules.

Where advisable, a blanket agreement will be made with a manufacturer covering a group of lines in a certain territory; or where practicable from a distribution standpoint; for the entire membership of the association, whereby all requirements in his line will be bought from this manufacturer.

Orders will either be sent direct by the member lines, or through the consolidated purchasing agency, as may be deemed most expeditious; but in all cases the material will be shipped and invoiced direct to the railroad company.

In the purchase of fuel, wherever practicable, an agreement will be made with mines or oil producers whereby their total output will be taken and distributed to a group of lines in that particular territory.

The locomotive and car builders will be asked to assist with composite designs of locomotives and cars, using, wherever possible, standards for which patterns are already available, and any other manufacturing practices which will make for economy in the construction of equipment and yet secure for the Short Lines the very best product obtainable.

There are a great many short line railroads that are endeavoring to use equipment entirely unsuited to their needs. In some cases this equipment was bought during the construction period and from divers sources. The short line has been unable to dispose of this equipment except at a sacrifice usually demanded in second-hand deals, and has, therefore, worried along with it at a considerably greater expense than if an exchange could be made for something different. The consolidated purchasing agency is, therefore, planning to send out questionnaires to each line, asking that it list such equipment or material as it desires to sell, with a fair price thereon; and in another column it will be asked to list such equipment or material as it desires to purchase provided proper disposition can be made of that which it has for sale. These items will then be tabulated and negotiations started between the various roads.

Wherever a short line railroad is in the market for second-hand equipment, and nothing of the desired quality and specifications is available among the members of the association, inquiries will be sent direct to the trunk lines and the sale of the equipment handled direct from the trunk line to the short line at a considerably lower cost than in the past where it has passed through a number of hands.

The short lines, located as they are in all parts of the country, originate a large quantity of raw materials used in various industries, and this department will devote its efforts to developing these various sources, primarily for increasing the traffic of the various lines, but of equal advantage to industries in general and to the entire railroad system of the country.

In the matter of cross ties alone, the short lines probably originate a very large percentage, and through the operation of this department, sales will be promoted between the producers along the short lines and those trunk lines not located in tie producing territories.

While it will require time and energy to work out the various details of this plan, considerable headway has already been made through the co-operation and help of the manufacturers. The members of the American Short Line Railroad Association are equally desirous of co-operating to the fullest extent, and as the consolidated purchasing agency will

act as the medium between the two bodies, it would seem that the results are destined to be mutually advantageous.

James W. Cain, who has been appointed manager of purchases of the American Short Line Railroad Association, with headquarters in Washington, D. C., has had an extended experience both in railroading and in the supply business. He served a machinist's apprenticeship with the Atchison, Topeka & Santa Fe at Topeka, Kan., and later took a mechanical engineering course at Purdue University, graduating in 1905. From 1906 to 1907 he was assistant engineer of tests on the Atchison, Topeka & Santa Fe, and in 1907 he became general sales manager of McCord & Company, Chicago. After two years he was appointed chief engineer of the company at Detroit, which position he held until 1914, when he became vice-president of the G. F. Cotter Supply Company, and the Houston Tie & Lumber Company at Houston, Texas. He remained with this company until 1918 when he offered his services to the government and was assigned to the inspection of ordnance in the Chicago district. After the armistice he formed the firm of Cain-Smith & Co., consulting engineers at Houston, Texas, and was engaged in developing oil and mineral properties until coming to Washington to assume his new duties.

More Fruit and Vegetables Shipped in Spite of Higher Freight Rates

WASHINGTON, D. C.

SHIPMENTS TO MARKET of leading fruits and vegetables up to June 4 this year have been 15 per cent greater than during the corresponding period of last year, according to official statistics given in the weekly Market Reporter published by the Bureau of Markets of the U. S. Department of Agriculture under date of June 11. This report seems to controvert the assertion so frequently made that the increase in freight rates made on August 26 last year has decreased the shipments of fruits and vegetables.

According to the Market Reporter, the carload shipments of fruits and vegetables this season to June 4 totalled 367,741 cars, an increase of 58,560 cars as compared with last year. For the week ending June 4 the total was 8,105 cars as compared with 6,904 last year; for May the total was 34,524 as compared with 23,221; for April, 31,035 as compared with 20,250, and for March, 29,990, as compared with 25,185. The figures for the season to June 4 for the two years are as follows:

Apples:	1921	1920
Boxed	35,022	45,579
Barreled	68,989	41,278
Cabbage	11,659	13,044
Cantaloupes	1,199	1,313
Celery, Florida	4,148	3,602
Lettuce	12,031	8,790
Onions	4,704	6,148
Peaches	1,592	101
Potatoes:		
Sweet	17,567	15,423
White, old	186,755	159,927
Strawberries	9,192	5,139
Tomatoes	6,146	3,442
Watermelons	1,556	127
Vegetables, mixed	7,181	5,868
Total	367,741	309,181

"Severe declines in the prices of western cantaloupes featured the fruit and vegetable markets during the week ending June 6," the Market Reporter says. "The monthly report of carlot shipments shows that the volume of leading lines has been increasing for the past two months. May shipments totalled 34,524 cars compared with 31,035 in April and 29,990 in March. Movement of apples, cabbage, celery, lettuce and old potatoes showed big decreases, while the supply of cantaloupes, peaches, new potatoes, strawberries, tomatoes and watermelons recorded important increases. Carlot movement continues about 11,000 cars in excess of the corresponding month of last season.

Meeting of Railway Accounting Officers' Association

Concluding Session Addressed by Col. Colston, Director of I. C. C.

Bureau of Finance

TENTATIVE PRINCIPLES relative to the action that the Division of Finance of the Interstate Commerce Commission was prepared to take as to maintenance charges during the guaranty period were outlined in an address by W. A. Colston, director of the I. C. C. Division of Finance before the concluding session of the Railway Accounting Officers' Association annual meeting at Atlantic City last week. Director Colston outlined the provisions of Section 209 of the Transportation Act relative to maintenance charges for the guaranty period, and invited the carriers to co-operate with his division in arriving at the proper solution of the problem represented. Mr. Colston's address is given in part as follows:

Maintenance Charges During the Guaranty Period

By Col. W. A. Colston
Director, Division of Finance, I. C. C.

In settling up the accounts under the guaranty of section 209, if we don't do something we will crucify the carriers on the cross of inaction. We have not been able to get a decision in the most important or most troublesome factor affecting the settlement of the accounts—the matter of maintenance, and I do not believe that we can entertain any great hope of obtaining a general ruling in the very near future. I think, however, that I have a way to suggest out of this trouble. I have been authorized by the chairman of Division 4 to put up a specific case or cases. I am willing to put up not only one specific case or cases as a test, but I am willing to put up the case of every carrier that wants to come in and talk the question across the table, and we can get a decision on each case just as well as we can in a general situation.

What I am going to submit is the plan upon which the Bureau of Finance is willing to enter into a discussion. It is not the decision of the Commission.

Provides an Accounting Method

For Enforcing the Physical Test

I think that the basis for us to build our construction upon is the basis of the law itself. There has been no substitution of anything for the physical test. The physical test is provided as the final result that we must accomplish, and there is provided merely an accounting method for enforcing the physical test; and the result must be as nearly as practicable the same amount, character and durability of physical reparation. Less than that would be unfair to the carrier. More than that would be unfair to the United States.

In the President's Proclamation, when he took over the railroads, and in the paper annexed to that proclamation, he stated that there were two things that we must be assured of, first, that the railway properties should be maintained during the period of Federal control in as good repair and as complete equipment as when taken over by the Government, and, second, that the roads should receive a net operating income equal in each case to the average net income for the three years preceding June 30, 1917. The President promised to recommend those things to Congress, and he did recommend those things to Congress.

When Congress started in to consider those recommendations it was made to appear that, although these two things were ordinarily treated as separate, nevertheless under the system of accounts laid down by the Commission, pursuant to Section 20 of the Act, there was an inseparable connection between maintenance and income and that, therefore, although the President had considered the two things as entirely distinct, it must be recognized that there was an inseparable bond between the two, and that provision must be made to recognize that fact, and Congress legislated with conclusive knowledge of the accounting classifications which had the force of law. Therefore, although Section 1 of the Federal Control Act provided "that the property should be returned in substantially as good repair, and substantially as complete equipment as it was at the beginning of Federal control," Con-

gress recognized then that if during Federal control the carrier had over-maintained its properties you might still comply with that covenant and not give the carrier as much as it was entitled to, because the carrier would have reduced the income that it was entitled to claim during Federal control because of over-maintenance in the test period. On the other hand, if a carrier had under-maintained its properties and you made a double allowance—

- (1) of income realized after under-maintenance or insufficient maintenance had been deducted, and
- (2) then full maintenance.

you would be giving it more than it was entitled to. So Congress went a little beyond what the President had said in his proclamation, and provided that the United States should be reimbursed by deductions from the just compensation, or by other means, for the cost of any additions, repairs, renewals and betterments to such property not justly chargeable to the United States; recognizing that with compensation based on income for the test period, in the case of under-maintenance during the test period if the Government fully maintained the properties during Federal control it would be undertaking a greater maintenance than the carrier was entitled to, therefore, it should deduct from full compensation enough to bring down the allowance for maintenance to the standard actually observed in the test period by the carrier. And it was provided that in making these adjustments consideration should be given to the amounts expended or reserved by each carrier for maintenance and repairs, renewals and depreciation during the three years ending June 30, 1917, and the condition of the property at the beginning and at the end of Federal control, and any other pertinent facts and circumstances.

Possibly it would be well for me to indicate a syllabus of the tentative principles we propose to use in the Bureau.

Amounts to Be Charged for Maintenance

First, our rule is that in fixing the maximum amounts to be included in operating expenses for maintenance under the guaranty of section 209 of the Transportation Act, 1920, the Bureau of Finance will, as far as practicable, under the accounting test established by the proviso of Section 5 of the standard contract, fix such amounts as would have resulted during the guaranty period in the same amount, character and durability of physical reparation as was applied to the respective carrier properties, during an average six months of the test period, three years ending June 30, 1917, making due allowance for differences in the amount and use of the properties involved.

Adjustments for Charges in Cost of Labor

Second, in making the adjustments for changes in cost of labor consideration will be given to all changes of any character which affect in any way the labor cost of material in place, and will include not only changes in price of labor per payroll hour or other unit paid for, but also the relation of time paid for to effective time of work, differences in the efficiency and cost of labor due to changed personnel, and any other elements affecting the aggregate cost of labor necessary to affect the standard of maintenance observed by the carriers respectively during the test period.

Depreciation and Repairs

Third, in fixing the maximum maintenance allowance for the properties during the guaranty period, all charges representing depreciation and repairs will be computed upon the same bases for the guaranty period as were used in the test period.

The Accounting Test

Fourth, in the computation of railway operating income or any deficit therein for the guaranty period for the purpose of section 209 of the Transportation Act, 1920, the provisions of paragraph (3) of sub-division (f) of the section are provisions limiting the inclusion for guaranty computation of maintenance expenses to amounts actually charged or chargeable on the carrier's books of account under the accounting rules of the Commission, and do not contemplate any increase in or addition to such charges for the purpose of the guaranty settlement.

Amount and Use of Properties

Fifth, While adjustments for differences in the amount and use of properties involved are not merely matters of accounting to be

settled by the application of fixed and unalterable rules that may be followed by accountants and statisticians, and many adjustments may present serious practical questions not to be anticipated by any rules or formulas, nevertheless, within the limits required by practical substantial settlement of these matters, certain general rules may be determined by men who have had actual extensive experience in the railway field, and carriers are invited to appoint representatives to meet the representatives of the Bureau of Finance to consider and recommend fair and workable formulas for the determination of these questions in specific cases, with the right reserved to any carrier involved in a determination to show that in its case the general rule would be inequitable.

The Tentative Formula

I will give the results of a tentative formula which we have worked out and which I have submitted to one carrier to be discussed beginning with the commencement of next week, and it is

substantially this, applying these principles as to maintenance of way and structures, there shall first be deducted from the total charges for maintenance of way and structures for the average six months of the test period the following elements:

1. Depreciation.
2. All charges for retirements based on original cost.
3. Assessments for public improvements.
4. Fire losses.
5. Injuries to persons.
6. Insurance.
7. Possibly joint facility accounts. I have an open mind with respect to the seventh item.

The remaining expenditures, representing material and labor actually expended and directly chargeable to maintenance of way and structures shall be divided so as to ascertain the amount of material and the cost thereof utilized during the average six months of the test period, and such cost shall be equated at



The Officers of the R. A. O. A.—left to right: J. J. Fkin, Comptroller, B. & O. and First Vice-president, R. A. O. A.; L. F. Lorce, President, D. & H., who addressed the Opening Session; I. G. Drew, Vice-president, Mo. Pac. and President, R. A. O. A.; L. G. Scott, Vice-president and Comptroller, Wabash and Second Vice-president, R. A. O. A.; E. R. Woodson, Secretary, R. A. O. A.



Left to Right: John F. Mitchell, Ticket Auditor, A. T. & S. F.; J. C. Briggs, Auditor Passenger Accounts, St. L.-S. F. and chairman R. A. O. A. Committee on Passenger Accounts; L. C. Esschen, Auditor Passenger Receipts, I. C.
Right-hand Picture—left to right: F. W. Main, Auditor Freight Overcharge Claims, C. R. I. & P.; A. E. Fowler, General Auditor, So. Ry. and chairman, R. A. O. A. Committee on Disbursements; S. L. Porter, Auditor Expenditures, C. B. & Q.; A. Hermany, Assistant General Auditor, C. R. I. & P.



Left to Right: F. W. Charkse, Comptroller, U. P.; G. E. Bissonnet, General Auditor, U. P.; A. D. McDonald, Vice-president and Comptroller, So. Pac. and chairman R. A. O. A. Committee on General Accounts.
In Center Picture—left to right: Paul Peters, Auditor Freight Traffic, C. R. I. & P.; G. E. Bramon, Auditor Freight Accounts, C. B. & Q. and chairman of R. A. O. A. Committee on Freight Accounts.
Right Hand Picture—left to right: F. S. Fowler, Chief of Depreciation Section, I. C. C.; F. H. Harvee, General Auditor, P. & W. V.; Alexander Wylie, Director, Bureau of Accounts, I. C. C.; Will H. Carleton, Assistant Director of Accounts, I. C. C.

The Officers, Committee Chairmen and Other Members of the R. A. O. A.

guaranty period prices to determine the amount for material allowable for the guaranty period. In addition to the allowance for material thus obtained, the carriers will be allowed all actual cost of labor or other expenses incident to putting such material in place. In ascertaining such guaranty allowance for labor and other expenses incident to putting such material in place, the maintenance of way and structure expenses for the guaranty period shall be segregated similarly to the way in which the test period expenses were segregated after taking out the seven items which I have indicated. The remaining expenses representing labor and material are to be separated between the two elements, and the ratio between the two shall determine the allowance for labor in connection with the allowance for material as we have stated. For instance, if the test period material cost equated at guaranty period prices is \$100,000 and the total labor cost during the guaranty period was twice the total material cost during the guaranty period, the labor allowance for the guaranty period will be \$200,000. To the items of labor and material thus allowed we shall, of course, add back the eliminated items adjusted as may be proper in each case.

That is a very general rule and we shall have to make an additional computation. Our rule contemplates calculation at one step of differences in cost of labor arising from differences in price and differences arising from factors other than price. And in order that the Commission may know what is involved in the controversy we shall require intermediate adjustments similar to those which are provided for in Exhibits B and C, I think, of the report of the Sub-committee of the Adjustment Committee of the Executives Association, one of which will show the facts up to the point where you adjust for differences in price of labor and for labor paid for but not worked, because of the regulations as to punching the clock, going to and from work on company's time, etc. In other words, it would show the adjustment of the cost of the effective hours of labor regardless of efficiency, and then the second step will be that which is shown by Exhibit C, which is the adjustment for factors other than price, which will include efficiency or inefficiency and any other elements that may affect the cost of material in place. So we would set forth here the result with respect to all the labor costs for the guaranty period.

For maintenance of equipment, the same procedure will be followed as I have indicated for maintenance of way and structures, except we will make a separate ascertainment for

1. Steam locomotives.
2. Other locomotives.
3. Freight train cars.
4. Passenger train cars.
5. Work equipment.
6. Floating equipment.
7. Miscellaneous equipment, or such combination of the elements as may be found necessary in making the ascertainment.

That, I think, will outline the methods which we purpose to employ. We want to sit down and talk these matters over with you across the table. My advice is don't wait for a final determination on the maintenance question as affecting all the carriers. Come down and present your own case and let us settle it upon these principles or upon these principles as modified after discussion with you. Let's get down and have a heart to heart talk, and I assure you that in the Bureau of Finance we will endeavor on the one hand to so administer this Act, and make our recommendation that we will at least observe the constitutional prohibition against taking of private property for public use without just compensation, and on the other hand I have no doubt in the assistance and in the aid that will be given to us by those with the understanding and the integrity of the members of the Accounting Officers Association.

Report of the Committee on Disbursement Accounting

The first part of the report of the meeting of the Railway Accounting Officers' Association was given in last week's issue of the *Railway Age*, pages 1343 to 1354. The report as given in the *Railway Age* covered the meeting as far as part of the report of the Committee on Disbursement Accounting. Other important subjects discussed by that committee follow:

Wage Statistics. This subject received considerable attention, particularly because of the new rules issued by the Railroad Labor Board which become effective July 1, 1921. The committee submitted the following in the supplementary agenda:

Your committee has considered the order of the Interstate Commerce Commission, issued under date of April 18, 1921, prescribing rules governing the classification of steam railway employees and reports of their services and compensation, effective July 1, 1921. Several forms for compiling the required data were submitted by carriers, which illustrated the wide difference in their respective organizations.

The rules issued by the United States Railroad Labor Board are comprehensive and will serve to guide each carrier in classifying its employees, and enable them to compile the information from their existing sources of information, with such changes as may be necessary.

In order to bring about uniformity in the reports, it is recommended that all carriers adopt nomenclature of the Labor Board's rules for use on payrolls and all supporting papers.

Your committee does not believe it possible at this time to make any recommendations as to specific forms to be used in collecting the data under this order, for the reason that the organizations of the carriers are so different. In some instances, the data will be assembled at division headquarters, while in other instances, it will be done in general offices. Standardization of forms and plans for this work should be deferred until the carriers have had at least one year's experience.

Making R. A. O. A. Interline Accounting Recommendations Mandatory. In accordance with the policy outlined by the Executive Committee in the minutes of its meeting held in Chicago, February 15, 1921, the following recommendations are made by the Committee on Disbursement Accounts:

The following rules, relating to inter-road disbursements accounts, shall be mandatory and binding upon carriers who are members of the Railway Accounting Officers' Association, operating in North America, and shall become effective and operative as of January 1, 1922:

Rule 482 R. A. O. A. Synopsis 1920, reading as follows:

LOSS AND DAMAGE CLAIM AUTHORIZATION BLANK—As a means of facilitating the ready identification of the authorization blank when attached to claim papers, R. A. O. A. Standard Form 200, Loss and Damage Claim Authorization Blank—shall be printed on salmon colored paper.

Rule 484, R. A. O. A. Synopsis 1920, be made to read as follows:

STANDARD FORM OF BILL, BLANK—Carriers must use the standard form of bill blank, R. A. O. A. Standard Form 206, as between carriers, except for car repairs.

SUBJECT 12—CURRENT DOCKET, COMMITTEE ON DISBURSEMENT ACCOUNTS, SETTLEMENT OF PER DIEM BALANCES—Rule to read as follows:

The settlement of Car Service and Per Diem balances between Carriers should be by draft on net balances, net balances to include the debits and credits for per diem accrued in the same month; also corrections on reports previously rendered and delayed reports for previous months.

Reports to creditor lines shall be forwarded by the 10th day of the second month following that in which per diem accrued (see Rule 11, Paragraph A of American R. R. Association, Current Code of Per Diem Rules) and settlements thereof shall be subject to draft on the 25th day of the second month, i. e., the second month following that in which per diem accrued.

SUBJECT 15—CURRENT DOCKET, COMMITTEE ON DISBURSEMENT ACCOUNTS, RENDERING BILLS COLLECTIBLE IN DUPLICATE—The rule to read as follows:

All bills against other carriers (except for car repairs) must be rendered in duplicate.

SUBJECT 19—CURRENT DOCKET, COMMITTEE ON DISBURSEMENT ACCOUNTS, STANDARD FORM FOR USE IN TRACING FOR UNPAID BILLS—The rule to read as follows:

All tracers for unpaid bills between carriers shall be accompanied by a statement of such bills on R. A. O. A. Standard Form 210, rendered in duplicate, the original to be returned to the forwarding carrier, and the copy retained by the receiving carrier.

The description of account on the tracer must be clear and concise, and that for bills covering the shipment of material, must show the destination of the shipment.

Subject 29, relating to the rendition of bills covering the joint use of facilities was included in the agenda, but it was voted to omit it from the mandatory rules.

[Herewith follow the rules for arbitration similar to those recommended by the Committees on Freight Accounts and on Passenger Accounts.]

The report is signed by A. E. Fowler, auditor, Southern Railway, chairman.

Report of the Committee on Overcharge and Agency Relief Freight Claims

The committee report consisted of various detailed recommendations relating to the overcharge claim rules.

Minimum Charges on account of Overcharge Claims. This was the most important subject which the committee discussed. The committee submitted the following:

There is now in effect a minimum of \$1.00 for adjustments incident to interline freight accounts and junction settlements which correction minimum is the same amount as the R. A. O. A. Overcharge Claim Minimum. To create a disparity between these two minimums, such as would result

from increasing the R. A. O. A. Overcharge Claim minimum and allowing the interline freight account minimum to remain at \$1.00, would create a situation that would probably disturb uniform interline accounting. That phase is regarded as being of serious concern to some, if not all, carriers.

On the other hand, it is maintained that to increase both the R. A. O. A. Overcharge Claim minimum and the interline freight account minimum would gravely affect the revenue of some carriers.

The argument is advanced that the R. A. O. A. Overcharge Claim minimum should be increased on account of the additional expense involved in clerical hire and similar expenses incident to handling overcharge claims.

Your Committee is not convinced that the convenience of an increased Overcharge claim minimum will offset or surpass the effects in other directions, therefore,

Your Committee recommends that the R. A. O. A. Overcharge Claim Minimum remain \$1.00.

The report is signed by E. J. Bloodgood, auditor of freight accounts of the Chicago & North Western, chairman.

Report of the Committee on Terminal Companies' Accounts

The committee submitted recommendations dealing with various phases of accounting by terminal companies. One of the more important subjects covered was the following:

Standardization of Terminal and Switching Companies' Forms

As a result of study and investigation, your committee reached the following conclusions:

Terminal companies doing a regular freight or passenger business are constrained to use, and do use, as far as possible, the R. A. O. A. Standard Forms.

The various terminal companies throughout the country are so diverse in their operations and there is such an absence of similarity in their methods and in their contracts with tenant lines, which in some cases are the owning lines, that there is necessarily some reasonable limitation to standardization of forms in this connection.

It is the opinion of your committee that a standard form of Conductors' Car Report, Joint Mileage Per Cent Sheet and Summary of Joint Expenses, could be devised, it being understood that the arrangement of and information shown on the forms could be modified to meet the individual requirements of some companies.

Your committee, therefore, recommends, for adoption by the Association, the R. A. O. A. Standard Forms, the following, as per samples submitted herewith:

R. A. O. A. Standard Form No. 400, Conductors' Car Report.

R. A. O. A. Standard Form No. 401, Joint Mileage Per Cent Sheet.

R. A. O. A. Standard Form No. 402, Recapitulation of Joint Operating Expenses.

The report is signed by F. B. Huntington, general auditor, Baltimore & Ohio Chicago Terminal, chairman.

President's Address

During the past year, the greatest volume of work ever turned out by the association in any one year throughout its entire history has been performed. You have had before you approximately 300 subjects, to say nothing of special committee reports and other extraordinary matters.

By submitting recommendations on 56 subjects in 1917, the Committee on Freight Accounts established a record for handling the largest number of subjects ever handled by any one committee in any one year *up to that time*. During the past year, the Committee on Freight Accounts has again made history by handling 77 subjects, thus excelling its own high record, while each of the Passenger and Disbursements Committee have by far exceeded its own respective previous "high water" mark.

There is one suggestion, in connection with the future, which I should like to offer for consideration and action by the Executive Committee. Accounting is practically the only important branch of railway work that does not have a magazine or regular publication devoted to it. The outstanding hiatus in railway accounting, from my viewpoint, is the lack of educational opportunities. The only way by which, under the existing conditions, any ambitious person may progress in railway accounting is by actually doing the work, which, in principle, the old apprenticeship system that was abandoned, in connection with all other professions, many years ago. My opinion is that a magazine or periodical devoted to railway accounting would be helpful to the accounting

officers and would prove particularly beneficial to ambitious clerks, agents and others. There are some practical difficulties, in connection with such a publication that would need to be worked out, but I do not believe that those difficulties are insurmountable. I therefore, commend, to the Executive Committee, the thought that the establishment of a periodical, devoted to railway accounting, would be a step for the advancement and development of our profession.

There is another matter of a momentous nature to which I call your attention. In my opinion, the necessity exists for our association to take action promptly and effectively towards constructing uniform, workable, useful physical statistics; that is statistics which will visualize the physical characteristics, developments, operations, etc., of the carriers. Statistics of that nature, if made practical and applicable to all carriers, would unlock the great storehouses of railway accounting and make available the stupendous funds of information stored there. Those statistics should be made such as to present a picture of the conditions that prevail. Clearly, there rests upon the carriers, under existing conditions, an obligation to undertake studies of that nature and the accounting officers, who have available such a tremendous stock of data, could well inaugurate the necessary plans, although any studies made along this line should, naturally, have the co-operation and collaboration of other interested departments. My recommendation is that our association forthwith create a committee to handle this subject.

It is generally admitted that a science or profession make progress in the same degree that the ideas or ideals of the men engaged in that science or profession advance. It has been, and is, the policy of the Railway Accounting Officers Association to maintain and foster the loftiest ideals for the science and profession of railway accounting. The association finds its field of productive effort in the individual interest and professional pride of its members in the advancement of railway accounting. No more convincing proof can be offered of the effectiveness of those efforts than the tremendous strides which have been and are being made.

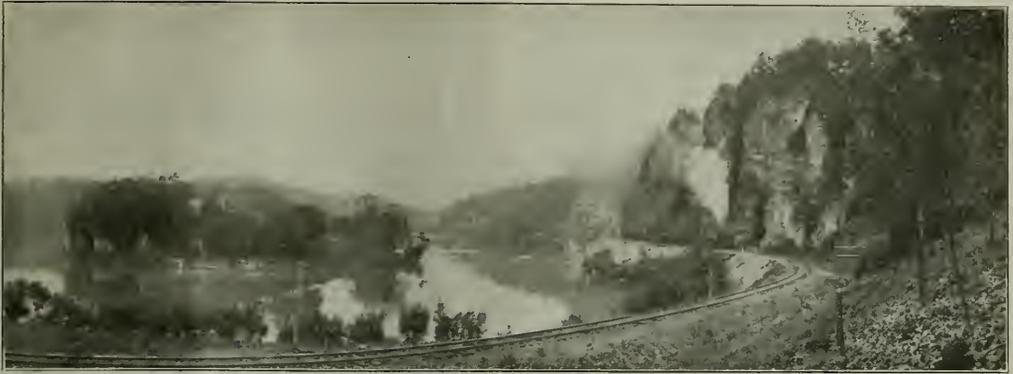
Practically every railroad is so organized that the accounting department is not under the jurisdiction of an officer who originates expenditures or revenues.

In the days long gone by, nearly all of the railway accounting officers had the title of auditor. The title was significant because then they merely audited accounts or kept books. Today, many accounting officers have the title of vice-president or comptroller. Most chief railway accounting officers are executive officers. They are able to serve the carriers more effectively by having a wider and broader viewpoint—by being analysts, advisors—and not mere recorders. Although the corollary to freedom of action and judgment is added responsibility there are compensating opportunities for development and progress.

Other Business

The association was addressed on Thursday morning by Commander C. A. Mayo, Navy disbursing officer, and on Friday morning by W. A. Colston, director of the division of finance of the Interstate Commerce Commission. Mr. Mayo spoke on the relations between his department and the railroads. Mr. Colston spoke as above noted on the subject of settlements for the guaranty period.

The election of officers resulted in the choice of J. J. Ekin, comptroller, B. & O., as president; L. G. Scott, vice-president and comptroller, Wabash, first vice-president; A. J. County, vice-president, Penn., second vice-president, and E. R. Woodson, secretary. The following were elected members of the executive committee: J. G. Drew, vice-president, Mo. Pac.; F. W. Charkse, comptroller, U. P.; W. C. Wishart, comptroller, N. Y. C. and E. Deschenes, comptroller, C. V. The decision as to the time and place for the next annual meeting was left with the executive committee.



The 100-Car Demonstration Train Rounding a Curve on the New River

Virginian Demonstration of Double-Capacity Brake

Speed Regulated Within Narrow Limits—Low Air Consumption a Notable Feature

IN AN ARTICLE on the operation of the Virginian Railway in the issue of May 27 there was published an account of the air brake demonstrations conducted on that road on May 25-27. Only the general results of the runs were given as more specific data was not available at that time. The report of the brake performance has now been made public and a more extended description of the results is therefore given below.

The double capacity brakes as applied on the Virginian 120-ton cars represent the latest development of the Westinghouse Air Brake Company's equipment for long trains of extremely heavy cars. Some time previous to the introduction of the 120-ton car, the road had consulted the air brake company with regard to handling still greater tonnage by operating 90 or more 55-ton cars per train. This brought up the question of applying a special brake with a double capacity feature, the KCE 10-10, which had already been developed in anticipation of a demand for heavy-tonnage operation that would necessitate the use of a brake providing a more uniform braking ratio, lighter retardation on empty cars with a substantial reserve braking force available in the case of loaded cars.

Eleven hundred of the 55-ton cars of the type then in use were equipped accordingly with the double capacity feature. The results were so gratifying that the Virginian saw the possibility of extending the use of such apparatus to cover the requirements of much heavier rolling stock.

During the spring and summer of 1914, the advisability of increasing the capacity of the individual car was suggested with the object of not only increasing the tonnage of the train, but at the same time decreasing its length. This suggestion resolved itself into the 120-ton capacity car. The Virginian ordered the construction of the cars on the assurance of the Westinghouse engineers that the first double capacity brake had been further developed to a point that would meet the requirements of the heaviest car that any railroad could conveniently handle from the standpoint of motive power.

The problem of providing the proper brake equipment for these record-breaking cars was solved by minor modifications in the double capacity equipment, which had already been brought to a high degree of development in anticipation

of a demand for freight brakes of exceptionally high capacity. It is significant of the well-rounded development of the air brake art that the conditions to be met on the Virginian involved only one new factor, the high ratio of loaded weight to the light weight of the car. The grades presented no special difficulty since trains are being handled daily with air brakes alone on much steeper gradients. The length of the train was no greater than has been successfully handled with the existing equipment and the total weight of the train is of secondary importance since each additional unit increases the braking force correspondingly.

The principal problem in braking these heavy cars, as already stated, was to provide a suitable ratio of braking force to car weight, both loaded and empty. The equipment as finally applied and demonstrated between Princeton and Roanoke is known as Schedule KDE-4-10-16, indicating that three cylinders, whose diameters are represented by the figures, are employed. A change over valve and a load reservoir are used to provide the flexibility in braking force which makes it possible to obtain a uniform braking ratio in solid trains of loads, solid trains of empties, or mixed trains. The cylinders in load operation augment each other in such sequence that only a short piston travel is required in each case, making for practically normal air consumption, though providing a much greater braking force than is obtainable with the standard single capacity brake. The relative braking force and air consumption of the double capacity brake and various types of single capacity equipment are clearly shown in one of the diagrams.

Operation of the Westinghouse Double Capacity Freight Brake Equipment

The fundamental characteristic of the Double Capacity freight brake equipment is that it provides for the same percentage of braking force (ratio of total shoes pressure to car weight) on a loaded car as on an empty car.

With the single capacity brake the braking force developed is constant in magnitude but varying in its relation to the car weight. Consequently, it is much less effective on a loaded car than on an empty car. The usual practice has been to so design the brake layout as to provide the highest practicable percentage of braking force on the empty car,

60 per cent being the standard for freight cars, and then to accept whatever reduced braking ratio might be available for the loaded car. This means that in grade service the retarding force on a loaded train may not be adequate for safe control, and in level road service the retarding force may vary so much throughout a mixed train as to be productive of damaging shocks. Furthermore, in long trains of empties, severe shocks are often created because of the high braking ratio, which manifestly cannot be lowered if any appreciable braking force is to be realized on a loaded car, and also because of the inherent serial action of a purely pneumatic brake.

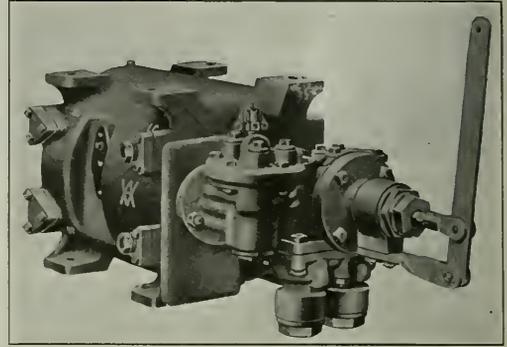
In the effort to mitigate these undesirable effects, various expedients are sometimes resorted to which are far from satisfactory, and restrictions are often imposed on train make-up and operation which tend to curtail traffic.

Obviously the ideal condition is that in which the braking force on loaded cars bears the same relation to the loaded weight as that on the empty car bears to the light weight, so that adequate and uniform retardation may be possible.

The ideal condition, always desirable, becomes imperative with heavy tonnage trains made up of high capacity cars, because of the great difference between the loaded and empty car weights. In other words, the operating conditions of loaded and empty trains with modern equipment are so widely separated that any attempt at a compromise between the two will result in unsatisfactory operation with either one or the other. The degree of retarding force set up on an empty car must be such as to permit a train of empties to be handled without the possibility of unduly severe shocks. On the other hand, with a loaded car a degree of retarding force must be provided which will be adequate to control safely a loaded train down a grade. These two requirements are so far apart that a solution of the problem is possible only with a *double capacity brake*, one which will be equally as effective when the car is loaded as when it is empty.

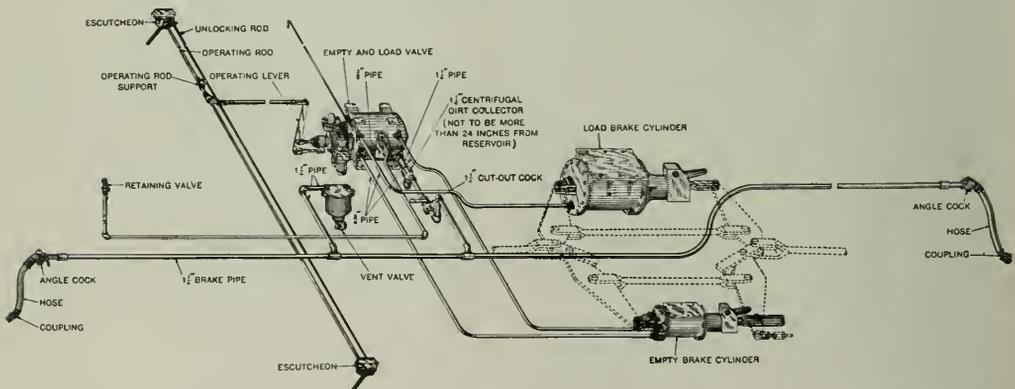
With the Double Capacity brake equipment the brake layout is designed to provide for 40 per cent braking ratio

When the equipment is set for empty car operation, the take-up and empty cylinders, which are built into one structure with the small piston operating within the larger, operate as one 10-in. cylinder similar to the standard single capacity brake. When the equipment is set for loaded car operation the take-up cylinder piston first takes up the slack in the rigging and brings the shoes firmly against the wheels. Then the empty cylinder piston moves out a slight amount, its clutch gripping the notched push rod of the take-up cylin-



Double Capacity Brake Equipment; Triple Valve Change Over Valve and Two-Compartment Reservoir

der piston, thus supplying additional force. Finally, as the brake pipe reduction continues, the load cylinder piston moves out a slight amount, gripping its notched push rod and adding to the force already developed, through the connecting rods and levers. By this method of slack take-up and short travel of the larger pistons the volume of air required for a given application is reduced to a minimum. In addition, especially where retaining valves are used, after



General Arrangement of Double Capacity Brake Equipment on the Car

as against the usual 60 per cent for an empty car (permitting smoother brake operation on long trains of empty cars), and also 40 per cent for the loaded car as against the usual average of 15 per cent.

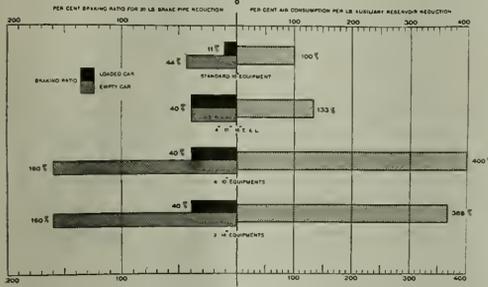
The equipment, known as schedule KDE-4-10-16, has three brake cylinders of the size indicated by the numerals. They are the take-up cylinder, the empty cylinder and the load cylinder respectively. In addition to the usual auxiliary reservoir there is a small load reservoir provided to supply the additional air required for loaded car braking.

the first reduction required to bring the load cylinder into operation (about 12 lb.), all succeeding reductions are much lighter, and consequently the air consumption is more economical than with any other form of equipment for a corresponding degree of train control, and still within the capacity of the standard 1 1/4 in. brake pipe—an important requirement.

The higher braking ratio necessary for the loaded car can only be obtained when desired, since the equipment is manually changed for loaded car braking, through the me-

dium of an operating mechanism which shifts a change-over valve to its load position. This valve functions similarly to a number of cut-out cocks to effect the proper volume and port arrangements, and also controls the flow of air to the cylinders in the proper sequence.

The equipment may be manually cut into empty posi-



Comparative Braking Ratios and Air Consumption for Various Brake Equipments

tion again, or if this is not done, it will automatically return to empty position when the pressure in the system leaks down to about 15 lb., as would be the case, for example, when the car is being unloaded on a siding.

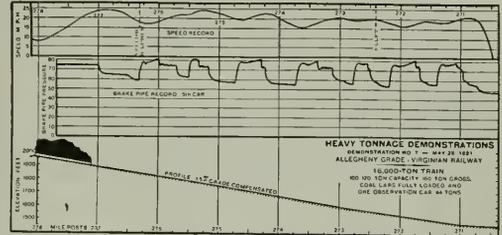
The triple valve used with this equipment (designated the K-E-N) possesses the same essential characteristics of quick service, uniform recharge and uniform release as are embodied in the well known K type of valve now in general service. A separate quick action device in the form of a brake pipe vent valve is employed.

Attention should be called to the fact that the unit system, fundamental to all brake equipments now in use on freight cars, is preserved with this new equipment, so that if there be excessive brake cylinder leakage on one car it affects that

Car 70 was 13.9 sec.; the rate of quick service propagation, 294 ft. per sec., or 201 m.p.h. The resultant cylinder pressure on Car 1 was 35 lb. and on Car 70, 25 lb. The time from movement of the brake valve to full release position to start of release on Car 70 was 10.5 sec.

No. 2—EMERGENCY APPLICATION—EMPTY POSITION

Time from movement of brake valve to emergency position to piston start on Car 70, 7.5 sec.; rate of emergency propagation, 546 ft. per sec., or 372 m.p.h. The resultant cylinder pressure on Car 1 was 54 lb., on Car 70, 51 lb.



Speed and Brake Pipe Pressures on Allegheny Grade, 100-Car Train

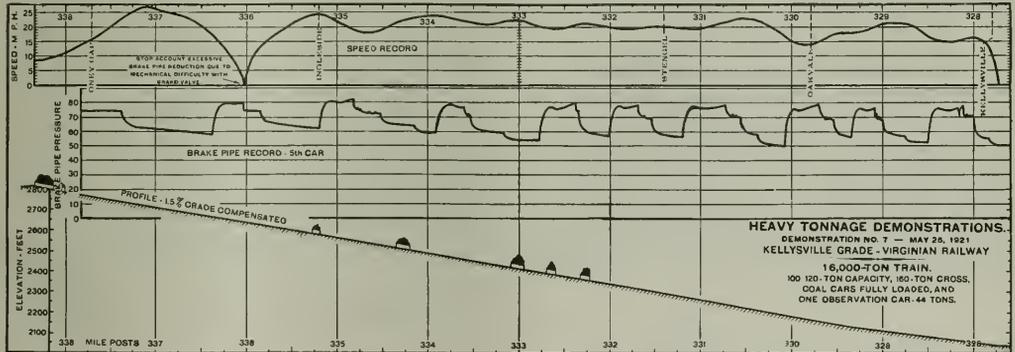
no compensation for 37 ft. connection between cars 35 and 36). The resultant cylinder pressure on Car 1 was 54 lb., and on Car 70, 51 lb.

No. 3—EMERGENCY AFTER SERVICE APPLICATION—EMPTY POSITION

Service pressure in pounds, Car 1, 36; Car 70, 19. Service time in seconds, 13.8. Emergency pressure in pounds, Car 1, 53; Car 70, 50—time, brake valve to car 70, 3 sec.

No. 4—TO ILLUSTRATE THE DOUBLE CAPACITY AND AIR ECONOMIZING FEATURES

It was demonstrated that the brake cylinders operated in the intended sequence, as follows, take-up cylinder, empty



Speed and Brake Pipe Pressures on Kellysville Grade, 100-Car Train

car only and does not interfere with the proper operation of the remaining brakes in the train. This feature insures the desired flexibility and safety of brake control.

FURTHER DETAILS OF STANDING TESTS

As the cars were assembled for the standing tests the train brake pipe, exclusive of the branch pipe on locomotive and tender, measured 4,097 ft. on the 70 car train, and 5,837 ft. when the additional 30 cars were later cut in.

No. 1—10-POUND SERVICE APPLICATION—BRAKES IN EMPTY POSITION

The time from brake valve movement to piston start on

cylinder and load cylinder on application and in reverse order on release. The time from movement of brake valve to start of release on car 70 was 21 sec.

No. 5—AUTOMATIC RETURN TO EMPTY POSITION

The return to empty position occurred on Cars 1 and 70 when pressures were between 15 and 10 lb.

After the completion of Demonstration No. 5 the train was increased to 100 cars by adding 15 cars to each of the strings.

No. 6—BRAKE CYLINDER LEAKAGE

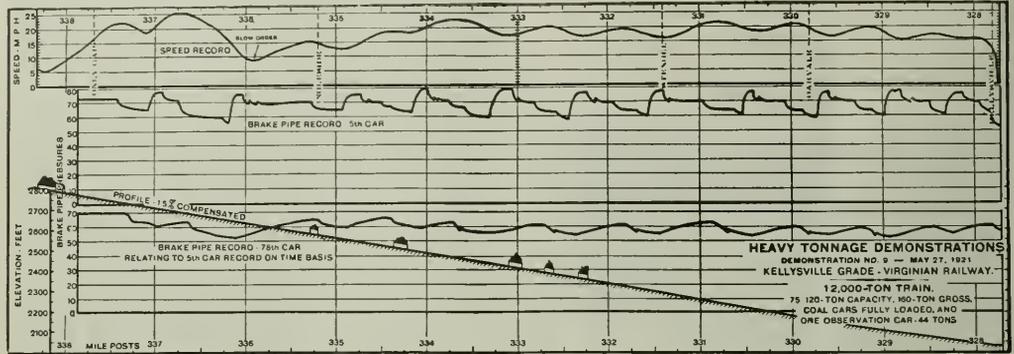
Cocks having No. 8 drill (.199 in. diameter) orifices were opened on five cars adjacent to Car 70, preventing the

development of brake cylinder pressure on those cars, while normal pressures were developed in the remainder of the cylinders.

That this intended brake cylinder leakage did not influence the pressure in the brake pipe is evidenced by the fact that while Demonstration No. 6 was in progress the

cars and the observation car. The gross weight with the locomotive was 12,519 tons; without the locomotive 12,070 tons. As on previous occasions, a brake pipe pressure of 75 lb. was maintained.

Five cars in the train (15th, 30th, 45th, 60th and 74th) had open drain cocks in the cylinders. The speed fluctu-



Speed and Brake Pipe Pressures on Kellysville Grade, 75-Car Train

brake pipe leakage was determined and found to be 5 lb. in two minutes from 61 lb. pressure.

SPECIAL DEMONSTRATION A (REQUESTED)

BRAKE PIPE LEAKAGE CORRESPONDING TO BRAKE CYLINDER LEAKAGE OF DEMONSTRATION NO. 6, ESTABLISHED STEP BY STEP ON CARS IN REGION OF CAR 70.

No. Orifices (No. 8 Drill) open	Brake Pipe Pressure		Brake Cylinder Pressure Car 100
	Car 1	Car 100	
None	69	66*	
1	69	60	+
2	66	47	46
3	65	41	46
4	64	30	45

*Lack of time prevented waiting for complete recharge of train.
 +Not observed. (10 lb. reduction of Demonstration No. 1 gave 25 lb. cylinder pressure on last car.)
 The value of a No. 8 drill orifice is 48 cu. ft. of free air per minute from 70 lb.

SPECIAL DEMONSTRATION B (REQUESTED)

QUICK ACTION TIME ON 100-CAR TRAIN

Total Length of Brake Pipe (Less Branch Pipes and Engine and Tender)—5,837 Ft.

Time from movement of brake valve handle to piston start on Car 100, 10.7 sec.; rate of emergency propagation, 545 ft. per sec., or 372 m.p.h.

Speed and Air Consumption with 100-Car Train

The speed and brake pipe pressure as recorded on the 100-car train are reproduced herewith. Briefly the record shows the following for the descent of Kellysville and Allegheny grades:

	Length of 1 1/2 per cent grades	Average Speed
Summit to Kellysville.....	10.5 miles	20.6 m. p. h.
Merrimac to Fagg.....	7 miles	19.0 m. p. h.

The speed down the grade ranged from 18 to 24 m. p. h., except for a reduction to 14 m. p. h. at Oakvale. The air consumption per car was .328 cu. ft. of free air per minute.

The train performance down the Allegheny grade from Merrimac to Fagg was a duplicate of the run down the Kellysville grade. At no time did the speed range exceed a 5 m. p. h. variation from the desired mean speed of 20 m. p. h. The air consumption was .304 cu. ft. of free air per minute per car.

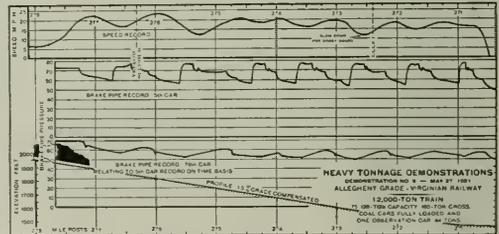
Demonstration With 75-Car Train

The concluding run of the demonstration was made on May 27, from Princeton to Roanoke, as mentioned in the issue of that date, with a train of 75 loaded 120-ton capacity

ations did not exceed 5 m. p. h. for any brake cycle except on the observance of a 10 m. p. h. slow order at one point a short distance east of the summit. The average speed down the Kellysville grade was 17.6 m. p. h. and from Merrimac to Fagg 19.2 m. p. h. The air consumption was 1,112 cu. ft. of free air per minute per car.

Just east of Rich Creek station, on a .9 per cent descending grade, an emergency stop was made from a speed of about 27 m. p. h. As measured by rail lengths, the stop distance was 760 ft. The slack was stretched prior to the emergency brake application and the run-in was even milder than that of the preceding day's test.

With a view of making this test under more critical conditions, a repeat at about 13 m. p. h. was made just east of McCoy station on an ascending grade of .2 per cent. The



Speed and Brake Pipe Pressures on Allegheny Grade, 75-Car Train

slack run-in at the rear end came just at the stop, and while more noticeable than in the first test, was very mild, being insufficient to move a camera in a leather case acting as an improvised slidometer on a planed board bench. The stop distance according to rail lengths was 230 ft.

The train was handled between Merrimac and Fagg with the same uniform control as on Kellysville grade, including a slow down for orders at Elliott, with a total variation of speed of from 13 m. p. h. to 23 m. p. h.

The train arrived at Roanoke at 3:10 p. m., a total of 8 1/2 hours elapsed time, showing the practicability of handling a 12,000-ton train in regular traffic in reasonably close to an eight-hour period. The air consumption per car was .97 cu. ft. of free air per minute.

General News Department

The Railway Fire Protection Association will hold its annual meeting at Hotel Sherman, Chicago, on Monday, Tuesday and Wednesday, October 18, 19 and 20.

The convention of the American Railway Tool Foremen's Association which was to have been held at the Hotel Sherman, Chicago, on August 9, 10 and 11, has been postponed.

The convention of the International Railroad Master Blacksmiths' Association which was to have been held at the Hotel Sherman, Chicago, on August 16, 17 and 18, has been postponed.

The Interstate Commerce Commission has announced a hearing at Norfolk, Va., on June 21 with reference to the cost of locomotive equipment of the Seaboard Air Line repaired in outside shops.

Z. J. Fury, of the division of conciliation of the Federal Department of Labor, is attempting to effect a settlement of the threatened strike of the Pullman Company employees at Chicago. Mr. Fury intervenes for the federal government and strike ballots sent to 80 cities have been recalled.

The Midland Valley Railroad, about 300 miles long, from Fort Smith, Ark., northwest to Wichita, Kan., is installing Western Electric telephones for use on its train dispatching line throughout the length of the road. The dispatcher's office is at Muskogee, Okla., and there are 37 stations.

On the night of June 10 six pouches of registered mail were seized at Arion, Iowa, while awaiting transfer to the Chicago & North Western train No. 26, a fast mail train to Chicago, when three bandits overpowered the telegraph operator and escaped with the pouches in an automobile.

The Baltimore & Ohio has consolidated the Ohio river and the Wheeling divisions, making Wheeling, W. Va., the headquarters and discontinuing the offices at Parkersburg. On the Indiana division, Seymour, Ind., has been abandoned as a freight terminal and North Vernon is to be the terminal instead.

American Station, Cal., on the Southern Pacific, 70 miles east of Sacramento, has been made a regular stop for the through overland trains, in order to enable passengers to view the American river from an observation platform which has been erected at that point. The river is hundreds of feet below the railroad in a vast canyon.

The new classification of railroad employees and rules for reporting their number and compensation announced some time ago by the Railroad Labor Board has been completed and issued in book form to the carriers. The employees are divided into approximately 148 classes, which in turn have been subdivided so that there are approximately 500 distinct classes created.

The South Eastern Express Company, operating on the Southern Railway Company, has filed with the Interstate Commerce Commission a complaint that the American Railway Express Company has closed expeditious and well established routes and denied to the South Eastern Company joint rates, thus forcing shippers to pay combination rates in order to avail themselves of the services of the South Eastern Company.

For the accommodation of delegates to the convention of the American Society for Testing Materials, which will be held in Asbury Park, N. J., on June 20 to 24 inclusive, the Pennsylvania will operate a solid Pullman train, in case there are sufficient number of reservations to warrant, leaving Chi-

cago at 10:15 a. m. Sunday, June 19, and running direct to Asbury Park without change, arriving there at 10 a. m. Monday, June 20.

The Supreme Court of the United States has given permission to the attorney general of Texas to file an original suit attacking the constitutionality of the transportation act, particularly the rate-making and labor provisions. The state authorities asked that all acts and orders of the Labor Board and of the Interstate Commerce Commission taken under the authority of the new law be declared invalid and that if any section of the act be held constitutional the remaining sections be declared invalid.

The Newfoundland Railroad (Reid Newfoundland Company, Limited) is to be returned to its owner, the Railway Commission, consisting of three members appointed by the cabinet and three by the Reid-Newfoundland Company, having decided that on June 30 government operation shall be terminated. The company sustained a loss of nearly \$1,400,000 in its operation of the system for the year ended in June, 1920, and it is estimated that the loss for the current year under government control will be greater. Officers of the company declare it impossible to operate the railway under present conditions without substantial financial help from the country, but they have made no announcement of future plans.

Postal inspectors at Chicago have made arrests which they claim will clear up the recent theft from the Dearborn station of a registered mail sack containing some \$350,000 in securities and cash, and the \$100,000 station robbery at Pullman (Chicago) last August. The arrests followed information given out by a railroad mail clerk on the Monon following his arrest on information furnished by a clerk who had become suspicious of the man's actions following the robbery. From time to time the inspectors have recovered securities contained in the loot when "fences" sought to convert them into cash, and on June 13 \$98,600 in Liberty Bonds and \$14,300 in cash were recovered following the arrests.

The average cost of freight train operation per freight train mile based on certain selected accounts for the month of March, according to the monthly bulletin of the Interstate Commerce Commission, was \$1.97 as compared with \$1.78 in March, 1920. The cost, however, was less than that for February, when the average was \$2.11. Practically every item included in the bulletin shows an increase as compared with 1920, but the wages of enginemen averaged 25.9 cents as compared with 27.1 cents in March, 1920, and 27 cents in February, 1921. The average of selected accounts in passenger train service was \$1.07 as compared with 96 cents in March, 1920, and \$1.14 in February, 1921.

Cape Cod Canal

The Secretary of War has recommended to Congress the purchase by the government of the Cape Cod Canal for \$11,500,000, a price agreed upon by the canal company and the department, which is approximately \$5,000,000 less than the valuation which was allowed by a federal court jury at Boston in condemnation proceedings instituted by the government. Secretary Weeks says that the canal is the busiest inter-coastal waterway of the world. It has more traffic than the Suez Canal and is regarded as one of the chief arteries of commerce in New England. It likewise has great military and naval potentialities. Under the Rivers and Harbors act passed by Congress in 1917, the advisability of the purchase of the canal was approved by the Secretary of War and he entered into negotiations for its purchase, but not being able to agree on a price condemnation proceedings were instituted by the Attorney General. Six hundred acres of land owned by the construction company is included in the proposed purchase.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF APRIL AND FOUR MONTHS OF CALENDAR YEAR 1921—CONTINUED

Table with columns: Name of road, Average mileage operated per month, Operating revenues (Total, Freight, Passenger, etc.), Maintenance of way and equipment, Trans-shipment, General, Operating ratio, Net operating income, Net after rentals, Net operating income after rentals, Increase (comp. with last year).

REVENUES AND EXPENSES OF RAILWAYS

MONTHS OF APRIL AND FOUR MONTHS OF CALENDAR YEAR 1921—CONTINUED

Table with columns: Name of road, Average mileage operated per month, Freight, Passenger, Total operating revenues, Maintenance of way and structure, Traffic, Transportation, General, Total, Operating ratios, Net operating ratio, Net income (or loss), Net after rentals, Increase (or decrease) in net operating ratio.

*Corrected report.

REVENUES AND EXPENSES OF RAILWAYS

MONTHS OF APRIL AND FOUR MONTHS OF CALENDAR YEAR 1921—CONTINUED

Name of road.	Average mileage operated during month				Operating revenues—				Maintenance of—				Operating expenses—				Net operating ratio.	Net from operations.	Operating (or loss).	Net (or deficit) rentals, last year.	Increase (or decrease) last year.
	Freight.	Passenger.	(Inc. misc.)	Total.	Way and structure.	Equip- ment.	Traffic.	Portation.	General.	Total.	Depreciation.	Repairs.	Other.	Total.							
Galveston, Harris & S. Antonio.....	1,380	1,275,222	\$1,992,147	\$409,373	\$453,439	\$84,640	\$874,474	\$3,642	\$1,890,694	94.91	\$101,453	\$58,174	\$55,947	\$350,181							
Houston & Texas Central.....	1,380	624,627	1,957,931	9,936,367	1,463,408	1,930,221	203,326	3,646,958	329,337	7,656,231	84.73	1,890,136	1,906,612	663,110	1,413,807						
Houston & Texas Central.....	4 mos.	2,577,941	13,133,806	30,151	172,617	21,692	379,669	33,967	906,666	97.04	27,682	16,640	80,488	109,070							
Houston & Texas Central.....	4 mos.	932	2,577,363	865,448	4,041,910	1,035,385	733,152	83,178	1,913,909	132,626	3,737,234	92.48	303,896	54,534	18,305						
Houston, East & West Texas.....	191	167,616	44,235	63,214	31,567	63,214	31,567	17,053	198,472	89.27	23,455	72,794	109,876	100,803							
Houston, East & West Texas.....	4 mos.	669,209	186,137	91,021	229,621	141,837	14,514	451,027	301,161	873,923	96.25	33,828	17,233	64,462	91,182						
Louisiana Western.....	207	198,501	88,363	310,987	56,325	68,594	10,580	116,651	17,040	273,702	88.01	37,283	9,890	182	38,864						
Louisiana Western.....	4 mos.	207	946,938	396,137	1,433,647	219,864	333,019	45,604	66,678	1,157,970	81.47	265,077	152,366	132,468	236,270						
Morgan's L. & T. R. & S. Co. April	400	483,338	155,417	682,080	161,493	162,677	16,355	327,305	32,170	705,535	103.44	23,455	72,794	109,876	83,563						
Morgan's L. & T. R. & S. Co. April	4 mos.	429,684	667,778	2,985,183	672,189	673,672	71,492	1,377,198	124,472	2,940,357	98.50	44,826	152,208	303,150	819,506						
Texas & New Orleans.....	4 mos.	425	1,439,937	146,399	652,085	523,985	12,113	307,198	24,005	710,384	108.97	58,479	78,662	108,893	69,528						
Texas & New Orleans.....	4 mos.	475	2,120,181	621,473	2,890,501	630,056	839,278	49,994	1,330,977	100,876	2,987,643	103.36	-97,142	-178,477	-268,086						
Spokane International.....	165	100,138	16,092	120,052	22,910	8,980	3,581	38,129	6,335	80,754	67.27	39,298	31,672	26,583	-8,392						
Spokane International.....	4 mos.	156	341,641	42,904	72,988	33,443	13,472	154,258	25,253	301,838	71.04	123,066	94,941	72,605	-80,114						
Spokane, Portland & Seattle.....	4 mos.	549	1,478,597	142,879	581,232	511,27	93,215	8,801	216,067	323,43	398,658	68.59	101,594	100,675	-23,386						
Spokane, Portland & Seattle.....	4 mos.	549	3,782,788	568,360	2,242,425	280,370	387,880	35,039	94,204	1,732,828	77.27	509,597	178,365	171,419	-287,042						
Terminal Railroad Assn. of St. L. April	36	.....	345,025	89,549	32,789	32,789	9,330	120,197	9,330	264,394	76.92	79,632	27,026	135,016	99,229					
Terminal Railroad Assn. of St. L. April	4 mos.	36	.....	1,469,695	347,739	137,810	88,45	583,557	35,727	1,133,265	77.12	336,130	154,673	603,885	111,485					
Terminal Railroad Assn. of St. L. April	3	.....	.....	116,652	18,626	2,290	346	58,921	3,486	81,500	71.73	32,984	28,608	18,250	89,433				
Terminal Railroad Assn. of St. L. April	4 mos.	3	.....	551,889	84,430	24,905	1,354	286,161	14,952	411,802	74.62	140,087	127,714	81,379	281,257					
St. L. Merchants Bridge & Term. April	9	.....	288,625	30,077	11,336	6,839	97,6	193,428	67,02	95,197	78,579	78,579	95,199	109,199						
St. L. Merchants Bridge & Term. April	4 mos.	9	.....	1,173,022	205,456	102,031	3,775	722,584	28,515	1,062,360	90.57	10,562	55,403	108,335	351,613					
St. L. Merchants Bridge & Term. April	4 mos.	9	.....	387,507	40,938	12,469	1,849	164,000	2,234	228,612	88.93	15,795	157,683	139,058	79,674					
Tennessee Central.....	282	151,147	49,056	146,941	46,116	5,237	106,229	12,271	236,793	102.67	-5,644	-10,243	-31,019	28,154							
Tennessee Central.....	4 mos.	1,932	1,915,567	731,907	2,813,472	597,193	1,196,442	48,333	1,957,442	108,702	2,611,196	92.81	202,276	74,283	64,591						
Tennessee Central.....	4 mos.	1,932	8,486,448	3,089,710	12,421,722	2,163,488	2,822,441	221,416	5,353,319	412,434	11,097,440	89.34	1,324,283	812,369	315,193						
Toledo, Peoria & Western.....	247	71,493	45,241	126,357	97,170	72,157	3,827	35,439	6,483	107,850	118.67	61,501	198,579	169,719	224,900						
Toledo, Peoria & Western.....	4 mos.	247	311,354	210,404	688,872	134,439	152,772	14,120	357,938	33,945	727,351	127.88	58,379	98,579	67,313						
Toledo, St. Louis & Western.....	4 mos.	454	636,565	26,951	639,300	135,088	182,068	19,970	276,945	19,638	633,022	91.31	60,278	24,278	854						
Toledo, St. Louis & Western.....	4 mos.	454	2,627,880	117,539	2,870,768	463,014	757,845	81,377	1,155,380	66,201	2,523,680	87.91	347,087	213,002	136,440						
Trinity & Brazos Valley.....	368	210,227	15,949	233,916	43,103	45,573	2,748	94,785	8,799	105,009	83.37	38,907	32,067	7,444	87,153						
Trinity & Brazos Valley.....	4 mos.	368	748,156	11,204	830,385	202,200	221,470	12,432	399,626	41,341	976,417	103.06	26,032	53,473	119,725						
Trinity & Brazos Valley.....	4 mos.	128	237,388	74,088	407,485	62,088	86,119	2,200	22,134	8,173	122,701	88.30	16,262	7,295	1,296						
Trinity & Brazos Valley.....	4 mos.	128	237,388	74,088	407,485	62,088	86,119	2,200	22,134	8,173	122,701	88.30	16,262	7,295	1,296						
Union Railroad of Pennsylvania.....	45	.....	646,633	51,147	249,961	272	359,186	7,908	668,474	103.39	-21,941	34,362	20,196	35,917						
Union Railroad of Pennsylvania.....	4 mos.	45	.....	3,839,075	232,464	932,151	1,146	1,897,227	33,016	3,096,704	92.74	248,371	19,952	376,298	472,987					
Union Railroad of Pennsylvania.....	4 mos.	3,614	2,227,054	670,903	3,192,629	2,943,221	7,409,084	548,002	10,743,888	1,365,020	23,737,220	74.29	8,213,039	1,162,651	3,656,493						
Oregon Short Line.....	2,359	1,897,881	461,178	2,578,571	396,708	518,918	17,065	888,062	137,314	2,028,001	78.67	549,970	317,787	284,177	-28,814						
Oregon Short Line.....	4 mos.	2,359	7,332,269	1,646,513	10,332,269	1,996,513	2,976,513	170,636	9,000,520	1,377,233	12,546,513	86.04	1,235,698	141,185	65,470						
Oregon Short Line.....	4 mos.	2,223	6,651,810	2,001,824	8,761,352	1,163,826	2,001,824	200,582	4,892,952	565,023	8,592,597	96.07	168,735	-556,674	-880,235						
Oregon Short Line.....	4 mos.	2,223	6,651,810	2,001,824	8,761,352	1,163,826	2,001,824	200,582	4,892,952	565,023	8,592,597	96.07	168,735	-556,674	-880,235						
St. Joseph & Grand Island.....	268	331,038	124,333	1,033,558	129,539	242,433	9,079	112,301	14,996	910,591	82.45	43,907	33,082	15,098	89,190						
St. Joseph & Grand Island.....	4 mos.	268	831,038	124,333	1,033,558	129,539	242,433	9,079	112,301	14,996	910,591	82.45	43,907	33,082	15,098						
St. Joseph & Grand Island.....	4 mos.	98	91,235	445	418,917	68,749	140,861	1,549	339,554	15,395	335,554	80.10	83,383	49,994	-197,800						
Virginian Ry.....	526	1,333,893	69,761	1,525,897	164,523	9,375	426,049	32,328	890,892	72.38	635,004	159,612	557,290	233,061							
Virginian Ry.....	4 mos.	526	4,838,715	298,459	5,257,035	733,706	1,277,244	40,612	1,811,959	127,256	3,966,221	88.30	1,530,764	1,151,411	1,388,717						
Virginian Ry.....	4 mos.	2,472	3,909,844	744,865	4,901,461	876,766	1,591,160	119,362	2,078,032	778,009	4,238,019	86.46	663,442	517,563	611,993						
Virginian Ry.....	4 mos.	2,472	14,910,827	3,206,786	2,905,056	4,059,115	453,448	8,926,283	178,606	17,207,206	89.44	2,033,828	1,437,966	613,666	1,243,596						
Western Maryland.....	797	1,338,945	82,650	1,485,701	328,009	79,225	573,862	53,956	1,580,585	80.07	296,116	262,376	264,116	301,629							
Western Maryland.....	4 mos.	797	5,478,546	367,875	6,182,909	1,832,772	1,588,830	108,217	2,502,370	214,437	5,260,380	85.08	925,479	699,419	972,576						
Western Maryland.....	4 mos.	797	5,478,546	367,875	6,182,909	1,832,772	1,588,830	108,217	2,502,370	214,437	5,260,380	85.08	925,479	699,419	972,576						
Western Maryland.....	4 mos.	1,011	2,657,930	750,588	3,206,658	584,104	779,228	129,259	1,353,284	183,833	3,281,938	96.49	344,721	5,687	30,357						
Whiting & Lake Erie.....	511	882,899	78,857	1,032,369	141,513	247,521	12,849	435,403	44,839	886,174	85.84	144,194	76,214	191,246							
Whiting & Lake Erie.....	4 mos.	511	3,286,116	328,320	3,896,607	579,415	1,020,971	55,960	1,878,316	170,211	3,721,959	95.82	174,645	-128,104	-191,246						

Freight Rate Proposals in Congress

Representative Sweet of Iowa has introduced in the House of Representatives a bill to amend the transportation act so that it will not authorize interference with the regulation of intrastate commerce by the several states; to repeal Section 15a of the act, which contains the 5½ to 6 per cent rule of rate-making, and to limit the effect of orders of the Interstate Commerce Commission to prevent their application to intrastate traffic.

A resolution adopted by the California legislature objecting to the rate-making provision of the transportation act of 1920 has been presented to the United States Senate in which Congress is asked to eliminate the objectionable features pointed out and to "grant a rate structure that will not place the false earning power on a large fictitious railroad capital, the payment of which is stifling to industries of the Pacific Coast."

Senator Kellogg of Minnesota has presented in the Senate a resolution adopted by the Minnesota legislature petitioning Congress to take such action as will nullify the orders of the Interstate Commerce Commission as to intrastate rates and to so amend the act to regulate commerce as to forbid such orders in the future.

Government Attitude as to Automatic Train Stops

Commissioner C. C. McChord, speaking for Division 1 of the Interstate Commerce Commission—Messrs. McChord, B. H. Meyer and C. B. Aitchison—has written to the American Railway Association concerning the automatic train control situation, and the substance of the letter has been issued by Secretary J. E. Fairbanks, in circular No. 2,163, for the information of the members of the association.

The members of Division 1 are agreed that no unnecessary delay or obstruction should be indulged. The letter, with this introduction, goes on to recount briefly the history of what has been done by the government, since 1906, when Congress first called for an investigation of the subject; and now "it is apparent that Congress expects definite and prompt action on our part." Mr. McChord thinks that as the automatic stops now in operation on the Chicago & Eastern Illinois and other roads have been functioning for some time, the report of the government inspectors concerning them ought soon to be available. Continuing, the letter says: "It is the Commission's desire not to be forced to issue specific orders to the various carriers, nor to discourage initiative in the matter of the installation of these devices on the part of the carriers. We suggest that you [the A. R. A.] indicate to the various executives that it is the Commission's desire to effectuate the purposes of Section 26 within the two-year period mentioned therein and that proper steps to that end be taken. We are pleased to note the interest being taken in the matter by the Joint Committee."

Railway Returns for April

The net operating income in April of the railroads of the United States totaled \$29,201,000, or \$1,494,000 less than it was in March. On the basis of the tentative valuation fixed for rate-making purposes by the commission, this would be at the annual rate of return of 2.18 per cent, as compared with 2.30 per cent in March. The carriers in April fell short \$51,286,000, or approximately 64 per cent of earning the amount contemplated by the law.

The ratio of operating expenses to revenues in April was 86.74 per cent, compared with 87.19 per cent in March. Reductions, compared with April, 1920, in operating expenses were reported in all districts. The total operating revenues of the railroads in April were \$433,181,000, or an increase of 7.7 per cent over those for the same month last year, while operating expenses were \$375,732,000, or a decrease of 6.2 per cent under April, 1920. The net operating income was \$29,201,000, compared with an operating deficit of \$23,767,000 in April, 1920. In considering comparisons with April last year, however, consideration must be given to the fact that railroad operations were affected that month by the switchmen's outlay strike.

During the eight months since September 1, 1920, when the guaranty period expired, the net operating income of the carriers has totaled \$279,008,000, which would be at the annual rate of return of 2.41 per cent on the tentative valuation of the railroads. This sum, however, is \$414,253,000 under the amount contemplated to be earned from the rates established by the commission.

Report on Collision at Welch, West Virginia

The Interstate Commerce Commission has issued a report on the collision which occurred on the Norfolk & Western near Welch, W. Va., on May 3, last, when six passengers were killed and 41 passengers and one employee were injured. This accident occurred on the Tag Fork branch, and the train, passenger No. 160, consisting of a locomotive and five cars, was moving backwards at about 15 to 18 miles an hour. It ran over a misplaced switch and collided with some loaded coal cars, wrecking two passenger coaches. The switch had been left misplaced by trackmen, working near it, and Foreman Fine is held responsible; and Brakeman Powell, at the rear of the train—that is, on the leading car—is held blameworthy for not keeping a good lookout. The inspectors believe that he should have discovered the open switch in time to make an emergency application of the air brakes. The inspectors cannot decide whether Foreman Fine left the switch open, and forgot it, or closed the switch and later instructed Sectionman Hale to throw it, on the assumption that it was still set for the side track. The sectionman may have thrown it, on instruction, without observing its position.

Valuation Bill Hearing

The Senate committee on interstate commerce held a brief hearing on June 10 and 11 on the bill to amend the valuation act by striking out the provision requiring the Interstate Commerce Commission to report separately the cost of acquisition of land. The bill was opposed by S. W. Moore, counsel for the Kansas City Southern, and W. G. Brantley, representing the President's Conference Committee on Valuation, who asked that the provision be left in the law and that the question of the weight to be allowed to this part of the evidence of value be left to the courts. Otherwise, they said, if the courts should decide that this evidence had been improperly excluded it might require considerable delay. The bill was advocated by P. F. Farrell, chief counsel of the Interstate Commerce Commission, and J. E. Benton, solicitor for the National Association of Railway and Utilities Commissioners. Mr. Farrell contended that the provision now requires the commission to spend a large amount of time and money to get an estimate, which he called a mere guess, of no use to anyone. He said the commission has all the information necessary to the determination of the real value of railroad lands when it finds the original cost and the present value, and its finding as to a present value based on the value of adjacent lands does not mean that that exact amount is to be allowed in making a final valuation.

Compliments of the Santa Fe to the Great Western

Isaiah Hale, safety superintendent of the Atchison, Topeka & Santa Fe, believes that good records made by other railroads may be effectively used to stimulate officers and employees of the Santa Fe to increase exertion, and under date of May 17, 1921, he issued and posted a bulletin on his railway which refers as follows to the safety drive on the Chicago Great Western:

The Chicago Great Western Railroad inaugurated a Safety Drive January 1, to continue during the calendar year. Their record of injuries to employees during March this year shows a reduction of 65 per cent, as compared to same month last year; in the first three months they show a reduction of 64 per cent. Their Western Division of 377 miles has not had a reportable injury (that is, one resulting in loss of more than three days' time) since January 1, a stretch of 128 days, and to prove this in itself is not an accident, let it be known that their Northern Division has not had such an injury in 74 days.

American railroad history records no other similar performance which is a solar plexus blow to the argument that "you can't stop accidents," "they are bound to occur," etc. We cannot decrease their number if we constantly keep telling ourselves we can't; nor can we do anything else, in striving for which we admit we are whipped before the start.

We are not speaking disparagingly of the Chicago Great Western when we say the physical condition of their property is no better than ours; the thing then that makes this record possible is the employee—individually and collectively—and we must swallow the distinctly bitter pill of having to admit that our organization suffers by comparison with theirs.

Do you know of any good reason why we should be content to mark time while Chicago Great Western men are making such wonderful progress and attracting the attention and admiration of the entire railroad world?

Shriners' Convention Creates

Heavy Passenger Movement

The Imperial Council Session of the Mystic Shrine at Des Moines, Iowa, on June 14, 15 and 16, provided the railroads with the largest passenger movement to any convention of the year and the roads entering that city made elaborate preparations to handle the Shriners going to the session from all points in the country.

It is estimated that the Chicago, Milwaukee & St. Paul and the Chicago, Rock Island & Pacific handled about 25,000 passengers, with equal participation. Next in rank came the Chicago & North Western, while large local movements were also handled by the Chicago, Burlington & Quincy and the Great Western. The movement on the St. Paul comprised organized parties from 20 different points over the country, the largest being a 13-car special train from Tacoma, Wash., carrying the Imperial Potentate of the Order, Lewis Garretson, and Shriners from Everett and Spokane, Wash., Butte, Mont., and other points along the route. It is interesting to note that the Denver, Colo., special was cancelled when the Shriners from that territory turned over their services and money to the flood refugees. The Rock Island lines handled 32 special trains with a total of over 10,000 passengers, the largest special train coming from Brooklyn, N. Y. Another train handled by this road came from California and a third from Newark, N. J. The North Western carried organized movements of passengers from Columbus, Ohio, Indianapolis, Ind., and Atlanta, Ga. One of the trains operated over the Great Western was made up at Washington, D. C.

Illinois Central Begins Program of Improvements

C. H. Markham, president of the Illinois Central, on June 10, sent the following circular letter to officers and employees of that system:

"I have been endeavoring to keep you advised in regard to important developments affecting the Illinois Central System. In a communication addressed to you March 1, 1921, I said that it was necessary to put our affairs in such shape that we would be enabled to grasp the first signs of business revival to start upon that program of expansion and development necessary to the well-being of the business interests dependent upon the Illinois Central System for transportation service.

"The decision of the Labor Board in regard to the reduction of wages, when it becomes effective will result in a substantial decrease of the operating expenses of the Illinois Central System. You will be interested in learning that we intend to invest that money in maintenance which has been deferred—in the employment of additional men and in the purchase of materials and supplies. We have not waited for the money to come in, but we have already entered upon our program, and we believe that other railroads will do likewise.

"The action of the Labor Board, therefore, operates as the first signal for the opening up of business which will redound to the benefit of the public at large. The crop prospects are favorable. This railway recognizes its pressing duty to patrons to place its roadway and equipment in condition to serve them this fall. The Labor Board decision will help to enable it to meet that duty.

"You are aware of the agitation for a reduction of freight and passenger rates. The Interstate Commerce Commission is watching that question closely. Already many of the freight rates have been adjusted, and other adjustments are under consideration at the present time. However, on account of the physical condition of the railways and the great necessity of spending large sums to bring them back to their former state of efficiency, it is not believed that rates can be reduced generally at any time within present vision. The railways must first be restored, and that will absorb all the money in sight for some time to come, and much more if it were available.

"I feel that, while you will naturally regret to give up any portion of the increase in wages that was granted to meet living costs when they were at their peak (and I regret that it is necessary that you should do so), you will recognize that the reduction was inevitable, since the costs of living have been reduced. I am confident that you will meet this situation in that same wholesome spirit with which you met each trying situation that confronted you during the last few years."

Traffic News

A bill to amend the Interstate Commerce Act to provide for seasonal rates on coal has been introduced in the House of Representatives by Mr. Linthicum.

The Senate committee on oceanic canals on June 13 ordered a favorable report on the bill introduced by Senator Borah, providing that no tolls shall be levied upon vessels passing through the Panama Canal engaged in the coastwise trade of the United States.

The Southern Pacific will put into effect on July 15, a rate of \$16.50 per ton on copper bullion, copper matte, blister copper, also lead bullion and speiss, in carloads, with a minimum weight of 60,000 lb., from points in Arizona and New Mexico to New York, and points taking New York rates, by rail, to Galveston, Tex., and thence by steamship. The reduction amounts to \$20 a ton.

The Senate on June 10 passed with minor amendments the bill, S. 621, providing an additional extension of one year to shippers as to claims in respect of overcharges made during the period of federal control. The bill was recommended both by the Interstate Commerce Commission and the director general of railroads. It amends Subdivision C of Section 206 of the Transportation Act.

The Interstate Commerce Commission on June 10 issued a sixth section permission order authorizing the western transcontinental railroads, represented by R. H. Countiss as agent, to put into effect on one day's notice a rate of \$1.75 per 100 lb. on vegetables, melons and cantaloupes from Pacific Coast terminals and intermediate points to eastern points in place of rates ranging from \$1.83 to \$2.08½.

The state commissions of Alabama and of Tennessee have issued orders requiring the American Railway Express Company to co-operate with the Southeastern Express Company in making through routes and rates substantially in accordance with the practice which prevailed before the establishment of the Southeastern Express Company and when the American operated over the lines of the Southern Railway Company.

Plans for the shipment of more than 10 per cent of the Pacific Coast fruits and vegetables to the eastern seaboard through the Panama Canal have been announced in a statement to the press by C. S. Whitcomb, president of the Pacific Producers' Association. Another statement announced that the western fruit shippers would not accept a reported proposal of the railroads that the rates on citrus fruits to the east be reduced 10 per cent on condition that the shipments be confined to the rail carriers. "The consumer fixes the price," said Mr. Whitcomb, "and our hope is to be able to come within that price." Answering criticisms, Mr. Whitcomb says that in hot spells it is impossible to keep the price of lemons normal.

Anthracite Shipments, May, 1921

The shipments of anthracite in May as reported to the Anthracite Bureau of Information, amounted to 5,793,895 tons, a decrease as compared with the preceding month of April, of 173,570 tons, and 361,983 tons less than tonnage shipped during May of last year, when 6,155,878 tons were shipped to market, and reflected the benefit of the termination of the switchmen's strike.

Shipments by originating carriers were:

	May, 1921	April, 1921
P. & R.	1,108,476	1,123,585
L. V.	1,027,688	1,102,965
C. R. R. of N. J.	544,716	537,822
D. L. & W.	915,191	929,271
D. & H.	753,039	812,967
Penna. R. R.	409,027	416,847
Eric. R. R.	630,574	630,471
N. Y., O. & W.	153,809	128,689
L. & N. E.	251,375	284,853
Total	5,793,895	5,967,465

Commission and Court News

United States Supreme Court

Penalties Not Recoverable Against Director General

In a proceeding for a penalty for non-payment of wages of a railroad employe, wrongfully discharged, brought under an Arkansas statute, the railroad appealed from a judgment by default to the State Circuit Court and there moved to substitute the Director General of Railroads. This substitution the court refused to make, but joined the Director General as defendant and entered judgment against both him and the company for the debt and penalty. This judgment was affirmed by the State Supreme Court but it is now reversed by the United States Supreme Court for the following reason: "As the Federal Control Act did not impose any liability upon the companies on any cause of action arising out of the operation of their systems of transportation by the government, the provision in Order No. 50 authorizing the substitution of the Director General as defendant in suits then pending was within his power; the application of the Missouri Pacific that it be dismissed from this action should have been granted; and the judgment against it should, therefore, be reversed." The government did not, under section 10 of the Federal Control Act, undertake to punish itself for any departure from the existing laws by the imposition upon itself of fines and penalties or to permit any other sovereignty to punish it. The judgment against the Director General, so far as it provided for recovery of the penalty was therefore held erroneous. Judgment reversed. *Missouri Pacific v. Ault*. Decided June 1, 1921. Opinion by Mr. Justice Brandeis.

Supreme Court Sustains Railroad in Objection to Assessment for Highway Construction

In answer to a petition filed by the Kansas City Southern and the Arkansas & Ft. Smith against Road Improvement District No. 6, Little River County, Ark., opposing the levying of an assessment against the railroads for the construction of permanent roads, the Supreme Court of the United States sustained the protest of the railroads, declared the assessment excessive and expressed doubt regarding the railway receiving any benefit from such an improvement. This road district was created in accordance with an act of the Arkansas legislature to include approximately 25,000 acres and within them 9.7 miles of main track owned and operated by the Kansas City Southern and the Arkansas & Ft. Smith, together with the corresponding right-of-way covering 130 acres and requisite station buildings. Little River County is distinctly agricultural, has an area of 546 square miles, and 16,000 inhabitants. The improvement district was created for the purpose of constructing 11.2 miles of gravel road through taxation upon real property, defined by the statute as "land, improvements thereon, including railroads, railroad right-of-way and improvements thereon, such as public buildings, sidetracks, etc., and tramroads."

A duly appointed board assessed the benefits to the roads on account of the proposed road at \$7,000 per mile of main track—\$67,900. They divided the farming lands into five zones, determined by distance from the highway, and assessed uniform benefits upon all within the same zone without regard to improvements or market value—in the first \$12 per acre, second \$10, third \$8, fourth \$6 and fifth \$4. Town lots were likewise assessed without reference to value or improvements at \$10, \$15, \$20, and \$25 each, according to location. A pipe line, telephone line, and telegraph line were severally assessed at \$2,500, \$300 and \$300 per mile, without any designated basis.

The railroads maintained that the assessment upon their property was unequal, arbitrary, unreasonable and in violation of the Fourteenth Amendment. The state courts held to the contrary.

In its decision the Supreme Court stated that the settled rule is that a state legislature "may create a taxing district to meet the expense of local improvements, and may fix the basis of taxation without encountering the Fourteenth Amendment unless its action is palpably arbitrary or a plain abuse." Ordinarily,

the levy may be upon lands specially benefited according to value, position, area, or the front-foot rule.

The statute under consideration prescribes no definite standard for determining benefits from proposed improvements. The assessors made estimates as to farm lands and town lots according to area and position and wholly without regard to their value, improvements thereon, or their present or prospective use. On the other hand, disregarding both area and position, they undertook to estimate benefits to the property of plaintiffs in error without disclosing any basis therefor, but apparently according to some vague speculation as to present worth and possible future increased receipts from freight and passengers which would enhance its value, considered as a component part.

Obviously, the railroad companies have not been treated like individual owners, and we think the discrimination so palpable and arbitrary as to amount to a denial of the equal protection of the law. Benefits from local improvements must be estimated upon contiguous property according to some standard which will probably produce approximately correct general results. To say that 9.7 miles of railroad in a purely farming section, treated as an aliquot part of the whole system, will receive benefits amounting to \$67,900 from the construction of 11.2 miles of gravel road seems wholly improbable, if not impossible. It is doubtful whether any very substantial appreciation in value of the railroad property within the district will result from the improvements; and very clearly it cannot be taxed upon some fanciful view of future earnings and distributed values, while all other property is assessed solely according to area and position. Railroad property may not be burdened for local improvements upon a basis so wholly different from that used for ascertaining the contribution demanded of individual owners as necessarily to produce manifest inequality. Equal protection of the law must be extended to all.

Risk on Team Track, First 48 Hours

Shipments of grapes were transported from different points of origin to Chicago, arriving on different days. On arrival each car was placed on a public delivery track and notice thereof given. The consignee accepted each car, breaking the seals. Loss occurred after acceptance and commencement of unloading. In an action for damages the question was whether the railroad was liable therefor, and in what capacity—whether as carrier or warehouseman, or at all. The bill of lading provided that "Property not removed within 48 hours after notice of arrival, may be kept by the carrier as warehouseman only. . . . Controversies have arisen as to this provision, the decisions differing. Consignee contends that the railroad during the 48 hours is responsible as a carrier, this relation not terminating until the expiration of that time. The contention of the railroad company is *contra*, that it, the company, is neither liable as a carrier nor as warehouseman; not as carrier because the shipment had been delivered and accepted, and not as warehouseman because no negligence has been proved against it. Affirming a judgment of the state court for the consignee the United States Supreme Court says: "The property here was not delivered; access was only given to it that it might be removed, and a period of 48 hours was given for the purpose. Pending that time it was within the custody of the railroad company, which had the same relation to it as during transportation. The bill of lading is definite as to the time at which responsibility of the company shall be that of warehouseman, and by necessary implication until that responsibility attaches, that of carrier exists."—*Michigan Central v. Owen & Co.* Decided June 1, 1921. Opinion by Mr. Justice McKenna.

Mr. Justice McReynolds dissented in an opinion in which he says that section 5 of the Uniform Bill "does not purport to establish any rule of liability during the 48 hours, but leaves that to be determined by application of the common law to the circumstances. To say that a carrier insures for 48 hours although the consignee has taken actual custody of the goods would seem an absurd conclusion. And the practical impossibility of stationing an agent at every car within a great terminal while freight is being removed by thousands of consignees and their agents—a necessary precaution if thefts or mistakes by any of them must be prevented—makes it manifest that the Interstate Commerce Commission would not have sanctioned the responsibility now claimed and that the carriers would not have acquiesced."

Foreign Railway News

Wage Reductions in Belgium

Reductions in wages are general in Belgium, according to the Times (London) Trade Supplement but the result is a growing dissatisfaction in the ranks of labor which, it is feared, may lead to serious consequences. Railway workers are said to threaten a general strike if proposed wage reductions are put into effect.

Latvian Railways Forsaking Standard Gage

At the present time there are some 500 miles of standard railroads in Latvia, as against 1,125 miles of Russian gage (5 ft.), according to Trade Commissioner Groves, at Riga. The line from Riga to the Russian border on the line to Moscow is a broad gage line, while the road leading from the port of Libau is standard gage. The existing standard gage lines are being converted to the Russian gage as traffic demands.

Sabotage Hinted in French Accidents

The wrecking of several French trains recently has caused some inquiry into the probability of sabotage in view of the radical disaffection of many railway workers. In one instance a rail was found removed from the track. In another a fixed signal was bound with copper wires to show clear. Several serious accidents have resulted from this apparently malicious tampering with the signals and track.

German Consolidations

A company called the Gutehoffnungshutte, has been formed in Germany by a group of German companies included in which are the Henschel Locomotive Works (Cassel), the Nuremberg Oil Engineering Works, the Deutsche Werft of Hamburg, a shipyard having 22 ways, various steel interests and Hamel & Leng of Dusseldorf, the latter having a dominating interest.

LONDON

Further Service Curtailments in England

Due to the coal strike in England, great reductions in train service have been necessitated. The extent of these reductions had been predetermined by the officers and it is estimated that the present service is only about 66 per cent of normal. Sunday service on branch lines has been withdrawn in a number of instances, no collections or deliveries of mail are made on Sundays, and many regular through runs have been suspended temporarily. These economies have been estimated by the Engineer (London) to be sufficient to reduce the consumption of coal by the railways to 50 per cent of normal. It is pointed out that one of the conditions of service of the railway employees is the "guaranteed week" of regular employment. Owing to the curtailment of service this guaranty has now been reduced to three days per week.

Earnings of Nitrate Railways

The Nitrate Railways, the largest privately operated lines in Chile, earned a net of \$1,218,776 (pounds to dollars at par) in 1920 as compared with \$465,539 in 1919. Gross receipts were \$5,345,708 in 1920 and \$2,357,795 in 1919. Dividends of 7 per cent were paid on all the capital stock excepting the deferred ordinary shares and \$483,090 was transferred to surplus. At the annual meeting of the stockholders in London on May 24, the acting chairman told of the adverse effect which labor troubles were having on earnings. There has, he said, been a great increase in expenses due to wage increases and payment for overtime. It was announced that the company is contemplating the electrification of its line from Iquique to Carpaz, 20 miles, and is seeking the sanction of the Chilean government for this work. The purpose of this undertaking would be to conserve water, which is scarce in northern Chile.

Equipment and Supplies

Locomotives

THE SHANTUNG RAILWAY has ordered from the American Locomotive Company through Mitsui & Co., New York, 1 Pacific type locomotive.

MITSUI & Co., New York, have ordered from the American Locomotive Company 5 Mogul type locomotives for the Imperial Karafuto Government, Japan.

Government Locomotives Sold

The Surplus Property Division of the War Department has sold 45 of the Decapod locomotives originally built for the Russian government to the Erie Railroad. This constitutes the remainder of the Decapods held by the government. The price has not been announced.

Freight Cars

THE BALTIMORE & OHIO is inquiring for 500 hopper car bodies, of 70-tons capacity.

THE CHICAGO, INDIANAPOLIS & LOUISVILLE is asking for prices on 500 composite gondola cars.

THE SPANISH GOVERNMENT RAILWAYS are asking for prices, through the car builders, on 100 freight cars.

THE BANGOR & AROOSTOOK is inquiring for 300 box cars, of 30-tons capacity and 200 flat cars, of 40-tons capacity.

THE CHESAPEAKE & OHIO is asking for prices for rebuilding from 500 to 1,000 composite cars, also for repairs to 500 to 1,500 steel cars.

THE MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE has awarded a contract to the American Car & Foundry Company, for the repair of 500 box cars.

THE UNION PACIFIC has given an order to the Pacific Car & Foundry Company for repairs to 1,000 box cars. The work is to be carried out at the Portland plant of the Pacific Car & Foundry Company.

THE ERIE RAILROAD, reported in the *Railway Age*, of April 1, as asking for prices on repairs to 1,000 box cars of 40-tons capacity, will have these repairs made at the Hammond shops of the Standard Steel Car Company.

Iron and Steel

THE ALASKAN ENGINEERING COMMISSION has ordered 10,000 tons of rails and accessories from the Tennessee Coal, Iron & Railroad Company, to be rolled at the Ensley, Ala., mills.

Miscellaneous

NORFOLK & WESTERN.—Bids will be received until noon, June 22, at Roanoke, Va., for parts for electrical apparatus; 400 rods galvanized wire fencing; 24 steel flanged engine truck wheel tires; approximately, 45,861 lb. soft steel bars; 116,711 lb. steel plates, 580,302 lb. steel shapes, and repairs to electrical apparatus.

Signaling

THE BOSTON ELEVATED has ordered from the Union Switch & Signal Co. an a. c. electro-pneumatic interlocking for Forest Hills, the machine to have 13 levers for 41 signals and 16 automatic stops; 14 levers for 14 single switches and three double slips, and five traffic levers, making a total of 32 working levers in a 35-lever frame. At each high signal there will be an automatic stop. There will be section and sectional route locking throughout, and time locking on all signal levers.

Supply Trade News

The Standard Pressed Steel Company, has removed its headquarters from Philadelphia to Jenkintown, Pa.

P. R. Letts has been appointed office manager of the industrial bearings division of the Hyatt Roller Bearing Company, New York, succeeding G. J. Traendly, who is now office manager of the General Motors Corporation, New York.

C. W. Cross has been appointed railroad representative of the Torchwood Equipment Company, Fulton and Carpenter streets, Chicago. Mr. Cross was until June 1, manager of western railroad sales for the Chicago Pneumatic Tool Company.

John B. Seymour, district sales manager of the Verona Tool Works at Chicago, has been appointed sales manager of the Superior Supply Company, 5 South Wabash avenue, Chicago, effective June 16. The officers of this company, which was organized recently, are: President, Will R. Sostheim, formerly director and manager of the railroad, contractor and machinery department of Geo. B. Carpenter & Co.; vice-president, E. A. Kreplin, formerly purchasing agent of that company; and secretary-treasurer, John H. Erby, formerly Detroit district manager of the same company.

The name of The Esterline Company, Indianapolis, Ind., has been changed to The Esterline-Angus Company. The Esterline Company was organized by J. W. Esterline in 1900, and was incorporated in 1906. D. J. Angus became associated with Mr. Esterline in 1910 in a consulting engineering business, and in 1917 he became a stockholder and director of the Esterline Company. Mr. Angus has been responsible for the development of three new types of recording meters, known as the k. v. a. meter, the concentration meter and the graphic ohm-meter.

The directors of the Greenfield Tap & Die Corporation, Greenfield, Mass., on June 9, voted to purchase the entire capital stock of the Greenfield Machine Company, Greenfield, manufacturers of cylindrical and universal grinders, and the Morgan Grinder Company, Worcester, manufacturers of internal grinders. This combination together with the machines now produced by the Greenfield Tap & Die Corporation, will constitute the machine division of the Greenfield Tap & Die Corporation. The operation and organization of both plants will remain the same for the present, although eventually the Worcester plant will be moved to Greenfield.

Obituary

James Prentice Snedden, general superintendent at Bayonne, N. J., of the Babcock & Wilcox Company, New York, also vice-president of the Pittsburgh Seamless Tube Company, Beaver Falls, Pa., died on June 11, at the Johns Hopkins Hospital, Baltimore, Md., at the age of 58.

Trade Publications

BOILER EXPLOSIONS.—The Falls Hollow Staybolt Company, Cuyahoga Falls, Ohio, has issued a new pamphlet setting forth some of the reasons for boiler explosions, attributable to staybolts. It also enumerates fifteen reasons why the danger of explosion is eliminated by the use of its staybolt.

FIRE TESTS OF BUILDING COLUMNS.—The United States Bureau of Standards, Washington, D. C., has issued Technological Paper No. 184 comprising a report of nearly 400 pages on tests of a great variety of building columns subjected to conditions simulating those of building fire while under load in order to determine the relative fire resistance of different constructions. These tests were conducted under the direction of S. H. Ingberg, physicist at the Underwriters Laboratories, Chicago, Ill., and resulted in the accumulation of a large amount of information that will be valuable to the building engineer.

Railway Construction

CHICAGO & EASTERN ILLINOIS.—This company contemplates the construction of a two-story brick railroad Y. M. C. A. building at Mitchell Yard, Ill., to cost \$100,000.

CHICAGO, BURLINGTON & QUINCY.—This company has closed its bids for the grading in connection with the track elevation at Broadway, Benton and Clark streets, Aurora, Ill., the work to involve the expenditure of approximately \$50,000.

CHICAGO, ROCK ISLAND & PACIFIC.—This company contemplates the construction of a new power plant at Trenton, Mo., on the site of its shops which were destroyed by fire.

CHICAGO, ROCK ISLAND & PACIFIC.—This company has awarded a contract to the Roberts & Schaefer Company, Chicago, for supplying the coal and sand handling equipment for a coaling station at El Reno, Okla. The station, which will replace a similar structure destroyed by fire, will be built by company forces.

CHICAGO UNION STATION.—This company contemplates widening Canal street, between Van Buren and Jackson streets, Chicago.

ILLINOIS CENTRAL.—This company, which was noted in the *Railway Age* of May 6 (page 1093) as contemplating the construction of additions to its roundhouse at Waterloo, Ia., has awarded the contract for this work to W. J. Zitterall, Webster City, Ia. The company has also awarded a contract to M. J. Roach, Memphis, Tenn., for grading in connection with the construction of yard and storage tracks at Sarpy, La. The company contemplates the construction of an engine house at Herrin, Ill., to be built by company forces, and the enlargement of its pumping plant at Ramsey, Ill.

INTERNATIONAL & GREAT NORTHERN.—This company is erecting a new three-story office building with dimensions of 46 ft. by 52 ft., at San Antonio, Tex.

LOUISVILLE & NASHVILLE.—This company has awarded contracts to Joseph E. Nelson & Sons, Chicago, in connection with improvements to its terminal at Hazard, Ky., for the construction of a roundhouse, machine shop, oil storage building, car department building, storage and office building, lavatory building, and an engineers' locker and register building. The total cost of the project is approximately \$180,000.

PITTSBURGH & WEST VIRGINIA.—The Interstate Commerce Commission has issued a certificate authorizing the construction of a branch or spur from a point on its main line near Virginia Station, W. Va., a distance of approximately 3.2 miles.



Photo by Ewing Galloway

Railway Station at Lourenco Marques, Portuguese East Africa

Annual Report

New York, Chicago & St. Louis Railroad Company—Thirty-fourth Annual Report

To the Stockholders of The New York, Chicago and St. Louis Railroad Company:

The Board of Directors herewith submits its report for the year ended December 31, 1920, with statements showing the financial condition of the company.

The capital stock authorized and issued to December 31, 1920, was..... \$30,000,000.00
being the same as at the close of the previous year.

The funded debt outstanding as of December 31, 1919, was.. \$37,715,000.00
It was decreased during the calendar year:
By the retirement of Equipment Trust
Certificates of 1916..... \$110,000.00
By the retirement of Engine Trust Certi-
ficates of 1916..... 30,000.00
By the retirement of Equipment Trust Cer-
tificates of 1917..... 133,000.00
By the retirement of First Mortgage Bonds 122,000.00
..... 395,000.00

Funded debt outstanding as of December 31, 1920..... \$37,320,000.00

During the year, Second and Improvement Mortgage Bonds (Series A), with a par value of \$1,036,000, were executed and delivered to the Treasury of the Company, the purpose of the issuance of these bonds being to reimburse the Treasury of the Company for capital expenditures theretofore made by it. These bonds have not been converted into cash.

The operation of your property under the direct supervision and control of the United States Government was continued until February 29, 1920. On March 1, 1920, the property was returned to the Company pursuant to the provisions of the Transportation Act, 1920.
The Company did not accept the guaranty provisions of that act. Therefore, your Company has no claim against the United States Government covering the so-called Guaranty Period. The earnings for the Guaranty Period exceeded one-half of the Certified Standard Return by approximately \$890,000.00.

The compensation for the use of your property for the twenty-six months, during which it was operated by the United States Government, has not as yet been determined. Negotiations with the Railroad Administration are well under way, however, and an early settlement of all claims is expected.

SUMMARY OF OPERATIONS AFFECTING INCOME AND SURPLUS

OPERATING INCOME	Federal operations	Ten months ended Dec. 31	Total	Corporate income for the year
Railway operating revenues.....	\$4,701,940.15	\$23,953,608.15	\$28,655,548.30	\$23,953,823.96
Railway operating expenses.....	4,174,337.91	19,093,838.60	23,268,176.51	19,112,850.38
NET REVENUE FROM RAILWAY OPERATIONS	\$527,602.24	\$4,859,769.55	\$5,387,371.79	\$4,840,973.58
Railway tax accruals.....	\$619,978.93	\$1,020,000.00	\$1,639,978.93	\$1,020,000.00
Uncollectible railway revenues..	1,798.70	4,857.05	6,655.75	4,857.05
	\$621,777.63	\$1,024,857.05	\$1,646,634.68	\$1,024,857.05
RAILWAY OPERATING INCOME.....	\$94,175.39*	\$3,834,912.50	\$3,740,737.11	\$3,816,116.53

* Deficit

NON-OPERATING INCOME	Federal operations	Ten months ended Dec. 31	Total	Corporate income for the year
Hire of freight cars—credit balance.....	\$159,843.17	.....	\$159,843.17	.....
Rent from locomotives.....	33,900.06	\$24,927.56	58,827.62	\$24,927.56
Rent from passenger-train cars.....	3,568.45	11,602.50	15,170.95	11,602.50
Rent from work equipment.....	1,035.84	9,285.48	10,321.32	9,285.48
Joint facility rent income.....	28,461.71	72,143.10	100,604.81	72,143.10
Income from lease of road.....	.....	.....	.....	440,547.96
Miscellaneous rent income.....	.....	.....	.....	21,754.46
Miscellaneous non-operating physical property.....	.....	.....	.....	13,386.01
Income from unfunded securities and accounts.....	.....	.....	.....	95,493.41
Income from sinking and other reserve funds.....	.....	.....	.....	425.00
Miscellaneous income.....	.....	.....	.....	1,791.56
TOTAL NON-OPERATING INCOME.....	\$226,809.23	\$117,958.64	\$344,767.87	\$691,357.04
GROSS INCOME..	\$132,633.34	\$3,952,871.14	\$4,085,504.98	\$4,507,473.57

DEDUCTIONS FROM GROSS INCOME	Federal operations	Ten months ended Dec. 31	Total	Corporate income for the year
Hire of freight cars—debit balance.....	.....	\$229,183.60	\$229,183.60	\$229,183.60
Rent for locomotives.....	\$1,250.40	7,057.30	8,307.70	7,057.30
Rent for passenger-train cars..	1,293.83	15,287.97	16,581.80	15,287.97

OPERATING INCOME	Federal operations	Ten months ended Dec. 31	Total	Corporate income for the year
Rent for work equipment.....	\$63.43	3,595.41	4,558.84	3,595.41
Joint facility rents.....	42,473.44	137,520.27	179,993.71	137,520.27
Rent for leased road.....	.....	.....	.....	5,682.65
Miscellaneous rents.....	.....	.....	.....	77,519.26
Miscellaneous tax accruals.....	.....	.....	.....	1,115.72
Interest on funded debt.....	.....	.....	.....	1,640,640.17
Interest on unfunded debt.....	.....	.....	.....	4,764.95
Amortization of discount on funded debt.....	.....	.....	.....	43,847.52
Miscellaneous income charges.....	.....	.....	.....	92,408.18
TOTAL DEDUCTIONS FROM GROSS INCOME.....	\$45,981.10	\$392,644.55	\$438,625.65	\$2,258,623.00
NET RAILWAY OPERATING INCOME.....	\$86,652.74	\$3,560,226.59	\$3,646,879.33	.....
NET INCOME.....	.....	.....	.....	\$2,248,850.57

DISPOSITION OF NET INCOME	Amount
First mortgage bonds redeemed (sinking fund).....	\$98,600.50
Dividend on first preferred stock, 5%.....	249,895.00
Dividend on second preferred stock, 5%.....	549,990.00
Dividend on common stock, 5%.....	699,480.00
TOTAL SINKING FUND AND DIVIDEND APPROPRIATIONS.....	\$1,597,965.50
SURPLUS TRANSFERRED TO PROFIT AND LOSS.....	\$650,885.07

PROFIT AND LOSS, CREDIT BALANCE, DECEMBER 31, 1919..... \$3,701,765.67†
ADD:
Surplus for the year, 1920..... \$650,885.07

Discount on first mortgage bonds purchased and retired account sinking fund.....	23,399.50
Discount on equipment trust certificates of 1917 purchased and retired.....	10,660.00
Unrefundable overcharges.....	13,565.83
Profit on road and equipment sold.....	3,801.29
Miscellaneous credits, and adjustments.....	1,906,610.47
Donations.....	665.90
Delayed income credits.....	466,990.47
	\$3,076,578.53
DEBIT:	\$6,778,348.20
Loss on retired road and equipment.....	135,423.13
Surplus appropriated for investment in physical property.....	1,850,906.16
Dividend appropriation of surplus.....	274,995.00
Miscellaneous debits.....	8,372.31
Delayed income debits.....	200,960.91
	\$2,470,657.51

PROFIT AND LOSS, CREDIT BALANCE, DECEMBER 31, 1920..... \$4,307,690.69†

† Tentative, pending adjustments of claims, accounts, and other matters in dispute between the Company and the United States Government.

STATEMENT OF AMOUNTS DUE TO AND FROM THE U. S. RAILROAD ADMINISTRATION

	Due Railroad Administration	Due Company
Cash, December 31, 1917.....	\$1,292,167.80	.....
Cash subsequent to December 31, 1917.....	.....	300,000.00
Agents and conductors balances, December 31, 1917.....	.....	1,190,497.76
Materials and supplies, December 31, 1917.....	.....	1,689,846.62
Equipment retired.....	.....	211,036.18
Assets, December 31, 1917, collected.....	.....	1,881,584.72
Depreciation on equipment.....	.....	1,026,729.81
Revenue prior to January 1, 1918.....	.....	346,241.01
Road property retired and not replaced.....	.....	43,031.01
Agents and conductors balances, February 29, 1920.....	.....	164,001.61
Federal liabilities paid.....	.....	5,606.87
Federal mileage scrip.....	.....	86.42
Compensation set up for the use of this Company's property during Federal Control (less advances of \$3,292,000.00).....	.....	2,468,077.52
Corporate income transactions.....	\$878,197.63	.....
Liabilities, December 31, 1917, paid.....	3,842,438.50	.....
Expense prior to January 1, 1918.....	2,140,548.74	.....
Additions and betterments (less paid on account, \$712,000.00).....	2,065,209.90	.....
Materials and supplies, February 29, 1920.....	1,922,826.44	.....
Federal assets collected.....	1,729.00	.....
Totals.....	\$10,850,950.21	\$10,618,907.33
Net balance due Railroad Administration.....	232,042.88	.....

The foregoing statement is informative only, inasmuch as the Company does not admit the propriety of the Railroad Administration charges.

The usual statistical tables are appended.
The Board desires to express its appreciation of the faithful and efficient services rendered by officers and employees during the year.

For the Board of Directors,
J. J. BERNET, President.

Railway Financial News

BOSTON & MAINE.—Defers Dividend Action.—Announcement that no action was taken by the board of directors at a meeting in Boston on June 14 in the matter of declaring a dividend on the first preferred stocks, which would normally be payable on July 1, was made by President J. H. Hustis. He pointed out that dividends on these stocks were cumulative and said they would be paid when earned.

In a statement issued after the meeting Mr. Hustis said:

The conditions which made it necessary to defer action on the preferred dividends due January 1 last have continued during the intervening months, and as a result it is estimated that the deficit for the first six months of 1921, after the payment of fixed charges and taxes, will be over \$7,000,000.

This period was abnormal in many respects for all railroads, as is indicated in their monthly reports. With the Boston & Maine the sharp decline in business which began in November, 1920, has continued up to the present, without any substantial recovery. Wages have been at their maximum, and the fuel and materials used in this period were necessarily purchased or contracted for at the high prices of 1920. Maintenance both of track and equipment, which had been deferred because of conditions due to the war, was necessarily prosecuted to a greater extent than would ordinarily have been justified under the business conditions prevailing during the period.

We believe, however, that there is a turn in the adverse tide against which we have been struggling and that the second half of the year will show a different tendency. We have the Labor Board decision as to wages, which should result in a substantial saving. The Labor Board also has decreed the abrogation of national agreements on July 1, but as this question involves further consideration by the Labor Board in the event of failure to agree upon new agreements locally we cannot as yet estimate the effect of that decision.

We know that reduced prices of locomotive fuel should have a substantial effect on operating expenses in the second six months. A reduction of \$1 a ton, which is conservative, would result in an annual saving on the present basis of consumption of approximately \$1,500,000. We should also have the benefit of lower costs of other materials as fast as present stocks are replenished.

It is believed that any increase in business—and there are some indications of a slight revival—could be handled with a relatively small increase in expenses and should immediately be reflected in the net results.

CENTRAL VERMONT.—Authorized to Pledge Bonds.—This company has been authorized by the Interstate Commerce Commission to issue \$100,000 of refunding mortgage 5 per cent gold bonds and to pledge them from time to time as collateral security for short term notes.

CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA.—Defers Dividend Action.—Pending adjustment of accounts with the government, the directors have decided to defer until the September meeting the regular semi-annual dividends of 3½ per cent on the preferred and 2½ per cent on the common stock for the first half of the current year. This road is controlled by the Chicago & North Western.

COLUMBUS & GREENVILLE.—Receivership.—This road, formerly the Southern Railway in Mississippi, has been placed in the hands of a receiver by Federal Judge Edwin Holmes at Aberdeen, Miss., on the application of the company itself. The court has authorized the receiver, A. T. Stovall, to issue \$200,000 receiver's certificates, of which about \$150,000 will be used to pay delinquent taxes. The road runs from Columbus, Miss., westward to Greenville, 168 miles, with 110 miles of branch lines. The receivership was brought about to prevent the sale of the road for the taxes due.

DEATH VALLEY.—Authorized to Issue Stock.—This company has been authorized to issue and sell at par \$34,900 of common capital stock, the proceeds to be used to retire 90 first mortgage bonds which mature on March 1.

DETROIT & IRONTON.—Authorized to Issue Stock.—This company has been authorized by the Interstate Commerce Commission to issue and sell at par \$1,000,000 of capital stock, the proceeds to be used in the construction of a line approximately 15 miles long, extending southward from Springwells or Fordson, Mich., to a connection with the Detroit, Toledo & Ironton, near Trenton or Flat Rock. The company has also asked authority to assume as lessee of the properties of the Detroit, Toledo & Ironton obligations in respect of certain securities issued by the latter company. These matters were reserved by the commission for further consideration.

DETROIT, TOLEDO & IRONTON.—Authorized to Issue Bonds.—This company has been authorized by the Interstate Commerce Commission to issue and sell at par \$182,000 of first mortgage bonds.

KANSAS CITY TERMINAL.—Authorized to Issue Notes.—This company has been authorized by the Interstate Commerce Commission to issue and sell at not less than 93½ per cent of par and accrued interest or to exchange for maturing notes \$2,000,000 of 10 year, 6½ per cent, secured gold notes and to pledge as collateral security for the notes \$3,125,000 first mortgage 4 per cent gold bonds.

E. H. Rollins & Sons, of New York, and the Continental and Commercial Trust & Savings Bank of Chicago are offering these notes, dated July 1, 1921, at 96.44 and interest at 7 per cent. The proceeds will be used, with other funds, to retire \$2,500,000 of the company's notes, maturing July 1. The twelve railroads entering Kansas City are bound unconditionally to provide funds for the payment of principal and interest of the pledged bonds and taxes, as well as their ratable share of operating expenses.

MAHONING COAL RAILROAD.—Extra Dividend Declared.—This company has declared an extra dividend of \$15 a share on the common stock and the regular semi-annual dividends of \$5 on the common and 2½ per cent on the preferred. The extra dividend on the common is payable July 1 to stock of record June 24; the regular common August 1 to stock of record July 15, and the preferred dividend is payable July 1 to stock of record June 24. The dividends of this company from 1915-1920 have been at a rate of 20 per cent a year.

READING COMPANY.—Trustees Appointed.—The trustees appointed under the segregation plan by the United States District Court at Philadelphia for the stock of the Philadelphia & Reading Coal & Iron Company, which will be assigned to the new corporation are: Newton H. Fairbanks, of Springfield, O., and Joseph B. McCall, of Philadelphia, Pa. The trustees of the New Jersey Central stock owned by the Reading company are R. E. McCarty, of Pittsburgh, general manager of the Pennsylvania System, Central Region, and C. S. W. Packard, of Philadelphia.

A decree filed by Judges Buffington, Davis and Thompson, making the appointment, provides that the two groups of trustees shall diligently take up their duties and in case either of the trustees are unable to agree as to the voting of shares or any other matter in the scope of their duties they may apply to the court for instruction.

SALT LAKE & UTAH.—Application for Loan.—This company has applied to the Interstate Commerce Commission for a loan of \$700,000 from the revolving fund for 15 years.

ST. LOUIS-SAN FRANCISCO.—Authorized to Issue Bonds.—This company has been authorized by the Interstate Commerce Commission to sell \$4,232,000 of prior lien mortgage bonds at not less than 90 and to pledge them as security for short term notes.

TENNESSEE CENTRAL.—Nashville Terminal Company Declares Lease Forfeited.—The Nashville Terminal Company which is leased to the Tennessee Central at an annual rental of \$60,000 has refused to accept \$30,750, being the rental due to January 1, 1921, with interest, and has posted notices to the effect that it has taken possession of the property covered by the lease. The company declares that the lease has been forfeited owing to the failure of the Tennessee Central to pay the rental when due.

Judge E. T. Sanford at Knoxville, Tenn., has postponed until June 25, the hearing on the lease controversy. J. H. DeWitt, of Nashville, has been appointed special master to make a report to the court showing an itemized list of all creditors to whom the receivers are indebted and when and for what each debt was created.

VIRGINIAN.—Annual Report.—The corporate income account for the year ended December 31, 1920, compares with the previous year as follows:

	1920	1919
Railway Operating Revenues, March 1 to December 31, 1920		
Freight	\$13,901,140	.....
Passenger, including excess baggage and club car fare	798,531	.....
Total operating revenues (inc. other).....	\$15,989,750	.....

Railway Operating Expenses, March 1 to December 31, 1920:

Maintenance of way and structures.....	\$1,965,229	.....
Maintenance of equipment.....	3,177,424	.....
Trains.....	91,733	.....
Transportation.....	5,518,806	.....
General.....	350,688	.....
Total operating expenses (inc. other).....	\$11,085,299	.....
Net revenue from railway operations.....	\$4,904,451	.....
Railway tax accruals.....	1,026,492	.....
Total deductions.....	\$1,026,507	.....
Total railway operating income.....	\$632,786	.....
Tentative net railway operating income for the ten months ended December 31, 1920.....	\$4,510,729	.....
Compensation due from U. S. Government (January and February, 1920; full year 1919).....	513,365	\$3,247,603
Tentative railway operating income for the year subject to settlement with the United States Government.....	\$5,024,095	.....
Total non-operating income.....	\$284,209	.....
Gross income.....	\$5,308,304	\$3,548,577
Total deductions from gross income.....	2,020,842	1,767,012
Net income (tentative for year 1920 subject to settlement with U. S. Government).....	\$3,287,462	\$1,845,632

The annual report of the Virginian will be reviewed editorially in an early issue.

WICHITA NORTHWESTERN.—*Loan from Revolving Fund Approved.*—The Interstate Commerce Commission has approved a loan to this company of \$381,750 for 10 years to be used in meeting maturing indebtedness and in paying for some additions and betterments.

Railroad Administration Settlements

The United States Railroad Administration reports the following final settlements, and has paid out to the several roads the following amounts: Port Bolivar Iron Ore Railway, \$35,000; Chicago, Milwaukee & Gary, \$200,000; Bangor & Aroostook, \$575,000. The payment of these claims on final settlement is largely made up of balance of compensation due, but includes all other disputed items as between the railroad companies and the administration during the 26 months of federal control.

Guaranty Certificates Issued

The Interstate Commerce Commission has issued certificates for partial payments on account of the six months' guaranty for 1920 as follows:

Bath & Hammondsport.....	\$9,000
Central New York Southern.....	6,000
Chicago, Detroit & Canada.....	55,000
Fort Worth Belt.....	12,500
Galveston Wharf.....	100,000
Fenn Yan & Lake Shore.....	2,000
Toledo & Ohio Central.....	105,000
Ulster & Delaware.....	25,000
Lake Erie & Western.....	360,000
Chicago & Alton.....	20,000

The commission has also issued a certificate for the final amount due under the guaranty to the Electric Short Line for \$14,993.67.

Dividends Declared

Albany & Susquehanna.—\$4.50, semi-annually, payable July 1 to holders of record June 15.
 Chicago & North Western.—Common, 2½ per cent, semi-annually; preferred, 3½ per cent, semi-annually; both payable July 15 to holders of record June 23.
 Chicago, Indianapolis & Louisville.—Preferred, 2 per cent, semi-annually, payable June 29 to holders of record June 22.
 Detroit, Hillsdale & South Western.—2 per cent, payable July 5 to holders of record June 21.
 Kanawha & Michigan.—1½ per cent, quarterly, payable June 30 to holders of record June 20.
 Little Schuykill Navigation Railroad & Coal Company.—\$1.00, payable July 15 to holders of record June 21.
 Mahoning Coal Railroad.—Common, \$5.00, semi-annually, payable August 1 to holders of record July 15; common, extra, \$15, payable July 1 to holders of record June 24; preferred, 2½ per cent, semi-annually, payable July 1 to holders of record June 24.
 Northern Central.—4 per cent, semi-annually, payable July 15 to holders of record June 30.
 Pittsburgh, Ft. Wayne & Chicago.—Preferred, 1¾ per cent, quarterly, payable July 5 to holders of record June 10; common, 1¾ per cent, quarterly, payable July 1 to holders of record June 10.
 Rensselaer & Saratoga.—4 per cent, payable July 1 to holders of record June 15.

Railway Officers

Executive

V. V. Boatner, whose election as president of the Peoria & Pekin Union, with headquarters at Peoria, Ill., was announced in the *Railway Age* of June 10 (page 1378), was born at Bethlehem, Miss., on May 6, 1881. He was educated at the Mississippi College at Clinton, and entered railroad service in May, 1901, as a station helper on the Illinois Central at Elizabeth, Miss. His entire railway career has been spent in the service of that company. On August 8, 1901, he was transferred to the office of the trainmaster at Greenville, Miss., as time-keeper and stenographer. In March of the following year he was transferred to Wilson, La., where he served successively as



V. V. Boatner

clerk in the trainmaster's office, copy operator, train dispatcher and chief dispatcher. He was promoted to trainmaster on April 1, 1907, and served in that capacity on the New Orleans, Vicksburg, Memphis and Indiana divisions until July 15, 1916, when he was promoted to superintendent, with headquarters at Vicksburg, Miss. At the time of his recent election Mr. Boatner was serving as superintendent of the Memphis division, to which he had been transferred in August, 1917.

Elliott E. Nash, whose election as vice-president and general manager of the Minneapolis & St. Louis, with headquarters at Minneapolis, Minn., was announced in the *Railway Age* of June 10 (page 1378), was born at Hudson, Wis., on March 28, 1870, and entered railroad service in June, 1886, with the Chicago, St. Paul, Minneapolis & Omaha. He was employed by this company on part time work until June, 1888, when he became a clerk in the local station at Hudson, Wis. Six months later he was transferred to St. Paul, Minn., as a clerk in the auditor's office, and served in that position until November, 1891, when he was promoted to traveling auditor, with the same headquarters. In



E. E. Nash

March, 1892, Mr. Nash was made agent at Ashland, Wis., and served there until November, 1893, when he returned to St. Paul as agent. In March of the following year, he was transferred to Minneapolis, where he served until January, 1905. On this latter date he was promoted to assistant superintendent, with headquarters at Itasca, Wis., and in May of the same year he was transferred to Eau Claire, Wis. In May, 1910, Mr. Nash was assigned to special work in

the office of the president of the Chicago & North Western at Chicago, and in May, 1911, he was promoted to superintendent of the Minnesota division of the North Western, with headquarters at Winona, Minn. In April, 1912, he was transferred to the Madison division, with headquarters at Baraboo, Wis. In November, 1913, he was promoted to assistant general superintendent, lines east of the Missouri river (except the Iowa, Minnesota and Dakota divisions), with headquarters at Chicago. He was transferred to the Iowa territory as assistant general superintendent with headquarters at Boone, Iowa, in October, 1917. During the period of federal control, Mr. Nash served as assistant to the federal manager of the North Western, with headquarters at Chicago. He was appointed general manager of the Minneapolis & St. Louis in March, 1920, and was serving in this position at the time of his recent election.

Financial, Legal and Accounting

C. L. Young, district claim agent of the Chicago & North Western, with headquarters at Milwaukee, Wis., has been promoted to assistant general claim agent, with headquarters at Chicago, succeeding **F. B. Piersol**, deceased. **O. J. Adams** succeeds Mr. Young.

George N. Yard, whose election as secretary and treasurer of the Gulf, Colorado & Santa Fe, with headquarters at Galveston, Tex., was announced in the *Railway Age* of June 3 (page 1301), was born at Harrisburg, Tex., on September 17, 1863. He was educated in the state normal school at Trenton, N. J., and entered railway service in 1884 on the Texas lines of the Southern Pacific. He has been in the service of the Gulf lines of the Santa Fe continuously for 32 years, having entered the employment of that company in July, 1889, as a clerk in the treasury department. He was made assistant cashier and paymaster in 1890, and in August, 1897, was promoted to paymaster. He was serving in that position at the time of his recent election.

Operating

Edgar G. Goforth, whose promotion to general manager of the International & Great Northern, with headquarters at Palestine, Tex., was announced in the *Railway Age* of May 13 (page 1149), was born at Goforth, Tex., on December 10, 1886. He entered railway service on May 1, 1902, as a station helper on the Missouri, Kansas & Texas. After serving for two years as telegraph operator and relief agent on this road, he entered the service of the International & Great Northern, as a telegraph operator and towerman. In April, 1905, he was promoted to train dispatcher and three years later was appointed a chief train dispatcher. In December, 1912, he was made trainmaster, a position which he held for five years, and which was followed, in February, 1917, by his promotion to superintendent. At the time of his recent promotion, Mr. Goforth was serving as assistant general manager, with headquarters at Palestine, Tex., a position to which he had been promoted in June, 1919.



E. G. Goforth

F. G. Gurley, assistant superintendent of the Chicago, Burlington & Quincy, with headquarters at Wymore, Neb., has been promoted to superintendent, with headquarters at Alliance, Neb. He succeeds **G. L. Griggs**, who has been

transferred to the Beardstown division, with headquarters at Beardstown, Ill., succeeding **W. A. Chittenden**, who has been transferred to Brookfield, Mo. Mr. Chittenden succeeds **N. H. Young**, who has been transferred to St. Louis, Mo. **H. J. Hognlund** has been appointed trainmaster, with headquarters at Wymore, Neb. The promotions and appointments were effective June 16.

Traffic

L. H. Mann has been appointed general agent of the Erie, with headquarters at Indianapolis, Ind., succeeding **C. A. Rouse**, who has resigned.

H. C. Dinkins has been appointed general agent of the International & Great Northern, with headquarters at Mexico City, Mex., effective June 15.

H. E. Macdonell, assistant freight traffic manager of the Canadian Pacific with headquarters at Montreal, has been granted a leave of absence on account of illness, effective June 6. During his absence **R. E. Larmour** will serve as acting assistant freight traffic manager, **C. E. Jefferson** as acting general freight agent and **S. C. Hurkett** as acting assistant general freight agent.

Obituary

Henry R. Williams, former vice-president of the Chicago, Milwaukee & St. Paul, died at Seattle, Wash., on June 8. Mr. Williams was born at Palmyra, Wis., on July 14, 1849,

and entered railroad service in January, 1867, as a telegraph operator on the Chicago, Milwaukee & St. Paul. After serving for four years in this capacity on various points on the line, he was made assistant train dispatcher at Milwaukee, Wis., where he remained until 1873. In this year, he was made train dispatcher, with headquarters at Minneapolis, Minn., and during the succeeding eight years served in this position on the Hastings, Dakota and River divisions. In 1881, he was promoted



H. R. Williams

to trainmaster on the Hastings and Dakota division, and later was transferred to the Iowa and Minnesota division. On January 1, 1882, he was promoted to superintendent, serving on the Iowa and Minnesota division until September 1, 1885, when he was transferred to the southern Minnesota division, with headquarters at La Crosse, Wis. From February, 1888 to June, 1890, he served as superintendent of the Ottumwa & Kansas City line, with headquarters at Kansas City and Chillicothe, Mo. In the latter year, he was promoted to assistant general superintendent, with jurisdiction over the Northern district of that road, and eight years later was promoted to general superintendent. He served as general manager from February 1, 1900 until October, 1905, when he was elected president of the Pacific road, which had been incorporated to build the Washington section of the Chicago, Milwaukee & St. Paul's extension to the Pacific coast. On January 4, 1909, Mr. Williams was elected president of the Chicago, Milwaukee & Puget Sound, a position which he held until January 1, 1913, when he was elected vice-president of the Chicago, Milwaukee & St. Paul. He served as vice-president of the St. Paul from that time until February, 1918, when he retired from active railroad service.

EDITORIAL

Railway Age

EDITORIAL

The Table of Contents Will Be Found on Page 5 of the Advertising Section

IMPORTANT FOR SUBSCRIBERS.—*In the interest of the conservation of paper, the Railway Age will print at the end of the present volume only a sufficient number of indexes to meet direct requests from its subscribers. Those desiring indexes should, therefore, immediately advise the New York office, 2201 Wookworth Building, New York.*

On a succeeding page in this issue there appears a statement given to the Senate Committee on Interstate Commerce, now engaged in an inquiry into the railroad situation, on the subject of co-ordinating motor transport with rail traffic, by Stuart B. Moore, former construction engineer of the Southern Pacific Lines.

Co-Ordinating Motor and Rail Transportation

This article should be given careful consideration by railroad officers in general for Mr. Moore not only definitely establishes the relation between the economic location of railroads and that of highways but also shows how motor transport can be co-ordinated with rail traffic to the advantage of both. It is undoubtedly true that if a system of highways could be established that by the aid of the motor car would make the distant country districts as available to the city as the territory located close by, rural development would receive a tremendous impetus, rail revenues would be greatly increased and the use of motor vehicles largely extended. Mr. Moore's plan for doing this is well worth the careful consideration of the managers of our railroads, motor car manufacturers and highway engineers.

Emergencies such as the disastrous floods which occurred in various parts of the state of Colorado during the past three weeks, or heavy snow storms such as overwhelmed the railroads in January, 1918, present excellent opportunities for a study of the manner in which the roads organize their efforts to restore the properties to service. Some officers pride themselves on their ability to direct the work first hand and honestly feel that it is their duty to be out on the firing line undergoing hardships shoulder to shoulder with the men taking a direct part in clearing the line for traffic. Other officers find it of advantage to direct the work from temporary headquarters located with a proper consideration for the source of supply as well as the scene of action and make it a point to be present at these headquarters for as large a portion of the time as possible, after having made an inspection which gives them a thorough knowledge of the conditions. Close adherence to this plan insures access to the officer quickly when his advice and decision are necessary. On the other hand, it enables him to have an intimate touch with all the activities that play any part whatever with the strenuous work of restoring a line to service. Consequently, he is able to co-ordinate the various branches of the work so as to expedite progress to the greatest extent. Like a commanding general he is stationed at a sufficient distance behind the firing line to enable him to receive and transmit communications with all portions of the front in the sector under his command, while directing

Organizing for Emergency Work

the service of supply, including the forwarding of men, equipment and tools, with a thorough knowledge of the requirements at all points. But of even greater advantage is the effect on the esprit de corps of the subordinate officers, who being placed to a larger extent on their own responsibilities are enabled to put a greater spirit into their work than when the general manager or chief engineer usurps their prerogatives. There are, of course, cases where the executive officer possesses particular talent for the direction of emergency work first hand but as a general rule his particular province lies in the organization of the emergency forces according to a plan under which individual responsibility for the numerous phases of the work are so subdivided that every detail is covered and each man in the entire organization knows just what is expected of him.

Colonel J. W. Pringle, senior inspecting officer of railways under the British Ministry of Transport, is the author of a report, just received, on the butting collision of passenger trains near Abermule, Wales, on the Cambrian Railway, January 26, when 17 persons were killed, and he omits mention of what seems at this distance an important underlying cause. The report fills 25 large pages, the disaster being classed as unique in the annals of British railways; but the fact that two of the persons at fault were boys under 18 years of age, not well trained, is not accorded special emphasis, nor is anything said as to why responsible station work was regularly entrusted to persons so young. Before the war, the British train accident reports could for long periods of time be searched in vain for examples of persons under 30 years old performing important duties in connection with train operation or signal working, and the war, depleting the forces and making difficult the recruiting of the ranks with satisfactory material ought, it would seem, to be considered as a cause of this collision; remote perhaps, yet potent. The immediate cause and other particulars will be found in another column. One of the main lessons, applicable everywhere, is the danger of delegating delicate duties. So far as this applies on American railroads, we may translate it as The Importance of Employing Many More and Much Better Inspectors. Many managers have said that the men on the firing line, such as trainmasters and road foremen, ought to be more numerous and more energetic; but to make any appreciable progress, this ought to be said much louder and a good deal oftener.

**The Danger of
Delegating
Delicate Duties**

The relation of railroad electrification to power supply is now causing much discussion. As much equipment as practicable should, of course, be standardized and it is contended by the advocates of direct current for railroad operation that 60-cycle alternating current, the use of which is increasing rapidly, will some day be universally adopted for power development in this country and that we must look forward to the time when all power for electric traction must be derived from 60-cycle, three-phase alternating cur-

**Electric
Power for
Traction**

rent feeders. The advocates of alternating current power for traction purposes are naturally opposed to this contention, for 60-cycle power supply involves the use of rotating machinery in the substations of railroads using alternating current on the trolley. Alternating current motors for 60-cycle signed for lower frequencies and if the power for traction is power are not as suitable for railroad traction as those developed as single-phase power at some lower frequency, such as 15 or 25 cycles, the substations become simple transformer stations. Rotating machinery, or perhaps some form of arc rectifier, is always necessary in substations supplying power to a direct current trolley. Either kind of power for traction may prove to be generally superior to the other but that is still a mooted question.

It is pointed out by F. H. Shepard, director of heavy traction, Westinghouse Electric & Manufacturing Co., in an article in this issue, that it is not desirable to superimpose a variable railroad load on a lighting supply circuit which requires close regulation. To this it might be added that recent experiments indicate that for very high voltage, long distance transmission, it may be found necessary, due to physical difficulties, to develop power at some frequency less than the 60 cycles. Advocates of alternating current power for traction lay great stress on the point that sufficient power for heavy and concentrated traffic movements can be supplied only by alternating current. This may prove to be true, but up to the present time direct current power has been able to meet all such demands of load that have been imposed upon it. In other words there are still too many variables involved to warrant curtailing the development of either kind of power for traction. It is highly probable that both kinds will be adopted as they have been in the past, except that the choice will be based more in the future on conditions of traffic and profile instead of being governed by laws and other extraneous influences which had much to do with the selection of equipment for the earlier installations. Railroad operating requirements should be of primary importance and special features of equipment should be subordinated to them.

The Taxes Upon Transportation

WHILE THE TAX SYSTEM of the Federal government is under revision and while there is so much talk about railway rates being too high, Congress and the public might appropriately give consideration to the matter of eliminating taxes on railway freight and passenger transportation.

The tax on freight is 3 per cent of the railway rates and amounted in 1920 to \$129,720,000. The tax on passenger freight is 8 per cent of the railway rates and amounted in 1920 to \$103,320,000. This made a total tax that the government added to the railway rates last year of \$233,040,000. It is not a part of the rates, and the railways did not get any of it. They merely collected it for the government.

On the basis of the total freight and passenger business handled last year and the higher freight and passenger rates which have been in effect since September 1, 1920, the total annual freight tax would be \$148,000,000, and the passenger tax \$120,000,000, a total of \$268,000,000.

These taxes have exactly the same effect upon the cost of transportation and the movement of traffic as equivalent additions to the freight and passenger rates would have, the only difference being that the money collected goes into the government treasury instead of to the railroads. Certain public officials have expressed the opinion that the present railroad rates are too high and are interfering with the revival of business. If this is true then these taxes upon freight and passenger transportation, which are added to the rates received by the railways, increase this undue burden, and since it is the last straw that breaks the camel's back their

removal, on the theory advanced, would be particularly helpful to business. Whether the present rates are or are not burdening business it is obvious that the government cannot consistently reduce a single railway rate on the ground that its reduction is needed to help general business without first removing the transportation tax which is applied upon that rate.

We could not have a better test of the sincerity of the public officials who argue that the present railway rates should be reduced to stimulate business than for them to apply to themselves the position they take regarding the repeal of the transportation taxes. Obviously if the railways are injuring business by charging rates that are too high, then the government is still farther injuring it by adding a tax to these rates. Clearly, it would be more appropriate for the government itself to take off a given tax for the purpose of reviving general business than it would be for the government to retain that tax and require a private industry such as the railroads to reduce the rates to which the tax is applied, not primarily to help their own business, but primarily to help general business.

Railway Assessments for Permanent Highway Construction

IN VIEW of the widespread movement for the construction of hard surfaced roads throughout the country, a decision handed down by the Supreme Court of the United States on June 6 on a petition presented by the Kansas City Southern and the Texarkana & Fort Smith against a road improvement district in Arkansas, in which the court rejected the assessment levied by the district against the railroad, is of particular interest to railway men throughout the country. In this instance, a road improvement district was created in accordance with an act of the Arkansas legislature, including approximately 25,000 acres having within them 9.7 miles of main track of the Kansas City Southern and the Texarkana & Ft. Smith.

The district was created for the purpose of constructing 11.2 miles of gravel road through taxation upon real property. The assessors divided the farm land into five zones and assessed uniform benefits ranging from \$12 per acre in the first zone to \$4 per acre in the fifth. The property of the railway was assessed at \$7,000 per mile of main track or \$67,900 in all. In its petition the railway maintained that this assessment was so excessive as to amount to a confiscation of its property and pointed out that the increased traffic, if any, would be largely or entirely offset by that which was naturally tributary to it, but which could be transported to competing railways over the road in question. It therefore contended that the benefit which would accrue to it as a railway would be negligible. The Supreme Court characterized this assessment as a palpable and arbitrary discrimination and stated that "it is doubtful whether any very substantial appreciation in value of the railroad property within the district will result from the improvement."

The inroads upon railway traffic which are being made by motor transport companies following the construction of hard roads are becoming so serious in certain areas that the Chicago, Rock Island & Pacific filed a protest with the State Public Utilities Commission of Illinois against the use of hard roads by motor bus companies as "an appropriation of public improvements to private interest without any compensation," stating that the operation of a motor bus line parallel to its road will force the railway to curtail its service. That a railway should be forced to meet competition of this character upon a thoroughfare provided by the public and used by competitors without compensation, which is similar in effect to providing a right-of-way complete with tracks

and bridges and turning it over to a competing railway without compensation, is so unfair as to require no argument. To require a railway to contribute to the construction of a highway for its competitor is adding insult to injury. This is the problem which the railways are facing and which they should meet squarely as the Kansas City Southern and the Texarkana & Ft. Smith have done. The decision of the Supreme Court in this case will do much to establish the proper relation between the railways and public authorities charged with the construction of highways.

Wages, Cost of Living and Productive Efficiency

IN THE recent wage hearings before the Railroad Labor Board some of the labor leaders protested against the policy of changing wages according to changes in the cost of living. The American Federation of Labor at its convention in Denver adopted a resolution denouncing the basing of wages wholly or mainly on the cost of living as "a violation of the whole philosophy of progress and civilization and a violation of sound economic theory and thoroughly without logic or scientific support."

Most of the advances in wages which have been made in this country since before the war have been based on increases in the cost of living. This has been especially true in the railroad business. Labor leaders were glad to accept advances in wages based on the cost of living when it was increasing. They repudiate the principle now that the cost of living is declining.

Having secured great advances in wages based on increases in the cost of living, the labor leaders cannot hope to prevent all reductions when it is declining. The cost of living is declining because prices are declining. Prices are declining because there is reduced demand for commodities at the high prices which have prevailed. Wages must be reduced when prices sharply decline, because employers cannot pay war wages when they can get only pre-war prices without being bankrupted. In many industries the wages being paid exceed the total earnings of those industries when lower prices and rates were in effect a few years ago. In the railroad industry, for example, the total wages paid in 1920 exceeded the total earnings of 1916. The restoration of pre-war prices means in many industries restoration of pre-war earnings. No industry can pay to labor all its earnings.

However, while in a period when prices are falling so much wages must come down, just as in a period when prices are greatly advancing they must go up, the labor leaders are on a sound economic ground when they condemn the practice of basing wages wholly or mainly on the cost of living. A large majority of the people of the world work with their hands. If wages were always to vary directly with the cost of living, the working people never would get for their work an increased amount of comforts and luxuries. This would mean that working people would derive no benefits from the material progress of civilization. If a large majority of the people derived no benefit from it, this so-called "progress" would be misnamed.

Upon what, then, should wages be mainly based? They should be mainly based on productive efficiency. Capital furnishes the directing brains, the physical plant, the tools, of industry. Working people furnish the manual skill and labor. Both should constantly increase their efficiency. The increasing efficiency of both will result in a constantly increasing product in proportion to the capital invested and the number of workers. Equitable division of this increased product would and should result in increasing returns to both.

Increases of industrial efficiency and output will, how-

ever, be seriously hindered or prevented if either of the partners in industry, capital and labor, constantly tries to defeat all efforts of the other partner to secure increases of efficiency and output. This is virtually what is being done in many industries now. Capital is constantly trying to increase production in proportion to the amount invested and the men employed. The members of many labor unions, under reactionary leadership, are just as constantly trying to prevent increases of output. These reactionary leaders are sometimes called "radicals." They are, in fact, the most reactionary men in civilized countries. If they should accomplish all they attempt, the efficiency of modern industry would be destroyed and its output so reduced that every working-man's family would suffer curtailment of its comforts and luxuries. These labor leaders restrict the number of brick that men can lay; they insist upon classifications which increase the number of men employed to do a given job; they exhaust their ingenuity in devising ways to curtail not only the number of hours which men work, but the amount each does in each hour he does work. Every measure of this kind tends to reduce the number of houses built, the number of suits of clothes made, the quantity of food produced, the amount of transportation rendered.

No better examples of the results of these labor union tactics could be cited than are afforded by developments in recent years on the railroads of this country. Until 1917 there was a steady increase in the amount of transportation service rendered in proportion to the number of men employed. Since then, while wages have been greatly increased, the output per employee has sharply declined.

In 1913 the amount of public service rendered for each dollar of interest and dividends paid to owners of railway securities was 459 ton-miles and 47 passenger-miles. In 1917 it was 582 ton-miles and 53 passenger-miles. In 1920 it was 611 ton-miles and 64 passenger-miles. The increase between 1913 and 1920 in freight service rendered for each dollar of return paid to capital was 33 per cent and in passenger service 36 per cent. Contrast these statistics with the following regarding the production of transportation to the wages paid: In 1913 for each dollar of wages paid the railroads rendered 245 ton-miles of freight service and 25 miles of passenger service; in 1917, 247 ton-miles and 22 passenger-miles; in 1920, only 121 ton-miles and 13 passenger-miles of service. The decrease in transportation output for each dollar of wages paid between 1913 and 1920 was about 50 per cent.

The *Railway Age* pointed out months ago to labor leaders and their followers that the only way they could hope to retain all, or even a large part, of the advances in wages made since before the war was through increased efficiency. High wages and low efficiency for any considerable time always have been and always will be incompatible in any industry. The labor leaders having, however, obtained rules, hours and working conditions from the Railroad Administration which greatly reduced the efficiency and output of the average employee, sought to perpetuate instead of to eliminate, to aggravate instead of to mitigate, the rules and conditions which produced the demoralization. They sought at the same time to maintain a scale of wages which was incompatible with the gross inefficiency that prevailed. They tried to both eat their cake and have it. The result was to force up railroad rates and at the same time bring the railroads to the verge of bankruptcy. Largely in consequence of these things, 500,000 railway men have speedily found themselves out of employment, and now \$400,000,000 of the wage advances has been ordered rescinded.

The labor leaders are right—wages should not be based entirely or mainly on the cost of living. Furthermore, in the long run they cannot and will not be. Efficiency of production always has and always will, in the long run, bring advances in wages largely regardless of the cost of

living. Inefficiency of production always has and always will, in the long run, bring reductions of wages largely regardless of the cost of living. The highest wages in proportion to the cost of living are, and always will be, paid in those countries where the efficiency of capital and labor are the greatest. The lowest wages in proportion to the cost of living are and always will be paid in those countries where the efficiency of capital and labor are the lowest. In the United States wages will increase more than the cost of living in the future as they have in the past if the productive efficiency of capital and labor increases, and decline more than the cost of living if efficiency declines.

Most of the present generation of labor leaders are engaged constantly in trying to reduce wages in proportion to the cost of living by trying to reduce productive efficiency. They may be unconscious of it, but this is what they are doing. Some time, perhaps, the workmen will choose leaders who recognize not only the truth that wages should not be based on the cost of living, but the additional truth that in the long run they always have been and always must be based upon productive efficiency. The worst enemy the workman has is the man who exhausts his ingenuity and energy in trying to reduce the amount of efficient work that workmen do.

Delaware, Lackawanna & Western

THE DELAWARE, LACKAWANNA & WESTERN found the year 1920 a most unsatisfactory one. Its operations in the first four months of 1921 have shown a considerable improvement over those for the similar period of last year, but despite this improvement the road thus far has not been earning its rentals, let alone anything towards its dividend requirements.

The Lackawanna, under the administration of President W. H. Truesdale, has been among the most progressive railroads in the country. It has for many years been conducting an elaborate program of improvements. During the war and the period of federal control, progress on this program was delayed. Despite the unsatisfactory earnings of 1920 and thus far in 1921, this program has been resumed and the road at the present time is carrying out a number of developments, the most important of which is a \$4,000,000 project looking to the elimination of grade crossings through the city of East Orange, N. J., and the installation of an additional track to take care of a rapidly increasing suburban service.

The Lackawanna's standard return for the use of the property under federal control was \$15,749,477. In 1918 the net operating income exceeded the standard return by a small margin. In 1919, the net railway operating income was \$11,947,364, whereas in 1920 it was but \$6,104,886. The gross earnings of the company for the year totaled \$83,340,062, an increase of \$11,516,015 over 1919. The total expenses, however, were \$73,840,729, or an increase of \$17,775,478. The payrolls for 1920 represent an increase of 117 per cent over the total for 1917. The cost of fuel represents an increase of 50 per cent, or the equivalent of 7 per cent on the capital stock, over 1919. In other words, the story of the Lackawanna's earnings in 1920 is about the same as that for most of the other roads of the country.

Referring briefly to 1921, it is worth noting that the net railway operating income for the first four months of this year, as given in the monthly report to the Interstate Commerce Commission, was \$2,227,319, as compared with \$305,098 in the same period of 1920. The earnings for the first four months of 1921 were not sufficient to pay the rentals on the Lackawanna's leased lines for the period in question. These total over \$7,000,000 a year. Attention should further be drawn to the fact that the Lackawanna

is endeavoring to bring its roadway and equipment back to Lackawanna standards. The charges for maintenance of way and structures in the first four months of 1921 were considerably in excess of those for the first four months in 1920. The results as to equipment are best pointed out by the fact that in March, 1921, but 12.4 per cent of the locomotives were classed as unserviceable and but 7.8 per cent of the cars, both of which figures are considerably below the average for the country.

The Delaware, Lackawanna & Western in 1920 carried 28,315,359 tons of revenue freight, aggregating a total ton-mileage of 5,166,315,007; the average haul was 182 miles. This business was considerably in excess of that for 1919, but was not up to the record made in 1917, when 30,477,491 tons of freight were carried. During the year, the road secured an average of 779 net tons per train and of 28.79 tons per loaded car mile, both of which figures were below



The Delaware, Lackawanna & Western

the averages for 1919. The number of passengers carried in 1920 was 30,612,506, an increase of 12.2 per cent over 1919. The average distance hauled per passenger was 123 miles. The average passengers per train mile was 126 and per car mile 37. These figures indicate the predominance of the suburban service, reference to handling of which is given in more detail below.

The operations of the Delaware, Lackawanna & Western are characterized by a number of interesting features. One of these is its financial structure, another is its high standard of maintenance of roadway and equipment and the progressive ideas which the road has shown in connection therewith; a third is contained in the fact that, although the Lackawanna is a hard coal road, about 40 per cent of its traffic being of that commodity, it has no superiors from the standpoint of its efficient handling of merchandise freight. Another interesting feature is the suburban service out of New York and the care which is taken for the comfort and convenience of the suburban passengers.

In so far as concerns the financial aspect but little comment is necessary in this review, for the reason that so much attention was given this subject in connection with the road's application to the Interstate Commerce Commission for permission to capitalize its surplus.* With reference to the standards of maintenance, attention has already been drawn to the efforts the railroad is making to restore its pre-war standards. It is generally known that the Lackawanna's construction standards are of the highest. With reference to the freight service, it may be said that the shippers who

*Covered in the article entitled I. C. C. authorizes Lackawanna stock dividend, *Railway Age* of April 22, 1921, page 995.

use the Lackawanna's rails are outspoken in praise of the service given them.

Attention was drawn above to the fact that the Lackawanna's passenger traffic increased 12 per cent in 1920 over 1919. In 1920 there were carried in and out of the Hoboken station a total of 21,500,000 passengers. This service has been increasing so rapidly in recent years that the Lackawanna has been hard pushed to care for it properly. It has met with difficulties because of inadequate facilities at Hoboken and it has been further handicapped by the failure to come to an agreement with the authorities of the city of East Orange as to the elimination of grade crossings through that community, and it is now meeting a problem in the way of motive power to handle some of its heavier steel suburban trains.

The East Orange difficulty is now by way of solution and work is going on covering the elevation of the line through that community, the work to cost about \$4,000,000. In connection with this work, an additional track is to be added, as above noted, which will greatly assist operation during the morning and evening rush hours. The road has been operating its suburban service between West End and Newark over two tracks. Additional facilities will be available when a third track between these points previously used for freight service has been rock-ballasted and made suitable for passenger trains; this work should be completed during the summer.

The motive power situation is still to be met. At present a considerable number of suburban trains are being handled with two superheated, ten-wheel locomotives; the road would presumably use Pacific type locomotives in this service but for the fact that it lacks suitable turntables and roundhouse facilities at the several suburban engine terminals. These facts are brought in to indicate that the Lackawanna has a real problem on its hands in connection with its growing suburban service, the solution of which problems may necessitate the expenditure of large sums of money in the near future.

We quote from the annual report a paragraph dealing with another important improvement which the road has had under consideration for some time and has been taking preliminary steps to carry out, namely, the electrification of the main line between Clarks Summit, Pa., and Gouldsboro, west and east of Scranton, respectively, and about 28 miles apart. The report says:

In the handling of the company's large coal and other freight traffic over the heavy mountain grades each side of Scranton, many helper or pusher engines are required, which involves the use of a large number of locomotives, at heavy cost, to move the traffic to the top of the mountain grades. Electric experts have given estimates, supported by the experience of other companies that have installed such service for similar purposes, showing that large savings in operating costs can be effected by such installation, and the management is convinced that, under normal conditions of cost as respects labor and materials, the company will be warranted in making the expenditure necessary to provide this improvement.

The operating results for 1920 as compared with 1919 are as follows:

Mileage operated:	1920	1919
Coal revenue	\$20,228,484	\$19,055,523
Freight revenue	40,132,599	32,839,871
Passenger revenue	13,868,517	12,380,787
Total operating revenue	83,340,062	71,824,047
Maintenance of way expenses	10,178,887	7,682,365
Maintenance of equipment	19,508,625	15,132,815
Traffic expenses	1,086,074	495,947
Transportation expenses	40,165,381	30,661,441
General expenses	1,918,854	1,368,205
Total operating expenses	73,840,729	56,065,251
Net revenue from operation	9,499,333	15,758,796
Taxes	3,416,868	3,449,429
Operating income	6,079,655	12,287,412
Net railway operating income	6,104,886	11,947,364

The corporate income account is as follows:

Income from lease of road (1920, 2 months)	\$ 3,249,379	\$17,324,424
Government advances on guarantee	5,124,500	.....
Total including other	\$25,446,520	\$25,453,407
Total deductions	\$13,675,109	\$16,072,200
Less:		
Dividends declared	8,444,110	8,444,455
	\$ 5,230,999	\$ 7,627,745

New Books

Proceedings of the Telegraph & Telephone Section. Published by the American Railway Association, 75 Church St., New York. 379 pages, 6 in. by 9 in. Bound in cloth.

The book contains the proceedings of the session of the Telegraph and Telephone section, Operating division, American Railway Association, which was held at the Ft. Gary hotel, Winnipeg, Man., September 22, 23 and 24, 1920. The first 33 pages are devoted to the personnel of committees, articles of organization, by-laws and regulations. A discussion of the various reports presented is next given, while the reports, with numerous drawings and several inserts, are presented on pages 154 to 379, inclusive. Reports are presented on construction and maintenance of wood pole lines along railroads; proposed specifications for telegraph, telephone and other signal wire and cable crossings over and under the tracks and wires across the property of steam and electrified railroads; specifications for the installation of telegraph and telephone equipment in railroad offices; protection against electrolysis; specifications for telegraph and telephone line fuses, office arresters and cable arresters; telegraph and telephone instrument fuses; specifications for telegraph and telephone heat coils; report on telegraph and telephone development; traingrams and message classification, semi-automatic sending-keys and theory of inductive interference.

Roadway and Track. By W. F. Rench, formerly supervisor Pennsylvania Railroad. 242 pages, 40 illustrations, 6 in. by 9 in. Bound in cloth. Published by the Simmons-Boardman Publishing Company, Woolworth Building, New York. Price \$3.

This book treats of the practical problems arising in the routine maintenance of railway tracks, including such basic items as the renewal of ties, rail, lining and surfacing, etc. It also discusses many of the problems less frequently encountered, such as legal points affecting the right-of-way and means of protecting slopes with vegetation. The book has been written with reference not only to the more elaborate practices on important main lines particularly in the east, but also with due regard for an average maintenance which is applicable to the majority of roads. Labor saving devices have been treated at length throughout the book as has the idea of safety. While the book is of particular value to the foreman and roadmaster, it will be found equally valuable to engineering and operating officers having more or less direct supervision over track work. The methods described are those which have been found practical in the long experience of the author, who was for 25 years a supervisor on the Pennsylvania Railroad, for a large part of which time he was in charge of the maintenance of tracks on its most important multiple track lines.

The book is worthy of a place on the desk of every railway man having direct or indirect responsibility for track maintenance.

Letters to the Editor

The Cost of Train Stops

CHICAGO

One Way That We Can

Help Stop the Leak

SAN FRANCISCO, CAL.

TO THE EDITOR:

In combating the loss and damage evil it is evident that a large number of patrons of the railroads make a complete study of the proper means of collecting their claims. The vast sums spent annually in payment of the bill for loss and damage claims illustrate all too well the degree to which they are successful in their study. As a division superintendent, I have always maintained that there should be an O. S. and D., and a loss and damage desk in each superintendent's office to obtain first-hand local information. By means of this loss and damage desk, investigations can be made immediately whenever agents and conductors turn in reports of goods found to be damaged, pilfered, or "short" when the car is opened at an agency station, or is looked over at a loading point.

In spite of this precaution, however, the haste of the local crew, the attention of the agent elsewhere, or carelessness in piling freight in a car, may result in further mishaps. To eliminate as far as possible, this expensive carelessness my assistants, trainmasters and road foremen were required to ride the local trains as often as they could, preaching the gospel that a penny saved is a penny earned. We talked on the same theme at our division safety meetings, at our staff meetings and at our general monthly "get-together" meetings for all employees, and the results which we obtained were more than satisfactory.

One request that I always made of the claim department was that it should inform me of the circumstances before paying a claim of any amount. That this request had a considerable monetary value was shown on a number of occasions.

In one instance, our claim department was about to pay a large claim for a consignment loaded on our lines which was declared to have been received in damaged condition. The bills of lading and the way bills bore no markings and were devoid of any notations. The receiving firm was threatening to sue us in order to collect, but I prevailed upon the claim department to defer payment a few more days. The shipment in question was one of baled cotton and after determining its originating point, I went direct to the merchant who had shipped it.

After a somewhat general discussion of the business situation, I casually asked if he had ever consigned cotton to the A. & B. Cotton Company. He replied that he had, and that they still owed him \$2,700, which I recalled was the exact amount of the claim we were holding. I sympathized with him of course, and he in turn, to reward my interest, searched his file and produced a letter from a friend at the point to which the cotton had been shipped. The letter related that the writer had recognized the merchant's mark on a number of bales of cotton lying on their sides and half submerged in water during the frequent hard rains which we were having. I secured a copy of the letter and needless to say, the claim was denied.

To assist the claim department and partly as a result of this investigation, we made it a rule that when exposed cotton was to be loaded from platforms into cars, the way bills and bills of lading should always be endorsed "exposed cotton."

C. W. HOISINGTON.

TO THE EDITOR:

According to a formula developed by R. E. W. to determine the approximate cost of stopping a train (which was published on page 708 of the *Railway Age* for March 22, 1918), it can be shown that to bring a 50-car freight train to a stop from a speed of 30 miles an hour and for it to again regain that speed is the equivalent of its running 2.4 miles. Again, referring to the Interstate Commerce Commission's report on operating statistics of large steam roads for February, 1921 (appearing on page 1184 of the *Railway Age* for May 20, 1921), an average cost of freight train operation by selected accounts is shown to be \$2.11 per mile.

From the above it is readily seen that the railroad assumes a cost of \$5.06 for each unnecessary stop made by an average freight train. A considerable saving on freight train operating costs can be secured at many outlying switches by installing electrically operated switch mechanisms and protecting signals. As an example there are many junction points, ends of double track, third track, passing track switches and switches located remotely from existing interlocking plants that are used frequently each day. Not only at such points can the economy of power-operated switch installations be definitely shown, but the increment in safety secured is well worth consideration.

In order to determine the saving made by an installation of electrically operated switch mechanisms at outlying switches we will assume that a saving of \$2.53 is made, or only half the cost of a freight train stop as shown above. On a first cost of \$6,000 for the installation, allowing 16 2/3 per cent for depreciation or \$1,000 per annum and adding \$60 per year for the maintenance of one track circuit, one switch movement, and the necessary signals we have a total of \$1,060 a year. On this basis it will be seen that 418 train stops, or 1.14 train stops a day at such an outlying switch would pay all charges except that for battery. The cost of battery for operating the switch mechanism has been found to be less than 1/4 cent per movement, which is so small as to be negligible. Thus it is seen that the first train which would otherwise have to stop at a switch not equipped with an electrically operated switch mechanism would pay practically all fixed and maintenance charges. If two trains used the same switch each day the second train shows a saving of \$2.18, and each succeeding train after the second would show a saving of \$2.53.

In a test made under the auspices of the United States Railroad Administration two years ago this month it was found that a tonnage freight train on practically level track made a full stop from 20 miles an hour and again accelerated to 20 miles per hour; in doing this 658 lb. of coal was consumed in addition to that required for the distance run. At \$4.61 a ton (I. C. C. cost for February, 1920) this is equivalent to \$1.51 worth of extra fuel consumed for the stop. On the basis of economy alone, the desirability of more complete interlocking and signaling has been demonstrated, even assuming that the increment in safety to railway traffic does not warrant the cost of installations at various points.

J. E. S.

THE LEGISLATURE of Illinois has passed a bill which permits corporations to own not more than 40 acres of land for housing employees. The bill now goes to the governor for his signature.

A GIFT OF RAILROAD PASSES is reported in the Pittsburgh (Pa.) Post; but the statement does not mean exactly what the reader might expect. The gift does not mean free rides for anybody; it is a collection of seven large scrapbooks, given to the Carnegie Museum by E. H. Utey, vice-president and general manager of the Bessemer & Lake Erie, containing the annual passes which he has accumulated during the last 50 years.



Two Trimmers Working in Hold of Vessel at Curtis Bay

Mechanical Trimmers Facilitate Coal Loading

Baltimore & Ohio Installation at Curtis Bay Piers Reduces
Time of Turn-Around and Labor Costs

By P. G. Lang, Jr.

Engineer of Bridges, Baltimore & Ohio

EXPORT COAL forms a large and important portion of the American mine-owner's commercial field, and, in itself, creates difficult and unique problems. Prominent among these is that of transferring the coal from railroad equipment to vessels at ocean terminals. One practical solution of these difficulties is represented in the export conveyor-belt coal pier of the Baltimore & Ohio, at Curtis Bay, Md. This was described in detail on page 1226 of the June 15, 1917, issue of

for distances up to 50 ft. from the device. Four of these trimmers have been installed, making the Curtis Bay pier a very complete and efficient unit for the handling of export coal.

Capacity of Pier Exceptionally Large

This coal pier has the largest capacity of any in the world, and includes mechanical appliances for every operation con-



A View of the Pier, with Three of the Six Belts in Operation

the *Railway Age*. A further development of the export coal handling since the construction of this pier, has been made by this road. This consists of the addition of mechanical trimmers which by means of high speed belts distribute the coal at a rate of approximately 25 tons per minute and

nected with the removal of bulk coal from open-top railroad equipment and its delivery to the hatches of vessels. This transfer can be effected at a maximum rate of 7,000 tons per hour. These facilities with the exception of the trimmers were placed in operation February 1, 1917, and immediately

demonstrated a capacity which exceeded the anticipation of the designers.

The pier has a capacity of about 12,000,000 tons per year, and experience in its use during an extended period of intensive service has demonstrated the fact that a very efficient mechanism had been created for the mechanical performance of every operation incident to the transfer of coal from cars to the holds of vessels, and that, so far as "open" boats were concerned, a complete cycle of mechanical transfer had been established.

The efficiency of this pier as a medium for rapid loading was demonstrated in the case of the New England Coal and Coke Company's ship "Malden," into which there was deposited in 1 hr. 58 min., 7,222 tons of bituminous coal, previously contained in 151 cars.

Trimming by Manual Labor Proves Expensive

In the case of boats whose design embodied numerous small hatches and one or more between decks, a separate operation was necessary for the trimming or distribution of coal after it had been deposited within the hold. For this purpose, the constant employment of large numbers of laborers was necessary, and these men, by the use of shovels, scattered the coal to the remote portions of the hold, which it had failed to reach in its descent from the pier.

The scarcity and high cost of labor during the war period caused the trimming operation to add very materially to the expense of coal movement. It was further productive of extensive delays, both to ships and to the operations of the pier, as the mechanical delivery of coal to the hatches was at a much more rapid rate than its distribution could be effected. Experience at this and other ocean terminals has invariably demonstrated the inability of manual trimming to keep pace with mechanical delivery.

This condition became the object of serious consideration on the part of the railroad management, and, during 1918, extensive studies were undertaken at the Curtis Bay terminals, with a view to evolving some mechanical device capable of supplementing, and, if possible, replacing, manual labor for the performance of the trimming operation. The mechanical features of the pier, the physical characteristics of bituminous coal and the various types of vessels presented may be enumerated among the elements which demanded cognizance in this research. These phases were each considered in their integrity and weighed in their bearing upon each other. The general plans for a mechanical trimmer were gradually developed in the engineering offices of this railroad.

High Speed, Endless Belt Forms

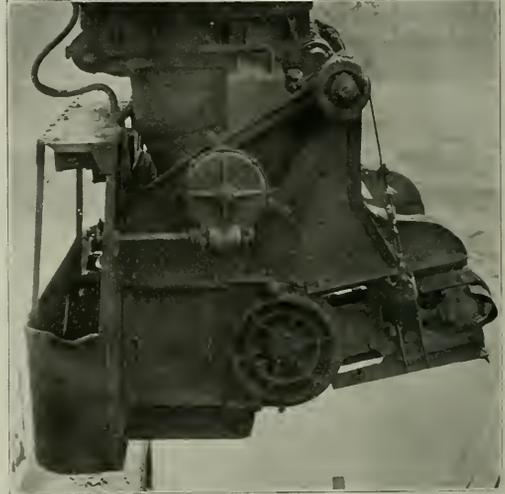
Backbone of Trimmer Action

The general principle embodied in this machine is that of an endless belt traveling at high speed over two parallel pulleys or rollers. The coal, in its descent from the shuttle belts of the pier, is direct to and concentrated upon the trimmer belt by means of a telescopic chute. This chute had a maximum cross-sectional area of 2 ft. 9 $\frac{3}{4}$ in. by 3 ft. 2 $\frac{3}{4}$ in. and can be adjusted as to length from a complete extension of 44 ft. 3 in. to a telescoped condition of 23 ft. 6 in. This attribute, in conjunction with the mechanical characteristics of the pier, renders it possible to adapt the movement of the stream of export coal to practically any of the diverse types of vessels using this pier.

In the design of the trimmer itself, a primary consideration was the necessity for so restricting its dimensions as to permit its introduction within the hatches of vessels, which are, in numerous instances, comparatively small. Extreme dimensions for the trimmer of 7 ft. 6 in. by 10 ft. were finally determined upon, which permitted the introduction of these machines within the hatches of 95 per cent of the ocean-going vessels.

The development, within the space thus afforded, of a mechanism capable of exerting the power requisite for the purpose of this device was a matter of some difficulty. The distance center to center of the pulleys of this trimmer is 3 ft. 9 in. The pulleys are 18 in. in diameter, and, when the machine is in operation, revolve at a speed of 527 r.p.m., imparting to the trimmer belt a speed of 2,700 ft. per min., or approximately 30 mi. per hr. The power for the belt movement is supplied by a 50-h.p. direct-current motor, and is transferred to the driving pulley by a chain drive, protected by a metallic dust cover.

The angle of the trimmer belt with the horizontal may be



Side View of Trimmer, Showing Controls and Controller's Cab

adjusted by means of a mechanism consisting of a ratchet wrench driving a worm wheel through a shaft and meshing with a gear segment on a lever arm carrying the belt frame. The endless belt can also be revolved through a complete circle about a vertical axis by means of a 13-h.p. direct-current motor driving a motor pinion engaging gear, which drives a worm and worm wheel and pinion engaging a rack. The conditions under which this machine operates render the protection of its mechanical parts against dust a vital necessity.

The distance to which bulk material must be thrown in order to fill properly the holds of ocean-going vessels was also carefully considered, and extensive studies were made to determine the range and trajectory of material thrown at various elevations and speeds. The expulsion of the coal with sufficient force to effect its transfer to the remote portions of the hold is accomplished by means of transverse cleats with which the trimmer belt is provided. This trimmer belt has a width of 48 in. The cleats are spaced 6 in. center to center, and consists of strips of belting placed across the trimmer belt and at right angles to its edges. These are secured in place and protected by means of metal clips.

Free Movements of Vessels Necessitates

Unusual Method of Support

In order to prevent interference with the free movement of boats alongside of the pier, it is necessary that the trimmer be movable. It is also necessary that it remain steady in heavy winds, be securely attached to the tower and susceptible of

quick adjustment for operating purposes. The weight of each of these machines is about 22 tons, and the method of so attaching them to the pier as to provide for these several conditions was a matter requiring much study and thought.

Each trimmer is supported by means of vertical pipes, which resist the reaction due to the flow of coal, and also the lateral wind pressure. These pipes are suspended by cables from a boom which forms a portion of the loading tower. In the operating position, the weight of the lower portion of the machine is sustained by the boom through the ropes and vertical pipes, while the telescopic chute section is held by brackets placed on top of the cross girders.

Provision is made for the movement of the trimmer from



The Delivery End of the Trimmer, Showing the High Speed Belt

its berth to the end of the ram, whence it can be raised, lowered, carried in and out under the absolute control of the operator located on the end of the hatch. All operations are controlled by electric motors and magnetic controllers.

The time required for the movement of the trimmer from the housed position to the operating position in the hatch of a vessel is about $3\frac{1}{2}$ min. The operator's cab is attached to the rear of and forms a part of the machine, which, in its various movements, is accompanied by the operator, who is thus enabled, at all times, to exercise complete control over the stream of coal.

The difficulties encountered in the development of this machine can be appreciated when it is borne in mind that the device is new and original. It was conceived and created by the engineers of the Baltimore & Ohio, for whose guidance in this class of construction no precedents existed.

Although the practicability of this machine, its behavior in service, and the trajectory and range of the expelled material are matters which could, by engineering experience or mathematical determination, be forecast, with reasonable certainty, the initiation of the trimmer into service was a matter of some anxiety. In November, 1918, contract was placed for one machine; this order was subsequently increased to four.

The first trimmer successfully trimmed 1,000 tons of petroleum coke in the S. S. "Victorious" during its initial hour of operation. The other trimmers were installed as received at the pier, and the last was put into operation about one year ago.

Machines Show No Deterioration

Despite Heavy Service

During the summer of 1920 the volume of export coal business was very heavy, and the Curtis Bay facilities, including the trimmers, were subjected to practically continuous operation. Since the use of these machines was inaugurated, about 4,500,000 tons of coal have passed through them, and been deposited within the holds of vessels. The actual service capacity of each of these four trimmers may be briefly summarized at 25 tons per min., 1,500 tons per hr., and a maximum throw of 50 ft. No perceptible breakage of the trimmed coal has been observed, and no complaints have been received on this account from any source. In spite of the severity and continuity of the demands imposed upon them, these machines have shown no signs of deterioration, and the mechanism of each device is today as serviceable as on the date of its installation.

In considering the remarkable service record of these trimmers, it should be borne in mind that the particles of coal passing over the Curtis Bay pier vary in size from granular consistency to individual lumps attaining a maximum weight of approximately 200 lb. Bulky foreign substances have also found their way into the chute, and been expelled from the trimmers. These articles include a piece of iron, 2 ft. wide, 3 ft. long, weighing approximately 500 lb., large fragments of stone, 500 to 600 lb. in weight, and, on one occasion, a steel car-strut, 8 ft. long, 10 in. wide and 4 in. thick. Although the entrance of such articles into the trimmer chute, and their passage through the machine is an accidental



A Lane-Galloway Trimmer in Action

condition, for the avoidance of which every possible precaution is exercised, the fact that their actual movement and expulsion has, on numerous occasions, occurred without injury to the machines, is an unmistakable demonstration of the soundness of principle embodied in the design of these trimmers and of their rugged construction.

The economic results effected by the use of these machines have, since their initiation into service, been the subject of constant scrutiny and rigid analysis. Their influence upon the operations at the Curtis Bay terminals is clearly illustrated by the following tabulation which appeared in "The Baltimore & Ohio Magazine" for April, 1921.

From comparison of the operating statistics for the months of October, 1919 and 1920, respectively, it will be noted that,

by the use of these trimmers, the capacity of this pier has been practically tripled.

The significance of the figures appearing in this table is not clearly apparent from a cursory examination, and one might easily be led into the error of surmising that the two months mentioned constitute periods of extremely light and extremely heavy traffic, designedly selected for the purpose of magnifying the service rendered by the mechanical trimmers. Careful

COMPARATIVE RECORD, CURTIS BAY CONVEYOR-BELT COAL PIER, BEFORE AND AFTER THE INSTALLATION OF LANE-GALLOWAY MECHANICAL TRIMMERS.

	Without Mechanical Trimmers October, 1919	Four Trimmers Working October, 1920	Percentage Increase
Total tonnage of coal handled during month.....	266,533	622,097	133%
Total number of cars unloaded.....	6,903	13,504	125%
Average number of cars handled per working day.....	207	500	(*)
Average number of tons placed in vessels per working hour.....	460	1,342	192%

(*) Average working day in 1919—20 hours.
Average working day in 1920—17 hours.

analysis of the facts set forth will, however, dissipate whatever doubts of this nature may exist. That the two months cited were both periods of heavy traffic is evidenced by the following facts: In October, 1919, before the mechanical trimmers were in existence, the working time of the Curtis Bay export facilities amounted to 579 hours, which, on the basis of a 20-hour working day, then in effect, indicates that the plant was in use 29 days of the 31 in that month. This certainly represents the practical limit of physical endurance, so far as the operating personnel were concerned, even were the mechanical appliances of this pier capable of withstanding, in a satisfactory manner, more continuous service. In October, 1920, when four mechanical trimmers were in use at this pier, 17 hours constituted a working day. The entire working time for the Curtis Bay plant during that month amounted to 463 hours, or 27 days out of a 31-day month. It is worthy of note in this connection that the imminence of the coal strike which commenced on November 1, 1919, constituted a strong incentive for the realization, during the preceding month, of the utmost possibilities of every facility which existed for the mining and transportation of this commodity, and, as might be anticipated, the tonnage handled at which had, up to that time, passed through this terminal in a Curtis Bay coal pier during October, 1919, was the greatest similar period.

A Considerable Saving Is Made by the Elimination of Hand Trimming

A specific instance of the labor-saving characteristics of this device appears in a recent case, where 9,569 tons of bituminous coal were deposited and trimmed in the hold of a vessel in 9 hr. 33 min. Analysis of this operation indicates that, if hand trimmers had been employed, the labor of 200 men for 25 hours would have been required. The record for October, 1920, when an average of 1,342 tons per working-hour was placed in vessels, is believed to be the world's maximum. It should further be borne in mind that this tonnage was placed in all classes of ocean-going vessels.

The capacity of these trimmers for rapid and intensive service was further demonstrated in October, 1920, when, in 22 hours, 9 vessels and 14 scows were completely loaded with bituminous coal, the coal trimmed in the holds, and work commenced on loading three other vessels. The ships involved in this case were the "Brodin," "Aulmuir," "Isfond," "Bur," "Waage," "Hamden," "Trogu," "Ryage" and "Liberty Bell." The "Sygard" and "Laguasuck" received a part of their load from the 1,082 cars which were dumped in making this record, which is believed to be the world's maximum for rapid handling. A total of 49,630 tons of coal was

handled, and this performance is directly attributable to the use of the mechanical trimmers.

An element of prime importance for consideration in connection with the mechanical trimming of coal is that of the service or life obtained from the high speed belts. Belting experts consider that the service which the trimmer belts on these machines must withstand represent the most severe conditions occurring in any field of belt utility. The descent of the coal a distance of 23 to 44 ft. upon the high speed belt, which, moving at the rate of 2,700 ft. per min., hurls the material into distant portions of the vessel's hold, necessarily imposes a severe strain upon this portion of the device, and the development of a type of belt capable of withstanding the needs at this point for an extended period is a matter of some difficulty. Determination of the type of belt most adaptable to the requirements of this service is still the subject of research and experimentation. Many interesting and pertinent facts along this line have been developed since the use of these machines was begun, but investigation has not yet reached such a point as to justify an expression of final opinion concerning this detail.

The appropriation for the necessary studies and the construction of the machines was secured through the efforts of Charles W. Galloway, vice-president in charge of operation and maintenance, Baltimore & Ohio, Baltimore, Md. The development and construction of the machines were under the general charge of H. A. Lane, chief engineer, while the direct supervision of the work, including the preparation of general and detail plans, the construction and installation of the machines devolved upon the writer.

Chairman Clark Deprecates Agitation for Early Rate Reductions

WASHINGTON, D. C.

IN A LETTER to the secretary of the Michigan-Ohio-Indiana Coal Association, Chairman Clark of the Interstate Commerce Commission said he regarded it "as extremely unfortunate that there should have been so much agitation in regard to early reductions in rates on coal, on other commodities, and in some instances on freight traffic generally." "I think that the result of those rumors, which in the main have had no real foundation, has been to stagnate industry and commerce," he said.

"There is not to my knowledge now pending before the commission any formal proceeding in which general reductions of coal rates under Section 1 of the act are sought. There is now pending before us a formal complaint of the Southern Ohio Coal Exchange which alleges undue prejudice against Ohio points and undue preference of mines in the inner and outer Crescent districts. A similar complaint of the Michigan Manufacturers' Association which brings in issue the rates from mines in Ohio and the Crescent groups to destinations in Michigan is also pending. There is also now before the commission for consideration a petition filed in behalf of carriers operating in Ohio, seeking an investigation under section 13 of the act by reason of an alleged preferential adjustment in favor of the intrastate coal traffic. The Michigan case, No. 12,235, has been recently heard, but complaint in the Southern Ohio case, No. 12,698, was not filed until April 13 last and hearing thereon has not yet been had. The cases are brought primarily under sections 2 and 3 of the act. Other minor complaints of an individual character are pending. All are being handled as expeditiously as possible under the considerable pressure of imperative duties. However, I could not undertake to forecast any probable date of decision or to say what the probable effect of our decisions might be."

Employees Win Several Cases Before Labor Board

Pullman Case and Disputes Over Negotiation of Agreements Decided in Favor of Workers

THE DISPUTE over the application of the decision of the Railroad Labor Board abrogating national agreements to the schedules now in effect with the various train service brotherhoods, outlined briefly in the *Railway Age* of June 17 (page 1389), was decided by the Board on June 16 in favor of the employees. In describing the frame of mind which train service employees are now in several of the brotherhood executives, during the progress of the wage reduction hearings, laid great stress on their dissatisfaction over the interpretation of several carriers of Decision 119, which abrogated "the agreements in force under the authority of the United States Railroad Administration." W. S. Carter, president of the Brotherhood of Locomotive Firemen and Enginemen, stated that many roads have interpreted this decision to mean that the schedules held by the train service employees should be abrogated on July 1 and that the employees will "fight ten times as hard against the abrogation of their schedules as they will against a moderate wage cut."

The decision made by the Board in this controversy says in part:

The Labor Board did not, nor could it under the provisions of the Transportation Act, 1920, include in its Decision No. 119 any matter which was not properly before it as a dispute. Decision No. 119 did not, therefore, terminate the existing schedules or agreements of the train, engine and yard employees in the service of the carriers involved. Changes in such schedules or agreements, however, may be made after the required notice either by agreement of the parties or by decision of this Board after conference between the parties and proper reference in accordance with the provisions of the Transportation Act and the rules of the Board.

Pullman Company Loses Case

The controversy between the Pullman Company and its shop employees, which was described briefly in the *Railway Age* of June 10 (page 1336) and of June 17 (page 1390), was also decided by the Board in favor of the employees, the Board's ruling being dated June 17 and designated as Decision No. 174.

After outlining the question in dispute and the history of the controversy, the Labor Board said:

The Labor Board held in Decision No. 119 that the presentation of irreducible demands without a genuine attempt to negotiate a settlement was not in compliance with Section 301 of the Transportation Act, 1920. So far as the evidence shows in this case, representatives of the Pullman Company had no authority further than to ask the employees to accept or reject one proposition.

Furthermore, the carrier takes the stand that it is optional with the carrier, when a dispute arises between itself and its employees, whether or not to confer with the employees directly or with their representatives. In this case, the carrier has elected to meet with the employees and has wholly ignored the respondent organization which claims to represent a majority of the Pullman Company employees directly interested in the dispute.

In taking this course, the Pullman Company contends that the question whether conferences have been held, also whether the respective parties have used every possible means to avoid interruption to traffic, is purely technical.

In Order No. 1 of April 19, 1920, Announcement of December 17, 1920, and various decisions, the Labor Board has clearly set forth its views that parties shall exert every effort to avoid interruption to traffic, that it is the duty of officers of the carrier to confer or attempt to confer with the representatives of the employees, and that these preliminaries are not technicalities but prerequisite to a hearing.

The decision in the case is as follows:

The letter and spirit of Section 301 of the Transportation

Act, 1920, have not been complied with by the carrier. The act will not have been complied with until the carrier shall have met in conference or endeavored to meet in conference the duly designated representatives of the employees directly interested in the dispute, and, in case of disagreement, shall have properly certified the dispute to the Labor Board.

The majority of said employees shall have the right to select their said representatives as provided in Principle 15, Decision No. 119.

Application is therefore dismissed.

Employees Win Another Point

Another significant decision was rendered by the Board in a dispute between the Missouri, Kansas & Texas and the Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station Employees. The question in dispute was, in general, whether or not an agreement covering rules and working conditions of the employees of a carrier be made directly with the employees or with an organization representing the employees. The carrier contended that it was its duty to make an agreement with the employees concerned and not with an organization. Representatives of the carrier conceded that the brotherhood represented a majority of that class of its employees, but declined to permit the caption of the proposed agreement to show that the employees covered by the agreement were represented by this organization. The carrier also objected to the caption offered by the organization on the ground that by its terms it would not include the employees not members of the organization and would result in a "closed shop" on that property. The organization contended that it had the right to make an agreement covering all employees and stated that it was not the desire of the organization to negotiate an agreement that did not cover non-members as well as members of the organization.

The decision of the Board in this case is as follows:

The following language of Decision No. 119 bears upon this controversy:

"The majority of any craft or class of employees shall have the right to determine what organization shall represent members of such craft or class. Such organization shall have the right to make an agreement which shall apply to all employees in such craft or class."

It is, therefore, clear that said organization has the right to make an agreement as to rules and working conditions for said entire class of employees of said carriers, both members and non-members of said organization, and it is proper that the caption be so drawn as to show for whom and by whom the agreement is made, and the Labor Board so directs.

In order that there may be no misunderstanding as to the matter in dispute the Labor Board directs that the caption of said agreement shall be as follows:

Missouri, Kansas & Texas Railway
Missouri, Kansas & Texas Railway of Texas
Wichita Falls & Northwestern Railway
C. E. Schaff, Receiver.

AGREEMENT between

C. E. Schaff, Receiver,
and all that class of clerks and other office and station employees, represented by the Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station Employees.

American Railway Express Company

Asks for Wage Reduction

The American Railway Express Company appeared before the Board on June 17 and through L. R. Gwyn, chairman of the company's board of wages and working conditions, requested that the wage increases granted by the Railroad La-

bor Board last July be wiped out. In support of the request Mr. Gwyn submitted numerous exhibits which showed that the ratio of wages to revenue increased from 26.15 per cent in 1915 to 41.53 per cent in 1920 and to 52.78 per cent in January, 1921. The ratio of wages to operating expenses he showed to be 57.7 per cent in October, 1919, rising to 68.4 per cent in February, 1921. The average wage of all employees of the company increased from \$71.33 in December, 1917, to \$138.54 in March, 1921, Mr. Gwyn testified.

The employees' arguments were presented by E. H. Fitzgerald, president of the clerks' organization. Mr. Fitzgerald, in defending the present wage scales, stated that there has been a marked increase in the efficiency of the express employees, pointing to a decrease of 49 per cent last year in claims against the company as proof of this increased efficiency. Mr. Fitzgerald also contended that the expressman's work was hazardous in that it exposed him to diseases in handling shipments and to death at the hands of bandits. The case was closed on the same day and taken under advisement by the Board.

More Railroads Ask for Wage Reductions

A hearing was held on June 20 at which approximately thirty carriers presented pleas to the Board for wage reductions for various classes of employees which they had not included in previous presentations. Among those which appeared before the Board for the first time in this case was the Southern and its subsidiary lines. The evidence presented at this hearing was largely a repetition of the evidence which has already been presented in the case and the roads involved will be included in the forthcoming decision.

New Rules Governing Equalization

Accounts Issued by I. C. C.

NEW RULES governing the equalization of operating expenses have been issued by Division IV of the Interstate Commerce Commission. The new rules supersede section 19 of the special instructions now appearing on page 37 of the Classification of Operating Revenues and Operating Expenses of Steam Roads, Issue of 1914, and add two new sections, namely, Account 280, "Equalization—Way and Structures," and Account 338, "Equalization—Equipment." They are effective as of January 1, 1921, and are as follows:

It is ordered, That section 19 of the special instructions as it now appears on page 37 of the classification of Operating Revenues and Operating Expenses of Steam Roads, Issue of 1914, is hereby cancelled, and the following is prescribed as section 19 of the special instructions:

19. **EQUALIZATION OF EXPENSES.**—When carriers adopt a budget or estimate of expenditures for maintenance of fixed improvements or equipment for the year, such authorized estimates may be equalized by division into twelve equal parts, if for a full year, or into a number of equal parts corresponding to the number of months remaining in the year after the adoption of the maintenance program. If advantage is taken of the optional accounting prescribed in this section, the appropriate primary accounts chargeable with the actual expenditures and the equalization account combined shall contain, each month, amounts aggregating one of such equal parts.

Adequate records shall be kept to fully support the estimates for expenditures for maintenance which form the basis of entries to accounts 280, "Equalization—Way and Structures," and 338, "Equalization—Equipment," and these records shall be filed in such manner as to be readily accessible for examination by representatives of the Interstate Commerce Commission. The equalization accounts are provided in order that their use may show, for each month, the adjustment necessary between actual expenditures included in the other primary accounts and the equal monthly proportion of the estimated or authorized maintenance expenses for the period.

If the actual monthly expenditures do not aggregate a sum equivalent to the equal monthly proportion of the estimated cost of maintaining such way and structures and equipment as are provided for in the budget, an amount sufficient to make up the difference shall be charged to the appropriate equalization account. If the actual expenditures are more than the equal monthly proportion of the estimate, the difference shall be credited to the equalization account. Concurrently, a credit or debit, as may be appropriate, shall be made to a ledger account styled, "Equalization reserve—Way and Structures," or "Equalization reserve—Equipment," classable under account 727, "Other unadjusted debits," if the balance be a debit, or account 778, "Other unadjusted credits," if the balance be a credit.

The accounts, "Equalization reserve—Way and Structures," and "Equal-

ization reserve—Equipment," shall be cleared annually unless at the close of the year a credit balance remains therein due to the non-completion of maintenance work because of adverse labor conditions, non-receipt of material, or similar reasons, in which case such part of the balance as is applicable to unfinished work may be carried over to the following year. The carrier shall indicate in its annual report to the Commission the amounts constituting such balance and the reasons therefor. Under no circumstances shall a debit balance be carried over the year. Where a credit balance is carried forward it shall be shown separately as one of the items comprising the detail of account 778 in the schedule provided therefor. Balances in reserve accounts carried forward to the succeeding year shall not be merged with equalization reserves for the subsequent period. The equalization accounts for each year shall be kept separate.

Carriers desiring to make use of the equalization accounts shall file with the Bureau of Accounts of the Commission, each year, before making use of them, a statement of the maintenance program which is to be equalized in the accounts of that year. If conditions arise which necessitate changes in the maintenance program involving changes in the equal monthly charges to operating expenses, a full statement of the facts as to the changes shall be filed with the Commission not later than thirty days after the changes are made.

Estimates of expenses, other than under general accounts I and II, on account of personal injury or loss and damage liability, for stationary and printing, and for advertising, may be equalized in the monthly accounts for the year by use of the regular primary accounts. If, on account of claims for personal injury or loss and damage being unsettled at the close of the year, the accounts for such expenses are not adjusted, the balances carried forward in the operating reserve account shall be analyzed as provided in section 20 of these instructions.

Charges for stationary and printing, and for advertising, for a fiscal year shall be adjusted to the actual expenses.

It is further ordered, That accounts 280, "Equalization—Way and Structures," and 338, "Equalization—Equipment," with the taxes pertaining thereto, as follows, be prescribed as a part of the Classification of Operating Revenues and Operating Expenses of Steam Roads, Issue of 1914:

ACCOUNT 280 "EQUALIZATION—WAY AND STRUCTURE."
This account, the use of which is optional, shall include an adjustment of the monthly proportion of the estimated or authorized maintenance expenses for the year, as provided for in section 19 of the special instructions, the amount included herein being the difference between actual expenditures as reflected in other primary accounts under this general account, and the equal monthly proportion of the estimate for the period. Concurrently, a credit, or debit, as may be appropriate, shall be made to a ledger account styled, "Equalization reserve—Way and Structures."

ACCOUNT 338, "EQUALIZATION—EQUIPMENT."
This account, the use of which is optional, shall include an adjustment of the monthly proportion of the estimated or authorized maintenance expenses for the year, as provided for in section 19 of the special instructions, the amount included herein being the difference between actual expenditures as reflected in other primary accounts under this general account, and the equal monthly proportion of the estimate for the period. Concurrently, a credit, or debit, as may be appropriate, shall be made to a ledger account styled, "Equalization reserve—Equipment."

Employees and Their Compensation

THE INTERSTATE COMMERCE COMMISSION'S quarterly statistical report on the number, service and compensation of steam railroad employees (class I roads) shows a reduction of \$38,000,000 in the payroll during the first three months of 1921 as compared with the corresponding quarter of 1920 in spite of the increase in wages. The report shows a decrease of 302,053 in the number of employees for the quarter and a decrease of 416,880 for the month of March as compared with March last year. The total compensation for the quarter was \$757,000,000 as compared with \$795,000,000 for the first quarter of 1920. For the year ending with March 31, 1921, which includes only one month at the old rates of pay and 11 months on the basis of the increased wages made effective as of May 1, 1920, the payroll would appear from the reports to have been \$3,695,000,000. This includes \$801,000,000 for the second quarter of 1920 on the old basis, \$102,000,000 as the commission's estimate for the May and June back pay, \$1,052,000,000 for the third quarter of 1920 on the new basis, \$982,000,000 for the fourth quarter on the new basis, and \$757,000,000 for the first quarter of 1921 on the new basis. The commission's report showed \$3,733,000,000 as the payroll for 1920 for Class I roads. The commission's summary of its report for the first quarter of 1921 is as follows:

Item.	Average number of employees:	1921	1920	Decrease	Per cent of decrease
January	1,894,822	2,000,105	195,283	9.76
February	1,676,543	1,970,525	293,982	14.92
March	1,593,068	2,009,948	416,880	20.74
First quarter	1,691,471	1,993,524	302,053	15.15
Compensation:					
First quarter	...	\$757,325,356	\$795,616,330	\$38,290,974	4.81

Annual Meeting of the A. S. T. M. at Asbury Park

An Abstract of the Reports and Papers Presented Which Are of
General Interest to Railway Men

THE ANNUAL MEETING of the American Society for Testing Materials was held this year, as it was in 1920, at the New Monterey Hotel, Asbury Park, N. J., on June 20 to 24, inclusive. The following officers were elected for the coming year: C. D. Young, president; Guillaem Aertsen, vice-president, and F. R. Baxter, E. D. Boyer, F. M. Farmer and W. H. Fulweiler, members of the executive committee.

The joint committee of the American Society for Testing Materials, the American Society of Civil Engineers, the American Railway Engineering Association, the American Concrete Institute and the Portland Cement Association presented its progress report on standard specifications for concrete and reinforced concrete in the form of tentative specifications for the same. According to the method with which this is being handled, the initial report of the joint committee will be submitted to each of the five societies as a tentative report after which it will be referred to the committee for revision.

The following is an abstract of some of the reports and papers presented before the convention:

Some Failures of Cast-Iron Wheels

By H. J. Force

Chemist and Engineer of Tests, D. L. & W.

TABLE I—WHEELS WORN OUT IN SERVICE
(All values in per cent)

Mark	Cast	Total carbon	Graphitic carbon	Com- bined carbon	Phos- phorus	Sulfur	Mang- nese	Silicon
A.....	9-20-15	3.34	2.32	0.99	0.360	0.154	0.49	0.70
B.....	6-2-16	3.53	2.77	0.75	0.308	0.136	0.66	0.73
C.....	7-2-13	3.17	2.18	0.98	0.304	0.155	0.55	0.65
D.....	8-24-12	3.08	2.15	0.93	0.260	0.122	0.43	0.59

It is well known that during the past few years railway cars have been loaded to greater capacity; heavier equipment has been placed on many lines; many roads are using rails much heavier than a few years ago; roadways are rock ballasted, and are very largely equipped with tie plates. This rigid track construction has placed a greater duty upon the chilled-iron wheel, a condition which it is felt the manufacturers possibly have not realized, for little or no effort has been made to improve the quality of the wheels to meet these severe conditions.

The cast-iron wheel is about the only part of railway equipment which is not purchased to a chemical specification; yet it is the most important part of such equipment. Such chemical specifications, as have been recommended, are not generally acceptable both to the manufacturer and the consumer. It is generally conceded that unless an improvement is made in the quality of cast-iron wheels, the railway lines will be forced to give careful consideration to the use of steel wheels, with the hope that fewer failures will result in service. From a study of the service condition of cast-iron wheels, we are of the opinion that this wheel can be greatly improved, and that it will be found to be satisfactory under nearly all equipment.

Four wheels were selected from a number of wheels which had been worn out and marked A, B, C, and D. Table I shows the date each wheel was cast, and gives the composition. It will be noted that in most cases these wheels met the requirements of the specifications recommended later, although no effort apparently was made to make the wheels to any specification. The table shows the fact that the composition as to phosphorus and sulfur, and especially silicon, is fairly satisfactory. It should also be pointed out that the

wheel with the lowest sulfur and lowest phosphorus apparently gave the best service. The higher silicon wheels in all cases showed more wear than lower silicon wheels. On the other hand it is believed that the combined carbon content, which in one case is as high as 0.99 per cent, is outside the limit for a cast-iron wheel which would give the best service.

Table II shows a list of wheels which failed in service and in each case caused a serious derailment. Note here the

TABLE II—WHEELS FAILED IN SERVICE
(All values in per cent)

Mark	Cast	Total carbon	Graphitic carbon	Com- bined carbon	Phos- phorus	Sulfur	Mang- nese	Silicon
1.....	8-27-17	3.24	2.24	1.01	0.430	0.176	0.57	0.70
2.....	.....	3.36	2.13	1.23	0.430	0.191	0.41	0.82
3.....	.....	3.35	2.45	0.89	0.440	0.200	0.65	1.06
4.....	4-15-18	3.37	1.87	1.50	0.384	0.182	0.39	0.75
5.....	5-28-13	3.34	2.19	1.14	0.388	0.199	0.52	0.75
6.....	3-28-18	3.34	2.10	1.24	0.386	0.146	0.36	0.76
7.....	6-28-20	3.22	1.91	1.31	0.354	0.193	0.52	0.80
8.....	8-21-19	3.20	1.99	1.21	0.384	0.261	0.67	0.88
9.....	3-14-18	3.19	2.24	0.95	0.364	0.171	0.50	0.84
10.....	3-9-20	3.14	2.15	1.10	0.438	0.168	0.52	0.69
11.....	16-13-17	3.19	2.16	1.03	0.408	0.138	0.38	0.70
12.....	9-3-19	3.33	2.24	1.08	0.376	0.197	0.60	0.76
13.....	12-30-18	3.32	2.34	0.98	0.420	0.175	0.79	0.73
14.....	.....	3.12	2.14	0.98	0.420	0.219	0.72	0.93
15.....	2-17-15	3.32	2.20	1.12	0.400	0.190	0.43	0.68

high combined carbon, high phosphorus and uniformly high sulfur, in some cases low manganese, and in many cases high silicon. Wheels of this composition should not, under any circumstance, be placed in service.

It is not contended that a chemical requirement will at once eliminate all wheel failures, for it is possible that an occasional wheel will fail in service from inferior composition due possibly to some oversight on the part of a workman in the foundry. The cracking of plates is due very largely to inferior chemical composition. Seamy rims and seamy treads are as a rule due to foundry practice, and are usually the result of metal being poured at too low a temperature. It is hardly necessary to call the attention of the manufacturer to the necessity of immediate improvement in both manufacture and composition of cast-iron wheels.

The following specification is therefore recommended to cover all weights of chilled iron wheels:

SPECIFICATION "A"

Total carbon, per cent.....	3.00 to 3.65
Combined carbon, per cent.....	0.45 to 0.85
Manganese, per cent.....	0.50 to 0.75
Phosphorus, per cent.....	Not over 0.35
Sulfur, per cent.....	Not over 0.17
Silicon, per cent.....	0.45 to 0.75

It is felt that the heavier wheels which are now being recommended will have a further tendency to reduce failures.

It is recommended that special consideration be given to a wheel which contains a small percentage of nickel and chromium, as indicated in specification "B." Wherever wheels of this composition have been placed in service, the results have been highly satisfactory; and the wheels should be especially suitable for the heavier equipment. The increased cost of these special wheels will run from seven to ten per cent.

SPECIFICATION "B"

Total carbon, per cent.....	3.20 to 3.75
Combined carbon, per cent.....	0.40 to 0.80
Manganese, per cent.....	0.45 to 0.65
Phosphorus, per cent.....	Not over 0.35
Sulfur, per cent.....	Not over 0.17
Silicon, per cent.....	0.45 to 0.70
Chromium, per cent.....	0.10 to 0.25
Nickel, per cent.....	0.10 to 0.20

The majority of the failures of wheels previously cited occurred near the bottom of long, heavy grades, probably due to the elevated temperatures which the wheels attained.

In nearly all cases failure occurred by rupture of the plate, and it is important, therefore, that the composition be controlled so that as much strength as possible may be obtained and the wheel enabled to withstand the elevated temperatures developed on all heavy grades.

Phosphorus and Sulphur Note in Specifications

The committee, on steel, after careful consideration of the note concerning phosphorus and sulphur, which by action at the last convention was allowed to remain on 14 specifications, recommended that this note be removed from all specifications and that the sulphur requirement be raised 0.01 per cent in four specifications, and the phosphorus requirement for acid steel be raised 0.01 per cent in one specification.

In explanation of these recommendations it was pointed out that of the 14 specifications which now carry the note, the note affects the phosphorus in Bessemer steel in the specifications for rails, splice bars, reinforcement bars, tie plates, track bolts, and the Bessemer grade in structural steel for buildings. The recommendation to remove the note from these specifications will require manufacturers to work to the original phosphorus limit for Bessemer steels.

Of the remaining specifications, three cover rivet steel, original sulphur 0.045 per cent; also the specifications for original tubes and seamless tubes call for sulphur 0.045 per cent. The effect of this recommendation would be to require manufacturers to adhere to the original 0.045 limit. Sulphur for steel chain is specified at 0.05 per cent and this would again become the limit.

As against these changes cutting off the extension for sulphur and phosphorus, it was felt the extension in sulphur from 0.05 to 0.06 per cent in the three classes of structural steel must be retained due to the heavy tonnages involved, and to the continued difficulty in obtaining low-sulphur fuels and melting stock.

Interpretation of Timber Tests

The committee on timber reported that much confusion arises by various people attempting to use the data in ways that were never intended. This is especially true when they undertake to compare species on the basis of existing structural timber tests. The information is of exceeding great value in formulating grading rules, in determining the influence of defects and in getting the relation between the strength of large and small pieces, but the absolute values do not and can not represent the average strength of any grade of material of the species, as that average value is continually shifting, due largely to manufacturing conditions which at one time will throw into a grade timber of a high quality and at another time changes in demand will cause the same grade to carry a maximum of the poorest stock that will pass. This difficulty is also aggravated by the fact that most of the commercial grades now in use are not based on the size and distribution of defects such as insure any standard strength. It must also be considered that the tests made with the center load will always average higher for the same grade of material than the tests made with the two loads, since with the two loads the knots and other defects have a greater influence.

Two rather comprehensive tables have been published as United States Department of Agriculture Bulletin No. 556. In the use of this bulletin it is important that the engineer and architect read carefully the text, for, while the text appears simple, it contains explanations of many of the variations and the strength data which would otherwise be confusing. Bulletin No. 556 contains by far the largest collection and most authentic strength data yet published.

The committee offered the following comments in regard to working stresses in structural timber:

1. It is well determined that the strength of a particular piece of timber is in a measure determined by the condition under which it is used. Increase in moisture decreases the strength of timber, therefore it must be determined, first, in designing a particular structure, what the moisture conditions are.

2. It is also well determined by tests that resistance to suddenly applied loads is much greater than to slowly applied or constant loading; therefore the condition of loading will affect the amount of allowable stress.

3. Warning of failure of a piece of timber in a structure is usually given a considerable time in advance of actual failure; therefore, when efficient inspection is had this feature gives an element of safety in older structures.

While there is no well-defined "elastic limit" in timber tests, there is in general a region where the proportionality of stress to strain ceases to be constant. It is therefore well to keep stresses well within this limit. Timber, however, does recover from high stresses; therefore its resistance to quick loading.

From the above it will be seen that in order to have a rational design it is necessary to state working stresses of different amounts for different kinds of loadings and exposure of the timber. As an example, for dense structural yellow pine, the minimum working stress will be 1,100 lb. per sq. in. This is for constant loading and for submerged locations where the timber is constantly wet. In locations in the weather, such as bridges, the allowable working stress for constant loading is 1,400 lb. per sq. in. Under cover, where the timber is always dry, the allowable working stress for constant loading is 1,600 lb. per sq. in.

From the tests, it is determined that the resistance of timber is approximately proportional to the speed of loading. For constant loading, the stresses above given are proper, but for sudden loading, resulting in 100 per cent impact, the successive loadings being far enough apart so as to allow reasonable recovery of the timber, the allowable stresses may be doubled (not to exceed 2,800 lb. sq. in.), the stresses due to this sudden loading being those actually computed from the load with the impact. For other proportions of impact, less than 100 per cent, the allowable working stress may be increased in a ratio equal to the percentage of impact. For dense structural yellow pine, the allowable working stresses would, therefore, where I is the proportional impact stress, be as follows:

1. For wet or submerged locations.....	1100 + 1100 <i>I</i> lb. per sq. in.
2. For exposed locations (bridges).....	1400 + 1400 <i>I</i> lb. per sq. in.
3. For constantly dry locations.....	1600 + 1600 <i>I</i> lb. per sq. in.

Other Papers

Duff A. Abrams presented a paper on "Wear Tests of Concrete," containing the following general conclusions:

In general the tests showed that the factors that give concrete of a high strength produce concrete of low wear. Increasing the quantity of cement decreases the wear. Increasing the quantity of mixing water causes a material increase in wear. The coarser the grading of the aggregate up to certain limits the lower the wear. One of the most significant results of the tests was to bring out the importance of curing concrete for a time in a moist condition. The quality of fine or coarse aggregate produced less effect on wear than is commonly supposed. The wear was materially reduced by increased mixing. The wear of concrete was not sensibly increased by the use of hydrated lime or other admixtures used in the tests up to 20 per cent of the volume of cement. Wear was reduced with the age of concrete.

The committee on preservative coatings for structural steel submitted, among other tentative specifications, the results of its studies on South American flax-seed in the form of two proposed tentative specifications, one for the purity of raw linseed oil and the other for the purity of boiled linseed oil as made from South American seed.

Railroad Electrification at High Voltage

The Development of Alternating Current Equipment and Its Relation to Power Supply

By F. H. Shepard

Director of Heavy Traction,
Westinghouse Electric & Manufacturing Company

THE OVERHEAD TROLLEY is now accepted as the standard contact system for American railroad electrification, and, in fact, is the only contact system suitable for high voltage. The expansion of the use of electric power has been essentially due to the use of high, and still higher voltages. How, therefore, can we hope for electrification in its highest estate without recourse to high, and still higher voltage on the trolley?

The first use of electric power for full size railway trains was on the Baltimore & Ohio tunnel in 1895. The commitment for this had been made as early as 1891, when the Baltimore tunnel was under construction. This operation was heralded as "Railway Electrification," and the success of these locomotives led to popular references to



Train on Lortschberg Railway, Switzerland, Hauled by 15,000 Volt, 2,500 hp. Locomotive

increasing demand for a high voltage trolley, resumed his consideration of this development, and, in 1901, a contract was taken for an interurban installation for the railway line which was projected between Washington and Baltimore. The first public announcement of this was made in Mr. Lamme's paper before the American Institute of Electrical Engineers in September, 1902, and was received with great enthusiasm throughout the technical world. The equipment was built, but never installed, owing to the financial difficulties which prevented the completion of the construction of the railroad. This equipment comprised four 100 h.p. motors at 16 2/3 cycles, with 1,100 volts on the trolley, the motor voltage of 220 being derived from a transformer carried on the car. This equipment was run on a test line at East Pittsburgh, and operated with entire success.

The endorsement this practical undertaking gave to the single-phase system led to immediate activity by other manufacturers throughout the world. This comprised that of the



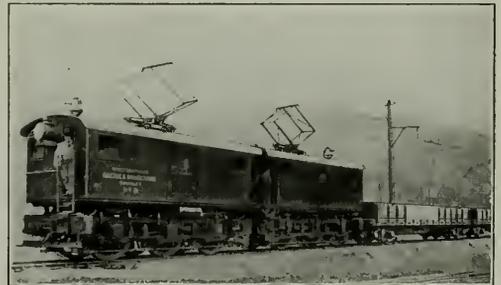
First Experimental Single-Phase Car, Pittsburgh, Pa., 1892

the "death knell of the steam locomotive." Subsequent history has shown how far afield these popular references were.

The various studies and consideration for extensive electrification always led to the economical necessity that the contact system be operated at some high voltage. A number of studies were made in which three-phase working conductors were considered. One of the most important of these was that for the Cumberland grade of the Baltimore & Ohio by Messrs. Duncan and Hutchinson, in 1896. The first extensive application of these three-phase was on the Valtellina Railroad in Italy in 1901.

Alternating Current Tried in 1892

As long ago as 1892, Benjamin G. Lamme had experimented with a commutator type motor, using alternating current at very low frequency. While this experiment was successful from the standpoint of motor design, the development of the alternating current system lay dormant for a number of years, owing to the great pressure of other development. Mr. Lamme, about 1900, in order to respond to the



First Experimental Single-Phase Locomotive for Heavy Haulage, East Pittsburgh, Pa., 1905

General Electric Company, with a repulsion type of motor, described in the paper of W. I. Slichter, before the A. I. E. E. in 1904; the Winter-Eichberg armature excited repulsion motor; the Siemens' series motor and the series motor of the Oerlikon Company, as well as numerous alternatives, such as the Finzi, Deri, Latour and others. The enthusiasm with which the alternating current motor was embraced has unfortunately proved to be a serious handicap to its actual development and use. This is due to the fact that many of the early applications were made with equipment of insufficient capacity, undeveloped design, or untried features of

that period, which had no place in regular operation. The voltage of the trolley increased to 3,300, 6,600, 11,000 and even to 16,000 volts; the frequency was 15, 16 2/3, 25 and 42 cycles.

Results of Early Application

Most of these installations were designed to accomplish service comparable to that performed on the interurban railroads, and as it was possible to maintain schedules far in excess of the capacity of the motors by voltage control of the single-phase equipment, the motors were almost always outrageously overloaded. This has been the principal reason that the maintenance costs were excessive.

At this time, with direct current, the practical limit of voltage supply was that for the motor—then, 550 volts. To raise the supply voltage, alternating current was adopted as the only available means.

The handicap imposed by the combined operation over direct current lines ultimately led to the replacement of some of this equipment with direct current at 600 and 1,200 volts.

The legislation compelling the use of vaporless traction in the Fourth Avenue tunnel leading to the Grand Central Terminal at New York, compelled the adoption of electric service for that operation. While the New York Central adopted the third-rail system, the New York, New Haven & Hartford, which was under legislative restriction prohibiting the use of the third rail in the state of Connecticut, decided to use an alternating current system with 11,000 volts on the trolley as that which promised to be the most suitable for its requirements, with special reference to the needs for the future.

The Westinghouse Company had, in the meantime, through its study of the electric service for the St. Clair tunnel, developed a 120-ton locomotive, which had been operated experimentally at East Pittsburgh with satisfactory results. This experiment settled the questions of the effect of pulsating torque upon adhesion, commutation of large motors, and the various questions of control. The use of the overhead trolley on the New Haven led to a controversy, which oftentimes took the nature of the burlesque, regarding the relative virtues of direct-current third-rail versus the alternating-current trolley.

The New Haven undertaking was a courageous one, comprising in its initial installation thirty-five 1,000 hp. passenger locomotives, capable of operating at speeds up to 80 miles an hour. These were originally laid out as the geared type, but owing to the preference for the gearless locomotives as constructed were of that type, with the resulting increase in weight entailed. The design of this locomotive was further involved, due to the undertaking to operate over the direct current third rail into the Grand Central terminal. This installation, in many respects, was truly a pioneer one, involving the determination of many features which had previously been untried. Among them were the following:

1. The generation of single-phase power in large steam turbo units.
2. The installation of high voltage trolley exposed to the continued exhaust from steam locomotives.
3. The installation of an overhead conducting system on a four-track railroad.
4. The development of a selective system of circuit breaker protection to handle short circuits of high capacity and great frequency compared to the commercial service then accomplished.
5. The first use of gearless single-phase motors.
6. The combined use of alternating current and direct current on locomotives.
7. The inauguration of a service without the trial period of elements included in power house, line and locomotive.
8. The extensive undertaking of electric service by a steam railroad organization.

The result of the New Haven installation was to establish the sufficiency of an overhead trolley at high voltage for rail-

road service. There was demonstrated as well, the flexibility of alternating current in railway service. This service developed, on a considerable scale, the various conditions which are necessary to satisfy the successful operation of an alternating-current system. In the case of the generating plant, it was shown that damper construction was necessary on generators and that circuit breakers of greater capacity and more rugged type were required. For the line, there was shown the type of installation necessary to withstand the exhaust of the steam locomotives, and also that the initial requirement for mechanical strength in the overhead conducting system was far less than anticipated, and, furthermore, that great attention should be given the question of flexibility at the traveling point of contact. On the locomo-



Electric Passenger Train on the New York, New Haven & Hartford

tives there was developed the need for greater ruggedness in switches, auxiliary parts and connections, as well as certain changes in the mechanical parts of high-speed electric locomotives. The greatest handicap to the most successful operation and one which still prevails, is that due to overloading the equipment. This has apparently been difficult, if not impossible, to prevent, and prevails even to this day to an unfortunate extent. The education of the operating forces on steam railroads has, however, been progressing, and it will undoubtedly follow that railroad electrification in the future will recognize the inevitable fact that electrical apparatus of no kind or type can be overloaded without undue cost for maintenance.

Owing to the accepted advantage of a high voltage trolley, and due to the activities of Frank J. Sprague, complemented by those of James Bryan, the equipments for 1200-volt direct current operation for the Pittsburgh, Harmony & New Castle Railway were built in 1906 and placed in operation in 1907. These equipments were built by the General Electric Company of America. Previous to this time, there had already been placed in operation, in Europe, equipments at 850 and 1,000 volts direct current. The voltage of 1,500 volts was developed later by the Westinghouse Company for the Piedmont & Northern and the Southern Pacific Company. The overhead trolley at 2,400 volts was used on the Butte, Anaconda & Pacific with 80-ton locomotives, and in 1916, the Chicago, Milwaukee & St. Paul inaugurated its notable installation of 440 miles across the Rocky mountains at 3,000 volts direct current.

The Use of High Voltage Alternating

Current for Traction in Europe

In Europe, following the initial development of 1904, there has been carried on a comprehensive analysis of high voltage railway electrification with the use of alternating current, and also with direct current. In Sweden, comparisons were made with direct current voltage as high as 4,000 volts on the trolley. Decision has followed in the case of Sweden, Norway, Germany, Austria and Switzerland to standardize upon

15,000 volts, single-phase, at 15 and 16 $\frac{2}{3}$ cycles, and there are now in operation approximately as follows:

In *Sweden*, 300 miles of track, with 125 miles under construction; in *Norway*, 60 miles, with 50 miles under construction; in *Germany*, 600 miles, with about 100 miles under construction; in *Austria*, 200 miles, and in *Switzerland*, 300 miles, with 300 miles under construction.

In *Italy*, following the successful operation of the Valtel-



Passenger Train at South Portal of the St. Gothard Tunnel, Swiss Federal Railways, 1921. Locomotive Develops 2250 h.p. from a 15,000-Volt, Single-Phase Trolley

lina Railroad, there has been constructed about 600 miles using three-phase at 3,300 volts, and this has been settled as standard for all the heavy railroad operation in Italy, which includes practically the whole of northern Italy. For the lines of light traffic, consideration is being given in Italy to the use of 42 cycles and a higher voltage trolley, and also

direct current with a third rail conductor as a standard for all the railways in France.

In *England*, 1,500 volts direct current with third rail has been adopted as the preferred type, the overhead construction being considered impracticable for general use on account of the limited overhead clearances, although in England the most extensive electrification, that of the London, Brighton & South Coast, will be continued with extensions of the single-phase trolley. In *Belgium* and *Holland*, the importance of multiple unit service with small distances and light trains has led to a decision to use 1,500 volts direct current; in Belgium, with third rail, and in Holland, with the overhead trolley.

Present Conditions in America

In America, the commission of the Pennsylvania Railroad, after nearly two years' investigation, decided to use the alternating current trolley at 11,000 volts and 25 cycles. There followed the electrification of the Philadelphia terminal at Broad Street, which includes suburban service as far as Chestnut Hill and Paoli. The Norfolk & Western decided to use the single-phase trolley, and, for extremely heavy service, has used the split-phase type of locomotives, the induction motors being fed from a single trolley through the medium of a phase converter.

It should be recognized that the most comprehensive electrification in America involving high speed passenger service, freight service, multiple unit service and switching service, is that of the New York, New Haven & Hartford, where some 500 miles of track are operating at 11,000 volts on the trolley. In this service there are more than 100 electric locomotives and a large number of multiple-unit cars used for the local passenger service as well as classification yards of great extent.

The heaviest service performed electrically is that on the Norfolk & Western, where coal traffic is moved with heavy tonnage trains over the Elkhorn grade section. The performance of each electric locomotive in this service is the practical equivalent of four of the large Mallet steam loco-



A 15,000-Volt, Single-Phase Locomotive in Service in Lapland, Sweden, 1920

to a transmission system for both railroad and commercial use, with possibility of high voltage direct current on the trolley.

In *France*, subsequent to the decision of the Midi Railway to electrify with single-phase, there followed a controversy with the post and telegraph department of the government which has finally led to the decision to use 1,500 volts

tives replaced. Current input as high as 15,000 kilowatts per train has been reached in this operation. The dispatch with which this service is handled is double that for the former steam service, and this installation forms a good illustration of the increased capacity which may be secured through electrification.

On the Pennsylvania Railroad, at Philadelphia, with

multiple unit trains the flexibility of operation has very greatly reduced the congestion, which would otherwise have required a large addition to that terminal.

In general, an electric locomotive has been used to supplant a steam locomotive and, in this respect, has followed the general history of electrification of other industries. While this has been of benefit, the great value for electrification, and this applies especially to America, lies in the ability to accomplish, with electric power, service which would be entirely impossible with steam.

Future Needs

There is arising in America the imperative need of greater capacity for our transportation systems and greater dispatch in the movement of traffic. This latter, in fact, seems to be the logical way by which expansion of our railroad machine can take place. There is no good reason why an electric locomotive cannot remain at the head of a train for a run of hundreds of miles, or why electric locomotives cannot haul a train at speeds much in excess of those which are ordinarily attained with steam service.

There will develop, therefore, with the extension of electric power, the need for a large increase in motive power for each train unit. This may be taken to be roughly equivalent to four times the maximum horsepower now used for the propulsion of a train by steam. This will be utilized in hauling larger freight trains at higher speeds and will enable traffic movement to be handled on schedules which will be somewhat comparable to the movement of passenger trains. Thus, an electrically hauled freight train will be able to continue on the main line for the larger part of its course, thereby facilitating its arrival at terminal points on schedule, which alone will go a long way toward reducing the present serious congestion at terminal points. In fact, except for local distribution, the need for terminals should very largely disappear. A step in this direction was developed to clear up the congestion which existed on our railroads during the past year, trains, in many instances, being made up and run solid for great distances.

If this view is to be taken as to the utility of electric power in the movement of traffic, consideration will have to be given to the still larger concentration of electric power for single trains. The only practical way this can be accomplished is by a high trolley voltage, and this is most readily secured by the use of alternating current.

A great advance has been made in the design of direct current electrical apparatus, so that it is now possible on locomotives to build apparatus which functions successfully with 3,000 volts on the equipment. With direct current, however, the equipment, including the auxiliary apparatus, must necessarily be built to correspond to the voltage of the trolley, while with alternating current the equipment can be designed for the most economical and conservative voltage, and, through a static transformer, receive power from an alternating current trolley at a comparatively high voltage. This is shown by the use of motors of 300 to 400 volts from a 15,000-volt trolley. In fact, as far as the equipment is concerned, its design is quite independent of the trolley voltage.

Inasmuch as some time in the future it is universally accepted that the operation of our railroads with electric power will be great in extent, the development necessary to utilize electric power with the least restriction is that which should be given the utmost consideration. It should not be taken as fanciful to consider a district with complete electrification of the main lines of 500 to 1,000 miles handling the heaviest kind of traffic. The large trains, and the occasional bunching of trains, which is inevitable on certain sections of this major electrification, will cause a relatively poor load factor.

Since this is a condition which should be recognized, it is obvious that the best use of the investment for transmission

and transforming apparatus local to any given section of railway will be that which utilizes the highest voltage for the supply of power to the trains. In other words, to meet the concentration of loads which will be necessary in the future the tendency is toward the highest practicable voltage on the trolley as a matter of economy.

Methods for Meeting Demands of the Future

There follows logically the suggestion that even with the highest voltage on the trolley the demand for railroad power should be equalized by the inclusion of many miles of railway deriving their power supply from a common feeder. This, in turn, could very well be at the highest practical voltage, so that it might be considered that hundreds of miles of railway would be fed from a super railway feeder.

The traffic movement on our railways varies during the day, from day to day, and from season to season. It is also subject to fluctuations due to conditions of weather and derangements in train service due to obstructions on the track, wrecks, and other causes. Allowance must be made for a considerable flexibility of movement to avoid congestion. Unfortunately, this condition does not produce an ideal demand from a power generating system, so that a railroad load is not generally considered to be a desirable one.

Close regulation of voltage for railway use is of less importance than that for industrial use, especially where a lighting load is carried, so that an independent railway feeder should be more economical than supply from a common feeder system with its requisite regulation with a super-imposed railway load.

For such a scheme of power supply to our railways, it should follow that power could be taken from the various regional generating systems for common supply according to a schedule or set condition, which could be adapted to use power in the most effective manner. For instance, during times of lesser demand for commercial power, such as nights, Sundays and holidays, there should be little, if any, restriction of power supply from any of the power systems. In the case of hydro plants, the demand should recognize the characteristics of each system, whether dependent upon stream flow or water storage. In the case of steam plants, consideration could be given to the effective loading of the steam generating units in operation. At times of maximum demand for commercial load, the railroad demand from any system could be limited according to a definite schedule which would avoid super-imposing the peak loads for lighting and urban transit upon the railroad demand.

With such flexibility of relation to the various power systems, the amount of spare generating apparatus to provide for emergency would be lessened. In fact, a large part of the railroad load could, undoubtedly, be furnished by assigned generating units, and through their regulation, transfer of load would be readily secured over the super railway feeder, independent of the commercial demand and net work.

For such minor transfer of power between the railroad system and the commercial network as might be advantageous, motor generators could be used, thus lessening the burden of cost due to a frequency for railroad use which may differ from that of the commercial net work.

The expansion in electrical generating capacity for industrial and commercial use has been phenomenal in America. Undoubtedly, this growth is destined to continue to very large proportions. The generation of electric power for railroad use may also be expected to develop and grow. Each, therefore, should be able to develop without restriction by the other, and each in the utilization of nature's resources, could very properly be used to complement the other. It would appear, therefore, that we have not yet reached the time when railroad electrification should be dominated by conditions of power supply and distribution for other purposes.

Railroad Hearings Before Senate Committee

Railroad Testimony Completed by L. E. Wettling and W. H.

Williams—S. Davies Warfield Presents Plan

WASHINGTON, D. C.

THE PRESENTATION of direct testimony on behalf of the railroads before the Senate Committee on Interstate Commerce was concluded on June 17 and an adjournment was taken until June 22, when S. Davies Warfield, president of the National Association of Owners of Railroad Securities, appeared. Chairman Cummins was the only member of the committee to hear the final testimony of the railroads presented by L. E. Wettling, manager of the statistical bureau of the Western lines, and W. H. Williams, chairman of the Wabash.

The railroads in 1920 suffered a deficit of two-tenths of a cent for each mile run by a train, Mr. Wettling showed in continuing his testimony on June 16. The average revenue received by the carriers per train mile was \$5.065, while the average expenses and taxes per train mile were \$5.067. For the last four months of the year, when the increased rates were in effect, the average revenue per train mile was \$5.883 and the expenses and taxes \$5.328, leaving a net railway operating income per train mile of 55.5 cents.

In 1916 the average revenue per train mile was \$2.938 and the average expenses and taxes were \$2.089, leaving a net operating income of 84.9 cents. While the increase in revenue per train mile from 1916 to the latter part of 1920 was \$2.945, the increase in expenses and taxes was \$3.238 and the net operating income was reduced by 29.4 cents.

Total operating expenses were also divided in the exhibit between labor and materials and supplies. Whereas in 1916 the labor cost per train mile was \$1.20, in the last four months of 1920 it was \$3.27. While materials and supplies per train mile in 1916 cost 72.6 cents, in the last four months of 1920 they cost \$1.75. The average revenue per mile for freight trains in the last four months of 1920 was \$7.94 and the average revenue for passenger train was \$2.465.

Mr. Wettling said railroad operating revenues in 1920 were by far the largest in the history of the railroads, although the net operating income left after paying expenses and taxes was the smallest on record for a year. Of every dollar taken in by the railroads in 1920, 59.9 cents was expended for labor, as compared with 55.3 cents in 1919; 10.9 cents went for fuel for locomotives as against 9.2 cents in 1919; 17.3 cents for material, supplies and miscellaneous as against 15.6 cents in 1919, and 10.9 cents for loss and damage, injuries to persons, insurance, depreciation and retirements, and taxes. These items in 1919 took 11.1 cents of each dollar. Only 1 cent was left in 1920 for return on investment, as against 8.8 cents in 1919 and 28.9 cents in 1916.

An analysis of the expenditures follows:

	1916	1919	1920
Total operating revenues....	\$3,596,865,766	\$5,144,795,154	\$6,171,493,301
Amount			
Labor	1,468,376,394	2,843,128,432	3,698,216,351
Fuel (locomotive).....	250,344,862	474,174,792	672,891,964
Loss and damage.....	30,958,221	116,683,270	122,022,696
Injuries to persons.....	29,485,700	37,314,145	50,683,684
Insurance	10,731,935	410,677	15,884,070
Depreciation and retirements.	119,785,157	126,292,105	145,252,339
Material, supplies and miscellaneous	447,316,143	801,712,094	1,063,769,900
Loss and damage.....	797,486	916,889	1,224,980
Uncollectible railway revenues	157,113,372	232,601,396	278,868,668
Taxes			
Hire of equipment and joint facility rents.....	41,471,979	56,576,401	60,751,014
Return on investment.....	1,040,084,517	454,984,953	61,928,626

Despite the fact that the railroads handled more business in 1920 than ever before in their history, the average number of train miles operated per 100 hours of work by the train service employees was 8 per cent less than in 1916, Mr.

Wettling showed. At the same time, the labor cost for operating a train one mile, he said, increased from \$1.20 in 1916 to \$3.27 in the last quarter of 1920, or an increase of 264 per cent.

Mr. Wettling filed with the committee statistics which showed that while the number of hours worked by 10 classes of road trainmen increased from 626,800,000 in 1916 to 670,800,000 in 1920, or seven per cent, the mileage of the trains run in transportation service decreased in that period from 1,224,000,000 to 1,205,500,000, or 1.52 per cent, because of the heavier load carried per car and per train.

While the railroads were obtaining a constantly increasing efficiency in the movement of each car of freight and each locomotive, Mr. Wettling said, the efficiency of the individual employee declined.

Mr. Wettling told the committee that the wage bill of the carriers in 1920, which totaled \$3,698,000,000, exceeded by more than \$100,000,000 the gross revenues of the railroads in 1916, which was the best year in railroad history prior to the war. In 1916, he said, their gross revenues were \$3,596,865,000.

The average compensation of railroad employees per hour increased from 27.8 cents in 1916 to 66.5 cents in 1920 and 70.4 cents in the last quarter of 1920, Mr. Wettling said, while the average compensation per employee per day increased from \$3.048 in 1916 to \$6.156 in 1920 and \$6.513 in the last quarter of 1920. The average annual pay increased, he said, from \$892 in 1916 to \$1,904 during the last four months in 1920, while if the wage award of the Railroad Labor Board had been in effect throughout the year of 1920 instead of from May 1, the average for the year would have been \$1,926.

Despite the fact that the railroads in 1920 employed 289,841 section men, or an increase of 36,264 or 14 per cent more than were employed in 1916, they actually worked during the past year 761,965,074 hours or 23,507,094 hours less than was worked by the lesser number of section men in 1916. Their average pay, however, in 1920, was \$1,192, as compared with \$509 in 1916, or an increase of 134 per cent. Had the wage award of the Labor Board been in effect throughout 1920 their average annual pay, he said, would have been \$1,252.

Mr. Wettling said that in 1916 the total compensation of section men was \$129,033,692, while in 1920 it was \$345,511,579.

Statistics filed by the carriers with the Interstate Commerce Commission, the witness added, showed that despite an increase of 18 per cent in the number of other unskilled laborers employed by the railroads compared with 1916 and an increase during that period of 115 per cent in compensation those employees worked 311,282,925 hours in 1920, or a decrease of 11,230,000 hours. Their average annual pay last year, he said, was \$1,311, compared with \$609 in 1916.

The largest increase in rates of pay received by any class of employees under the wage award of last July, Mr. Wettling said, was that of the car inspectors, who were increased 231 per cent over 1916.

General officers receiving \$3,000 and upwards per annum from 1916 to 1920 actually suffered a reduction of about 10 per cent in their pay.

Mr. Wettling told the committee that up to February last the relative increase in freight rates in the past eight years

had been less than the increase in wholesale commodity prices. In 1913 average receipts per ton-mile was 7.19 mills while in 1916 it had decreased to 7.07 mills. In 1917 it was 7.15 mills and in November, 1920, three months after the increase in rates became effective, it was 12.63 mills, or an increase of 77 per cent over the average receipts in 1913. For the same month the increase in wholesale prices was 107 per cent over 1913. He said that the increase in freight rates and the decline in wholesale commodity prices passed each other last February and that in March the average receipts per ton-mile was 13.33 mills, or an increase of 85 per cent over 1913, while for the same month wholesale prices showed only 62 per cent increase over the same year.

Increased Revenues Absorbed by

Advances in Wages and Other Expenses

How increases in railway earnings resulting both from increased traffic and from increases in rates have been more than absorbed by increases in operating expenses, chiefly by increased payroll costs, which in 1920 practically wiped out the net operating income, was strikingly illustrated by statements filed by Mr. Wettling. From 1912 to 1920 the increase in total operating revenues was \$3,366,000,000, or 120 per cent, while the increase in operating expenses was \$3,809,000,000, or 194 per cent, and the increase in compensation of employees was \$2,489,000,000, or 205 per cent. The payroll was 43.13 per cent of the revenues in 1912 and 59.92 per cent in 1920. The average compensation per employee during this period increased from \$736.68 to \$1,820.05, or 147 per cent, and during the latter part of 1920 the average wage was at the rate of \$1,904 per year.

From 1916 to 1920 the revenues increased \$2,575,000,000, or 70 per cent, but operating expenses increased \$3,411,000,000, or 145 per cent, and the payroll increased \$2,230,000,000, or 152 per cent. In 1916 the payroll was 40.83 per cent of the revenues and 62.3 per cent of the expenses.

From 1916 to 1917 the revenues increased \$418,000,000, or 11 per cent, resulting in part from increased traffic and in part from an increase in rates, but the expenses increased \$472,000,000, or 20 per cent, and the payroll increased \$271,000,000, or 18.6 per cent, largely as the result of the passage of the Adamson law in 1916.

In 1918, after the government took over the railroads, wages were increased effective as of January 1, and rates were also increased effective during the last half of the year. There was also an increase in traffic as compared with 1917. The revenues increased \$866,000,000, or 21 per cent, the operating expenses increased \$1,153,000,000, or 40 per cent, and the payroll increased \$877,000,000, or 50 per cent, amounting to 53.55 per cent of the earnings and 65.64 per cent of the expenses.

From 1918 to 1919 there was a decrease in traffic and no general rate advances were made but the increases made in 1918 were in effect throughout the year and some additional wage advances were made. The revenues increased \$264,000,000, or only 5 per cent, but the expenses increased \$417,000,000, or 10 per cent. The payroll increased \$230,000,000, or 8 per cent.

In 1920 there was a new wage advance effective from May 1, but the rate advance did not become effective until August 26. From 1919 to 1920 there was an increase in revenues of \$1,027,000,000, or 20 per cent, due to increased traffic and in part to the rate advance in effect for four months, while the expenses increased \$1,369,000,000, or 31 per cent, and the payroll increased \$555,000,000, or 30 per cent.

From 1917 to 1920, comparing the years before and after the period of federal control, the increase in revenues was \$2,157,000,000, or 53 per cent. The increase in expenses, however, was \$2,839,000,000, or 100 per cent, or \$682,000,-

000 more than the increase in earnings. The increase in the payroll was \$1,959,000,000, or 113 per cent. In 1917 the payroll was 43.33 per cent of the earnings and 61.43 per cent of the expenses. In 1920 it was 59.92 per cent of the earnings and 64.11 per cent of the expenses. The net operating income fell from \$934,000,000 in 1917 to \$62,000,000 in 1920. Besides the increase in expenses there was an increase of \$65,000,000 in taxes and there were also some increases in equipment and joint facility rentals.

Increase in Expenses Greater Than Rate Increase

That the poor showing made by railway net operating income since the increases in rates were made effective on August 26 was due more to increases in expenses than to the reduction in traffic was illustrated by a table comparing the results for the six months ended with February, 1921, with those for the corresponding period of the previous year.

The railway revenues for this period showed an increase of 16 per cent, or from \$2,825,000,000 to \$3,277,000,000, but operating expenses increased 17.9 per cent, or from \$2,443,000,000 to \$2,880,000,000 and taxes increased from \$115,000,000 to \$144,000,000, or 25.8 per cent. During this period both the increased rates and the increased wage rates were in effect. The net railway operating income was \$218,120,632, a decrease of 6 per cent as compared with the corresponding period of the previous year. This was at the rate of 2½ per cent per annum on the railroad valuation.

In spite of a decrease in both freight and passenger traffic for the six months as a whole, the freight revenues for the period increased 21.6 per cent, as compared with the corresponding six months of the previous year, while the passenger revenues increased 14.4 per cent.

Railroad Traffic Performance in 1920 Set New Record

The railroads in 1920 performed 12.6 per cent more freight service and 1.2 per cent more passenger service than in 1919, exceeding all previous records for a year, according to exhibits filed by Mr. Wettling. The freight service is measured by the number of tons of revenue freight transported for a distance of one mile, a total of 409,970,656,000 ton-miles, which was an increase of 45,000,000,000 ton-miles, as compared with 1919. The number of tons carried was 2,234,547,672, an increase of 9.9 per cent, and the average distance each ton was handled per railroad increased from 178.97 to 183.47, or 2.5 per cent.

The number of passengers carried was 1,234,222,889, an increase of 5.1 per cent, but there was a decrease in the average journey per railroad from 39.32 miles to 37.86, or 3.7 per cent. As a result the passenger miles increased only 1.2 per cent.

Including non-revenue freight the railroads handled 449,292,355,000 ton-miles, an increase of 13.2 per cent over 1919 and a new record for a year. By increased efficiency in car loading and by increasing the average trainload this increase of 13.2 per cent was handled with an increase of only 11.3 per cent in train mileage. The average revenue received by the railroads for hauling a ton of freight one mile was 1 and 5/100 cents and the average revenue per passenger mile was 2 and 74/100 cents.

Maintenance Restricted by Railroad Administration

The director general, through orders restricting the amount to be spent for maintenance during the period of federal control, thereby resulting in the railroads being turned back on March 1, 1920, in a condition of undermaintenance, was largely to blame for the increased expenditures made for that purpose during the past year compared with 1919, Mr. Williams testified.

"A substantial portion," said Mr. Williams, "if not all, of the increase in number of units of material and number of hours of service performed in the year 1920 as compared

with the year 1919 over and above that necessitated by increased service was due to the under-maintenance of 1919 and not to any over-maintenance in the year 1920. Orders issued by the director general limiting the expenditures for maintenance during the year 1919 were largely responsible for this situation. The machinists' strike in August, 1919, was partly responsible for the under-maintenance of locomotives and cars in that year. During the latter part of the year, the director general declined to authorize any new addition and betterment work unless the carriers agreed to finance the same, which most of them were unable to do owing to uncertainty as to their future.

"Order No. 20, issued by the Director, Division of Operation, limited the expenditures for repairs or additions and betterments to certain types of cars, with the result that a substantial number of cars was allowed to get in such condition as to necessitate very heavy expenditures and required their being set off on side tracks; and no charge was made during the year 1919 to cover the cost of placing these cars in proper condition."

Mr. Williams cited a long list of additional orders issued by the director general in 1919 and shortly before the roads were turned back in 1920, the "wording of which orders seemed to indicate that their purpose was to limit expenditures during the period of federal control to the amount which the government was obligated to expend for maintenance of the properties."

"Their practical effect, however, owing to the improper basis established, was to cause serious under-maintenance," Mr. Williams said. "All the under-maintenance of the period of federal control was not made up during the year 1920, owing to the inability of the railroads to secure sufficient rails and ties.

"The director general's telegram of May 27, 1919," he said, "instructed that the ratio of maintenance of way expenditures to operating revenues in June should be no greater than the average maintenance of way ratio for the entire 36 months of the test period. When issuing this order, the director general overlooked the fact that maintenance expenditures in the summer months are necessarily much greater than in the winter months inasmuch as it is not advisable to disturb track during cold weather. He also overlooked the fact that revenues had not increased proportionately with the increase in operating costs and that increases granted to maintenance of way and shop labor were greater than the average increases of all classes of employees. In determining the basis of settlement with the director general for upkeep of the property for the last two months of federal control, viz., January and February, 1920, the director general agreed with the railroads that it was not advisable to expend in each of said months only one-twelfth of the annual maintenance charged during the test period and agreed to accept for said months one-sixth of the annual charge, notwithstanding the fact that a less amount was actually expended, thus conceding that a mistake had been made in issuing the order of May 27, 1919, limiting the expenditures during the summer months of that year."

During the past 10 years, Mr. Williams said, the Wabash had made a practice of renewing rail in its high speed main tracks about once in every 12 years. During the federal control period only 83 track miles of new rails were laid, or 107 miles less than the standard previously maintained by that road.

In order to make the Wabash track safe for operation in 1920, it was necessary for the Wabash to make up this deficit of 107 miles which accrued during federal control and to lay an additional amount of 44 miles partially to take care of the current year, the witness said.

During federal control, he said, 1,052,043 ties should have been placed in order to maintain previous standards. Instead, however, only 861,794 were actually furnished, which

left a deficit of 412,880 ties during the period of federal control.

"In general," Mr. Williams continued, "repair costs for all classes of equipment were much higher in 1920 than in 1919, due to the fact that the 1919 year was a subnormal year of maintenance and during 1920 an effort was being made to re-establish normal conditions. One reason for the subnormal maintenance during 1919 was the reduction in shop forces brought about by regional director's instructions that maintenance of equipment expenses must not exceed a certain percentage of gross earnings."

Mr. Williams denied that existing freight rates are responsible for present business conditions. The rates, he said, have had no appreciable effect on the volume of business carried by the railroads and only a slight effect on the costs of commodities, virtually all of which, because of general market conditions, have been greatly reduced in price during the past year.

Mr. Williams attributed present business conditions to the readjustment that is now in progress throughout the world in an effort to return as nearly as possible to the pre-war conditions and the fact that the country is "now suffering from the unusually large inventories" which resulted from "an artificial augmentation of business" in 1920, "the cause of which was not thoroughly understood."

"No material increase in the volume of traffic can be expected until the inventories are reduced to normal," Mr. Williams said.

Because of over-production in 1920, he estimated that bituminous coal production this year would be from 100,000,000 to 125,000,000 tons below last year. A similar situation, he said, has developed as to sugar, as well as in many other industries with the result that falling prices have resulted in severe losses.

"The sugar companies of Canada lost in 1920 an amount equal to the profits of the preceding six years, this being due to the rapid fall in prices," Mr. Williams said.

Present Conditions in U. S.

Speaking of conditions in this country, he said:

"Furnace coke has dropped from \$17 per net ton, in October, 1920, to \$3.50 per net ton, in 1921.

"Open-hearth steel billets at Pittsburgh dropped from \$65 per gross ton, in July, 1920, to \$37 per gross ton, in April, 1921.

"Pennsylvania crude petroleum dropped from \$6.10 per barrel, in October, 1920, to \$3 per barrel, in April, 1921.

"No. 1 Northern spring wheat, at Chicago, dropped from \$2.22½ per bushel, in October, 1920, to \$1.33¾ per bushel, in April, 1921.

"Ohio fine delaine wool, clean basis, Boston, dropped from \$2.35 per pound, in April, 1920, to \$0.92, in April, 1921.

"Prime Western zinc, St. Louis delivery, dropped from \$7.30 per hundred, in October, 1920, to \$4.60, in April, 1921.

"Middling, spot cotton, New Orleans delivery, dropped from 20.25 cents per pound, in October, 1920, to 11.25 cents per pound, in April, 1921.

"No. 2 mixed corn, Chicago delivery, dropped from 95 cents per bushel, in October, 1920, to 55½ cents per bushel, in April, 1921.

"Fair to choice native steers, Chicago delivery, dropped from \$14.75 per hundred, in October, 1920, to \$8.15 per hundred, in April, 1921.

"Pig lead, New York delivery, dropped from 7.80 cents per pound, in October, 1920, to 4.50 cents per pound, in April, 1921.

"Red (facing) brick are now selling at \$12 per thousand, and salmon (backing-up) brick at \$10 per thousand in St. Louis, being one-half of the peak prices of last year.

"These unusual drops in prices and consequent losses in inventories, have seriously affected the buying power of the

dealers and also have affected their ability to borrow funds. At the time the break in prices occurred, producers and wholesalers had on their books many unfilled orders which were subsequently filled at the high prices, with the result that retailers found themselves overstocked with goods at high prices."

Mr. Williams told the committee that the increase in freight rates had been so small that they cannot be said to account for any appreciable amount of the charges in livestock and grain prices. The wholesale price in Chicago of cattle in 1920 was \$14.50 per hundred pounds and so far this year approximately \$8.60. Mr. Williams said, while to ship cattle from Sioux City, Iowa, it costs only 44 cents per hundred pounds. The wholesale price of hogs, he said, was around \$14.85 in 1920 and \$9.25 this year while the freight rate from Des Moines, Iowa, to Chicago is only 40 cents a hundred.

Last year, according to the witness, the wholesale price of corn in Chicago was \$1.41 per bushel and 64 cents this year while to ship a bushel from Decatur, Ill., to that city costs only 7½ cents. To ship a bushel of wheat from St. Cloud, Minn., to Chicago, Mr. Williams said, the cost is 15¾ cents per bushel while in 1920 the wholesale price in Chicago was \$2.80 and this year \$1.47.

Although contentions have been made that existing freight rates have curtailed building operations, Mr. Williams said statistics from six industrial centers in Indiana, Ohio and Pennsylvania as well as the District of Columbia show that approximately twice as many garages as dwellings were built in 1920.

"This plainly indicates that materials for buildings that are very greatly desired must be moving in considerable volume," Mr. Williams said.

Some Suggestions for Relief

Mr. Williams submitted the following suggestions as a possible means of providing some relief for the railroads:

State commissions have required the re-establishment of unremunerative passenger service, erection of new passenger stations, and other expenditures which ought to be deferred. The Interstate Commerce Commission, which has authority to regulate the receipts of the carriers, should be the sole agency authorized to require additional service or expenditures for plant facilities.

Freight rates for car-lot shipments should be based upon the cars being loaded to their weight capacity or cubical content capacity. This would make it unnecessary to buy freight cars other than for replacements during the next five years; it would minimize the possibility of car shortage, and would materially add to the revenue tons per train and thereby lessen the cost of operation.

Governmental work, particularly road work, should be done at such times and by such methods as to interfere as little as possible with private enterprise. Materials for such work ought not to be moved by rail when open top cars are needed for the coal trade.

The existing rules with relation to seniority rights when men are promoted, or forces are curtailed, should be modified so as not to apply when those by whom they are claimed are seriously inferior in qualifications. "During the past three years," the witness explained, "the railroads have found it necessary to employ men not the most competent or qualified to perform the work for which they were taken into the service. Many of these men are not capable of assuming increased responsibility and should not be retained in their present positions."

Mr. Warfield's Plan

S. Davies Warfield, testifying before the committee on Wednesday, declared that only through far-reaching economical methods for conducting transportation and the obliteration

of old-time prejudices can rates and fares be made satisfactory to the people and the railroads be enabled to compete with other forms of transportation and produce the return essential to enable the roads to finance their obligations.

He stated that a return on railroad property in the aggregate less than that provided for in the Esch-Cummins act would not maintain transportation, and any attempt to impair the provisions of that act would be a menace to the successful operation, in the public interest, of the transportation system.

"The question for the moment is," said Mr. Warfield, "Can sufficient revenue be obtained from rates and fares that will be considered reasonable by the public and the shippers, and will these rates bear a relation to the price obtainable for the articles transported that will not impede commerce; or will part of the money required to meet the necessities of transportation have to be supplied, in the public interest, by taxation?" The latter, he said, means government operation and eventual government ownership, and unless effective railroad organization is consummated to introduce rigid economies this could not be avoided.

Discussing freight rates he showed that the war produced abnormally high prices and high rail operating costs. When deflation set in prices broke precipitately and the unprecedented and unforeseen era of business readjustment, he said, was the real cause of the loss of business to the railroads.

"The exhaustion of general credit was manifest before the increase in railroad rates," said Mr. Warfield. "There had been a progressive decline in the reserve ratio of the Federal Reserve banks from the peak of August, 1917, caused by the expansion of bank credits of over 80 per cent to below 40 per cent in the early part of 1920; the increase in railroad rates was not made until August, 1920, when the exhaustion of credit showed its effect on commodity prices. The increase in rates cannot be held accountable for the contraction in business from which the railroads have suffered acutely."

The economies to be instituted, he classed under two headings: "one, by effecting an organization of the officials of the railroads as grouped in each of the four territories now established by the Interstate Commerce Commission; and two, through a central agency or corporation to supply equipment to the railroads without profit to the corporation, and to perform other services, under the supervision of the commission."

The commission has laid out the country in four districts, applying different ratios of increase or decrease in rates in the several districts, he said. On the aggregate group value of the property of the carriers in the respective groups the yield from rates is computed. He contended these and other conditions made it logical for the carriers of each group to organize themselves, a group railway board, of not less than five members, to be selected by each group of carriers. From among the carriers of the groups, men would be selected to report on advanced methods for producing economies. Three officials would be selected from the four group boards, 12 in all, to serve on a national board, with 12 additional members selected from the trustees of the National Railway Service Corporation. This national board would be composed of practical railroad officials and men trained in finance and general business administration. This board would determine questions of legislation and public policy.

"The group boards and their committees should be advisory," he said. "Neither the national board nor the four group boards would interfere with the boards of directors of railroads." The suggestions of the group and service boards now proposed should be submitted to the directors of the respective railroads, thus keeping before directors the relation of co-ordination to economical operation.

Through the organization proposed, information, he stated, would be available, scientifically assembled, to inform the shippers and the public of the relation of railroad rates to commerce. He contended that there is no organization of the railroads to speak with authority on these subjects, whose con-

clusions or suggestions could be accepted as authentic. "If the railroads themselves cannot produce convincing evidence of the necessity of a railroad rate and the relation that rate bears to the commodity transported fault cannot be found if governmental agencies step in to take up those questions," he said.

Mr. Warfield discussed the relation of valuation to the proposed consolidations and said that the group organizations, in co-operation with the recently appointed Board of Economics and Engineering, would be "helpful to the commission in working out the proposed large consolidations." He called attention to the desirability of keeping consolidations within reasonable limits so as not to impair incentive and retard the building into territories awaiting development. He advocated the immediate adoption of means to fund the obligations of the railroads to the Railroad Administration.

The purposes of the National Railway Service Corporation, organized by the association of security owners in July last, were outlined. This corporation, it was stated, has been supplying equipment to railroads otherwise unable to secure funds to purchase equipment. This corporation should not only supply carriers with equipment under long-time yearly payments, but, if so provided by Congress, it would be enabled to acquire a "floating supply" of equipment to be leased to carriers on a per diem basis. The railroads could largely reduce their capitalization for equipment, making purchases to meet only their normal requirements, securing from the service corporation the equipment to meet seasonal demands. Large savings would be made in first cost of equipment, and a greatly reduced number of cars required, the floating equipment being shifted from one railroad to another and from one section of the country to another.

He asked that Congress require a court or a receiver in a receivership to continue agreements made by carriers in the purchase of equipment. The knowledge that a receivership would not break an agreement would provide a more extended and stable market for the corporation's certificates.

He advocated the use of the excess earnings fund provided under the act through the corporation, to be used as a margin to enable the corporation to sell its equipment obligations at minimum rates of interest.

It was pointed out that the Esch-Cummins act and the commerce act give wide powers of supervision and regulation to the commission and the labor board. The commission is required to institute economies if the railroads themselves do not produce them. The railroad complaints of excessive regulation, he said, grew out of the lack of method for the co-ordination of effort. "It remains with the railroads themselves," he said, "to limit governmental regulation by the organization of agencies among themselves which would guarantee to the public and the shippers adequate transportation facilities at rates which the public must be satisfied are in line with intensive economies and wise administration."

He said the carriers had applied immediately to the Labor Board at Chicago before employing the methods contained in the Esch-Cummins act for the settlement of working conditions and wages. He quoted from the provisions of the act, giving specific methods for handling the questions, among others the formation of local or regional adjustment labor boards by the roads, the National Labor Board to be the board of appeal to settle disputed questions. Yet, he said, complaint is constantly made that the roads are now nearly operated by governmental agencies while little has been done to supply the machinery of organization to avoid or prevent it.

The reports of the commission of railroad revenue and expenditures, he said, gave conclusive evidence of the necessity for a reduction in wages. This is not the only remedy necessary in the emergency. Wage reduction, he stated, cannot entirely supply the means through which to meet the constant demands of the shippers for decreased rates, which can be secured through economies possible of attainment.

Mr. Warfield advocated co-ordinated relations between the commission and the labor board. He said while Congress had placed extensive powers with the commission, which provides the money through rates and fares to operate the railroads, the labor board, another governmental body, had been given the adjustment of wages, now constituting 65 per cent of all railroad operating expenditures. "Can the commission," he asked, "exercise authority to inquire into the management of the business—keep itself informed as to the manner and method in which the same is conducted—have complete information necessary to enable the commission to perform the duties and objects for which it was created," when Congress, without co-ordinate relations between the two bodies, charges one with the sole right to fix wages, and the other with the duty of supplying the money from rates to pay them, keep the railroads running and enable them to sell their securities?"

Mr. Warfield discussed the Board of Economics and Engineering, appointed by the Association as "the only instrumentally free from entangling alliances, which could review the questions involved unhampered by ties of individual, railroad or financial identity or ownership, or by the influences of any particular security owning or banking group, and from the environment that attends governmental appointment." He gave the subjects now under investigation by this board, as follows: Standardization of equipment; repairs and shop practices; power economies, including locomotive improvements and electrification; car service; joint facilities and terminals; consolidations of railroads—valuation; transportation economies—loss and damage; routing of traffic; purchase of fuel and supplies; simplification of accounting; traffic rates and divisions; wages and working conditions. The board is in consultation with representatives of car manufacturing companies for the purpose of discussing standard methods in respect to equipment.

He stated that the group organizations and the plans proposed to investigate, report and institute economies under the group plan, had been gone into by the Board of Economics and Engineering, and it was the opinion of that board that through such organization large economies could be instituted.

Mr. Warfield presented drafts of two bills, one entitled, "An act to further economies and efficiency in railroad transportation," to effect the organizations suggested of the railroads in the four group territories; the other, "An act to incorporate the National Railway Service Corporation."

He said that Congress was not asked to enforce the suggestions made in relation to the economies to be secured, but request is made that the railroads themselves effect the organizations to secure these economies and to bring such relations between the carriers as will permit the economical operation of the transportation system as a whole. All of the actions of these boards are proposed to be subject to the supervision of the Interstate Commerce Commission.

In closing, Mr. Warfield stated: "It has been made apparent that the country cannot look to a thousand or so executives of railroads, nearly two hundred alone representing the great systems, to reach agreements and conclusions among themselves respecting the co-ordination of facilities and service, and the introduction of economies to the extent essential to guarantee the most economical administration and methods of transportation, under the system that is at present observed. Unless these conditions are recognized and relieved through definite organization, then transportation under private operation must fail."

The Board of Economics and Engineering is composed of John F. Stevens, F. A. Molitor, John F. Wallace, W. L. Darling, L. B. Stillwell, and W. W. Colpitts. Mr. Warfield said that several members of the board were present and would indicate briefly the directions the proposed investigations will take. Mr. Stillwell was to indicate the direction in which investigation will be made in respect to equipment.

Mr. Wallace was to discuss the joint use of terminals in larger cities. Edwin Ludlow, president of the American Institute of Mining and Metallurgical Engineering, was to discuss methods for joint coal and fuel purchases. Forney Johnston, of counsel for the association, was to describe the equipment agreements and contracts between the carriers and the service corporation.

Mr. Warfield stated that his association represented the holders of \$11,000,000,000 of railroad securities, mostly bonds. Senator Cummins asked how these bondholders had selected the Board of Economics and Engineering. Mr. Warfield said they had been selected by the executive committee and were to be paid by voluntary subscriptions by members of the association. Senator Wolcott asked what was the attitude of the railroads toward the creation of this board. Mr. Warfield said that he thought the railroads would be willing to co-operate and that he could see no reason why they should not. Senator Cummins remarked that "to state it bluntly, the appointment of this board must be based on the thought that the railroads are not being properly managed and that they will accept the advice of this board and that the association must have had in mind that the railroads are not being as economically managed as possible." Mr. Warfield said there was no doubt about that, but that he thought that one difficulty of the present situation is that each executive is looking out for himself, but that he will welcome a plan of co-operation. He also said that in the event of consolidations it will be necessary to treat with the great bulk of the security owners. Senator Cummins said that if the railroads find it necessary to ask some indulgence from the security owners they will be able to get a hearing at any rate. Mr. Warfield said he desired to have W. A. Colston, director of the Bureau of Finance of the Interstate Commerce Commission appear before the committee to talk about the economies that can be effected through consolidation.

Report on Collision at Abermule

THE MINISTER OF TRANSPORT of Great Britain has issued a report, made by Col. J. W. Pringle, inspecting officer, on a disastrous butting collision of passenger trains on the Cambrian Railways at Abermule, Wales, on January 26, 1921, in which 11 passengers were killed and 36 persons, mostly passengers, were injured, three of these subsequently succumbing to their injuries. Abermule is about ten miles southwest of Welshpool and about four miles north of Newton; it is the junction of a branch to Kerry. The line is operated under the electric train-tablet system with Tyer's No. 6 instrument, which system has been in use 30 years; and the collision, one mile south of Abermule, was due to negligence in allowing the southbound train to enter the block section at Abermule with the tablet which had just been surrendered by that train (for the section north of Abermule). The trains met at about 25 or 30 miles an hour, and the engineman and fireman at fault were killed.

The inspector says that the engineman and fireman of the southbound train, Jones and Evans, should bear half the responsibility for the collision, holding also that if the engineman had been keeping a good lookout he could have applied the brakes so as to mitigate the effects of the collision. Both men evidently had accepted the tablet in a pouch without reading it. E. P. Rogers, a station porter, 17 years old, accepted the northbound train from the station to the south without authority from the station master or the signalman; and immediately after this he started for the south end of the yard to set the switch for the two trains to meet at Abermule. F. W. Thompson, ticket clerk, 15 years old, took the tablet from the southbound train, as it came in, this also without authority; and instead of putting the tablet into the instrument, he met the acting station master, Lewis, in the waiting room, and handed the tablet, in its

holder, to him, asking him to change it. Thompson then went across the tracks to take up the tickets from incoming passengers from the north. Lewis assumed that Thompson had already changed the tablet and that he was receiving one for the section south of Abermule, and he gave it to the fireman, the engineman being engaged in oiling.

Rogers, at the south end of the loop, was surprised to find that he could not set the switch for the northbound train (the switch being controlled by a bolt lock from the signal cabin) but he saw the station master give a hand signal for the southbound train to proceed, and he assumed that the meeting place of the trains had been changed.

Several other irregularities are noted in the report and responsibility is placed on the acting station master, Lewis, Signalman Jones (60 years old) and the porter and the clerk. The regular station master, Parry, was on vacation; he is held responsible for the growth of these irregular practices, and in a less degree, the inspectors who had failed to detect them. Lewis, with Jones, is held responsible equally with the engineman and fireman. All of the rules which were violated are simple and well understood and of long standing; and, indeed, violations are so infrequent that the collision is characterized as unique in the annals of British railways. "Such indiscipline and slipshod methods would have been incredible prior to this collision."

Having set forth the facts the inspector feels so strongly that the rules will be observed in the future that he finds no justification for recommending additional precautions, except the following: at meeting points where the tablet instruments cannot be placed in the signal cabin there should be electric interlocking between the tablet instrument and the starting signal; in special circumstances such interlocking should be provided even where instruments are in the signal cabin. The switches at Abermule should be worked from the cabin; and the governmental committee which is now engaged in standardization of rolling stock should consider the question of equipping new passenger cars with buffers designed to prevent overriding of one car by another in case of collision.

The engineman and fireman of the northbound train, men of long experience, could not recall cases of enginemen or firemen who did not habitually read tablets handed to them. We find no mention of the age, character or experience of the engineman and fireman who were killed.

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President Harding Leaving the Interstate Commerce Commission After His Call on June 1 for the Purpose of Inquiring as to the Progress Being Made in the Revision of Freight Rates

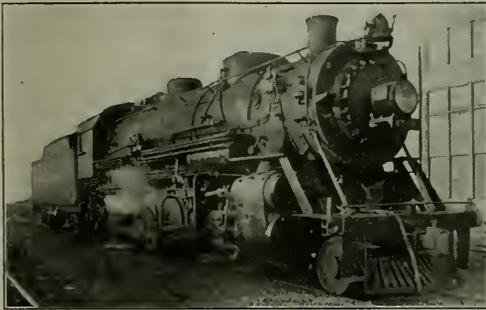
The Automatic Control of Locomotive Cutoff

Tests on Big Four Demonstrate Its Practicability, Utilizing Back Pressure as Actuating Force

By E. S. Pearce

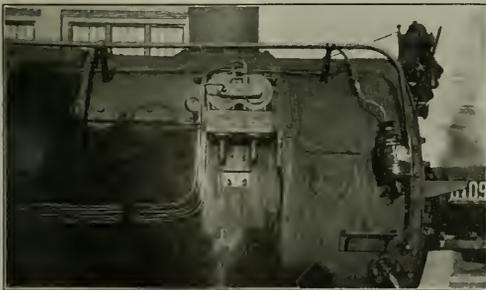
Mechanical Engineer, Cleveland, Cincinnati, Chicago & St. Louis

LOCOMOTIVE DRAW BAR pull is the result of steam pressure on the pistons. Variations in the amount of draw bar pull with changes in speed are the result of variations in the average pressure against the pistons, and changes in the average pressure against the pistons are the result of changes in the quantity, pressure and temperature of the steam admitted to the cylinders at the beginning of the stroke.



Mikado Locomotive Equipped for Automatic Control of Cut-Off

Graphically, the relation of quantity and pressure are represented by the indicator card. As shown by Fig. 1, steam is admitted to the cylinder from the point of admission *A* to the point of cutoff *B*, at a pressure of P_1 lb. At the point *B* the amount of steam in the cylinder, for all practical purposes, is the amount used in the development of the work of one stroke. From *B* the steam expands the remainder of the



Differential Valves Connected to Exhaust Passages and to Reverse Gear

stroke to the point of release *C*. On the return stroke the steam is expelled from the cylinder between *C* and *D* to the point of compression. During the time this steam is being expelled it is exerting against the piston a back pressure P_2 , tending to reduce the positive force of the steam against the opposite face of the piston.

The exhaust or back pressure, P_2 , varies directly with the admission pressure P_1 , the length of cutoff, speed and the ability of the boiler to supply steam at the rate required to maintain P_1 . It varies indirectly with the size of exhaust ports and passages.

Fig. 1 shows the value of back pressure when a constant cutoff is used through a range of increasing speeds as compared to the changes that take place in the admission pressure. The admission pressure falls off with increasing speed due principally to the inability of the boiler to supply steam in such increasing quantity and also on account of the decreased time interval for admission. Back pressure increases with increased speed due almost entirely to the shortened time interval for the escape of the steam. The net effect of the change in P_1 and P_2 was to reduce the area of the indicator card, which is the measure of the average mean effective cylinder pressure.

From the indications of the card, it is reasonable to suppose that somewhere between 12 and 26 miles an hour a shortening of the cutoff would have produced a card of greater area, regardless of the fact that a lesser number of cubic feet of steam would have been admitted to the cylinders. This increased area would be due to the higher value of P_1 caused by the smaller demand on the boiler and there being

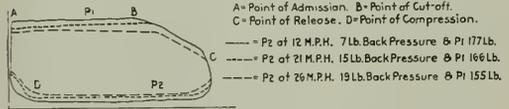


Fig. 1—Indicator Card Showing Relation Between Exhaust and Admission Pressure and Area with Fixed Cut-Off as Speed Increases

less steam in the cylinder to be exhausted the value of P_2 would be less. Should this supposition prove correct the decrease in drawbar pull would be less rapid and the amount of work per pound of steam used would be greater. Within the reasonable limits of practical application it is also possible that the exhaust pressure may bear a relation of a more or less constant nature to P_1 , the point of cutoff and the speed, such that by adjusting the cutoff to hold the exhaust pressure at a constant value an indicator card of the maximum area will be obtained for each speed within the limits of the boiler capacity.

The theory so far advanced, if of any practical value, should easily be demonstrated by the analysis of actual road tests conducted for that purpose. Such tests have been conducted on the Big Four in which no refinements of observation or calculations were indulged in not within the reasonable limits of every day performance. The conclusions, therefore, are within the reasonable limits of practical application.

It is first necessary to determine just what relation cutoff bears to drawbar pull, then what relation mean effective cylinder pressure bears to cutoff, through the same range of speeds. These relations being established, the variation of exhaust pressure as related to speed, cutoff, or mean effective

cylinder pressure can easily be determined. Since the exhaust creates draft and draft supports combustion, which must go on at a certain rate to supply steam, the relation of exhaust pressure and draft must also be determined. Part of the heat of combustion is used in superheating the steam. Since the steam supply, as controlled by cutoff, bears a possible relation to exhaust pressure and since draft may also bear such a relation, it is essential that the relation of superheat to back pressure be determined throughout the working range of cutoffs.

For determination of the above relations and variations in each specific element, a stoker fired locomotive of the Mikado type with the following dimensions was used:

Cylinders	27 in. by 30 in.
Tractive effort	50,000 lb.
Diameter of drivers	63 in.
Steam pressure	200 lb.
Grate area	60 sq. ft.
Evaporative surface	4,650 sq. ft.
Superheat surface	1,165 sq. ft.
Weight on drivers	246,000 lb.
Valve gear, Walschaert	

With respect to the relation of the position of the reverse lever to the amount of steam travel of the piston for several positions of the reverse lever, it should be noted that from the corner back to the third notch the cutoff was shortened .705 in., from the third to the sixth notch 2.135 in., and from the sixth to the ninth, the shortest cutoff, 5.74 in. The effect of one notch adjustment near the corner is, therefore, about one-eighth that of one notch near the center.

The range of speed through which one cutoff will maintain a greater drawbar pull than the next longer or shorter cutoff is very clearly shown in Fig. 2 by the relation of the drawbar pull-speed curves for the positions of cutoff with the reverse lever in the first, third, sixth and ninth notches. The extent to which the use of one cutoff through a considerable range of increasing speeds will tax boiler capacity is shown by the

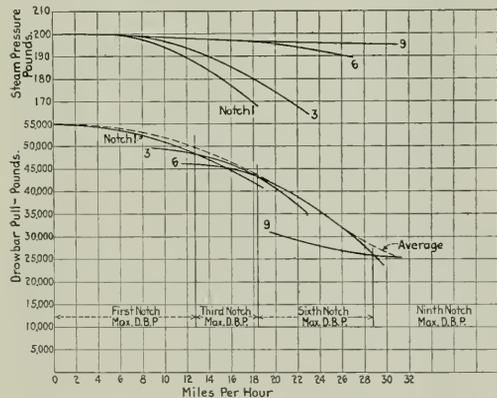


Fig. 2—Variation of Drawbar Pull and Boiler Pressure as Speed Increases with Four Positions of Cut-Off

rate at which boiler pressure falls off as speed increases. It is evident that using the incorrect cutoff when maximum capacity is required will not only prevent such capacity being developed, but will needlessly tax the steaming capacity of the boiler. Cutoff changes to develop maximum drawbar pull at each speed on this particular class of engine should be made as follows:

First notch, 89.1 per cent C. O.	0 up to 12-14 m.p.h.
Third notch, 86.75 per cent C. O.	12-14 m.p.h. to 18-19 m.p.h.
Sixth notch, 79.65 per cent C. O.	18-19 m.p.h. to 28-30 m.p.h.
Ninth notch, 60.5 per cent C. O.	28-30 m.p.h. up.

In actual practice with either increasing or decreasing speed this number of cutoff changes would not be made,

although the advantage of so doing must be evident. In fact, the notches between those cited could be used with profit.

Mean effective cylinder pressure, back pressure and their relation to speed are shown in Fig. 3. Since mean effective cylinder pressure produces drawbar pull, the cutoff changes required to hold it at the maximum with changing speed should correspond to those required to hold drawbar pull at the maximum. From Fig. 3 these are found to be as follows:

First notch	Up to 12-14 m.p.h.
Third notch	12-14 m.p.h. to 18-19 m.p.h.
Sixth notch	18-19 m.p.h. to 28-30 m.p.h.
Ninth notch	28-30 m.p.h. and up.

The slight discrepancy in speed at the upper limit of the third notch and the lower limit of the sixth notch does not

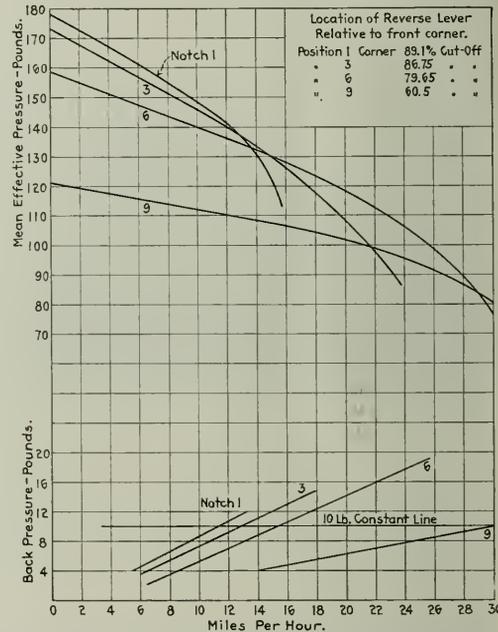


Fig. 3—Relation Between Average Mean Effective Pressure, Back Pressure and Speed for Four Positions of Cut-Off

detract from the theory and the fact that mean effective pressure falls off at a more rapid rate than boiler pressure, as shown in Fig. 2, while back pressure increases in practically direct proportion to increasing speed, is a practical demonstration of the theory set forth in connection with Fig. 1. Attention is called to the fact that the back pressure curve for each cutoff shows a value of approximately 10 lb. at the same speed at which the cutoff should be changed to hold mean effective pressure as well as drawbar pull at a maximum.

Since back pressure apparently bears some constant relation to mean effective cylinder pressure and thence, through cutoff, to drawbar pull, there must be some point of maximum return to be expressed in pounds mean effective cylinder pressure per pound of back pressure. Fig. 4 shows the ratio of mean effective pressure to pounds of back pressure for the various cutoffs and back pressures. The longest cutoff gives the maximum return in pounds mean effective pressure per pound of back pressure up to a point between 10 and 12 lb. back pressure, which occurs for this cutoff at 12 to 14 miles an hour. All values of cutoff show that with 10 to 12 lb.

back pressure the pounds mean effective pressure per pound of back pressure are approximately the same. Therefore, if each cutoff is changed when a speed is reached such that back pressure has reached between 10 and 12 lb., the maximum

10 to 12 lb. back pressure is the point of maximum return is still further evidenced by the fact that the relative positions of the several curves in Fig. 4 are reversed on either side of this critical range.

The relation of draft to back pressure is shown in Fig. 5. Dr. Goss in his book on "Locomotive Performance," states that:

"First—Changes in cutoff have no effect upon the form and character of the jet, except insofar as they affect the quantity of steam discharged.

"Second—With a given weight of steam discharged, whether in heavy exhausts incident to low speed, or the more rapid impulses at high speed, the draft resulting is practically the same. But whenever the weight of steam discharged per minute changes, the draft will change.

"Third—In any boiler the condition of draft determines the rate of combustion and consequently under ideal conditions, the draft will be a function of the rate of combustion."

From Fig. 5 it will be seen that for all of the cutoffs shown, constant back pressure is synonymous with constant draft. This seems to be contradictory to the first and second con-

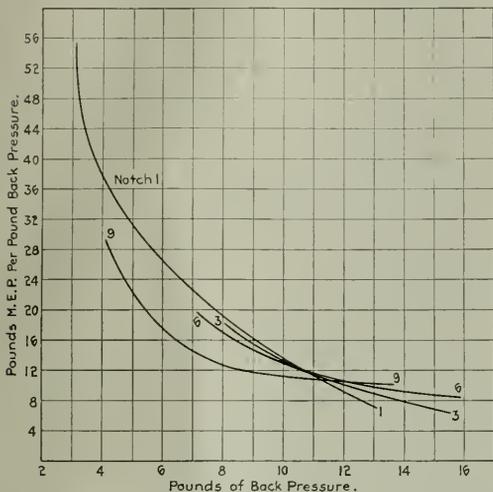


Fig. 4—Average Pounds Mean Effective Pressure Per Pound Back Pressure for Four Positions of Cut-Off

return for the back pressure carried will be obtained, both in economy as to mean effective pressure and capacity as to the drawbar pull obtained as a result of the change. That

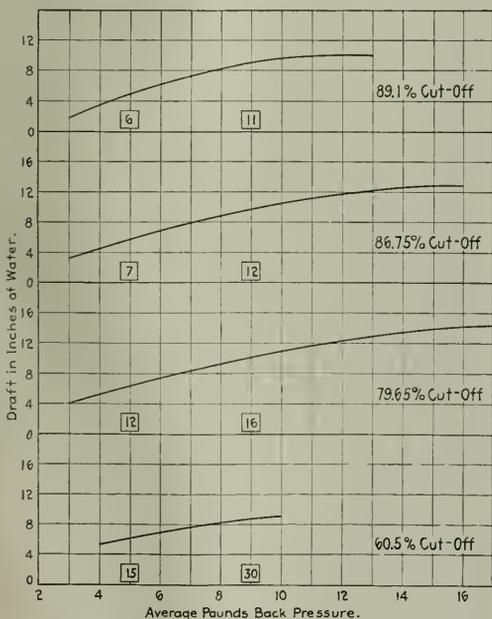


Fig. 5—Back Pressure and Average Draft at Base of Stack for Four Positions of Cut-Off with Varying Speed

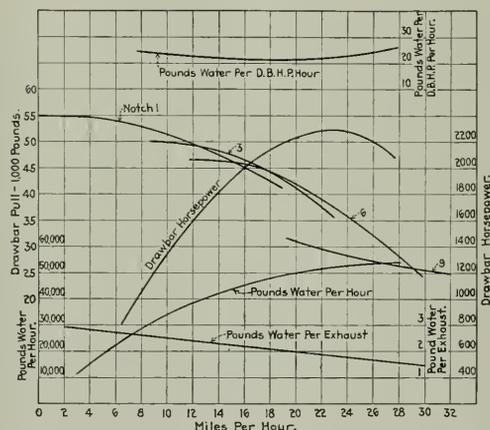


Fig. 6—Drawbar Pull, Horsepower and Water Rate Cut-Off Adjusted for Varying Speed, as Shown in Fig. 2

clusions of Dr. Goss since as speed increases and cutoff is shortened, the quantity of steam exhausted per minute increases with speed as shown by Figs. 6 and 7. It should be noted that as cutoff is shortened with increased speed the amount of steam discharged per exhaust decreases from 2 miles an hour to 28 miles an hour by 45.8 per cent, whereas the quantity per minute increases over the same range by 1,460 per cent. At low speeds the intervals between exhausts is large and the quantity of steam discharged per exhaust is also large. At high speeds the intervals between exhausts is small and the quantity of steam discharged per exhaust is also small. Low frequency and high quantity in one case is equalled by high frequency and small quantity in the other; the result is a constant.

Constant draft through a range of speed requiring an increasing rate of steam supply and consequently an increasing rate of combustion if steam pressure is to be maintained within working limits, may seem to be contradictory to the third deduction made from the experiments of Dr. Goss. Analysis of the conditions of actual operation very easily explains the consistency of both statements. To supply steam at low rates a heavy fire is used, giving greater resistance to the passage of a given quantity of air through the fuel bed

in a given time, hence a high draft is required although less air is required in a given time than at high speed. To supply steam at high rates a light fire is used with lower resistance to the passage of the air, yet the quantity of air required in a given time is greater than at low speed. For all practical purposes draft is constant for varying rates of combustion and the air supply automatically controlled by the thickness of the fuel bed.

The statement that conditions of operation actually require constant draft is further substantiated by the relation of superheat to back pressure. Shortening the cutoff to hold back pressure constant as speed increases results in constant draft and as a result of this regulation of the quantity of steam passing through the superheater, practically a constant amount of superheat is obtained throughout a great range of speed. For back pressures from 8 to 13 lb. the superheat is the same. The higher back pressure is the maximum of economical return in draft and the range is within that obtained with low as well as high speed.

In summing up the analysis of back pressure and the rela-

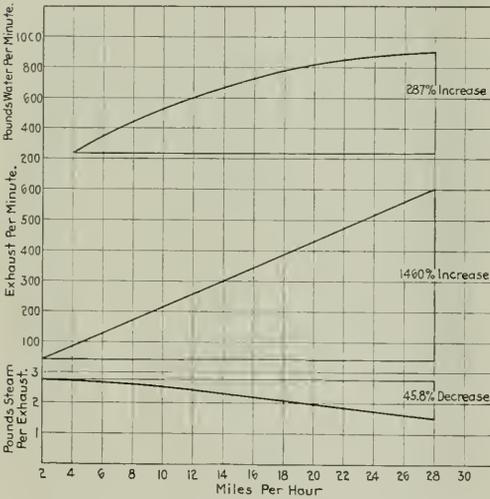


Fig. 7—Total Rate of Steam Discharge Per Minute. Cut-Off Changed at Speeds as Shown on Fig. 2

tion of back pressure to the several features of locomotive operation it would seem that operating an engine to constant back pressure should regulate the cutoff to sustain the maximum drawbar pull at all speeds and consequently develop the maximum drawbar horse power at each speed; and that in developing the maximum drawbar horse power at each speed the required number of pounds of water per drawbar horse power would be supplied, the draft and superheat being so regulated that the boiler would maintain adequate working pressure.

With the pressure, volume, and temperature of the steam used in a given time known, it is possible to calculate the weight of steam used within practical limits of accuracy, which is sufficient for comparing the steam consumption per unit of work at one speed with that at another. From the indicator card the volume of the steam and the average pressure at the point of cutoff can be obtained. The temperature of the steam may be that shown by the pyrometer, which will give the degrees superheat over the saturated temperature at the cutoff pressure, or the total superheat over the saturated temperature at cutoff may be assumed as that of the saturated

temperature at boiler pressure plus the degrees superheat indicated by the pyrometer. In either case the error is negligible. From the data shown on Fig. 6 and previous charts, such calculations may be made.

Applying this method of calculation, the amount of steam per minute, per exhaust and per drawbar horsepower-hour shown in Table I and in Figs. 6 and 7 have been obtained. The water or steam per drawbar horsepower hour is well

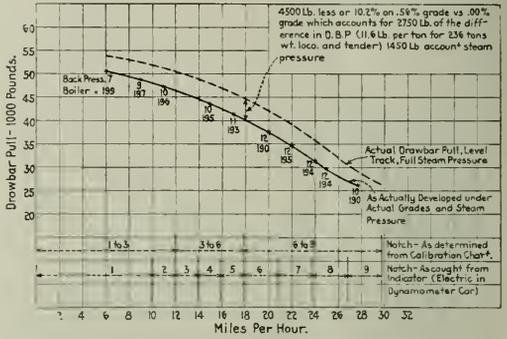


Fig. 8—Maximum Drawbar Pull Compared with That Developed by Regulating Cut-Off to Maintain Constant Back Pressure

within the limits of economical performance and at the maximum is within the limit of economical combustion.

The ability of the engine to maintain steam pressure when operated at 10 to 12 lb. back pressure and the extent to which the maximum drawbar pull will be developed at each speed is shown in Fig. 8. In the operation of the reverse lever to hold the back pressure constant, accelerating a maximum tonnage train from 3 to 28 miles an hour on grades of —13

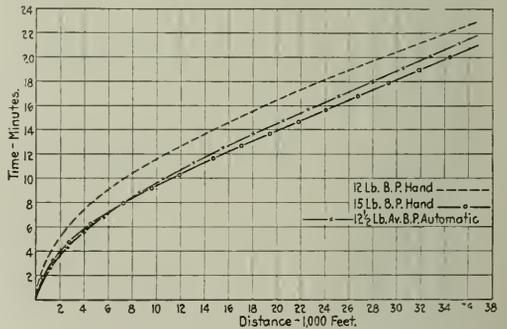


Fig. 9—Time Distance Curves for Runs Under Varying Conditions of Back Pressure

per cent to +.629 per cent, the cutoff was changed 14 times in 7 min. 23 sec. and in a distance of 2.4 miles.

The practical application of the back pressure method of cutoff control so far as the manual operation of the reverse lever is concerned, presents a serious problem because too much of the engine-man's time would be required to properly manipulate the reverse lever. To overcome the disadvantage of manual operation of the reverse lever the back pressure principle has been applied to a system of valves which, actuated by back pressure and synchronized with the throttle, automatically operates a power reverse gear to adjust the cutoff and thereby relieve the engine-man.

Automatic operation of the reverse lever possesses mechanical, economical and capacity increasing advantages, and it is also on the side of safety. Mechanically the advantages are independence of valve setting, reach rod length or fineness of the quadrant notches, and the elimination of mechanical appliances for the indication of speed, making the adjustment independent of conditions of wear, which would tend toward the inaccuracy of a mechanical speed actuated device. Economical advantages are the operation of the unit to the maximum economical capacity as to hauling light trains or heavy trains at the speeds consistent with the loading, and uniform and synchronous operation with respect to steam

finer cutoff than the engine will practically operate under at high speeds cannot be obtained. The circular quadrant permits the reverse lever to follow the gear and indicates the cutoff and also serves as a quadrant for the reverse lever when under hand control. A control valve is connected to the throttle so that the engine is placed in automatic cutoff and the reverse lever cannot be manipulated by hand when a full throttle is used. At any predetermined speed the throttle may be manipulated to restore hand control and with a small throttle opening, such as used in the movement of the engine alone or the engine and a few cars, the reverse lever may be manually operated.

Three comparative tests to determine the advantages of automatic operation were conducted under constant conditions of train loading, grade and direction. In the first test, the reverse lever was operated by hand to hold 12 lb. back pressure and the time to cover a given distance, while accelerating the train from a stand, was recorded. The second test was the same except that 15 lb. back pressure was to be maintained. The conditions of the third test were the same except that the reverse lever was automatically operated to maintain 12½ lb. back pressure. All tests started from the same point and a full throttle was required. The train consisted of 55 loaded cars of 3,479 tons actual weight.

Fig. 9 is the time-distance chart of these runs, which shows that six miles was covered in 20.9 min. in the first

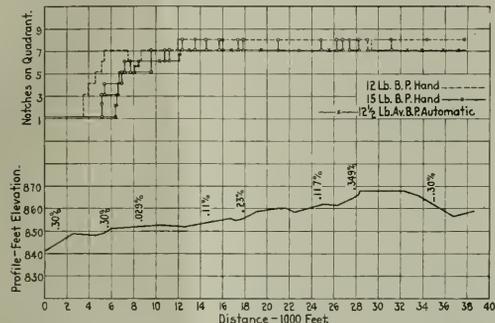


Fig. 10—Profile and Reverse Lever Positions for Runs Shown in Fig. 9

generation and consumption, draft, cutoff, superheat, and drawbar pull. From the standpoint of safety, the advantages are—relief for the engineman from a time absorbing duty, permitting concentration upon such other operating duties as the water, sand, throttle and signals.

The automatic device for the adjustment of cutoff consists essentially of three parts. Two differential valves set

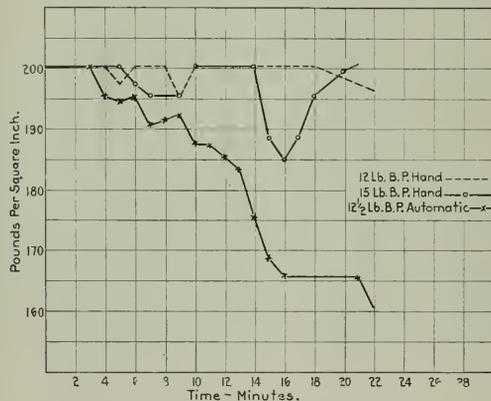


Fig. 11—Steam Pressure on the Three Runs Shown in Figs. 9 and 10

TABLE I—COMPARISON OF STEAM CONSUMPTION IN LB. PER MINUTE AS CALCULATED FROM INDICATOR CARD BY

- (1)—PRESSURE AND TEMPERATURE AT CUTOFF, PLUS 250 DEG. SUPERHEAT, AND
- (2)—PRESSURE AT CUTOFF AND TEMPERATURE AT BOILER PRESSURE, PLUS 250 DEG. SUPERHEAT

Miles per hour	Revolutions per minute	Volume of four cylinders per % cutoff	Cu. ft. steam per minute	Pounds steam per minute	Cu. ft. steam per lb. at cutoff	Pounds steam per minute	Cu. ft. steam per lb. at cutoff	Pounds steam per minute	Exhausts per minute
4	107.2	35.4	379	118.5	3.2	375	3.2	718	42.8
6	21.4	35.4	1757	331	3.28	338	3.28	331	85.6
8	32.0	35.4	1130	338	3.34	338	3.34	332	128.0
10	42.7	35.4	1510	430	3.5	253	3.46	436	170.8
12	53.3	35.4	1890	525	3.6	215	3.6	523	214.0
14	64.0	35.4	2560	610	3.7	138	3.8	593	256.0
16	74.8	34.5	2580	663	3.89	221	4.0	645	299.0
18	85.5	34.5	2950	728	4.05	213	4.1	720	342.0
20	96.2	34.5	3320	790	4.2	206	4.3	772	384.0
22	107.0	31.6	3380	844	4.4	179	4.5	780	438.0
24	117.5	31.6	3710	807	4.6	173	4.7	790	470.0
26	128.5	31.6	4070	849	4.8	165	4.9	830	514.0
28	138.0	31.6	4360	872	5.0	158	5.2	840	552.0
30	146.0	31.6	4920	895	5.5	149	5.7	863	600.0

test, in 18.5 min. in the second test and in 19.3 min. in the third test.

Fig. 10 shows the rate at which the cutoff was changed and the nature of the grades negotiated. In the first 10,000 ft. seven adjustments were made in 11.4 min., or one every 1.6 min., in the first test; six adjustments were made in 9.0 min., or one every 1.5 min., in the second test, and in the third test six adjustments were made in 9.4 min., or one every 1.56 min.

Some time had elapsed between the first and third tests and as a result, the condition of the fire in the test of the automatic device was not as conducive to good steam pressure as in the two previous tests. Since this condition, however, is to be expected no steps were taken to better it. Fig. 11 shows the steam pressure conditions under which the three tests were run and explains why the automatic device held the engine in the corner longer than was required in the first two tests and did not hook back to the same short cutoff that was obtained in the other tests. It is remarkable, how-

one pound apart are provided, one for shortening the cutoff when the back pressure increases, and the other for lengthening the cutoff when the back pressure decreases. Both valves are connected to the four exhaust passages of the cylinder saddles and to the air supply for the power reverse gear. A circular quadrant and cutout valve are so arranged that a

ever, that in spite of the lower steam pressure the performance practically equalled the first two tests.

The modern locomotive with all the capacity and economy producing specialties and features of design may be divided into two parts by a line extending horizontally under the fire box and through the valve, from tender end sill to pilot beam. Above this line there is every development to produce steam economically and in quantity. Below this line there is every development to utilize the steam and the potential capacity of the entire machine in the production of drawbar pull and gross ton miles—the ultimate justification for the investment. The extent to which the ultimate return in capacity and economy is realized depends upon the element of personal skill of the engineer.

The function of cutoff adjustment is the accurate and constant transfer of energy and the extent to which accuracy and constancy are obtained is the measure by which net return is realized.

Freight Car Loading

WASHINGTON, D. C.

FREIGHT CAR LOADING during the week ended on June 11 was the heaviest reported this year, according to the weekly report of the Car Service Division of the American Railway Association, a total of 788,997, as compared with 930,976 in 1920 and 807,205 in 1919. This represents a gain of 1,760 as compared with the week before the May 30 holiday, although it is still behind the figures for 1919. For the week ending June 4 the loading was only 706,508 cars, as compared with 828,907 in 1920 and 776,610 in 1919, but the reduction is attributed to the holiday.

The freight car surplus for the week of June 15 showed a further reduction of 7,780 to 381,746 cars, of which 143,935 were box cars and 159,448 were coal cars.

The summary for the week of June 4 and the summary for the following week are given below.

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

Summary—All Districts; Comparison of Totals This Year Last Year, Two Years Ago, for Week Ended Saturday, June 4, 1921

Districts	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Mdse. L. C. L.	Miscellaneous	Total revenue freight loaded		Received from connections			
										This year 1921	Corresponding year 1920	Corresponding year 1919	This year 1921	Corresponding year 1920	Corresponding year 1919
Eastern	1921	6,347	2,359	36,092	1,028	5,342	2,511	51,108	60,312	165,103	.....	.....	180,576	.....	.....
	1920	4,518	2,396	46,457	3,523	7,308	6,089	21,519	98,212	215,519	190,022	197,354	.....	230,513	200,300
Allegheny	1921	2,810	2,823	43,890	2,227	2,690	6,244	40,831	44,620	146,135	.....	.....	.....	101,525	72,428
	1920	2,395	2,407	48,207	5,933	3,354	10,670	37,277	65,362	176,140	159,701	.....	.....	113,704	113,118
Poehontas	1921	54	150	23,014	33	1,350	23	2,379	4,791	31,894	.....	.....	.....	13,721	.....
	1920	90	131	18,243	645	2,049	229	176	9,292	.....	30,855	34,773	.....	20,027	16,705
Southern	1921	4,338	1,980	19,416	448	14,470	582	35,258	31,002	107,394	.....	.....	.....	58,970	.....
	1920	2,177	2,177	22,576	1,721	16,403	3,117	23,422	47,562	117,949	110,861	.....	.....	74,428	60,366
Northwestern	1921	11,086	6,021	4,759	626	14,121	17,708	24,994	28,526	107,843	.....	.....	.....	40,113	.....
	1920	8,287	6,760	6,324	1,111	17,760	45,562	19,604	39,485	.....	144,903	138,225	.....	59,210	47,759
Central Western	1921	12,092	8,257	12,252	156	4,255	519	26,271	30,542	94,344	.....	.....	.....	43,332	.....
	1920	7,605	9,277	20,455	477	5,152	4,946	28,031	35,360	.....	112,308	89,024	.....	70,229	50,393
Southwestern	1921	4,657	2,449	3,251	122	5,999	724	14,405	7,218	53,795	.....	.....	.....	40,317	.....
	1920	3,371	2,236	5,757	132	6,204	817	15,120	23,098	.....	56,735	46,672	.....	47,898	35,890
Total all roads	1921	41,394	24,039	142,674	4,642	48,227	28,311	195,246	221,975	706,508	.....	.....	.....	478,554	.....
	1920	29,166	25,689	168,019	11,993	58,260	71,430	145,179	191,711	.....	828,907	.....	.....	657,709	.....
	1919	32,323	27,184	175,046	.....	58,921	.....	.....	.....	.....	42,514	.....	.....	.....	524,731
Increase compared	1920	12,228	.....	.....	.....	.....	.....	50,067	.....	.....	.....	.....	.....	.....	.....
Decrease compared	1920	.....	1,650	25,345	7,351	10,033	43,119	.....	97,196	122,309	.....	.....	.....	179,155	.....
Increase compared	1919	9,071	.....	.....	4,642	.....	.....	195,246	.....	.....	.....	.....	.....	.....	.....
Decrease compared	1919	.....	3,145	27,372	.....	10,764	31,241	.....	206,339	70,102	.....	.....	.....	.....	.....

L. C. L. merchandise loading figures for 1921 and 1920 are not comparable, as some roads are not able to separate their L. C. L. freight and miscellaneous of 1920. Add merchandise and miscellaneous columns to get a fair comparison.

May 28.....	1921	46,337	27,518	164,870	5,605	50,277	28,673	215,095	248,852	787,237	898,207	763,761	519,191	676,601	550,858
May 21.....	1921	37,252	26,368	158,512	5,337	50,216	30,214	216,030	244,401	768,330	862,074	777,324	508,969	666,585	557,879
May 14.....	1921	34,418	25,599	161,782	5,126	49,365	22,806	215,524	233,538	750,158	843,145	739,945	501,228	620,196	540,955
May 7.....	1921	34,847	27,123	143,323	4,626	48,095	13,041	213,535	233,345	718,025	843,184	753,287	495,386	594,418	549,712

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

Summary—All Districts, Comparison of Totals This Year, Last Year, Two Years Ago. Week Ended Saturday, June 11, 1921.

Districts	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Merchandise L.C.L.	Miscellaneous	Total revenue freight loaded		Received from connections			
										This year 1921	Corresponding year 1920	Corresponding year 1919	This year 1921	Corresponding year 1920	Corresponding year 1919
Eastern	1921	6,895	3,239	44,309	1,032	6,266	2,369	58,489	72,411	195,010	.....	.....	195,410	.....	.....
	1920	5,607	2,873	56,597	3,000	8,445	7,806	25,568	113,493	.....	223,389	203,550	.....	250,086	215,130
Allegheny	1921	3,041	3,630	52,497	2,372	2,973	6,973	43,859	52,797	168,142	.....	.....	.....	109,477	.....
	1920	2,710	3,555	56,398	5,849	3,539	11,084	42,522	73,987	.....	199,644	167,189	.....	145,985	121,311
Poehontas	1921	181	118	18,112	631	2,157	220	2,536	5,189	33,380	.....	.....	.....	14,262	.....
	1920	157	118	18,112	631	2,157	220	129	10,312	.....	32,036	32,981	.....	22,580	15,900
Southern	1921	3,664	2,302	19,796	441	14,608	787	38,291	32,375	112,264	.....	.....	.....	59,868	.....
	1920	3,291	2,185	23,092	238	16,690	3,494	25,908	51,541	.....	126,439	112,348	.....	79,768	58,058
Northwestern	1921	11,647	7,436	5,331	619	14,751	18,741	27,714	31,651	117,890	.....	.....	.....	34,745	.....
	1920	9,785	6,856	8,405	1,209	13,171	46,942	22,501	44,782	.....	158,651	146,234	.....	61,932	52,848
Central Western	1921	10,783	9,811	13,324	135	5,076	541	29,100	36,148	104,918	.....	.....	.....	46,203	.....
	1920	9,211	9,845	22,955	528	6,684	4,635	31,504	43,284	.....	128,646	100,680	.....	72,773	59,245
Southwestern	1921	4,908	2,564	4,107	134	6,303	742	15,651	22,984	57,393	.....	.....	.....	41,364	.....
	1920	3,647	2,189	5,735	88	7,292	843	16,805	25,902	.....	62,171	44,133	.....	48,390	41,346
Total all roads	1921	41,119	29,135	163,088	4,788	51,393	30,179	215,740	253,555	788,997	.....	.....	.....	501,329	.....
	1920	34,408	27,591	191,494	11,543	62,978	75,024	164,637	363,301	.....	930,976	.....	.....	681,514	.....
	1919	31,352	27,132	171,826	.....	59,463	65,874	.....	451,564	.....	.....	.....	.....	.....	563,838
Increase compared	1920	6,711	1,544	.....	.....	.....	.....	51,103	.....	.....	.....	.....	.....	.....	.....
Decrease compared	1920	.....	.....	28,406	6,755	11,585	44,845	.....	109,746	141,979	.....	.....	.....	180,185	.....
Increase compared	1919	9,767	2,003	.....	4,788	.....	.....	215,740	.....	.....	.....	.....	.....	.....	.....
Decrease compared	1919	.....	.....	8,732	.....	8,070	35,695	.....	198,009	18,208	.....	.....	.....	62,509	.....

THIRTY CENTS FOR A POTATO is the gravamen of a complaint made against a Canadian dining car by Hon. John Oliver, Premier of British Columbia, recently; and, says the minister, the farmers are selling them at 35 cents a sack. Mr. Oliver made this complaint, however, to a reporter, not to the railroad; and he turned at once to more serious matters. He says that this is going to be one of the best and one of the worst years for the farmer.

Canada never gave such a promise of good crops as this year. "There'll be splendid crops, bar accidents. But prices! Well, I don't know what the farmer is going to do this year. A farmer in Ontario told me that he was getting only \$7 a can for his cream. It dropped from \$22 to \$7 in six weeks. It looks as if this is going to be a year of difficulty for the farmer in spite of potatoes at 30 cents apiece on the trains."

Co-ordinating Motor Trucks With Railroads*

Opportunities for Highway Transportation to Develop New Traffic Instead of Merely Competing with Existing Lines

By Stuart B. Moore

Formerly Construction Engineer, Southern Pacific Lines—Atlantic System

I ASSUME it is generally admitted that traffic should move by the most economical route and that in considering the cost of motor truck ton-miles all items of cost should enter into the motor truck ton-miles. The layman is prone to figure the cost of motor truck service as the cost of wages, fuel and maintenance of equipment, plus a profit for the concern operating the truck line. If the proper charge were added for the damage that the motor truck does to the highway, plus an interest charge on the property investment, the cost of motor truck service would immediately become prohibitive. However, I want to make clear that this argument is not intended to discourage motor transport but on the contrary it is hoped that a way can be pointed out that will greatly extend the use of motor driven vehicles as an aid to our railroads instead of a competitor.

Motor Transport Now Unregulated

Motor transport as it exists today is totally unregulated from an operating standpoint. There is no prohibition against anybody running a motor truck of any weight, anywhere, regardless of danger to the roads when considered as a structure being able to stand this loading. It is a matter of common knowledge both to the lay and professional minds of the country that the loading of our motor transport is greatly in excess of the strength of our roads, yet no one does anything about it and the evil grows unchecked.

The main highways of today were originally located adjacent to the lines of railroad when the country was sparsely settled and without any view to bringing traffic to the railroads. It is on these highways that we are spending a very large proportion of the road funds today. The function of motor transport is to feed the railroads and not to compete with them and as this is quite generally acknowledged why should we spend most of our road funds on parallel highways and almost totally exclude tributary highways?

The economic theory of railroad and highway location demands that main highways that are built to carry heavy motor traffic should be across the main lines of railroads and should not parallel individual lines of railroads as is now too frequently the case. If the present policy of subsidizing parallel lines of highways whose only service is to compete with the railroads, instead of highways that radiate from transportation centers is continued this policy will certainly result in crippling of our transportation system. It is true that the railroads are here and cannot be removed but it is also true that good service is required, that terminal improvements are urgent and that new and additional equipment is essential if our transportation machine is to function properly. These things are essential and require money, and lots of it, and with the operating ratio of many of our best and most efficient carriers close to 100 per cent the chance of the public through the carriers obtaining these things is not good to say the least.

How Highways Can Best Serve the Public

It is, however, possible for the highways of this country to be located so as not only to serve the people to a much better advantage but also to assist the railroads to get ade-

quate returns as well as to stimulate very greatly motor transport.

Assuming that a transportation center—and any thriving town surrounded by a farming community or in which industries are located may be considered as such—had a system of good roads radiating from it so that the back areas were as available to the benefits of the city as the locations closer in, it would be possible for motor transport to be developed so that freight could be collected at either the farm or the factory and the bill of lading issued at once by the concern handling the motor transport. The merchandise thus collected could be delivered to the railroad which would haul it to its destination and would in turn be delivered to the motor transport company that would operate in the section to which the freight was destined and would be delivered to its final destination after having been handled throughout by the utmost economy and dispatch.

I of course do not mean to suggest that highways between large centers be not maintained to a high degree of excellence but I do affirm that it is unnecessary to construct these highways so that gasoline locomotives can be operated over them and that the major portion of the road funds available be consumed in their construction and maintenance to the detriment of the tributary territory.

To one familiar with the transportation business many things are obvious. The roads would have to be designed to carry a pre-determined load; and having been built in accordance with this design the load that the structure was designed for could not be exceeded without promptly destroying the structure. Heavy loads could of course be moved over the highways, but the manner in which these loads could be moved would first have to be regulated by the central authority in the district charged with this function of highway administration. If the railroads attempted to run their heavy locomotives indiscriminately over their branch and main lines they would be out of service the first day that such a policy was attempted.

Some definite policy of maintenance would of course have to be insisted upon and the roads of the district should preferably be of a common standard design so as to simplify the maintenance to as great a degree as possible.

The co-operation of the manufacturers of motor truck companies could be secured so that they would refuse to sell in a community a truck that was heavier than the roads in that particular district would carry.

The question as to who would administer a given district in such a manner naturally comes next. The talent to do so is found only in the railroad service and beyond any question the carriers would have to establish a department to co-operate with the local public officials; this department of the railroad functioning under the direction of some public body which would have the power of enforcing or annulling the carriers' suggestions for the handling of the traffic of the district.

The Federal Highway Council of Washington, D. C., has decided that "The encouragement of highway transportation beyond highway development is dangerous. It will discourage the use of motor trucks. Highway transportation will follow highway development but it cannot lead." As this is a strictly true statement and as it can be shown that an

*From a statement given to the Senate Committee on Interstate Commerce.

adequate system of rural roads of present types that are suitable to stand even light motor trucks is impossible on account of the cost being in excess of what the more sparsely settled communities can bear, a discussion of this sort would be visionary in the extreme if a design for a road that would fulfill the above requirements were not submitted to support the preceding analysis of our motor-transport-railroad situation.

When we come to consider hard surfaced roads we must discard all but one type for general use on our country roads outside of thickly settled communities on account of their cost. This is the surface treated road or as the laymen frequently miscall them, Tarvia roads. In considering this type we are immediately confronted with the fact that the life of this road is but a year and were we to pause here we should be forced to also discard this type on account of its high annual cost.

A careful investigation of this type of road reveals that the reason for the early failure of these roads is that traffic develops a well defined path which is in reality a slight rut and as almost the entire wear occurs in this rut, in the course of a year's time small holes wear through the thin asphaltic surface and as a consequence water is thus admitted to the subgrade. These wet places become soft places and the soft places under traffic quickly become low places and the low places produce impact and the entire rut is then quickly pounded to pieces and unless prompt and extensive repairs are made the road is destroyed.

As this type of road fails because the rut is not only the weak spot, but the very weak spot, a type of roadway has been developed that takes advantage of the psychology of the situation and recognizes the human tendency to follow a rut and furnishes the rut for traffic to follow and places a foundation under the rut so that the rut instead of being the very weak spot becomes the very strong point in the road. The rut (reinforced tracks sunk below the surface) is of course not made deep enough to interfere with a car turning out to meet or pass another car. On roads that have a heavy traffic in both directions the highway should be double tracked.

This road is not a visionary project by any means as it has been approved by the Bureau of Standards in Washington, the Federal Highway Council, spoken of favorably by the Bureau of Public Roads, and Julius Kruttschnitt, chairman of the board of the Southern Pacific Railroad, has gone into the matter and expressed a favorable opinion of the design and his interest in the initial installations.

International Equipment Association Proposed

WASHINGTON, D. C.

ESTABLISHMENT of an international railroad equipment association to finance the sale of equipment to railroad roads has been put forward by the American Committee on Land Transportation for consideration at the first annual meeting of the International Chamber of Commerce in London during the week of June 27. This proposal has been made to Walker D. Hines, formerly head of the United States Railroad Administration, who as chairman of the International Chamber railroad group asked for suggestions from the American committee in the formation of the program for the London conference.

The committee believes that the organization of an equipment pool would be an important step toward relieving a critical situation, which is one of the underlying causes impeding the restoration of the world's commerce. In its report to Mr. Hines, who has been in Europe for the past year, the committee says that "in view of the shortage of capital in

foreign countries it is probable that the additions and betterments of the physical railroad properties and the necessity for increased equipment cannot be locally financed for some time. We suggest that negotiations be entered into with a view to bringing American bankers and the fiscal heads of the nations interested together for the purpose of organizing an International Equipment Association. It would be the purpose of this association to furnish funds for equipment required, to the extent of perhaps 75 per cent of its value, with notes guaranteed by the government of the country concerned in the transaction; an initial payment of 25 per cent to be made by the purchaser."

At the same time, the American committee proposed to Mr. Hines "that it might also be desirable to organize a railroad construction and development association financed in America upon lines similar to those suggested for the equipment association. It would be the purpose of such association to undertake any needed extensions and development of railroad lines in foreign countries."

The committee's report gave considerable attention to the removal or simplification of frontier restrictions which delay either rail or water transport. "It is suggested by this committee," the report says, "that consideration be given to prevailing practices in the United States as related to international commerce between Canada and the United States, between Mexico and the United States, and between Mexico and Canada via the United States, under which system of documentation the local regulations of Canada, Mexico, Cuba and the United States as subordinated to well-defined regulations applying purely on through traffic, as under this system the delay at frontiers is minimized.

"The necessary, international shipments are carried forward under bond, the settlement being made at the established ports of entry in the several countries. Under this plan, the delay at the frontier is only that which is necessary for the proper protection of the customs revenue of the respective government."

The committee recommended the consideration of the possibility of creating at each port a port terminal zone under one authority whereby freight interchanged between the rail lines and the vessels shall be under a joint supervision and interchange of documents which will protect equally both the rail lines and the water carriers.

Another general topic of substantial importance considered by the American committee was that of international bills of lading. In answer to the question "is there any form of international bill of lading which at present is regarded as a standard and which ought to be put forward for endorsement by the London Congress?" the committee says: "The United States bill of lading is applicable on traffic between the United States, Canada and Mexico, and it is susceptible of adaptation to all international traffic. It is considered highly essential that such form of international bill of lading shall be put into effect."

The committee strongly recommended the use of an international uniform railroad gage as an important step toward improving railroad transportation between the various countries.

THE LOSS AND DAMAGE claim prevention committee of the Middle Division of the Pennsylvania Railroad has been making a "drive" against poor stowing and rough handling and to abolish the waste of money due to carelessness. Members of the committee are much pleased with the way the men have responded to their solicitation for help. William Elmer, superintendent of the Middle division, addressed the Kiwanis and Rotary clubs at their luncheons in Altoona recently in connection with the drive. He stressed the important part that the shippers have to play in the reduction of claims.

New Classification of Railway Employees Ordered

Labor Board Divides Workers Into 148 Reporting Divisions and 500 Occupational Classes

NEW RULES for the classification of railway employees and for reports as to their number and compensation have recently been issued by the United States Railroad Labor Board and approved by the Interstate Commerce Commission. The revised classification becomes effective on July 1. Reports to the Interstate Commerce Commission and to the Labor Board will be made under this classification thereafter. The new rules and classification are contained in a volume entitled, "Rules for Reporting Information on Railroad Employees Together with a Classification and Index of Steam Railroad Occupations," issued to the carriers by the Labor Board.

The introductory statement in this volume describes very clearly the inadequacy of the present reporting plan, and after outlining the difficulties encountered by various wage commissions and arbitration boards in collecting data upon which to base their decisions, the statement says: "In deciding questions at issue, the Labor Board was seriously handicapped because of the absence of wage data relating to homogeneous groups of occupations and classified according to the special working conditions found in railway operation. It seemed evident that steps would have to be taken by the United States Railroad Labor Board to secure current and properly classified data if it were correctly to perform its functions according to the provisions of the law.

The classification used for reporting the number of employees and their compensation is based largely upon a plan submitted to the Interstate Commerce Commission by the Railroad Administration during federal control. This classification was not adopted but it was submitted by the Commission to representatives of the railroads and the employees.

Purpose of the Occupational Classification

In outlining the purposes and value of the occupational classification of railroad positions the Labor Board's statement says in part:

The purpose of the occupational classification of railroad positions is to furnish a basis for the collection of wage and other data on homogeneous classes of railroad positions, to establish as nearly as can be a uniform terminology to be used in describing similar occupations, and to describe classes of positions so that all railroads may have the same general understanding of the kinds of positions that are to be included in any class.

The occupational classification is in no way and under no circumstances to be interpreted by the Board, by the Interstate Commerce Commission, by the railroads or by other interested parties, as setting up jurisdictional lines for occupations, or as limiting the kinds of work which employees may perform or the duties which they may assume. In preparing the occupational classification, the Board has not aimed to standardize for the railroads the occupational duties assigned to, or the kinds of work performed by their employees, and nothing in the classification nor in the report forms is to be construed in this light. Its purpose is solely so to group positions that the wage and other data reported to the Interstate Commerce Commission and to the Board may be used for administrative and public purposes. It specifically provides against grouping together occupations of widely different duties and responsibilities, as well as rates of compensation. By adhering to the classification and the groupings provided for in the reporting forms, wage data will be more than indiscriminate totals and the averages computed therefrom will be valuable for administrative and public purposes.

Reference to the occupational classification in making the reports to the Interstate Commerce Commission and the Board will facilitate the placement of positions and uniform segregation of wage and other employment data. The value of uniformity and definiteness in classification is particularly clear in the analysis of data on railroad positions which are well defined. In obtaining data on wages and other employment conditions for such

positions as those in the train and engine service, where the terminology and language used are fairly uniform on the different railroads, definite and comparable information can be furnished by the railroads and with the least possible danger of misunderstanding.

With respect to other services it is difficult, under present conditions, for the Board to make clear the exact information desired and for the carriers to furnish classified data suitable for analysis. Positions such as those in the clerical and office administrative service are good examples. There is no classification or uniform language at present in use as to clerical positions and there is little or no distinction between positions of varying importance and responsibility. It is therefore difficult to obtain comparable wage data and other information necessary to the Board in rendering decisions or in interpreting and applying such decisions by the interested parties. The use of standard nomenclature based on duties will also enable the Board to make comparisons with similar occupations outside of the railroad service and to detect inequalities between positions on the railroads and in outside organizations.

In order to simplify the reporting divisions and at the same time to secure reports suitable to the Interstate Commerce Commission and to the Board, the distinctive classes in the occupational classification have been re-grouped into 148 reporting divisions. The reporting divisions have been arranged according to established broad departmental lines and data relating to them, based as they are upon a comprehensive grouping of positions, will meet the general requirements of both the Commission and the Board, thereby reducing the amount of labor necessary in preparing any special reports which either body may deem necessary.

Description of the Occupational Classification

A description of the occupational classification follows:

The basis and general plan of the occupational classification conform to the recognized lines and the best practice which have been followed by industrial and governmental organizations in the development of employment classifications for their services, the entire plan being based upon the principle that duties and responsibilities must control in any orderly arrangement and classification of positions.

The occupational classification may be described as a functional grouping of positions, the aim being to set up unit classes which group together positions of essentially similar nature having due regard to the duties and responsibilities which they require or imply.

All railroad positions are separated into main divisions which, for convenience, are called *services*. These are the broadest divisions of positions and are determined irrespective of departmental lines. Such a grouping of services admits of a bird's-eye view of the entire range of railroad positions.

The services are sub-divided into *groups* of related positions covering work which is generally performed in the same profession, vocation or trade, or in a particular kind of railroad work.

Wherever there are wide and clearly discernible differences in the importance, difficulty and responsibility of the work performed, the groups are further sub-divided into *grades* which consist of one or more *distinctive classes* of positions. These classes are the smallest units provided for in the classification and are made up of positions carrying essentially similar duties and responsibilities. Each class is given a distinct title and described so far as is necessary to indicate the kinds of positions which fall under such distinctive class.

Under each of the respective services, groups and grades there is set out general descriptive statements of the duties and responsibilities of the services and groups and of the distinctive classes of positions. These descriptions are set out solely as distinguishing particular kinds of work, so as to provide for essentially homogenous classes of occupations.

The various positions found in the steam railroad service are grouped in the occupational classification under seventeen (17) major services; these services having been set up according to the general railroad functions as well as the special and peculiar requirements in railroad organizations. The services are sub-divided into 119 groups. Within the groups are the separate grades and distinctive class titles, each of which has a description of duties generally performed and illustrative examples.

Outside of the executive, official and staff assistant service, which is ungraded and unclassified and in which examples of posi-

tions are shown separately under appropriate groups but not distinguished as to importance and responsibilities of work performed, there are 500 distinctive classes which are distributed under the other sixteen (16) services as follows:

Service	Number of Distinctive Classes
Attendance service	26
Clerical and office administrative service	27
Dining car, restaurant and kitchen service	19
Engine and equipment operation service	37
Floating equipment service	31
Inspection service	34
Investigational and instructional service	10
Labor service	50
Police service	6
Professional service	23
Skilled trades service	103
Sub-professional service	7
Supervisory skilled trades and labor service	43
Traffic service	10
Train and engine service	29
Train dispatching, telegraph and station agent service	20
Total number of distinctive classes	500

The occupational classification with the alphabetical finding list should be used as a basis in distributing occupations in the reports which are to be made to the Interstate Commerce Commission and to the Board. This does not mean that the railroads are re-

- 22 Patrolmen.
- 23 Watchmen (without police authority).
- 24 Supervising traffic agents.
- 25 Traffic agents, advertising and development agents.
- 26 Fire prevention, smoke and time service inspectors and office building superintendents.
- 27 Claim agents and claim investigators.
- 28 Real estate and tax agents and investigators.
- 29 Examiners, instructors and special investigators.
- 30 Miscellaneous trades workers (other than plumbers).
- 31 Motor vehicle and motor car operators.
- 32 Teamsters and stablemen.
- 33 Janitors and cleaners.
- Total (professional, clerical and general).

III—MAINTENANCE OF WAY AND STRUCTURES

- 34 Road masters and general foremen (M. of W. & S.).
- 35 Assistant general foremen (M. of W. & S.).
- 36 Supervising maintenance of way and scale inspectors.
- 37 Maintenance of way inspectors.
- 38 Bridge and building gang foremen (skilled labor, M. of W. & S.).
- 39 Bridge and building carpenters.
- 40 Bridge and building iron workers.
- 41 Bridge and building painters.
- 42 Masons, bricklayers, plasterers and plumbers.
- 43 Skilled trades helpers (M. of W. & S.).
- 44 Regular apprentices (M. of W. & S.).
- 45 Portable steam equipment operators (M. of W. & S.).
- 46 Portable steam equipment operator helpers (M. of W. & S.).
- 47 Pumping equipment operators (M. of W. & S.).
- 48 Gang foremen (extra gang and work train laborers).
- 49 Gang foremen (bridge and building, signal and telegraph laborers).

FORM "A"

Month of.....192...		Service-hours (or days)										Compensation		Railroad		
Division number	Reporting division	1	2	3	4	5	6	7	8	9	10	11	12	13	Total	Division number
		Number of employees, middle of month	Number of full time positions	Straight time actually worked	Overtime paid for at pro rata rates	Overtime paid for at punitive rates	Time paid for but not worked	Total time paid for	Straight time paid for	Overtime paid for at pro rata rates	Overtime paid for at punitive rates	Time paid for but not worked	Total			
1																

FORM "B"

Month of.....192...		Service-hours								Compensation				Miles		Railroad														
Division number	Reporting division	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Division number											
		Number of employees	Middle of month	On dates of month	7	15	22	28	Straight time actually worked	Straight time paid for	Overtime paid for	Constructive allowances (see instructions)	Total	Straight time actually worked	Straight time paid for	Overtime paid for	Constructive allowance	Total (see instructions)	Grand total	Actually run	Paid for but not run	Total number of trains for which not less than a minimum day was paid								
1																														

Forms for Reporting Information on Railroad Employees

quired in making up the regular reports to the Interstate Commerce Commission and to the Board to observe all of the separate class distinctions provided for in the classification, but they are required to follow the definitions and make the distinctions which apply to the divisions of occupations upon which they report. It is hoped, however, that the classification in its detailed form will prove of such value to the railroads in viewing their employment problems as a whole that they will, of their own free will, install it as a basis for employment administration, and reap the advantages which would accrue therefrom.

The classes into which the railway employees have been divided for the purpose of reporting their number and compensation are as follows:

I—EXECUTIVES, OFFICIALS AND STAFF ASSISTANTS

- 1 Executives, general officers and assistants.
- 2 Division officers, assistants and staff assistants.
- Total (executives, officials and staff assistants).
- II—PROFESSIONAL, CLERICAL AND GENERAL
- 3 Architectural, chemical and engineering assistants (a).
- 4 Architectural, chemical and engineering assistants (b).
- 5 Sub-professional engineering and laboratory assistants.
- 6 Professional and sub-professional legal assistants.
- 7 Supervisory or chief clerks (major departments).
- 8 Chief clerks (minor departments) and assistant chief clerks and supervising cashiers.
- 9 Clerks and clerical specialists (a).
- 10 Clerks (b).
- 11 Clerks (c).
- 12 Mechanical device operators (office).
- 13 Stenographers and secretaries (a).
- 14 Stenographers and typists (b).
- 15 Storekeepers, sales agents and buyers.
- 16 Ticket agents and assistant ticket agents.
- 17 Traveling auditors or accountants.
- 18 Telephone switchboard operators and office assistants.
- 19 Messengers and office boys.
- 20 Elevator operators and other office attendants.
- 21 Lieutenants and sergeants of police.

- 50 Gang or section foremen.
- 51 Laborers (extra gang and work train).
- 52 Track and roadway section laborers.
- 53 Maintenance of way laborers (other than track and roadway) and gardeners and farmers.
- 54 General foremen and supervising inspectors (signal, telegraph and electrical transmission).
- 55 Assistant general foremen (signal, telegraph and electrical transmission) and signal and telegraph inspectors).
- 56 Gang foremen (signal and telegraph skilled trades labor).
- 57 Signalmen and signal maintainers.
- 58 Linemen and groundmen.
- 59 Assistant signalmen and assistant signal maintainers.
- 60 Signalman and signal maintainer helpers.
- Total (maintenance of way and structures).

IV—MAINTENANCE OF EQUIPMENT AND STORES

- 61 General foremen (M. E.).
- 62 Assistant general foremen and department foremen (M. E.).
- 63 General foremen (stores).
- 64 Assistant general foremen (stores).
- 65 Equipment, shop and electrical inspectors (M. E.).
- 66 Material and supplies inspectors.
- 67 Gang foremen and gang leaders (skilled labor).
- 68 Blacksmiths.
- 69 Boilermakers.
- 70 Carmen (A).
- 71 Carmen (B).
- 72 Carmen (C).
- 73 Carmen (D).
- 74 Electrical workers (A).
- 75 Electrical workers (B).
- 76 Electrical workers (C).
- 77 Machinists.
- 78 Molders.
- 79 Sheet metal workers.
- 80 Skilled trades helpers (M. E. & Stores).
- 81 Helper apprentices (M. E. & Stores).
- 82 Regular apprentices (M. E. & Stores).
- 83 Gang foremen laborers (shops, engine houses, power houses, power plants and stores).
- 84 Coach cleaners.
- 85 Laborers (shop, engine houses and power plants and stores).
- 86 Common laborers (shops, engine houses, power plants and stores).
- 87 Stationary engineers (steam).

- 88 Stationary firemen and cilers (steam and electrical plants).
- 89 Coal passers and water tenders (steam station boiler rooms).
- 90 Total (maintenance of equipment and stores).

V.—TRANSPORTATION (OTHER THAN TRAIN, ENGINE AND YARD)

- 90 Chief train dispatchers, train dispatchers and train directors.
- 91 Station agents (supervisory)—major stations—non-telegraphers).
- 92 Station agents (supervisory—smaller stations—non-telegraphers).
- 93 Station agents (non-supervisory—smaller stations—non-telegraphers).
- 94 Station agents (telegraphers and telephoners).
- 95 Chief telegraphers and telephoners or wire chiefs.
- 96 Clerk—telegraphers and clerk—telephoners.
- 97 Telegraphers, telephoners and towermen.
- 98 Station masters and assistants.
- 99 Supervising baggage agents.
- 100 Baggage agents and assistants.
- 101 Baggage, parcel room and station attendants.
- 102 (General foremen (freight stations, warehouses, grain elevators and docks).
- 103 Assistant general foremen (freight stations, warehouses, grain elevators and docks).
- 104 Gang foremen (freight station, warehouse, grain elevator and dock labor).
- 105 Callers, loaders, sealers and perishable freight inspectors.
- 106 Truckers and laborers, (stations, warehouses and platforms).
- 107 Laborers (coal and ore docks and grain elevators).
- 108 Common laborers (grain elevators).
- 109 Stewards, restaurant and lodging house managers and dining car supervisors.
- 110 Chefs and first cooks (dining cars and restaurants).
- 111 Second and third cooks (dining cars and restaurants).
- 112 Waiters and lodging house attendants.
- 113 Camp and crew cooks and kitchen helpers.
- 114 Barge, lighter and gasoline launch officers and workers.
- 115 Deck officers (ferry boats and towing vessels).
- 116 Engine room officers (ferry boats and towing vessels).
- 117 Deck and engine room workers (ferry boat and towing vessels).
- 118 Deck and engine room officers and workers (steamers).
- 119 Floating equipment shore workers and attendants.
- 120 Transportation and dining service inspectors.
- 121 Parlor and sleeping car conductors.
- 122 Train attendants.
- 123 Bridge operators and helpers.
- 124 Crossing and bridge flagmen and gatemen.
- 125 Foremen (laundry) and laundry workers.
- Total (transportation—other than train and engine).

VI.—TRANSPORTATION—(YARD MASTERS, SWITCH TENDERS AND HOSTLERS)

- 126 Yard masters and assistants.
- 127 Switch tenders.
- 128 Outside hostlers.
- 129 Inside hostlers.
- 130 Outside hostler helpers.
- Total transportation—(yard masters, switch tenders and hostlers).

VII.—TRANSPORTATION—(TRAIN AND ENGINE SERVICE)

- 131 Road passenger conductors.
- 132 Assistant road passenger conductors and ticket collectors.
- 133 Road freight conductors (through freight).
- 134 Road freight conductors (local and way freight).
- 135 Road passenger baggage men.
- 136 Road passenger brakemen and flagmen.
- 137 Road freight brakemen and flagmen (through freight).
- 138 Road freight brakemen and flagmen (local and way freight).
- 139 Yard conductors and yard foremen.
- 140 Yard brakemen and yard helpers.
- 141 Road passenger engineers and motormen.
- 142 Road freight engineers and motormen (through freight).
- 143 Road freight engineers and motormen (local and way freight).
- 144 Yard engineers and motormen.
- 145 Road passenger firemen and helpers.
- 146 Road freight firemen and helpers (through freight).
- 147 Road freight firemen and helpers (local and way freight).
- 148 Yard firemen and helpers.
- Total (transportation—train and engine).

The forms on which data regarding these various classes of railway employees are to be reported to the Interstate Commerce Commission and to the Labor Board are shown in the accompanying illustrations.

Form A is to be used for the following groups:

1. Executives, officials and staff assistants.
2. Professional, clerical and general.
3. Maintenance of way and structures.
4. Maintenance of equipment and stores.
5. Transportation (other than train, engine and yard).
6. (a) Transportation (yardmasters, switch tenders and hostlers).

Form B is to be used for reports regarding employees in group 6b—Transportation (train and engine service).

SAFETY MATCHES often prove inconvenient to anyone using them, because of their fragile character, being too short and easily extinguished; and the Railway Fire Protection Association has received complaints from trainmen and lampmen that they have trouble with such matches in lighting lanterns and switch lights. The president of the association has conferred with other superintendents and has found no complaint; but, at all events, he holds that none but approved safety matches should be used on railroads.

Hearing on Pennsylvania

Locomotive Repairs

WASHINGTON, D. C.

ORAL ARGUMENTS before the Interstate Commerce Commission at Washington on June 20, on the question whether the Pennsylvania caused 200 of its locomotives to be repaired at the shops of the Baldwin Locomotive Works in 1920 in disregard of efficient and economical management, resulted in a complicated statistical controversy as to whether the Pennsylvania showed wise management in making this contract instead of repairing the locomotives at its own shops. However, it remained for members of the commission to bring out by questions why so little had been put into the record at the previous hearings before an examiner bearing on the charges made by the International Association of Machinists that the repair contract was made for ulterior purposes to transfer money from the Pennsylvania Railroad, to be collected from the United States Government in the form of a guaranty, and into the treasury of an outside company for the profit of the banking combine said to control the railroads. The commissioners' questions on this point merely brought out that it was simpler to make such charges than it was to attempt to prove them and the commission was left to assume the evidence of a gigantic conspiracy which has been used so extensively as publicity material.

In reply to questions by Commissioner Lewis, R. B. Gregg, who appeared as attorney for the machinists' union, said that his organization would have objected to the contract even if the Pennsylvania had paid no more than the cost in its own shops, on the ground that it caused unemployment among the railroad shop men, although it had developed that the laying off of large numbers of Pennsylvania shop men had not taken place until several months after the letting of the contract and after business had begun to fall off in the latter part of the year.

Attorney List, who had represented the commission in the hearings and investigation, devoted himself largely to arguing that the Pennsylvania had paid \$3,173,000 or over \$16,000 per locomotive more than it would have cost to do the same work in its own shops, and that there was no justification for placing the outside contract because he argued that the Pennsylvania had sufficient shop capacity to handle the work itself, and its locomotive condition was better than it had been the year before. He went into a detailed analysis of the Pennsylvania shop statistics to prove his point and asserted that after the making of the contract with the Baldwin Company the Pennsylvania had laid off 10,000 men from its locomotive repair forces. He said that J. T. Wallis, superintendent of motive power of the Pennsylvania, had previously reported to the Railroad Administration, shortly before the termination of federal control, that it was unnecessary to send any of the Pennsylvania locomotives to shops of other railroads for repairs, yet the contract was entered into shortly after the road was returned and some of the engines were sent to Baldwin before the contract had been approved by the Pennsylvania directors. He also disputed some of the testimony of the Pennsylvania witnesses until Commissioner Potter asked him whether he had taken a partisan attitude in conducting the investigation. Mr. List insisted that he had not done so, but admitted that perhaps his experience of 12 or 14 years in the work of prosecution for the commission had led him to adopt a similar attitude in dealing with "somewhat evasive witnesses."

Necessary to Meet Demands of Shippers

Henry Wolfe Bikle, counsel for the Pennsylvania, admitted that the comparison of costs used was fairly accurate, but defended the action of sending the locomotives to an outside

shop for repairs on the ground that it was absolutely necessary to prepare the locomotives to meet the demands of the shippers for service and that while the cost was large, each locomotive that was put in condition for service was able to earn much more than the cost. Therefore the contract, he said, was not extravagance, but resulted in a real economy. He said the list of shop employees laid off had been put into the record at the request of attorneys for the machinists' union and had been given in complete detail, but had not thereafter been used, and he read from the statement to show that while a few hundred men engaged in running repair work had been laid off during July, August, September and October, 1920, these were not men engaged in making classified repairs, while most of the 10,000 men were laid off in November, December and January. In January, 5,300 men were laid off. Mr. Bikle said the commission would recall that in 1920 the shippers were demanding better service and were even asking the commission to increase freight rates to help the roads give better service and that the company was not able even with the assistance given by the Baldwin company in repairing these locomotives to meet all of the demands for service. He also pointed out that the six months' guaranty provided by the Transportation Act did not provide any immediate cash payment to the railroads and that under its provisions all expenditures of the railroad for maintenance were subject to the scrutiny of the commission, so that the guaranty did not place the burden of any extravagant expenditures upon the government.

He discussed in detail the testimony that had been given at the hearings to show that the Pennsylvania had operated its shops to capacity throughout the entire period that the 200 locomotives were being repaired at the Baldwin plant and that the classified locomotive repair work done at the company's shops in 1920 actually exceeded that done in any previous year. Regarding Mr. Wallis' report to the Railroad Administration, he said that this was made during the latter part of the period of federal control at a time when the Railroad Administration would hardly have had the authority to require the repairs to be made in the shops of other roads when most of the work would have been done at the expense of the corporation. When the roads were returned, he said, the Pennsylvania officers foresaw the heavy traffic that was confronting them at a time when 18 per cent of the Pennsylvania locomotives were in shop or awaiting shop. That was an alarming situation and something had to be done quickly. He pointed out that the comparisons used in criticism of the contract were largely based on 1919 figures for a period when traffic was much lighter than that of 1920 and it was necessary to do a greater amount of shop work to perform locomotive service.

Contents Pennsylvania Had Plenty of Shop Capacity

R. B. Gregg, representing the machinists' union, argued that the Pennsylvania had plenty of shop capacity for taking care of all of its own repairs, that it had adequate equipment and an adequate force and that there was nothing in the National Agreement to prevent the operation of the shops for longer hours, although the railroad would have had to pay punitive overtime. In reply to a question by Commissioner Potter as to a statement reflecting on the efficiency of the Pennsylvania management during federal control, Mr. Gregg said his theory was that the management deliberately held down production by delaying the men and withholding material and tools. Commissioner McChord asked why the evidence on that had not been put into the record. Mr. Gregg said that his information was received from employees and he was unwilling to run the risk of having them discharged. Commissioner McChord thought it strange that he had been unable to get one man out of 48,000 to testify and rely on the commission to see that no one was discharged for testifying.

Commissioners Ask Some Leading Questions

Mr. Gregg argued that, looking back over the statistical records, it was proved not only that the Pennsylvania could have repaired the 200 locomotives in its own shops in the time that was taken for the work at the Baldwin shops, but that the management should have reasonably anticipated its ability to do so. Commissioner Potter asked if it had been shown that Baldwin made a greater profit on this work than on its other work. Mr. Gregg said there was no information as to the profits on this work. Mr. Potter said that if Mr. Gregg's argument had force it left as the only reason for the action of the Pennsylvania the "conspiracy" regarding which charges had been made and which had been mentioned in Mr. Gregg's brief, but as to which no evidence had been presented. Mr. Gregg said the examiner had excluded evidence as to the entire profits made by the Baldwin Company and that the evidence was limited to the Pennsylvania transaction, whereas the conspiracy was on the part of the groups of bankers in control of the railroads and the equipment companies and was difficult to prove. Mr. Potter asked if the commission was expected to assume the conspiracy. Mr. Gregg said he thought in this case it could. Mr. Potter said that all the evidence went to the question of whether the Pennsylvania had made an improvident contract and gave no light on the question of the ulterior motive. He asked if the Baldwin plant was not very busy at the time and what object it had in taking the Pennsylvania contract unless it got a "fancy" price for it. Mr. Gregg said he did not know how much of the Baldwin work was construction and how much was repair work. Mr. Gregg asserted that men in control of the bankers and the railroads believed it was easier to make money through the equipment companies than through the railroads and that the Pennsylvania management had been particularly hostile to organized labor and that part of the conspiracy was for the purpose of causing unemployment among the railroad shop crafts. Mr. Potter said that nothing had been proven about any ulterior motive or any undue profit to the Baldwin Company. Commissioner McChord then inquired why the evidence regarding the Baldwin profits had been excluded and Attorney List said that the examiner had taken the position that the Baldwin Company was not under investigation. He added that the Baldwin Company had lost money on the first part of its contract, but had later made it up and that if the claim of the Pennsylvania that an emergency existed was true, it made no difference what the Baldwin profit was. Commissioner McChord expressed surprise that this fact had not been shown in the record. Commissioner Potter then asked what witnesses had been presented by the intervenor, the machinists' union, and was told that Mr. Gregg had presented some testimony, but had called Mr. Rea as his witness.

"The company was confronted in March, 1920," Mr. Bikle said, "with a situation of serious moment, serious not only to it, but to the shippers located along its line. It had the choice of pursuing a policy which would have impaired the service which it could furnish the public and which would have reduced its revenues, but which, on the other hand, would have avoided the possibility of unwarranted criticism on the score of supposed unnecessary expenditures. It chose the course which insured, so far as it could, its ability to meet the demands which it foresaw would be made upon it. If, in the making of this choice, there can be found ground for criticism, it is difficult to perceive what decision of managerial policy cannot also be criticised, particularly when it is remembered that the basis of the criticism is that the situation could have been met without adopting the course pursued. In some instances, this perhaps might be regarded a matter of doubt, but in the present instance, considering the actual developments during 1920, after the decision was made, there is, it is submitted, no possible ground on which it can be justly said that the decision was other than a wise one."

Pullman Fare Hearing

WASHINGTON, D. C.

A HEARING on the complaint of the United Order of Commercial Travelers and other similar organizations attacking as unreasonable the increase of 20 per cent in Pullman fares which was made on May 1, 1920, was held before Chief Examiner Quirk of the Interstate Commerce Commission at Washington on June 16. Two hearings in the case were held last fall after which the case was adjourned at the suggestion of the complainants until the figures for a year's operations under the new rates should be available.

J. A. Millener, attorney for the complainants, confined his case at the hearing almost entirely to the reduction in price of half a dozen articles used by the Pullman Company, although he also attempted to make a point of the money the Pullman Company is claiming from the Railroad Administration and of the expected reduction of wages on July 1.

Mr. Millener called as his first witness L. S. Taylor, vice-president of the Pullman Company, and brought out from him that the price of car wheels, which was \$59 in 1920, has now been reduced to \$58; oil boxes from \$13.75 to \$10; brake shoes from \$73 a ton to \$66; plush \$5.22½ a yard, has not changed in price; berth curtain material has been reduced from \$5.97 a yard to \$2.60; and axles from \$4.32 per 100 lb. to \$3.95. Having gained this information, he stopped, but G. S. Fernald, counsel for the Pullman Company, asked the witness regarding the quantities of those materials used and Mr. Taylor said the company uses approximately 20,000 wheels, so that the saving on that item is \$20,000; about 16,000 oil boxes, so that the saving is \$60,000; about 8,000 tons of brake shoes, on which the saving is \$56,000; 90,000 yards of plush, on which there is no reduction; while very little curtain material is now being used because the company is building no new cars.

Mr. Millener then asked if the company had not reduced the wages of the employees in its shops. Mr. Taylor said that a reduction of about 9 per cent on the average had been made on January 1 in the shop of the manufacturing department at Pullman, Ill., which manufactures cars to sell, but is not now building any new Pullman cars and which does no repair work for the Pullman Company except when cars are sent to it to be rebuilt, the ordinary repair work being done at five other shops and in various yards throughout the country in which the wages have not been reduced. Mr. Fernald objected to the introduction of evidence regarding the manufacturing plant on the ground that its costs are not involved in the operating expenses of the car lines, and Examiner Quirk ruled that the questions must be confined to those bearing on the operating accounts. Mr. Millener insisted that the manufacturing plant was part of the company, but Mr. Quirk said that the commission's jurisdiction is confined to the operations of the company as a carrier. Mr. Taylor was asked to file a statement showing the amount of the reduction in wages for a year, but said this would be impracticable because the operations are decreasing all the time and by July 1 the plant will be practically out of orders. He agreed to file a statement showing the difference in the labor cost per car in the first six months of 1921 as compared with the last six months of 1920, which he said would be very slight. There has been no reduction in the cost of repairs, he said. On the other hand, there has been a material increase since last spring because of the award of the Railroad Labor Board last July, retroactive to May 1. The principal material used, steel, has been reduced very little in price.

Mr. Taylor was asked if the Labor Board had not made a ruling which gives the company the right to contract with its employees as to wages after July 1.

"Not to our knowledge," he replied. This led to a dis-

ussion regarding the peculiar status of the company before the Labor Board. Mr. Fernald explained that the Pullman Company was not a party to the decision of the Board which promised a 12 per cent reduction in wages on July 1 and while it has since asked to be made a party, the labor organizations have protested that the company is not properly before the Board and that matter is for the Board to decide. Mr. Taylor said the company hoped to be able to follow the railroads and reduce wages on July 1, but was not yet certain of the result and the reduction would "only be a drop in the bucket," anyway.

Attorney Millener also asked about the company's claim against the Railroad Administration, saying he understood the company was claiming \$9,000 a car for repairs and that the company had expected to get \$2,000,000 from the government. Mr. Taylor said the company's total claim against the Railroad Administration was \$24,500,000, of which about \$7,250,000 is for undermaintenance, and the administration has paid \$7,000,000 on account. He said the claim for undermaintenance was based on an inspection of the equipment, which had been allowed to run down during the period of federal control, made jointly by the representatives of the company and of the administration, and the company had claimed from \$6,500 to \$7,000 each for a number of standard cars, stripped at the order of the director general, used for troop service, and then converted back. The claim also covered loss of supplies and other items. Mr. Taylor also described the damage to the cars done by the soldiers, but later asked that those remarks be kept out of the record. The company has been informed that the Railroad Administration will be prepared to begin negotiations for settlement about September 1. Mr. Millener asked if the claim would not cover the high cost of repairs in 1920 and 1921. Mr. Taylor said that it was confined to the period of federal control, whereas the company had spent \$21,000,000 for maintenance in 1920 and had overhauled only one-third of the cars. Asked how the \$7,000,000 would be used, Mr. Taylor said that it had been spent for wages and materials and had reduced by that much the company's deficit. He said there is very little chance of the company's getting the full amount of its claim because the railroads that have settled thus far have received less than 50 cents on the dollar. The attorneys for the commercial travelers asked questions assuming that the company would collect the full \$24,000,000, but the examiner ruled that they must confine their questions to the \$7,000,000 already collected and ruled out questions regarding "the money the company may never get." In reply to questions as to who had stripped the cars, Mr. Taylor said that he had done so as federal manager of the Pullman Car Lines at the order of the director general, although some cars had been stripped before at the request of the War Department.

Mr. Millener's witnesses were two assistant buyers of a large department store in Washington, who testified as to the reduction in prices of materials similar to those used by the Pullman Company, although in each case Mr. Taylor pointed out that the articles to which the prices were applied were not the same as those used by the Pullman Company, which were specially manufactured for it and of the best quality obtainable. It was testified that the present price of carpet similar to that used by the Pullman Company is \$4.50 per yard with a 10 per cent reduction for large quantities, as compared with \$5.75 last fall, and that the company uses 90,000 yards of carpet yearly. Mr. Taylor said the company is now paying \$4.35 a yard for a better grade of carpet than that described. A price of \$8.70 for blankets as compared with \$11 last year was quoted. Mr. Taylor says the company is now paying \$7.55 for blankets. Figures were also given for sheets, but of a smaller size than those used by the company. When one of the witnesses quoted a price of \$1.50 a dozen for hand towels similar to those used by

the company, Mr. Taylor asked if the witness' company would take a large order at that price for Pullman towels. Mr. Taylor said the company pays \$2.15 a dozen for towels specially woven with a blue stripe and the name of the company and the date. The witness said he had been making only a general comparison of the towels from observation. The witness also said that pillow-slips had been reduced from \$3.75 a dozen to \$3.00 or \$3.25. Mr. Taylor said that there had been a greater reduction in blankets and sheets than in any other articles.

Mr. Taylor's testimony on behalf of the company was confined to the introduction of a series of exhibits giving the revenues, expenses, payroll and costs of materials and supplies of the company, with quantities, for the past year as compared with previous periods. He said the average compensation of the employees had been increased during the year from \$1,406 a year to \$1,484. The car earnings, Mr. Taylor said, had been steadily decreasing since the application of the 50 per cent surcharge until in April, 1921, the revenues were \$458,000, or 7.53 per cent less than in April, 1920, and the number of berth and seat passengers was 24 per cent less. There was an increase in the revenues from May 1, 1920, to August, representing approximately the 20 per cent increase in fares, but after the surcharge was applied there was a steady decline both in the number of passengers carried and in the revenue until, in February, the gain in revenue derived from the increase in fares was entirely wiped out.

"We do not claim," he said, "that this was due entirely to the surcharge, but the application of the surcharge was a serious blow to the Pullman Company's revenues and it is a serious question whether the railroads have gained by it. Our thought is that they have lost in passenger revenues."

The opposing sides were allowed until August 15 to file briefs in the case.

Freight Rates Must Be Readjusted; Not Horizontally Reduced*

By Francis H. Sisson

Vice-President of the Guaranty Trust Co., New York

FOLLOWING THE RECENT DECISION reducing wages of railroad employees on about 100 roads, there has been considerable agitation for an immediate horizontal reduction in freight and passenger rates. Such a reduction would be extremely advantageous, of course, if it were possible without further jeopardizing the finances and credit of the carriers. The wage revisions are expected to "add" \$700,000,000 to railway net income. But even that will not enable the roads to earn a net return of 5½ or 6 per cent as contemplated in the Esch-Cummins Law. Certainly, it will not justify a horizontal rate reduction now.

During the war, horizontal rate increases were made, but now, with many commodity prices dropping sharply, the problem is to bring about a rate readjustment by which lower rates will be provided for commodities that cannot be handled at the present rate levels, and not to effect a horizontal rate reduction which will take away from the railroads all that they hope to save through the forthcoming wage economies.

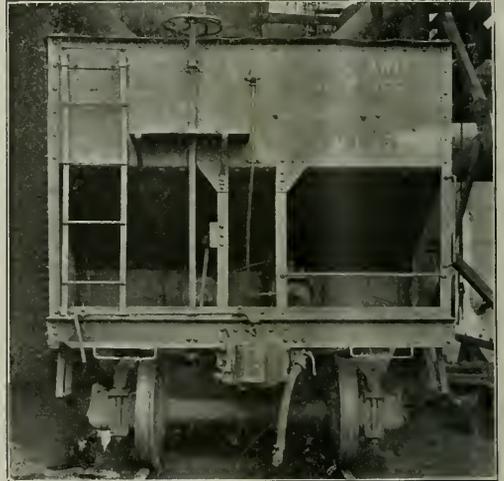
Approximately 50,000,000 Americans are the indirect owners of our railroads through the investment of their savings in railroad securities, and they should be keenly interested in the welfare of the railroads.

They should realize that railroad operating costs must be cut down before there can be justifiable general reductions in railroad rates.

*Extract from an address before the American Institute of Banking at Minneapolis, Minn., on June 16.

Safety Hand Brake

A NEW DESIGN of safety hand brake, made by the Minich Railway Appliance Corporation, Philadelphia, Pa., has been tested recently under severe service conditions and reported on favorably by the Interstate Commerce Commission. The brake consists of a vertical shaft, similar to those in common use, and attached as usual to the end of the car. The bottom of the shaft, however, is supported by a special cage casting, and is threaded to take a nut which is guided by slots in the cage. The nut moves vertically up and down, depending on which way the staff is revolved. On opposite sides of the nut are lugs forming trunnions by which a U-shaped lever is operated. The usual brake chain, or air brake lever in the case of hopper cars is replaced by a connecting rod. Round lugs on opposite sides of the cage serve as a fulcrum for the U-lever so that when the staff is revolved and the nut raised, the lever revolves on these lugs and tends to change from an approximately horizontal to a vertical posi-



Hopper Car Equipped with Minich Safety Hand Brake

tion, thus pulling up and applying the brakes through the rigging in common use. The fulcrum of the U-lever changes so that the power is comparatively low at the beginning, permitting the slack to be taken up quickly, but resulting in an increase of leverage, and power towards the end of the application. No pawl is necessary to hold the brakes applied, since they can be released only by turning the staff in the opposite direction.

It is maintained that this brake is an important safety device, being more efficient, inexpensive and easier to operate than the familiar ratchet and pawl type. The brake holds where applied and is not released partly to allow a pawl to engage, consequently all the energy is maintained and not lost when most needed. The brake is said to be three times as powerful as an ordinary brake and this without the use of a brake stick. Ratchet, pawl and brake chain are eliminated. It is stated that cars can be controlled accurately and easily on down grades, accidents being prevented by eliminating danger of sudden releases. All stress on the staff is vertical, therefore the parts will not be frequently bent and forced out of alinement. Owing to the use of few parts and a short, light staff, there is a saving in material and time required to install the brake.

General News Department

A. R. A. Mechanical Division Meeting Postponed Indefinitely

The postponed meeting of the Mechanical Division, American Railway Association, which was to have been held at the Blackstone Hotel, Chicago, on Wednesday and Thursday, June 29 and 30, has again been postponed as announced in a circular issued by the Mechanical Division on June 21. In view of the uncertainty as to conditions for the next few weeks no date has been set for the postponed meeting.

A fire at the roundhouse of the Boston & Maine, Portsmouth, N. H., on June 20, damaged the building and several locomotives at a total estimated loss of \$150,000.

Five persons were killed and 16 injured in a rear collision of interurban cars on the Detroit United Railway near Ann Arbor, Mich., on June 18. A wooden car was telescoped by a steel car.

The Interstate Commerce Commission has announced a hearing at Washington on June 29, before the commission, on the final value of the San Pedro, Los Angeles & Salt Lake and the Kansas City Southern.

J. M. R. Fairbairn, chief engineer of the Canadian Pacific and also president of the Engineering Institute of Canada, was given the degree of Doctor of Science by the University of Toronto, at Toronto, Canada, on June 9.

E. H. Morton, president of the Order of Railway Station Agents, has filed a petition with the Interstate Commerce Commission asking it to reopen its regulations regarding the designation of subordinate officers and to classify station agents as subordinate officers.

The Mechanical Division of the American Railway Association has issued a supplement to the 1920 Rules of Interchange, prepared by the Arbitration Committee. This supplement includes corrections to the rules, several additional interpretations rendered by the committee, and a few changes which have been made to clarify the rules.

Passenger trains on the Pennsylvania Railroad System in the month of May, this year, showed a marked improvement: 95.7 per cent of the trains arrived at destination on time, and 97.6 per cent made schedule time. In the three months ending with May the percentage making schedule time was over 97 per cent, as compared with 90 per cent in 1920.

Four strikers from the Missouri & North Arkansas, were convicted in the United States District Court and given jail sentences at Little Rock, Ark., on June 17. The strikers were sentenced on charges of contempt of court growing out of their interference with employees of the road, which is operating under a federal receivership. The offense, which consisted of abusing trainmen, was committed on June 2 and the sentences ranged from 90 days to 30 days each.

Freight Must Be Prepaid on B A R

The Bangor & Aroostook has given notice that on freight shipped from stations on its line to points on or beyond the Maine Central the freight charges, for transportation over the Bangor & Aroostook, must be prepaid.

President P. R. Todd is quoted as saying that this action is necessary to provide money to meet payrolls and other pressing bills.

Honorary Degrees

At the commencement exercises at Williams College, Williams-town, Mass., on June 20, the honorary degree of doctor of laws was conferred on Edgar E. Clark, chairman of the Interstate Commerce Commission.

At the commencement exercises at Tufts College, Medford, Mass., on June 20, the honorary degree of master of arts was conferred on Samuel O. Dunn, editor of the *Railway Age*.

Mechanical Division Scholarships

Three vacancies occur in June, 1921, in the scholarships awarded to sons of railroad men or others with experience in the mechanical department and administered through the Mechanical Division of the American Railway Association. Two of the vacancies are in the scholarships at Stevens' Institute of Technology and the third is one of Joseph T. Ryerson & Son's scholarships which provides for a four-year course at universities elected by the American Railway Association. Application for these scholarships can be made through V. R. Hawthorne, secretary of the Mechanical Division, Chicago.

Eight Killed in Collision of

Fire Truck and Locomotive

At a crossing in Perth Amboy, N. J., on the afternoon of June 15, a fire truck dashed at full speed into the side of a passenger train of the Central of New Jersey, which was passing over the crossing at about 40 miles an hour. The truck was wrecked; eight firemen and a gate tender were killed and several other firemen were injured. The gates had not been closed. A number of automobiles had stopped just short of the crossing and it is conjectured that the driver of the fire truck assumed that these automobiles had been stopped in order to clear the road for him.

Complaints Under Pennsylvania Train-Crew Law

Trainmen of all classes, acting through the lodges of their brotherhoods, have filed with the Public Service Commission of Pennsylvania complaints alleging that numerous trains are undermanned, and asking that the commission exercise its authority to prescribe the number of men in the crews, the railroads having reduced them since the repeal of the full-crew law. These complaints were filed against the Delaware & Hudson, the Delaware, Lackawanna & Western, and the Pennsylvania, the last named being based on charges connected with the operation of certain trains on the Monongahela division. The complaint against the Delaware & Hudson says that the practice of that company is now at variance with the rules prescribed in the company's code of train rules.

Pennsylvania Relief Department

G. L. Peck, vice-president of the Pennsylvania Railroad System, announces that in response to requests from employees the Voluntary Relief Department will receive subscriptions to additional death benefits up to three times the amount of the death benefit of the class in which the employee holds membership at present. Heretofore the amount of death benefits to which a member could subscribe varied from \$250 to \$1,250; now it will be from \$1,000 to \$5,000.

The Voluntary Relief Department at present numbers about 190,000 members. It was instituted on February 15, 1886. Employees becoming members of the Relief Fund are divided into five classes, each of which carries a certain amount of death benefit in multiples of \$250. It is the amount of these death benefits which has now been raised. Since the Relief Department was established in 1889, total subscriptions by employees amount to

more than \$80,500,000 and total disbursements to more than \$73,800,000. The companies comprising the Pennsylvania System have contributed more than \$10,000,000 as the operating expenses of the fund.

Bridge Disaster at Whitney, Neb.

Five passengers and one trainman were killed and six passengers were seriously and 25 slightly injured, when eastbound passenger train No. 606 on the Chicago & North Western, went through a bridge over Big Cottonwood Creek, near Whitney, Neb., on the night of June 15. The bridge, which had been weakened by erosion caused by flood water, gave way just after the engine of the train had passed over it; and the mail and baggage cars and two coaches piled up on the bank of the creek and in the stream. One Pullman car and the superintendent's car, which was attached to the train, were left standing on the track. The engine, after breaking away from the train, ran some 600 ft. Two of the trainmen, the express messenger and the fireman were slightly injured.

Traffic Statistics for March

The net ton miles of revenue freight handled by the Class I railroads in March aggregated 23,962,000,000, as compared with 32,910,000,000 in March, 1920, according to the monthly bulletin of traffic statistics issued by the Interstate Commerce Commission. The number of passenger miles for the month was 3,056,000,000, as compared with 3,533,000,000. The average revenue per ton mile for the month was higher than it has been at any month since the increased rates were made effective, 1.335 cents, as compared with 0.986 cents in March, 1920. For the three months ending with March the revenue per ton mile averaged 1.269 cents. The revenue per passenger mile for March was 3.175 cents, as compared with 2.613 cents in March, 1920, and 3.127 cents for the first three months of 1921. The average number of revenue passengers per car for the first three months of 1921 was 16.66, as compared with 18.68 in 1920.

E. E. Clark Re-elected Chairman of the Interstate Commerce Commission

The Interstate Commerce Commission on June 18 announced that Chairman E. E. Clark has been unanimously re-elected chairman of the commission for the year terminating June 30, 1922. For many years the commission followed the policy of rotating the chairmanship each year. Last year it was Commissioner Woolley's turn to be chairman and he was elected, but he declined the office on the ground that he had publicly opposed the passage of the Transportation Act which the commission was to administer. Commissioner Eastman was then elected and similarly declined the office, whereupon Commissioner Clark was elected for the term ending June 30, 1921, as senior member of the commission. Mr. Clark was appointed a member of the Interstate Commerce Commission by President Roosevelt in 1906.

Who Is to Blame for Freight Losses and Damage?

O. C. Castle, superintendent of transportation of the Southern Pacific (Texas and Louisiana lines), is the author of an effective bulletin prepared for use in interesting employees in the special claim prevention campaign which the company has launched. The bulletin is illustrated with a picture showing a section of the unclaimed warehouse, and the articles to be seen in the foreground of the photograph are described in the printed matter which follows, as examples of the results of careless handling, avoidable delays, or errors in marking.

In emphasizing the point that claim prevention can be successful only through the co-operation of the employees, the bulletin says in part: "The real preventive work must be done by the man who handles the goods. You, Mr. Agent, with your bill clerk, your check clerk and your warehouseman; you, Mr. Local Conductor, with your brakemen—you are the men on the firing line—you handle the individual packages that go wrong and find their way to the pile you see in the picture. Why not treat them as though they were

addressed to you, or as though the loss would come out of your pocket?"

Railway Revenues and Expenses for April

The Interstate Commerce Commission's summary of railway returns for April and four months for 201 Class L roads, is as follows:

Item No.	Item	April		Four months	
		1921	1920	1921	1920
1	Average number of miles operated	235,570.45	234,785.09	235,578.09	234,538.55
	Revenues:				
2	Freight	\$304,730,452	\$268,812,703	\$1,234,383,735	\$1,204,271,218
3	Passenger	\$90,698,125	92,963,857	\$381,809,386	360,078,084
4	Mail	7,782,447	7,566,673	33,597,409	85,544,799
5	Express	8,221,064	11,823,542	27,104,263	49,114,965
6	All other transportation	12,323,996	9,804,227	50,533,242	43,426,611
7	Incidental	9,129,188	10,915,720	39,456,190	43,982,354
8	Joint facility—Cr.	656,581	556,473	2,629,809	2,338,167
9	Dr.	184,654	161,282	777,855	755,329
10	Railway operating revenues	433,357,199	402,281,913	1,768,736,098	1,787,910,869
	Expenses:				
11	Maintenance of way and structures	59,936,374	74,511,616	236,432,439	264,440,092
12	Maintenance of equipment	101,426,224	111,046,136	441,580,609	464,633,924
13	Traffic	7,114,392	5,069,762	28,843,864	20,045,887
14	Transportation	188,912,346	192,500,729	823,300,139	836,300,559
15	Miscellaneous operations	4,056,923	4,601,347	16,737,901	17,866,264
16	General	14,895,321	12,860,609	59,151,636	58,820,064
17	Transportation for investment—Cr.	642,594	170,737	2,090,359	1,053,486
18	Railway operating expenses	375,698,986	400,419,462	1,603,956,229	1,653,053,304
19	Net revenue from railway operations	57,658,213	1,862,451	164,779,869	134,857,565
20	Railway tax accruals	22,390,587	21,772,465	90,482,082	85,353,510
21	Uncollectible railway revenues	90,539	58,579	322,792	357,240
22	Railway operating income	35,177,087	19,968,593	73,974,995	49,146,815
23	Equipment rent—Dr. balance	4,432,558	2,222,638	15,263,640	10,097,606
24	Joint facility rent—Dr. balance	1,495,655	1,552,435	6,057,862	6,298,078
25	Net of items 22, 23 and 24	29,248,874	23,743,666	52,653,493	32,751,131
26	Ratio of expenses to revenues (per cent)	86.69	99.54	90.68	92.46

¹Includes \$2,735,279, sleeping and parlor car surcharge.

²Includes \$10,334,326, sleeping and parlor car surcharge.

Plans to Expedite Settlement of Government Accounts

President Harding and the administration recently have been devoting consideration to the possibility of affording relief to the railroads through some way of expediting the settlements of their accounts with the government so that the roads may receive large sums still due them for the period of federal control, as well as for the six months' guaranty period of 1920. While there have been reports that the President was likely to exercise the discretion conferred upon him by the transportation act and authorize the Railroad Administration to increase the payments it may make on sums due the railroads by funding for a period of years the amounts owed by the railroads to the government for capital expenditures made during the federal control period, it is now understood that the President has been advised that this would involve another large appropriation of about \$800,000,000 for the Railroad Administration to enable it to make the payments to the railroads. The director general recently made an estimate for the House appropriations committee that a \$200,000,000 appropriation would carry him through another year on the assumption that he would not be required to fund any large part of the railroads' indebtedness. In view of the desire to reduce government expenditures and taxation, the administration does not take readily to the idea of asking a large appropriation from Congress, but it is regarded as possible that the consideration of the subject may result in some plan for expediting the settlements of the accounts, including those for undermaintenance. The Railroad Administration in the settlements it has been

making with railroads has in general been deducting the additions and betterments from the amounts it owed the railroads, although in one or two cases some of the capital expenditures have been funded and the equipment has all been funded. The settlement of the Southern Railway is reported in the Financial department.

Automatic Train Control

The Joint Committee on Automatic Train Control of the American Railway Association co-operating with the Bureau of Safety of the Interstate Commerce Commission has been making material progress in connection with the development of automatic train control. Negotiations are being conducted with various railroads looking to the installation of automatic train control on test sections. Arrangements have been made with the Southern Pacific for an installation of the National Safety Appliance Company's intermittent induction type of train control from Oakland, Cal., to Niles, a distance of 22 miles. A proposed installation of the Sprague system is contemplated on a section of the New York Central, the location of which has not yet been definitely decided but will probably be near Albany, N. Y. This system is also of the intermittent non-contact induction type. Plans have been made for the installation of the continuous non-contact induction system as developed by the Union Switch & Signal Company on a short stretch of the Pittsburgh & Lake Erie near Pittsburgh; while a contemplated installation of the General Railway Signal Company's intermittent non-contact inert roadside element type is planned on the Buffalo, Rochester & Pittsburgh.

Advance List of Exhibitors

at Roadmasters' Convention

The plans for the exhibit to be given by the Track Supply Association in connection with the convention of the Roadmasters' and Maintenance of Way Association at the Auditorium Hotel, Chicago, on September 20-22, inclusive, are well under way as evidenced by the fact that 45 firms have already requested and been assigned space at this exhibit. As in previous years this exhibit will be held on the ninth floor of the hotel in a room adjoining the convention hall. A list of manufacturers who have already been assigned space is given below.

Air Reduction Sales Company, New York City.
 American Chain Company, Bridgeport, Conn.
 American Hoist & Derrick Company, St. Paul, Minn.
 American Steel & Wire Company, Chicago.
 American Valve & Meter Company, Cincinnati, Ohio.
 Anchor Company, New York City.
 Baskwill Manganese Crossing Company, Cleveland, Ohio.
 Bucyrus Company, South Milwaukee, Wis.
 Carbic Manufacturing Company, Duluth, Minn.
 Chicago Malleable Casting Co., Chicago.
 Crerar, Adams & Co., Chicago.
 Duff Manufacturing Company, Pittsburgh, Pa.
 Elliot Frog & Switch Company, East St. Louis, Ill.
 Fairbanks, Morse & Co., Chicago.
 Fairmont Gas Engine & Railway Motor Car Company, Fairmont, Minn.
 Hauck Manufacturing Company, New York City.
 Hayes Track Appliance Company, Richmond, Ind.
 Ingersoll-Rand Company, New York City.
 Kalamazoo Railway Supply Company, Kalamazoo, Mich.
 Kilbourne & Jacobs Manufacturing Company, Columbus, Ohio.
 Lundie Engineering Corporation, New York City.
 Maintenance Equipment Company, Chicago.
 Mudge & Co., Chicago.
 National Lock Washer Company, Newark, N. J.
 National Malleable Castings Company, Cleveland, Ohio.
 Northwestern Motor Company, Eau Claire, Wis.
 Oxweld Railroad Service Company, Chicago.
 P. & M. Company, Chicago.
 Positive Rail Anchor Company, Marion, Ind.
 Pocket List of Railroad Officials, New York City.
 Q. & C. Company, New York City.
 Rail Joint Company, New York City.
 Railroad Supply Company, Chicago.
 Railway Review, Chicago
 Ramapo Iron Works, Hillburn, N. Y.
 Reade Manufacturing Company, Hohenken, N. J.
 Reliance Manufacturing Company, Massillon, O.
 Sellers Manufacturing Company, Chicago.
 Simmons-Boardman Publishing Company, New York City.
 Templeton, Kenly & Co., Ltd., Chicago.
 Track Specialties Company, New York.
 Union Switch & Signal Company, Swissvale, Pa.
 Verona Tool Works, Pittsburgh, Pa.
 Warren Tool & Forge Company, Warren, O.
 Woolery Machine Company, Minneapolis, Minn.
 Wyoming Shovel Works, Wyoming, Pa.

Traffic News

An agreement has been made between the Illinois Central and the Mississippi Warrior Barge Line, for a direct interchange of freight at Cairo, Ill. The contracts for the construction of the interchange terminals are in preparation and it is expected the terminal, which will be of the floating barge type, will be in service within 2½ months.

The Salt Lake City Passenger Association, suspended during the war, has been reorganized and has elected the following officers: C. H. Cutting, president; J. E. Light, first vice-president; Frank Yentzer, second vice-president, and A. W. Wagner, secretary and treasurer. The annual convention of the American Traveling Passenger Agents' Association is scheduled to be held at Salt Lake on September 12, 13 and 14.

In addition to the application for a 20 per cent reduction on iron and steel recently decided upon at Chicago by conference of freight traffic managers of transcontinental lines, it has been decided to apply to the Interstate Commerce Commission for a further reduction of 5 per cent in west bound rates on iron and steel from eastern points to the Pacific Coast terminals. The application will be filed with the Interstate Commerce Commission for permission to publish these revised rates to terminals only.

Passenger fares in Canada (eastern territory) are to be reduced on July 1, in accordance with an order which has been issued by the Board of Railway Commissioners. As of September, 1920, the commissioners authorized an increase of 20 per cent in fares, with the understanding that one-half the advance should be taken off on January 1, 1921, and the other half on July 1, 1921; and in accordance with this understanding the present order has been issued. The ordinary rate per mile, after the reduction, will be 3.45 cents.

The transcontinental railroads have filed with the Interstate Commerce Commission an application for fourth section relief to permit the reduction of rates on wool and mohair in carloads from Pacific coast terminals to points in eastern defined territory without corresponding reductions to intermediate points, in order to meet Panama Canal competition. An informal conference was held before the suspension board of the Interstate Commerce Commission on June 16 on a proposed reduction by the transcontinental railroads of the rates on sugar from California coast points to defined territories as far east as Chicago rate points. Various representatives of the sugar industry took different positions on the propriety of the proposed reduction and it was opposed by representatives of the eastern railroads.

Wholesale lumber dealers represented at a hearing at Chicago, before Examiner Butler of the Interstate Commerce Commission, have protested against the ten-dollars-a-day penalty for holding loaded lumber cars at any point longer than 48 hours. The lumbermen want the order passed in October, 1919, repealed. Retail lumbermen attending the meeting argued, however, that cars were made for transportation and not storage purposes, and they asked that the order, made at their request, should remain in effect. Before the order went into effect, they claim, the mills sent out lumber on orders from the commission men and loaded cars were held at different points sometimes for weeks before the lumber was sold. They denied the claim of the wholesalers that the competition created when they were able to hold the lumber on cars for a reasonable time, tended to bring down the prices.

Seasonal Coal Rate Bill Up in the Senate

The bill introduced by Senator Frelinghuysen to authorize the Interstate Commerce Commission to make seasonal reductions in coal rates to stimulate the movement during the early part of the year and corresponding advances in the rates during the latter part of the coal season, was taken up in the Senate on June 20, having been made the unfinished business. It was reported that members of the so-called "agricultural bloc" in the Senate would take advantage of

Commission and Court News

United States Supreme Court

Risks on Freight in Car Waiting

To Be Taken Into Train

In November, 1917, the Yazoo & Mississippi Valley issued a bill of lading for 31 bales of cotton which had been loaded into a box car at Alligator, Miss., for shipment to Memphis, Tenn. Before the loaded car had been attached to any train or engine it was destroyed by fire. The shipper sued in a state court to recover the value of the cotton. The carrier contended that it was relieved from liability, under section 5 of the Uniform Bill of Lading, providing that property taken from a station at which there is no agent, shall be at the risk of owner until the cars are attached to trains. The shippers insisted that the provision did not apply, because at Alligator there was a regularly appointed agent and that the place where the car was received was, in effect, a part of the carrier's terminal and not a "private or other siding" within the meaning of the provision. The cotton had been loaded from the platform of a gin situated at the blind end of a spur which leads from the main line at a point near the station. The spur, which is 1,000 ft. long, had been built by the railroad many years before at its own expense. About half of it is on the railroad right of way and runs parallel to the main line; the rest is on private land. The spur is used generally by the public for loading and unloading carload freight. A verdict was directed for the shippers. Judgment thereon was affirmed by the Supreme Court of Mississippi on the ground that the quoted clause applies only to stations at which there is no regularly appointed agent; 120 Miss. 690. In the appellate courts of the states in which the question has arisen the decisions are conflicting. For this reason a writ of certiorari was granted, 251 U. S. 550. The only question requiring decision was whether the court below gave the correct construction to the clause. The United States Supreme Court holds that it did. The court said: "It could not have been intended that at stations where there are regularly appointed agents unloading loaded cars for which bills of lading have issued and which are left standing on a siding solely to await the carrier's convenience are to be at the risk of the shipper. And this is true whether the siding be strictly public or semi-public, a siding privately used but owned by the railroad. The fact that the spur extends over land not part of the carrier's right of way is immaterial. Yazoo & Mississippi Valley v. Nichols & Co. Decided June 1, 1921. Opinion by Mr. Justice Brandeis.

Assessment of Railroads in Arkansas for

Highway Improvements Held Excessive

The Kansas City Southern and the Texarkana & Fort Smith were assessed by a road improvement district in Little River County, Arkansas (the district including about 25,000 acres of agricultural land and 9.7 miles of railroad owned by the companies), on account of a proposed gravel-road of 11.2 miles, at \$7,000 per mile of main track—\$67,900. Other property was assessed without reference to value or improvements, according to location. The railroads maintained that the assessment was unequal, arbitrary, unreasonable and unconstitutional. The state courts held to the contrary and declared the assignment valid. The Supreme Court of the United States has reversed the State Supreme Court's judgment, saying, in part: "Obviously, the railroad companies have not been treated like individual owners, and we think the discrimination so palpable and arbitrary, as to amount to a denial of the equal protection of the law. Benefits from local improvements must be estimated upon contiguous property according to some standard which will probably produce approximately correct general results. To say that 9.7 miles of railroad in a purely farming section, treated as an aliquot part of the whole system, will receive benefits amounting to \$67,900 from the construction

the opportunity thus afforded to try to press as amendments to the bill some of the various proposed bills to amend the transportation act. There have been numerous bills to repeal the 5½ per cent rate-making rule and also to prevent the Interstate Commerce Commission from interfering with state-made rates, which have been referred to the committee on interstate commerce and have not been acted upon. Senator Frelinghuysen made an opening statement on the bill, which he said has received the approval of Chairman Clark of the Interstate Commerce Commission as well as of the entire interstate commerce committee, and said that unless something is done to stimulate the buying of coal the panic prices of last year may be repeated this winter and transportation may be over-taxed so that a coal shortage will occur. He said the public expects Congress to do something to relieve the coal situation and that they will not endure another season of high prices. There is a great slump in coal buying at the present time and he argued at some length that action is necessary to stimulate coal buying at this time, although he did not discuss the question of how much of a reduction in freight rates would be sufficient to stimulate buying.

Railroads Decline General Reduction in Fruit and Vegetable Rates

In view of the many complaints and communications received by the Interstate Commerce Commission from the different producing sections and chief marketing centers of fruits, vegetables and melons, with respect to the freight rates thereon, the commission after investigations of its own, requested that a committee representing the railroads in the different sections of the country convene at Washington at the earliest practicable date for the purpose of considering the situation.

Such meeting was accordingly held on June 21, at which the complaints filed with the commission were placed before the carriers' representatives, supplemented by data which had come direct to the freight traffic officials of the railroads.

According to a statement issued by the Association of Railway Executives, "consideration was given to the complaints and to the reports of actual market conditions and returns to the producers. Many of the complaints were found to be merely in anticipation of reduced profits and unfavorable markets, but the actual figures demonstrated that the daily and weekly results were generally remunerative. Many sections which had definitely expected poor results were shown to have made more than the usual net profits.

"In no case was it shown that any section of the country was suffering from unduly burdensome rates or from inadequate facilities or service, but, on the contrary, the reports of the Bureau of Markets, United States Department of Agriculture, which are issued daily, as well as information in possession of the carriers, show that fruits, vegetables and melons generally are moving currently in larger quantities than ever before, and are being marketed without difficulty at fairly remunerative prices. The following figures, taken from the June 11 issue of the United States Department of Agriculture Market Reporter, show the increase in movement this year compared with 1920:

	Number of Carloads	1921	1920
Apples, cabbages, cantaloupes, celery, lettuce, onions, peaches, potatoes, strawberries, tomatoes, watermelons, and mixed vegetables		367,741	309,181

"In no case was it found that the carriers had failed to furnish, and at greatly increased expense, the adequate and well maintained service so valuable and necessary for this highly perishable traffic, or that there had been any lack of equipment or of facilities for icing and other protection of this traffic in transit or at terminals from which reconsignments were permitted or disposition made to the local markets."

Under these circumstances, announcement was made by the carriers that the evidence presented, both as to the current movement and the movement of fruits, vegetables and melons for the remainder of this season, did not justify a general reduction in the rates on this traffic.

of 11.2 miles of gravel road seems wholly improbable, if not impossible. Classification, of course, is permissible, but we can find no adequate reason for what has been attempted in the present case. *Royster Guano Co. v. Virginia*, 253 U. S., 412, 415. It is doubtful whether any very substantial appreciation in value of the railroad property within the district will result from the improvements; and very clearly it cannot be taxed upon some fanciful view of future earnings and distributed values, while all other property is assessed solely according to area and position. Railroad property may not be burdened for local improvements upon a basis so wholly different from that used for ascertaining the contribution demanded of individual owners as necessarily to produce manifest inequality. Equal protection of the law must be extended to all." *Kansas City Southern v. Road Improvement District*. Decided June 6, 1921. Opinion by Mr. Justice McReynolds.

Railroads Must Pay for Use of Shippers' Diverted Tank Cars

In an action by the owner of tank cars for payment for their detention and diversion for other shipments after delivery of the plaintiff's goods, it appeared that the railroad refused to pay for the use of the cars beyond the rate fixed by the Interstate Commerce Commission for empty mileage on tank cars. The Federal District Court for the Southern District of New York holds that rule 29 of the Commission does not authorize the railroad to detain or divert cars at will, and that for such detention and diversion beyond a reasonable time for their return, the railroad must pay the owner a fair amount. The railroad also argued that the A. R. A. rule forbids payment of the kind here sued for. That rule provides that the carriers will pay nothing for delay or diversion except as authorized in tariffs. But this, says the court, is not an assertion of any right deliberately to divert such cars; the practice is to observe the shippers' orders in the return of cars. Such detention remains, therefore, a wrong, both under the regulations and at common law.

The railroad contended that the carriers have nevertheless established a practice by which they have interpreted Rule 29 as covering the case of cars which happen to be delayed or diverted and that this practice must be reviewed by the commission before it can come before any court. The court, however, doubted whether there has been any consistent practice among the carriers on this subject. "Occasional, and even common, assertions of right do not make such a 'practice.' Its essence is its uniformity. Carriers may not claim the sanction of the statute for a usage which they apply only with exceptions. They cannot say that in such cases they 'observe and enforce' it themselves." The court added that the three cases in which the question has already arisen have been decided against the carrier. *Gustafson v. Michigan Central*, 296 Ill., 41, 129; N. E., 516 (Feb. 3, 1921); *Sun Co. v. Pennsylvania*, Pennsylvania Court of Common Pleas, July term, 1920; *Empire Refineries v. Mo. Pac.*, C. C. A. 8th Circuit, March 17, 1921; *Macklin, Brown, etc. v. Baltimore & Ohio*. Dist. Ct., S. D., N. Y. Decided June 1, 1921.

In the *Gustafson* case the railroad was held liable for negligence in delaying unreasonably the return of an empty tank car, the mileage rate filed with the commission referring to the Railroad's use of the car and not to unreasonable delay in its return.

In the *Empire Refineries* case, 271 Fed., 668, a tank car owned by a shipper, filled with gasoline, was delivered to a railroad for the transportation of the gasoline to a consignee under a bill of lading entitling the owner to payment for the use of the car on a mileage basis. The car was not delivered to the consignee, but diverted, and was not returned to the owner for three months. The Circuit Court of Appeals held that the railroad was a bailee for hire of the car, for its use only according to the bill of lading; that the diversion was a breach of the contract of bailment, which, whether intentional or negligent, rendered the company liable to the owner for all damages, including the value of its use during detention.

Foreign Railway News

Alcohol Locomotives in Brazil

In the vicinity of Pernambuco, Brazil, according to Consul C. R. Cameron, are some 80 sugar factories which operated approximately 800 miles of railways of from .75 meter to 1 meter gage. At the present time wood is the principal fuel but the supply of this fuel is not great and considerable interest is being manifest in the substitution of alcohol which can be manufactured in large quantities as a sugar by-product. The current price of alcohol, says Consul Cameron, is 22 cents a gallon, although the cost of production is much less. Mr. Cameron is impressed, consequently, with the opportunities in this section for American concerns manufacturing locomotives using alcohol as a fuel.

April Exports of Car Wheels and Axles

Exports of car wheels and axles in April were valued at \$304,659—a slight increase over the previous month. Brazil was the destination of this material to the value of \$93,089. Detailed figures, as compiled by the Bureau of Foreign and Domestic Commerce, follow:

Countries	Dollars	Countries	Dollars
Canada	18,757	Chile	52,183
Honduras	3,428	Colombia	600
Sierraguta	765	Ecuador	2,266
Panama	1,078	Peru	10,194
Mexico	18,8.9	Venezuela	649
Jamaica	308	China	27,830
Trinidad and Tobago	3,216	Kwantung, leased territory	3,950
Other Brit. West Ind.	612	Japan	62,311
Cuba	1,181	Philippine Islands	1,913
Dominican Republic	186	British South Africa	544
Argentina	920		
Brazil	93,089	Total	304,659

South African Railways Deficit

LONDON

The report of the South African Railways and Harbors for the year ending March 31, 1921, shows an estimated deficit of approximately \$3,500,000, instead of an anticipated surplus of \$750,000. This is due to the increased cost in wages, necessitated by the increase in the cost of living, which involved an additional expenditure of over \$3,650,000 per annum. To meet this increase in expenditure the rates were raised as from October 1, 1920, but owing to the falling off of both passenger and freight traffic, this increase was found to be far below expectations.

The total tonnage of freight, coal and minerals carried during 1920, was 16,164,700 tons, or an increase of 11.27 per cent over the previous year.

Some interesting figures were given by J. W. Jagger, the minister responsible for the South African Railways and harbors, as follows:

Gross capital expenditure of both Railways and Harbors at December 31, 1920	\$330,000,000
Gross expenditure on Rolling Stock in 1920	\$21,000,000
New Rolling Stock brought into service in 1920:	

Locomotives	113
Passenger cars	120
Freight cars	1919

It is estimated that the deficit for the financial year ending March 31, 1922, will amount to \$2,940,000, which, added to the accumulated deficit to the end of March, 1921, namely, \$12,300,000, will amount to \$15,300,000 for the year ending March, 1922.

Equipment Situation in Russia

An exchange telegraph dispatch states that on January 1, there were 7,729 locomotives suitable to run and 10,714 locomotives laid up for repairs in Russia. Likewise there were 358,552 freight cars fit for service and 96,580 in bad order. The repair work done in 1920 exhausted the supply of material for repairs and it was necessary to rob some of the bad order equipment of its material. In the summer of 1920, a program of repairs for four and a half years was adopted, but in the last half of that year only 30 per cent of the repairs scheduled to be done were completed. For 1921, this schedule was reduced 40 per cent, but in January and February only 10 per cent of the reduced schedule was com-

pleted. It is now stated that the Supreme Council of National Industry reports that owing to the lack of material the plans for repairing rolling stock cannot be carried through.

Objections to English Railway Bill

The English Railway Bill (*Railway Age*, May 27, page 1209) has aroused considerable criticism. Labor representatives claim that the amounts to be allowed the companies for settlements of claims against the government are too large. They also object to the bill because it does not provide for government ownership. The Scottish railways object to the provisions of the bill relating to the settlement of disputes with labor because they fear the perpetuation of the present standards of wages. Higher rates do not solve the problem of high wages, they say in effect, because they drive away traffic. The Scottish companies have suffered more from increased costs and decreased earnings than the English roads proper. Many of the railways are objecting to the compulsory consolidations called for by the bill, and shippers are not satisfied with the provisions for the regulation of rates. The railways object, too, to the extensive state control proposed in the bill.

Government Authorizes Increased

Rates on Mexican Railway

A report from Assistant Trade Commissioner Connell states that, by authorization of the federal government, the transportation rates of the Mexican Railway, a British property, are to be increased 25 per cent, placing them on a par with those collected by the government lines. However, one-half of the additional gross receipts resulting from this increase in rates will be considered as amortization by the government on its debt to the Mexican Railway, which amounts to some millions of pesos. This will obviate the withdrawal of funds from the treasury in order to decrease the obligation, and is apparently a new policy which will be adopted by the Secretary of Finance to cancel many of the claims for damages and losses of property and equipment arising during the time of political disturbance.

April Locomotive Exports

Exports of steam locomotives in April fell to 66, valued at \$1,922,487, from the March total of 105, valued at \$5,317,029. The largest shipments, 20 valued at \$567,610, were destined for Brazil. Eighteen, valued at \$422,362, went to Mexico. The detailed figures by countries, as compiled by the Bureau of Foreign and Domestic Commerce, follow:

Countries	Number	Dollars
Malta, Gozo, and Cyprus Islands	1	14,548
Canada	1	3,750
Honduras	1	17,550
Mexico	18	422,362
Cuba	5	162,430
Brazil	20	567,610
Peru	4	128,430
China	2	70,800
Hongkong	4	75,200
New Zealand	1	14,957
Philippine Islands	5	268,506
Egypt	4	176,350
Total	66	1,922,487

Trade Commissioner Predicts Large

Purchases of Supplies in India

Trade Commissioner Batchelder, according to Commerce Reports, is much impressed with the opportunity for the sale of railway supplies and equipment of all kinds, which will exist in India as soon as the plans for modernizing the antiquated railways of that country take definite form. Large loans have been floated in England recently for improving the Indian railways but, in view of the fact that the necessity for additions and betterments is so great, still greater capital expenditures will probably be undertaken as soon as possible. Commissioner Batchelder believes that an opportunity exists at the present time for the formation of a car trust to supply rolling stock to the roads. Rolling stock is not the only need—double tracking, new terminals and additions to yards and sidings are also contemplated.

Equipment and Supplies

Locomotives

THE PEKIN-SUIYUAN will ask for bids about July 20, through the Universal Steel Export Company, 26 Cortlandt street, New York City, for 7 Mallet type locomotives, 25 Mikado type and 5 Pacific type.

Freight Cars

THE ATLANTIC FRUIT COMPANY, 61 Broadway, New York City, is inquiring for 100 cane cars of 20 tons' capacity and 36 in. gage.

THE PITTSBURGH & WEST VIRGINIA has ordered 300 hopper car bodies of 55 tons' capacity from the Cambria Steel Company.

THE WESTERN MARYLAND is inquiring for 500 hopper car bodies of 55 tons' capacity, also asking for prices on the repair of 500 hopper cars of 50 tons' capacity.

THE PEKIN SUIYUAN will ask for bids about July 20, through the Universal Steel Export Company, 26 Cortlandt street, New York City, for 400 high side, steel freight cars of 40 tons' capacity.

Miscellaneous

THE NEW YORK CENTRAL will receive bids until 12 o'clock noon, July 6, for its requirements until October 1, 1921, for the line Buffalo and East, of fuel oil, gasoline, kerosene, long-time burning semaphore oil, turpentine substitute, gas oil and tallow candles

The BOSTON AND ALBANY will receive bids until 12 o'clock, noon, July 7, at Boston, Mass., for: 2 trailing truck wheel centers; 3 type E power reverse gears; 2 sand box bodies; 6 pressed steel small front doors; 6 cast steel trailer yoke seats, and 2 steam chest relief valves.

THE NORFOLK & WESTERN will receive bids until 12 o'clock noon, July 6, at Roanoke, Va., for repair parts for Westinghouse engine; parts for electrical apparatus; parts for electric pump; 400 rods of wire fencing; 2,000 double coil draft gear springs, approximately 40,000 lb., and soft steel bars.

THE CENTRAL OF NEW JERSEY will receive bids until 12 o'clock noon, July 6, for the work of repairing, rebuilding, refitting and finishing of its marine floating equipment, including Sandy Hook steamers, tugs, barges, car floats, derricks, lighters, etc., for the period of one year from July 6, 1921, to July 6, 1922. Bids will also be received until 12 o'clock, noon, July 11, for anthracite locomotive fuel coal for delivery at Ashley, Mauch Chunk, Phillipsburg, or Jersey City, as follows: Broken, 60,000 gross tons; buckwheat No. 1, 420,000 tons; buckwheat No. 2, 45,000 tons; pea, 46,000 tons.

Signaling

THE CANADIAN NORTHERN has ordered from the General Railway Signal Company of Canada a mechanical interlocking, 12 levers, for the Trent Canal drawbridge at Washago, Ont.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company will shortly receive bids for the installation of two new 120-ft. turntables, one at Winslow, Ariz., and the other at Needles, Cal., to cost about \$45,000 each

CHICAGO & ILLINOIS MIDLAND.—This company has accepted a contract for the construction of a 150-ton concrete coaling station at Humpfrey, Ill., to the Ogle Construction Company, Chicago.

Supply Trade News

The **Morkrum Company**, Chicago, has opened an office at 707 World building, New York, in charge of **J. B. Appleton**, assistant manager sales, engineering department.

The **Canadian Locomotive Company, Ltd.**, Kingston, Ontario, is carrying out improvements at its shops, to include two additional pits to the erecting shop and the construction of a storage building 200 ft. by 75 ft.

M. E. Lisle, assistant to the president of the **Terminal Engineering Company, Inc.**, 17 West Forty-fourth street, New York City, has been elected vice-president and **M. E. Peck**, office manager, has been elected secretary and assistant treasurer.

A. H. Dodge has been appointed sales manager of the **J. G. Wilson Corporation**, 8 West Fortieth street, New York City. **E. Doscher** has been appointed assistant sales manager and district manager for New York; **S. H. Moncses** has been appointed general sales correspondent and **H. S. Tompkins**, formerly of the Western Electric Company, will specialize on Diffuselite fixtures.

The **Link-Belt Company**, Chicago, has acquired all of the capital stock of the **H. W. Caldwell & Son Company**, Chicago, and **Frank C. Caldwell** has been elected a director of the Link-Belt Company. The Caldwell Company's plant will continue to operate under separate corporate existence, under its present name, and the plant management will remain substantially the same as heretofore.

Harry W. Torney, of Torney & Co., New York, was recently elected president of the **Sharon Pressed Steel Company** with office at 66 Broadway, New York City. This company was recently reorganized. **Arthur W. Swan** is now general manager in charge of manufacture; he was formerly chief engineer and works manager of the Crucible Steel Company and its associates. **J. G. White** has been appointed district sales manager at Detroit, Mich. The company recently installed some new machinery at its plant, Sharon, Pa.

William Aldrich, who has recently been in charge of thermit welding in the Southern territory of the **Metal & Thermit Corporation**, New York, has been transferred to the Western territory. **William H. Moore**, who recently was assigned to the Chicago territory, now has charge of the Southern territory. This corporation has constructed and will shortly place in operation in South San Francisco, Cal., a large new plant for the production of detinned billets, in addition to the detinning plants already operated by this company for several years at Chrome, N. J., and East Chicago, Ind. **E. Kardos**, superintendent, will be in charge of the new plant which includes a large welding shop. The estimated cost of this plant is \$800,000. The San Francisco offices of the corporation have been removed from 329-333 Folsom street, to the new South San Francisco plant.

Obituary

William Jordan Caton, secretary of the **Burden Iron Company**, Railroad and Steamship Division, and assistant to the president of the **Sanitation & Supply Company**, New York, died on June 17, in the Harbor Hospital, Bath Beach, Brooklyn, N. Y., at the age of 66. He began railway work in the auditor's department of the Boston & Albany at Springfield, Mass., and subsequently served in the passenger department of the same road. He was later purchasing agent of the Pittsburgh & Lake Erie. He served for about nine years as New York representative of **Brown & Co., Inc.**, Pittsburgh, Pa., until July, 1920, when he left the service of that company to go to the **Burden Iron Company**, Railroad and Steamship Division.

Railway Financial News

CAMBRIA & INDIANA.—Application for Loan.—This company has applied to the Interstate Commerce Commission for a loan of \$750,000 for 10 years, payable at the rate of \$75,000 a year, for the purchase and liquidating of two-year, 6 per cent gold notes maturing on August 1.

CENTRAL RAILROAD OF SOUTH CAROLINA.—Authorized to Issue Bonds.—This company has been authorized by the Interstate Commerce Commission to issue and exchange or sell at par and accrued interest \$300,000 of serial 6 per cent refunding bonds, to retire a like amount of first mortgage bonds.

CHESAPEAKE & OHIO.—Again Defers Dividend.—The directors on June 17 again deferred action on the usual dividend of 2 per cent for the current half year. Action thereon was deferred at the May meeting also.

New Director.—**W. J. Louderback**, of Chicago, has been elected a director to succeed **F. H. Davis**, deceased.

CHICAGO & EASTERN ILLINOIS.—Authorized to Extend Time for Issuing Securities.—The Interstate Commerce Commission has issued a supplemental order extending the time within which the company may issue securities as authorized in its order of February 3 from June 30, 1921, to January 1, 1922.

Application to Discontinue Operation of C. & I. Coal Railway.—**R. D. Stephens**, co-receiver, has applied to the commission for certificate authorizing the abandonment of operation of the Chicago & Indiana Coal Railway Division on the ground that the traffic is insufficient to justify the operation.

CHICAGO, INDIANAPOLIS & LOUISVILLE.—Authorized to Pledge Bonds.—This company has been authorized by the Interstate Commerce Commission to pledge and repledge from time to time \$3,493,000 of first and general mortgage 5 per cent gold bonds as collateral security for short term notes.

CHICAGO, MILWAUKEE & ST. PAUL.—Bonds Due July 1 Provided For.—This company has announced that the \$1,360,000 Chicago & Lake Superior divisional first mortgage 5s, and the \$4,755,000 Wisconsin & Minnesota divisional first mortgage 5s, due July 1, next, have been provided for, and that no new financing is contemplated this year.

CHICAGO UNION STATION.—Asks Authority to Issue Bonds.—This company, the Chicago, Burlington & Quincy, the Chicago, Milwaukee & St. Paul, and the Pittsburgh, Cincinnati, Chicago & St. Louis have filed a joint application with the Interstate Commerce Commission for authority to issue and sell \$6,000,000 of first mortgage 6½ per cent gold bonds, dated January 1, 1920, and maturing July 1, 1963, and also for authority to the owning companies to guarantee the principal and interest. The proceeds are to be used to continue the construction of the passenger terminal in Chicago. The bonds are to be redeemable at the option of the company on January 1, 1935, or thereafter at 110. They have been disposed of, subject to the commission's approval, at 97½ to **Kuhn, Loeb & Co.**, **Lee, Higginson & Co.**, **Illinois Trust & Savings Bank**, **National City Company**, and the **First National Bank**.

DELAWARE, LACKAWANNA & WESTERN.—Annual Report.—A review of this company's annual report for 1920 appears on another page of this issue.

DENVER & RIO GRANDE.—B. B. Odell Resigns from Stockholders' Committee.—**Benjamin B. Odell** has resigned as chairman of the Stockholders' Protective Committee, which has been endeavoring, through a court contest, to set aside the sale of the Denver & Rio Grande to the Western Pacific. He gave as his reason the pressure of other business.

The committee has ordered that appeals be taken from the orders entered in the United States District Court at Denver

confirming the sale of the property on grounds including the following:

Entire proceedings are irregular, because, based upon the original judgment for \$38,000,000, which the committee holds should be enjoined; decree erroneously cut off the six month period of redemption allowed by laws of Colorado, New Mexico and Utah; court is declared to have no power to sell the franchise; price of \$5,000,000, at which the properties were sold, is declared so grossly inadequate as to shock the conscience; Denver property, it is said, was sold at the upset price of \$5,000,000, whereas the treasury assets included in the sale, consisting of stocks and bonds, had a clear stock exchange value of more than \$8,000,000.

FLINT BELT.—Application to Abandon Line.—This company has applied to the Interstate Commerce Commission for a certificate authorizing the abandonment of 13½ miles of line in Genesee County, Mich.

GREAT NORTHERN.—Regular Dividend Declared.—This company has declared the regular quarterly dividend of 1¼ per cent on the preferred stock, payable August 1 to holders of record July 2. No statement was issued by the company regarding this payment.

HOCKING VALLEY.—Again Defers Dividend.—The directors on June 16 again deferred action on the regular semi-annual dividend of 2 per cent.

New Director.—G. B. Wall, of Richmond, has been elected a director to succeed F. H. Davis, deceased.

HUNTINGDON & BROAD TOP MOUNTAIN.—Asks Authority to Issue Equipment Trusts.—This company has applied to the Interstate Commerce Commission to issue \$300,000 of car trust certificates for the purchase of four locomotives and 10 passenger cars, to cost \$411,393. Certificates are to be sold to W. M. Canby and Robert Gleaning.

ILLINOIS CENTRAL.—Annual Report.—The corporate income for the year ended December 31, 1920, compares with the corporate income for the year 1919, as follows:

	1920	1919	Increase or decrease
Operating revenues.....	\$121,804,579	.....	.....
Operating expenses.....	121,874,327	.....	.....
Expenses over revenues.....	69,748	.....	.....
United States Government—guaranty period claim.....	\$19,499,887	.....	.....
Rental from United States Railroad Administration.....	3,399,635	\$17,896,467	—\$14,496,832
Railway operating income.....	\$22,829,773	\$17,896,467	\$4,933,306
Operating expenses, corporate, not assumed by United States Railroad Administration.....	\$117,658	\$351,633	—\$233,975
Federal War income and other taxes.....	7,172,262	853,200	6,319,062
Uncollectible railway revenues.....	23,320	.....	23,320
Railway operating income over corporate expenses, taxes and uncollectible railway revenues.....	\$15,516,534	\$16,691,635	—\$1,175,101
Equipment rents—net credit.....	3,196,849	.....	3,196,849
Joint facility rents—net debit.....	191,297	.....	191,297
Net railway operating income.....	\$18,522,085	\$16,691,635	\$1,830,450
Income from investments and other corporate income.....	7,219,882	7,634,005	—\$414,123
Gross income.....	\$25,741,967	\$24,325,639	\$1,416,328
Interest on funded debt and other miscellaneous corporate charges.....	12,170,845	12,156,720	14,125
Net income.....	\$13,571,122	\$12,168,919	\$1,402,203
Disposition of net income:			
Income applied to sinking and other reserve funds.....	\$118,200	\$118,200	.....
Income appropriated for investment in physical property.....	18,081	170,100	—\$152,019
Total appropriations of income.....	\$136,281	\$288,300	—\$152,019
Income balance transferred to profit and loss.....	\$13,434,841	\$11,880,619	\$1,554,222

The annual report of the Illinois Central will be reviewed editorially in an early issue.

LEHIGH VALLEY.—Another Extension Granted.—Judge Charles M. Hough in the United States District Court at New York has granted this company an extension of time until July 24 for filing a plan for segregating its properties. This is the second extension of time secured by the company.

LOUISVILLE & NASHVILLE.—To Increase Capital Stock.—Notice has been sent to the stockholders that a special meeting will be held July 23, 1921, at Louisville, Ky., for the purpose of considering the proposed increase of the company's capital stock and a distribution among the stockholders (in the form of a stock dividend) of surplus earnings invested in property and of

taking action on the authorization of a proposed first and refunding mortgage. The notice was accompanied by a letter from President W. L. Mapother which referred to the proposed action as follows:

At the regular annual meeting of the stockholders held April 6, 1921, a first and refunding mortgage for the purpose of retiring existing bonds and other indebtedness of this company and for other purposes was authorized, and will involve an ultimate issue of bonds in excess of the company's present indebtedness.

The most liberal and secure basis of such mortgages by the large systems of railroads needing large amounts for construction of extensions, for additions and betterments and to provide for refunding future maturities of existing bond issues, is to insert a condition that at no time shall the amount of bonds issued under such mortgage exceed at par three times the par value of the stock issued and outstanding. This happens to be almost the exact present ratio of the company's funded debt to its present capital stock—a ratio which the proposed mortgage will necessarily disturb.

The obvious remedy is to increase the capital stock, for the company is to maintain its present standard of excellence and to go forward in the development of the vast tonnage of the future, it must be placed in a position to offer the public investment securities which will be approved and recommended by the most conservative bankers.

For these reasons, and in order to provide for future expansions, the management decided to recommend that the authorized capital stock be increased from 720,000 shares to 1,250,000 shares of \$100 par value each. Having reached this conclusion, the question arose as to whether the additional stock should be sold or distributed to the stockholders as a stock dividend. As bearing upon this question, the records of the Louisville & Nashville disclose the following facts:

The company's surplus as of December 31, 1920, stands at \$82,985,890, and all discounts from the sale of bonds since 1902, aggregating approximately \$7,000,000, have been charged off to profit and loss. The annual amounts of surplus earned closed into profit and loss account, less dividends paid, aggregate (speaking in round numbers) about \$96,000,000. This does not include the items of depreciation of equipment (which stands on the books at \$30,900,097), and of depreciation of certain items of roadway (which stands on the books at \$13,796,051).

In view of the foregoing facts, showing that the proposed increase of stock represents the previous earnings of the company (and nearly a part of them) which were used to increase the property investment instead of being distributed in dividends, the management has decided it to be right and proper that there be issued to the stockholders ratable as a stock dividend so much of the \$5,000,000 increase of capital stock as the Interstate Commerce Commission shall authorize to be so issued.

MARSHALL & EAST TEXAS.—Certificate for Abandonment Held Not Necessary.—The Interstate Commerce Commission has reaffirmed its original finding that a certificate authorizing the abandonment of this line is not necessary, on the ground that the abandonment took place prior to the effective date of paragraph 18 of the Interstate Commerce Act. A reargument in the case was held at the request of the applicant, but the commission finds that the cessation of operation of this particular road amounted to complete abandonment, as evidenced by the commencement of proceedings in the federal court for the sale of the line as scrap.

MISSOURI, KANSAS & TEXAS.—Asks Authority to Extend Certificates.—The receiver has applied to the Interstate Commerce Commission for authority to extend for one year a series of \$3,000,000 of receivers' certificates bearing interest at 6 per cent instead of 5 per cent.

MISSOURI PACIFIC.—Asks Authority to Issue Bonds.—This company has applied to the Interstate Commerce Commission for authority to issue and sell or pledge from time to time \$5,501,500 of its first and refunding mortgage 6 per cent gold bonds now held in the treasury. It is proposed to sell the bonds at some future time at not less than 90, or to pledge them at not less than 75. No contracts have been made for their disposal.

MONONGAHELA.—Asks Authority to Pledge Bonds.—This company has applied to the Interstate Commerce Commission for authority to issue \$1,300,000 of 6 per cent first and refunding mortgage bonds to be pledged with the Secretary of the Treasury as security for a loan of \$1,000,000.

NEW YORK, NEW HAVEN & HARTFORD.—To Pay July 1 Interest.—President E. J. Pearson has issued the following statement referring to a report that the New Haven was going to default on the debenture bond interest July 1:

The affairs of the New Haven show improvement. Revenues during the month of June have increased. Expenses have decreased, owing to the decreased cost of fuel and materials. After July 1, labor costs will be still less. The divisions case is yet to be heard from. There is no doubt in the mind of the management that the New Haven will meet its interest, rentals and other fixed charges on July 1.

NORTHERN PACIFIC.—Regular Dividend Declared.—This company has declared the regular quarterly dividend of 1¼ per cent, payable August 1 to stock of record July 2.

Howard Elliott, chairman of the board, made the following statement: "This payment is not from earnings of the property in 1921, which, in common with other railroads, have been on a lower level than in previous years, but out of surplus heretofore accumulated and not distributed."

OCEAN SHORE.—Abandonment of Line Authorized.—The Interstate Commerce Commission has issued a certificate of public convenience and necessity authorizing the abandonment of this company's line, extending from San Francisco to Tunitas Glen, and a second line from Santa Cruz to Swanton, Cal.

PATTERSON & WESTERN.—Abandonment of Line Authorized.—This company has been authorized by the Interstate Commerce Commission to abandon its line from Patterson to Jones Station, Cal., a distance of 23.6 miles.

PEARL RIVER VALLEY.—Application for a Certificate Held Unnecessary.—The Interstate Commerce Commission has rendered a decision that the proposed relocation of a portion of the main line in Pearl River county, Miss., does not require a certificate as it does not constitute an abandonment of a line within the meaning of paragraph 18 of the interstate commerce act. The new line is within a mile of the former location.

PENNSYLVANIA.—Authorized to Acquire Control.—This company has been authorized by the Interstate Commerce Commission to acquire control of the Pittsburgh, Fort Wayne & Chicago by the purchase at par from the Pennsylvania Company of \$34,000,000 of special guaranteed stock and as part consideration therefor to assume the obligations of the Pennsylvania Company in respect of the payment of the principal and interest of \$33,239,000 of guaranteed trust certificates heretofore issued by that company.

PITTSBURGH, CINCINNATI, CHICAGO & ST. LOUIS.—Dividend Deferred.—The directors at their meeting in Philadelphia on June 22 decided to postpone consideration of the regular 2 per cent semi-annual dividend until later in the year. The following statement was issued:

The directors decided, in view of existing low earnings and prevailing adverse conditions, to postpone consideration of the dividend on stock of the company until later in the year by which time earnings for the year and final results of the reduction of wages by labor board and its action respecting the national agreements and working conditions can be ascertained; also settlements with government for the federal control and guaranty periods will no doubt be definitely determined.

All of the capital stock of the company excepting about 1 per cent is owned by the Pennsylvania company.

PITTSBURGH, SHAWMUT & NORTHERN.—Asks Authority to Lease Road.—The receiver has applied to the Interstate Commerce Commission for authority to lease the road of the Rochester, Hornellsville & Lackawanna, 10.13 miles.

READING COMPANY.—Appeal to United States Supreme Court Granted.—An appeal has been taken by the Continental Insurance Company and the Fidelity-Phoenix Fire Insurance Company, common stockholders of the Reading Company, from the decision of the United States District Court at Philadelphia, holding that the preferred and common stockholders of the Reading Company should share equally. Federal Judge Thompson, at Philadelphia on June 16, allowed the appeal and required the insurance companies to file an indemnity bond of \$750,000.

The appeal is limited to that portion of the decree deciding that the common and preferred stockholders have equal rights in the new coal company stock. The segregation plan will be carried out in all respects, including merger of the Reading Company and the Philadelphia & Reading Railway, and the trustee of stock, and up to issuing of certificates of interest of the coal company to the trustees.

From that point proceedings are stayed pending a decision by the United States Supreme Court.

Charles Heebner, counsel for the Reading Company, said any modification would seriously upset the plan and cause a great setback in carrying out the decision of the Supreme Court. He said that other plans had been considered, but the present one had been adopted as just and equitable to all interests. In adopting the plan he said the company gave up valuable charter rights to protect common and preferred stockholders. If the contention of the common stockholders is upheld by the Supreme Court, he intimated that the company would ask to submit an entirely new plan which would not contemplate merger of the Reading Company and the Railway Company.

It is expected that the Prosser Committee, representing certain large holders of Reading common stock, will take appeal from the Reading decree of segregation. The sub-committee, representing the largest of these stockholders, of which E. P. Maynard, president of the Brooklyn Trust Company, is chairman, has sent out letters asking that the legal expenses of the undertaking be underwritten by the largest stockholders whose proxies are held by the Prosser Committee.

TERMINAL RAILROAD ASSOCIATION OF ST. LOUIS.—Authorized to Issue Bonds.—This company has been authorized by the Inter-

state Commerce Commission to issue nominally \$719,000 of general mortgage bonds to reimburse the treasury for expenditures for additions and betterments.

WESTERN PACIFIC.—Settlement for \$8,646,053 with Government.—President Alvin W. Krcch, in a letter to the stockholders dated June 15, stated that the company had effected a final settlement of all claims against the government, equivalent to a net payment of \$8,646,053.

Guaranty Certificates Issued

The Interstate Commerce Commission has issued certificates for partial payments on account of the six months' guaranty for 1920 as follows: Missouri Pacific, \$1,100,000; Shearwood, \$2,000; St. Louis-San Francisco, \$30,000; New York, Susquehanna & Western, \$205,000; Ocala Southern, \$15,000.

Settlements With Railroad Administration

The Railroad Administration has announced a final settlement with the Southern Railway covering the adjustment of accounts for the period of federal control, by which the Southern receives a lump sum of \$6,000,000. The company's claim is understood to have been in the neighborhood of \$35,000,000, but the settlement represents a deduction of the amounts devoted by the government for capital expenditures. The Railroad Administration has also settled with the Chicago & Western Indiana for \$450,000, the Belt Railway of Chicago for \$140,000 and the Richmond Terminal Railway has paid to the administration \$17,157.42.

The payment of these claims on final settlement is largely made up of balance of compensation due, but includes all other disputed items as between the railroad companies and the railroad administration during the 26 months of federal control.

Dividends Declared

Atlantic Coast Line.—Common, 3¼ per cent, payable July 11, to holders of record June 25.

Canada Southern.—1½ per cent, semi-annually, payable August 1, to holders of record July 1.

Cleveland, Cincinnati, Chicago & St. Louis.—Preferred, 1¼ per cent, quarterly, payable July 20, to holders of record July 1.

Detroit River Tunnel.—3 per cent, semi-annually, payable July 15, to holders of record July 8.

Grand Trunk Railway Guaranteed Stock.—2 per cent, payable June 30, to holders of record June 3.

Great Northern.—Preferred, 1¼ per cent, quarterly, payable August 1, to holders of record July 2.

Joliet & Chicago.—1¼ per cent, quarterly, payable July 5, to holders of record July 1.

Kansas City Southern.—Preferred, 1 per cent, quarterly, payable July 15, to holders of record June 30.

Louisville & Nashville.—3½ per cent, payable August 10, to holders of record July 12.

Michigan Central.—2 per cent, semi-annually, payable July 29, to holders of record July 1.

New York Central.—1¼ per cent, quarterly, payable August 1 to holders of record July 15.

Northern Pacific.—1¾ per cent, quarterly, payable August 1, to holders of record July 2.

Northern Securities.—4 per cent, payable July 9, to holders of record June 29.

Philadelphia & Trenton.—2½ per cent, quarterly, payable July 10, to holders of record July 1.

Pittsburgh & Lake Erie.—\$2.50, semi-annually, payable August 1, to holders of record July 15.

Reading Company.—Common, 2 per cent, quarterly, payable August 11, to holders of record July 19; first preferred, quarterly 1 per cent, payable September 8, to holders of record August 23.

United New Jersey Railroad & Canal Company.—2½ per cent, quarterly, payable July 10, to holders of record June 21.

MODESTY IN ADVERTISING.—"Empty freight cars continue to obstruct some of the views along the Erie system, but they are on sidings in Ohio and Indiana and not along the Delaware or Susquehanna rivers."—*Erie Railroad Magazine.*

THE ALABAMA, TENNESSEE & NORTHERN has made a reduction of 16½ per cent in passenger rates. The decrease applies on one-way and round-trip fares with a return limit of thirty days. A decrease of 33½ per cent is made on round trip rates with a return limit of five days.

Railway Officers

Executive

Frank H. Hamilton, secretary and treasurer of the St. Louis-San Francisco, with headquarters at St. Louis, Mo., has been elected vice-president, secretary and treasurer, with the same headquarters, effective June 9.

Financial, Legal and Accounting

R. F. Humble has been appointed general auditor of the Arkansas & Louisiana Missouri, the Mansfield Railway & Transportation and the Louisiana & Pine Bluff with headquarters at Shreveport, La., effective June 1.

Operating

F. J. Slimer has been appointed car accountant of the Louisiana & Arkansas, with headquarters at Stamps, Ark., effective June 1.

Frank N. Spencer has been appointed general manager of the Chestnut Ridge with headquarters at New York City, succeeding W. L. Coursen, resigned.

G. D. Dager, superintendent of the Adirondack division of the New York Central, has had his jurisdiction extended over the Ottawa division and the Ottawa & New York, effective June 20.

C. E. Lanham, superintendent of car service of the Gulf, Mobile & Northern, with headquarters at Mobile, Ala., has been appointed superintendent of car service of the Birmingham & Northwestern, with the same headquarters, effective June 15, succeeding W. H. Trice, car accountant, who has resigned.

R. H. Janes, trainmaster of the Chicago, Milwaukee & St. Paul, with headquarters at Mason City, Iowa, has been given jurisdiction over the territory to Rapid City, S. D., including the entire Iowa and Dakota division. D. A. Gibson, trainmaster, with headquarters at Mitchell, S. D., has been assigned to other duties and the position of trainmaster abolished. The changes were effective June 11.

B. W. Procter, whose promotion to assistant general manager of the International & Great Northern, with headquarters at Palestine, Tex., was announced in the *Railway Age* of May 27 (page 1252), was born at Thornton, Tex., on June 15, 1884, and was educated at the Texas Christian University and the Chicago Correspondence School of Law, from which he graduated in 1909. He entered railway service on June 4, 1904, as a clerk to the roadmaster on the International & Great Northern, and his entire railway career has been spent in the service of that company. In November, 1904, he became a stenographer in the office of the superintendent, and two years later was made chief clerk to the superintendent of the Fort Worth division. He served in this position until May 1, 1919, when he was appointed traveling wage supervisor. At the time of his recent promotion, Mr. Procter was serving as assistant to the general manager, a position to which he had been promoted in September, 1920.

E. Bodamer, whose promotion to superintendent of the Memphis terminal division of the Yazoo & Mississippi Valley, with headquarters at Memphis, Tenn., was announced in the *Railway Age* of June 10 (page 1378), was born at Logan, Ohio, on June 9, 1870, and first entered railroad service as a switchman on the Pennsylvania. In 1889, he became a switchman in the service of the Terminal Railroad Association at St. Louis, and in 1894, took service with the Wiggins Ferry Company of St. Louis. After serving as a conductor on the St. Louis-San Francisco, from 1899 to 1903, Mr. Bodamer became a conductor on the Illinois Central. He was promoted to trainmaster, with headquarters

at Memphis, in 1913, and five years later was transferred to the Tennessee division. During the war he served as superintendent of the Memphis terminal division succeeding J. M. Walsh, and upon the latter's return from military service, he returned to his position as trainmaster. He was serving in this capacity at the time of his recent promotion.

Traffic

E. E. Overton has been appointed traffic manager of the Midland Continental, with headquarters at Jamestown, N. D.

A. L. Preston has been appointed general agent, freight department, of the Canadian Pacific with headquarters at New York.

Charles J. Rieger has been appointed express traffic agent of the Louisville & Nashville, with headquarters at Louisville, Ky., effective June 15.

G. S. Donaldson, traveling agent of the Chicago & North Western, with headquarters at Toronto, Ont., has been promoted to general agent, with the same headquarters, effective June 7, succeeding B. H. Bennett, deceased.

J. H. Shaw, general freight and passenger agent of the Arkansas & Louisiana Missouri, will also serve the Mansfield Railway & Transportation and the Louisiana & Pine Bluff in a similar capacity with headquarters at Shreveport, La., effective June 1.

A. L. Eidenmiller, general agent of the Chicago, Milwaukee & St. Paul, with headquarters at Boston, Mass., has been appointed general advertising agent, with headquarters at Chicago. F. D. Dodge succeeds Mr. Eidenmiller. The appointments were effective June 15.

P. Schorr, traveling freight agent of the Wabash, with headquarters at Des Moines, Iowa, has been promoted to division freight agent, with the same headquarters. Mr. Schorr succeeds L. E. Clarahan, who has been transferred to Omaha, Neb., succeeding G. M. Entrikin, deceased. The promotion and changes were effective June 15.

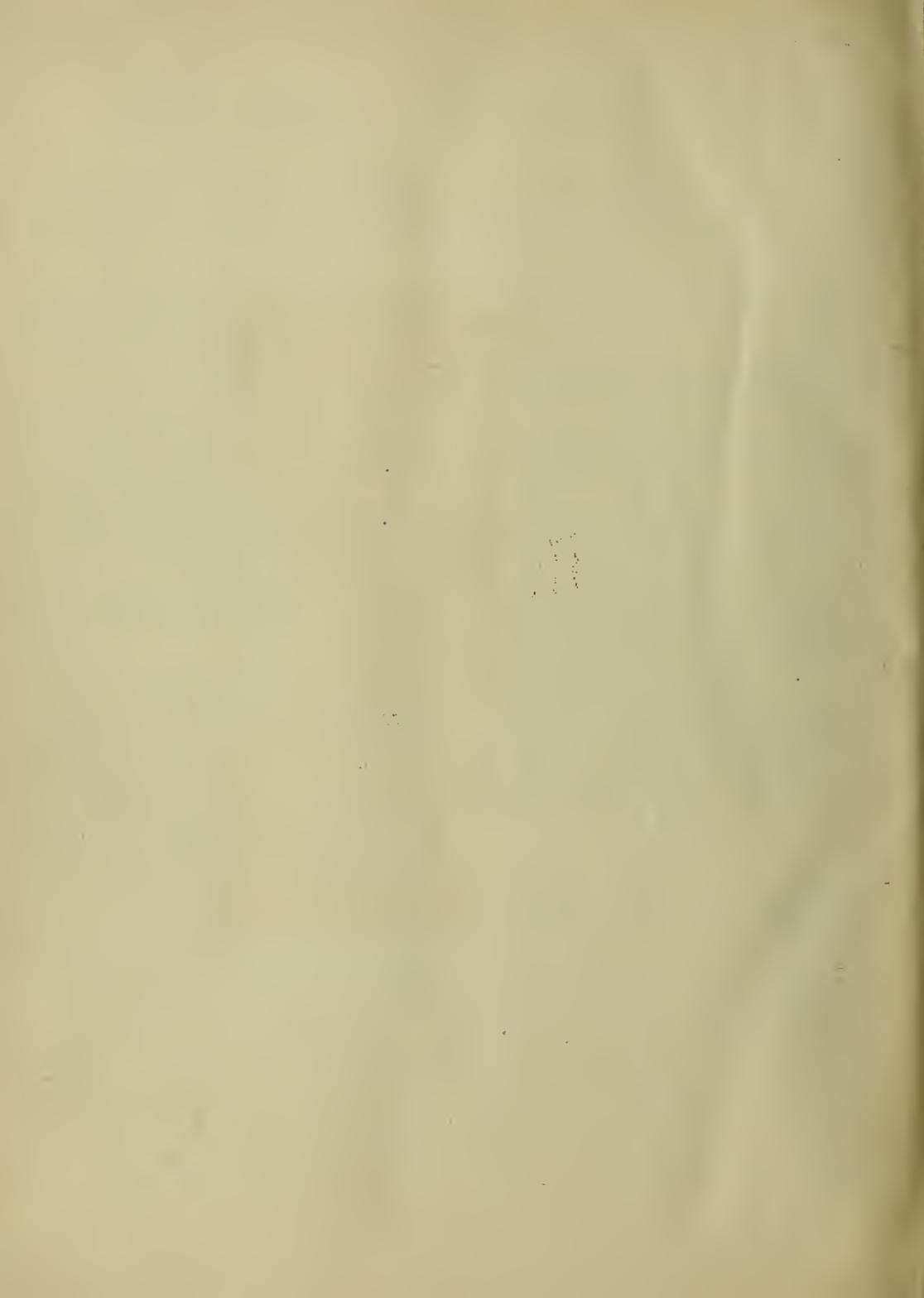
H. W. Watson, commercial agent of the Georgia & Florida, with headquarters at Nashville, Tenn., has been promoted to general freight and passenger agent, with headquarters at Augusta, Ga., succeeding W. D. Cook, who has resigned. W. W. Swain succeeds Mr. Watson. D. W. Agnew has been appointed general western agent, with headquarters at Cincinnati, Ohio, and W. H. L. Nelms has been appointed general agent, with headquarters at Atlanta, Ga.

Obituary

Coleman King, supervisor of track of the Long Island, died in St. Catherine's Hospital, Brooklyn, N. Y., on June 18, at the age of 59. Mr. King was a past-president of the Roadmasters and Maintenance of Way Association of the United States.

William H. Given, at one time assistant general manager of the Waterloo, Cedar Falls & Northern and more recently train rules examiner of the Chicago, Rock Island & Pacific, first district, died at Iowa City, Ia., on June 7, at the age of 63. Mr. Given was born at Coshocton, O., and at the age of seventeen entered the service of the Des Moines Valley, which was later absorbed by the Rock Island. He became trainmaster, and later superintendent, of the Missouri, Iowa & Des Moines Valley. For a short time he was assistant general manager of the Waterloo, Cedar Falls & Northern and in 1917 he returned to the Rock Island as train rules examiner, which position he held at the time of his death.

PENNSYLVANIA RAILROAD STOCKHOLDERS numbered 140,159 on May 1, an increase of 1,766 since April 1, and of 16,272 since May 1, 1920.



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